

## Committee As A Whole

**Mission:** "Engaging All Learners to Achieve Success"

The Committee As A Whole started at 5:30 PM on Monday, November 11, 2024. The meeting was held at Kramer Education Center  
2410 16th Street, Suite A  
Columbus, NE 68601

Candace Becher: Present

Michael Jeffryes: Present

Doug Molczyk: Absent

Theresa Seipel: Present

Douglas Willoughby: Present

Marv Zoucha: Present

I. CALL TO ORDER

II. ROLL CALL OF THE BOARD

Marv Zoucha took the Oath of Office for the CPS School Board.

III. EXCUSE BOARD MEMBERS

IV. PLEDGE OF ALLEGIANCE

V. NOTICE OF OPEN MEETINGS ACT

V.A. President ensures all can hear proceedings

VI. MISSION STATEMENT

VII. PUBLIC COMMENT

VIII. GUEST PRESENTATIONS

IX. RECOGNITIONS BY BOARD

IX.A. 2024 Cross Country State Qualifiers-Erick Alarcon and Melissa Gomez-Vazquez

Cross Country State Qualifiers, Erick Alarcon and Melissa Gomez-Vazquez along with their families, were welcomed. The athletes and coach were given their certificates and congratulated by the board and Dr. Chip Kay, Superintendent.

X. BUILDING OR DISTRICT PRESENTATION

X.A. World Classrooms CMS Washington DC Trip

Amy Haynes, CMS Principal, shared information regarding the World Classrooms Washington DC. This is a company that works outside of the school district to take students and teachers on a field trip. Mrs. Haynes said there are several teachers interested in chaperoning a trip and all the time would be outside working hours. The company provides a contract that states this is not part of Columbus Public School District. The presentation shared that the company plans all the transportation, destination lodging, meals and events/tours. Money is all handled through the company.

XI. CONSENT AGENDA

XI.A. Items to be removed from the Consent Agenda

XI.B.Meeting Minutes

XI.C.Finance Reports

Jason Schapmann, Director of Human Resources and Fiscal Support, talked about the financial reports for the month of October. He said the Bond Fund balance will go down. The first bond payment is due in Dec. There will be some movement in the Nutrition Fund. Revenue detail shows property tax coming into the account. Mr. Schapmann said we will start seeing special education receipts in December. Payments mentioned were to Commonwealth Electric for some work at CHS and CMS.

XI.D. Staffing Reports

Mr. Schapman shared information from the staff memos. Certified hires consisted of the hiring Ethan McKenna for Ron Haefner. He will retire in December. This was a great hire, Mr. McKenna is the only one with the certifications needed for this position. The classified

memo shows more hires than resignations, Mr. Harris, Director of Special Education, said he is hiring special education paras.

#### XI.E. Professional Travel

Mr. Schapmann shared the Travel Report which included the Safety Summit where CMS received an award. The highlighted items are listings for personal professional time taken by staff.

#### XII. FOUNDATION REPORT

Nicole Anderson, Director of Communications/Foundation, said information shown on the Foundation Report for the month of October. The total for the year to date is \$487,854.11; and for the month is \$66,810.81.

#### XIII. DIRECTOR & SUPERINTENDENTS REPORTS OR UPDATES

##### XIII.A. Director of Teaching and Learning

Teresa Hausmann, Director of Teaching and Learning, shared Amplify, reading curriculum information. The mClass is being rolled out. This is a tool in the curriculum used for support. This is the first year CPS has been using this curriculum.

Mrs. Hausmann said the Mechatronics and Robotics pathways have been updated.

Teacher support and/or contacts were 310 for October.

##### XIII.B. Director of Special Education

Jason Harris, said he spent last week working on the final reimbursement IDA grant, along with the ESSA funding, which includes Title 1 Reading, Title 2A Professional Development (public and non-public), Title 3 Immigration, Title 4A Safety, Security and Well Rounded Schools. Mr. Harris reminded the group that some of the money goes to the parochial schools. At this time, there are 925 special education students, that is 19%. The number keeps getting higher. Birth thru 21 are receiving services.

Mr. Harris said he is recruiting staff. There have been three hires, potentially a 4th interview scheduled for next week.

##### XIII.C. Assistant Director for Student Services

Sara Colford, Assistant Director of Student Services talked about the After School Program. She shared that there are 15 high school students working at the program. Mrs. Colford said they are excited to work with the students and they bring great energy. She also shared that this program has been recognized through the 21st Century Grant Program and the School Bell Grant. Mrs. Colford said our program is a model for other districts, and many come to visit to see how the operation is facilitated.

##### XIII.D. Director of Human Resources

Jason S. Mr. Schapmann talked about the UpBeat Survey results. He explained that any rating above 70% is good. UpBeat will assist in setting up an action plan, and supply a toolkit for help in the areas that need work. This is the first time that classified staff has done the survey. Mr. Schapmann said he will schedule meetings to go over the results. He said the lunch meeting with LSI students and staff had positive feedback.

#### XIII.E. Director of Operations

Leonard Kwapnioski shared information on the CMS issues audio in the auditorium. He said they worked with Jeff Peabody, CHS Band Director, to get it working temporarily. Mr. Kwapnioski explained the sound system will have to be revamped. He said the main component is that everyone that is working with it doesn't really know enough to be successful, there are too many hands in it. The solution will be to have 2 carts, each cart will need to be plugged into the system and nothing else will be available to change on the cart. Community organizations that rent the facility will be able to just plug in, they will bring their own equipment.

Mr. Kwapnioski said there is a problem with the siding curling at the CASSETTE House, it will need to be replaced. He offered a tour of the old CASSETTE House for anyone interested.

#### XIII.F. Superintendent

Chip Kay, Superintendent, talked about changes that will be made to next year's calendar, such as more student contact days and removal of some random planning time. Dr. Kay said the first 2 days of the school year will have modified schedules for orientation. Day 3 will be a full day for all students across the district. The preschool will have its own calendar. He will ask the board to approve the calendars in December for the next two years. Dr. Kay said our goal is not to just meet the required hours but to meet the academic needs of our students.

Superintendent evaluations will be distributed to board members in December. There will also be a two-question survey sent out to staff.

Winter weather protocol will come out next week. School will be called off by 10pm or not until 6am the next morning.

Dr. Kay talked about the community meeting. He said video clips will be sent out via social media to get the information out to more people.

He also shared some information regarding the growth the community is going to be seeing. We will host a panel which will include people that can answer the questions about the new residential building that is happening, along with representation from Scotus and Lakeview. Dr. Kay said this will impact all the schools in the area. CPS will have to make some decisions about boundaries.

#### XIV. DISCUSSION ITEMS

##### XIV.A. Replacement Plasma Cutter for CHS

Dave Hiebner, CHS Principal, talked about the quotes for the plasma table. He said they have tried everything to fix it. Feedback from people that are using this equipment says it works very well. This is the one they want. This would be much like what community companies are using.

##### XIV.B. Resolution for the Surplus and Sale of Real Property

Dr. Kay shared all the rules, statutes etc. He said we will get the process started, we have no time table. Working on getting the MLS number. If we use a realtor, we will take bids.

XIV.C. Discoverers of Distinction Review

Mrs. Anderson said the Discoverers of Distinction Event will be April 10, 2025 at Dusters. She is asking the board to approve the people to be inducted.

XIV.D. Nebraska Science Standards

Mrs. Hausmann talked about the Nebraska Science Standards, she said there are minimal changes. She will receive training in February, and then start work on making the changes district wide in Science.

XIV.E. Rule 17 Program for Columbus Public Schools

Dr. Kay shared the formal proposal for the Rule 17 Program. He said there would be limited placement opportunities. The timeline will be very aggressive. He would like to have it up and running in three weeks. We will start advertising to hire staff. Dr. Kay said we will be saving money based on what we have been paying for student placements. He feels lucky we have a space.

XIV.F. Surplus

XIV.G. Fundraisers

The board was happy to see the Waffleman fundraiser.

XIV.H. Kramer Bids

Mr. Kwapnioski shared some Kramer bids, he said there was an incorrect dollar amount listed. The correct information will be on the next meeting agenda. Mr. Kwapnioski said the flooring bid came in too high. He talked about using local contractors as much as possible.

XV. ACTION ITEMS FOR THIS MEETING

XVI. BOARD REQUESTS FOR INFORMATION

XVII. BOARD SHARING

Board Sharing will be next week.

XVIII. EXECUTIVE SESSION

The board did not go into Executive Session.

XIX. ADJOURN

The meeting was adjourned at 8:38pm.

I, the undersigned, being the duly qualified Secretary for the School District No. 1 of Columbus, Nebraska, certify that the preceding is a true and correct copy of the minutes of the Regular School Board meeting of Monday, November 11, 2024.

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President

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Secretary

# World Classrooms CMS Washington DC Trip

Summer of 2026



## PROGRAM DETAILS:

Trip Location: Washington, D.C. 4-Day Trip

Grades Invited: 6th-8th

Parent Meeting Date (Tentative): March 2024

\$500 Early Bird Scholarship per traveler

Early Bird Student Trip Price: \$2498

Early Bird Adult Trip Price: \$2998

Sponsored School Representative (for each 15 paying travelers)

## WHAT'S INCLUDED:

- » 100 Day Money Back Guarantee
- » 24/7 VIP Tour Directors
- » All transportation (air & coach)
- » Amazing premium hotels
- » Night security at hotel
- » All meals (B, L, D)
- » All Admission fees & gratuities
- » Fundraising support
- » Medical, health, & dental coverage
- » Optional TripCare+ Coverage

## 1. PRE-TRIP SERVICES

You will have a personal Travel Ambassador to guide you through the process and cover all trip details. We will provide custom materials and video. Our team will virtually host a parent informational meeting to handle 100% of all parent questions. Prior to travel, we'll handle all parent questions, installments, and account details!

**2. BEFORE YOU TRAVEL:** *All travelers will feel confident before ever hopping on the bus to the airport!*

### Pre-Trip Departure Meeting

Closer to departure, we'll do a virtual meeting where a Tour Director will update traveling families on the final trip itinerary and answer any questions!

**3. AT THE SCHOOL:** *Parking lot to parking lot, we're with you each step of the way!*

### Your Tour Directors

Two trained staff members will be with you from the time you arrive at the school for departure until you return back home. They are there to ensure safety and a seamless travel experience...Plus, they rock!

- » Over 100 hours of classroom and on-site training
- » 24/7 support on the ground in D.C.

**4. ON TOUR:** *Dedicated to ensuring a tour that is exciting, eye-opening, but most importantly, safe.*

#### **Airfare**

Round-trip air transportation

#### **Our Team in D.C.**

In addition to your Tour Directors, you will also have a licensed Tour Guide with you on tour. They are D.C. experts, and besides having mind-blowing facts, they also have extensive knowledge of the local safety protocols. There will also be WC support staff on the ground in D.C. at all times.

**5. OUR D.C. PARTNERS:** *Each vendor is vetted by our team and they are the best.*

#### **Premium Hotels**

We stay at the best hotels while in D.C., and avoid long daily AM and PM commutes.

#### **Amazing Food**

We have timed reservations to ensure the areas are prepared especially for us, plus we have the ability to do picnics and to-go lunches to give us even more flexibility if necessary.

#### **Great Transportation**

Each group will have their own clean, private charter buses at all times while in D.C.



# EXPLORE WASHINGTON, D.C. & BEYOND

## DAY 1

The countdown is over...Your amazing adventure begins today!

U.S. Capitol Tour

Library of Congress

Supreme Court

Smithsonian Museums

Tidal Basin Walk:

- » MLK
- » FDR
- » Thomas Jefferson

Hotel Check-In

Meals: Lunch, Dinner

## DAY 2

Arlington National Cemetery:

- » Changing of the Guard
- » Tomb of the Unknown Soldier
- » JFK Eternal Flame

Marine Corps War Memorial (Iwo Jima)

Holocaust Memorial Museum

White House & Lafayette Square

Memorial Tour:

- » WWII
- » Korean
- » Vietnam
- » Lincoln & Reflecting Pool

Meals: Breakfast, Lunch, Dinner

## DAY 3

### Gettysburg National Military Park

- » Cyclorama
- » Museum and Visitor Center

### Battlefield Tour

- » Civil War Cannon Demonstration
- » Little Round Top
- » Longstreet Observation Tower

### Old Town Alexandria - Night Out

Meals: Breakfast, Lunch, Dinner

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## DAY 4

### George Washington's Mount Vernon

- » Mansion Tour
- » Museum
- » Tomb

### Steven F. Udvar-Hazy Air and Space Museum

- » Space Shuttle Discovery
- » Enola Gay

Arrive home with memories and experiences to last a lifetime.

Meals: Breakfast, Lunch, Dinner

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\*Travel itineraries listed are approximations only and subject to modifications due to individual travel schedules from across the country.

# WORLD CLASSROOMS' APPROACH TO SCHOOL LIABILITY

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WorldClassrooms understands that sometimes school administrators, boards, or personnel may have questions surrounding off-campus student travel (summer programs). We understand that this is very important and will work alongside you to provide a win-win partnership for years to come.

***“We want to assure you that your school’s endorsement of a World Classrooms tour does not in any way place the school, its personnel, and/or the school district under any liability for the safety of the tour’s participants.”***

- » All travel takes place outside of school and usually outside of the school year itself.
- » The trip is not a school-sponsored activity.
- » Chaperones (teachers/school staff) and travelers will not be attending as representatives or employees of the school in any way.
- » All travel is contracted and payments are made directly between World Classrooms and parents.
- » When a student is enrolled in a World Classrooms tour, the student’s legal guardian signs a binding agreement specifically releasing anyone associated with the school from any and all claims.
- » World Classrooms does carry general liability insurance coverage as well as accident and illness medical coverage for all tour participants.

## **EXCERPT OF RELEASE AND AGREEMENT SIGNED BY ALL PARTICIPANTS (LEGAL GUARDIAN IF UNDER 18) UPON ENROLLMENT:**

3. Without limitation affiliated schools and each of their directors, officers, employees, volunteers, sponsors, independent contractors, agents and authorized representatives are not responsible for any injury, loss, or damage to person or property or for any other cause.

4. I agree to release my school, my school district, my school board, and my Group Leader (the "Released Parties") from, and agree not to sue the Released Parties for any and all claims, of any nature related in any manner to my participation in a WC sponsored tour. I hereby unconditionally and unequivocally waive any and all claims and demands for all damages, losses, costs and expenses of any nature whatsoever (including attorneys' fees) related in any way to my participation in any WC sponsored tour. I understand that the trip is not a school sponsored activity. Chaperones (teachers/school staff) and travelers will not be attending as representatives or employees of the school in any way. I further agree to release the Released Parties from any and all decisions to cancel, modify or delay the tour as a result of unforeseeable events that are beyond the reasonable control of WC or which become necessary or advisable so as to increase the quality of the tour.

# Nebraska References



## NEBRASKA

Adams Middle School  
Allen Schools  
Amherst Public School  
Battle Creek Middle/High School  
Bloomfield Jr/Sr High School  
Chambers Public School  
Creighton Community Secondary School  
Dundy Co. Stratton Secondary School  
Elm Creek Public School  
Elwood Public School  
Gibbon Middle/High School  
Giltner Secondary School  
Gothenburg Middle School  
Grand Island Central Catholic School  
Hastings Middle School  
Horizon Middle School  
Laurel-Concord-Coleridge Middle School  
Lexington Middle School  
Loomis Secondary School  
Loup City Jr. High School  
Newman Grove Jr/Sr High School  
Niobrara Public School  
North Platte Catholic School  
Palmyra Jr/Sr High School  
Pawnee City Secondary School  
Ponca High School  
Potter-Dix Jr/Sr High School  
Randolph Public School  
Ravenna High School  
Southern Valley Jr/Sr High School  
St. Columbkille Catholic School  
Sunrise Middle School  
Sutherland Public School  
Trinity Lutheran School  
Verdigre Public School  
Wausa Public School  
Westridge Middle School  
Wilcox-Hildreth Middle School



Committee As A Whole  
Monday, October 14, 2024 5:30 PM Central

Kramer Education Center  
2410 16th Street, Suite A  
Columbus, NE 68601

Candace Becher: Present  
Michael Jeffryes: Present  
Doug Molczyk: Present  
Theresa Seipel: Present  
Douglas Willoughby: Present  
Present: 5.

#### I. CALL TO ORDER

#### II. ROLL CALL OF THE BOARD

#### III. EXCUSE BOARD MEMBERS

#### IV. PLEDGE OF ALLEGIANCE

#### V. NOTICE OF OPEN MEETINGS ACT

V.A. President ensures all can hear proceedings

#### VI. MISSION STATEMENT

#### VII. PUBLIC COMMENT

#### VIII. GUEST PRESENTATIONS

VIII.A. Bank of the Valley  
Eric Hall from Bank of the Valley presented a check to CPS.

#### IX. RECOGNITIONS BY BOARD

IX.A. School Board Members  
The CPS Board Members were recognized at the NASB Area Meeting for points earned for their participation and engagement.

#### X. BUILDING OR DISTRICT PRESENTATION

##### X.A. Centennial Elementary Presentation

Andy Luebbe, Centennial Elementary Principal shared information about his building. He said enrollment is at 351 students. The breakdown is EL-33% Special Education-21% and Free/Reduced-68%. Centennial has 32 teachers, 4 certified non-teacher staff and 28 classified staff. Mr. Luebbe shared AQUESTT Data, and test scores, along with building goals. He shared how the staff is providing academic support for all students. Mr. Luebbe said they are encouraging staff engagement, family engagement and student engagement with their activities and celebrations.

#### XI. CONSENT AGENDA

## XI.A. Items to be removed from the Consent Agenda

### XI.B. Meeting Minutes

### XI.C. Finance Reports

Jason Schapmann, Director of Human Resources and Fiscal Support, shared information about the financial reports for the month. Financial Report M2 shows that the tax receipts were quite substantial, the cash balance is high. Report M3 shows a state aid payment was received. Report M4a details payments, some noted were to Presence Learning for speech, Remind, which is used to get information to families. There is a yearly payment that was made to Edupoint, mileage was paid for transportation of our special education students.

### XI.D. Staffing Reports

Mr. Schapmann reported that the Certified Staffing report lists two resignations. The Classified Staffing report shows more hires than resignations, we are getting jobs filled.

### XI.E. Professional Travel

Chip Kay, Superintendent, talked about the MTSS Conference. He said it allowed all key players in the same place at the same time and time to debrief. Consulted with Kearney and Hastings about utilizing Synergy for tracking Special Education information for students.

## XII. FOUNDATION REPORT

Nicole Anderson, Director of Marketing and Foundation, shared the September report. She said it was a very busy month with 3 large events. Mrs. Anderson said we have a donor who has pledged 35,000.00 for paras geared towards special education. Contributions: \$25,642.62 for the month and \$421,043.30 year to date.

## XIII. DIRECTOR & SUPERINTENDENTS REPORTS OR UPDATES

### XIII.A. Director of Teaching and Learning

Teresa Hausmann, Director of Teaching and Learning, said the reading teachers have been working hard to get materials ready for the Amplify Curriculum M Class. This is very exciting for students. She has been working with Mr. Whitmore, STEM Teacher, to create standards for electronics. There have been 401 staff connections for the month.

#### XIII.A.1. Computer Science and Technology Standards

Mrs. Hausmann shared the Computer Science and Technology Computer and Tech standards. NDE has finally come up with 6 standards.

### XIII.B. Director of Special Education

Jason Harris, Director of Special Education, said October is when final financials need to be submitted for reimbursements. He has been working to get all documents prepared and submitted.

### XIII.C. Assistant Director for Student Services

Sara Colford, Assistant Director of Student Service gave a follow-up on the McKinney-Vento shopping event served 275 students. Mrs. Colford shared information on the After-School Program surveys and grant funds.

### XIII.D. Director of Human Resources

Mr. Schapmann said the annual UpBeat surveys are 82% completed. The survey shows really good feedback. Each building principal will have a meeting with results from their staff. Mr. Schapmann will be meeting to obtain the district data. There will be a report next month. Mr. Schapmann said there is a new LSI employee, Mitch Novak. He is the Innovation Chef. He will be trying some new recipes at CPS. The LSI Advisory meeting will be on October 30. This meeting is to obtain data from students about their lunch experiences.

### XIII.E. Director of Operations

Leonard Kwapnioski, Director of Operations, said that the Tech Department has a lot of projects. There is a Safety and Security Grant that will fund new routers to be used within the district. Switches and wireless gear need to be replaced. Working on a phone system upgrade, we have had this phone system for 11 years. We are currently using the system with upgraded handsets.

### XIII.F. Superintendent

Dr. Kay was invited to speak about staffing and teacher retention in New Orleans for Smart Social. He said by participating, CPS will be offered the use of their resources for student, staff and parents for support when using social media. This piggybacks on Jay Martin, NDE Safety Director coming to speak to middle and high school students and parents. Everyone needs to be educated and taught about social media use.

There were 3 bids for bond services. Piper Sandler was chosen. CPS will be using Clark Enerson along with RVW for the design of the vestibules. The initial plan is to have the administration offices finished by June 1, 2025 and start on the non-traditional learning center. Dr. Kay said we will be managing these projects.

Discussion about the recent information from Boys Town only taking special education students at this time. There will be more discussion on student placements in mandatory reassignment situations.

## XIV. DISCUSSION ITEMS

XIV.A. Accept the bid for Qualified Capital Purpose Undertaking Fund Bond Services.

XIV.B. Accept the bid for Design Services for the Qualified Purpose of Undertaking Fund Projects 1a-1d and 6b.

XIV.C. Accept the bid for Consulting Services from AAIS for a Non-traditional Learning and Support Center

Dr. Kay talked about the bid from AAIS. There will be an analysis of the space and how we can support our students in a non-traditional learning center.

#### XIV.D. Kramer BP #3B - Bids to be approved

Mr. Kwapnioski shared the bids and added that the Commonwealth bid had just come in and would be added to the document for next week's meeting. He said HVAC and electrical are the big ones for this project.

#### XIV.E. Accept bid for Qualified Capital Purpose Undertaking Fund Checking Account and Tax Receipts/Bond Account

Mr. Schapmann said the best interest rates came from Columbus Bank and Trust. We will need two accounts one to write checks, and one to process payments.

#### XIV.F. 2024-2029 Strategic Plan

Dr. Kay said this is an approval of the mission statement, and the vision for each priority. A report will be created every 6 months regarding priorities. He said there is a broad range to plug in new priorities under each vision. We would have the opportunity to repopulate priorities every 5 years. Dr. Kay said that staff has seen the draft. He also said he will start attaching goals to agenda items each month.

#### XIV.G. Board Vacancy Appointment

There will be a meeting with Marv Zoucha regarding joining the board beginning in November. Mr. Zoucha will be joining the board in January after the election and this seems like a better solution. Less disruptive than trying to appoint someone at this time.

#### XIV.H. Fundraising Applications

All applications are within policy criteria, it was noted that two locations are selling popcorn at the same time. Dave Hiebner, CHS Principal, said he would check with sponsors.

#### XIV.I. Surplus Request

Surplus includes filing cabinets and old technology.

### XV. ACTION ITEMS FOR THIS MEETING

XV.A. Board Resolution declaring the K-12 Special Education Program is Closed for Option Enrollment Students for the 2025-2026 School Year.

Motion to approve the resolution to close option enrollment for the Special Education Program for the 2025-2026 school year. Passed with a motion by Michael Jeffryes and a second by Theresa Seipel.

Candace Becher: Yea, Michael Jeffryes: Yea, Doug Molczyk: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 5, Nay: 0

Dr. Kay explained that new statute 79-238 says we have until October 15 open or close Option Enrollment for the next school year 2025-2026. Special Education will be closed for the 25-26 school year. He also shared that this statute begins to eliminate our local control over decisions about option enrollment.

#### XVI. BOARD REQUESTS FOR INFORMATION

#### XVII. BOARD SHARING

Board Sharing will be next week.

#### XVIII. EXECUTIVE SESSION

Motion to go into Executive Session to discuss potential litigation Passed with a motion by Candace Becher and a second by Theresa Seipel.

Candace Becher: Yea, Michael Jeffryes: Yea, Doug Molczyk: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 5, Nay: 0

The board did go into Executive Session.

#### XIX. ADJOURN

Motion to adjourn Passed with a motion by Michael Jeffryes and a second by Doug Molczyk.

Candace Becher: Yea, Michael Jeffryes: Yea, Doug Molczyk: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 5, Nay: 0

I, the undersigned, being the duly qualified Secretary for the School District No. 1 of Columbus, Nebraska, certify that the preceding is a true and correct copy of the minutes of the Committee As A Whole School Board meeting of Monday, October 14, 2024.

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President

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Secretary

Regular Meeting  
Monday, October 21, 2024 5:30 PM Central

Kramer Education Center  
2410 16th Street, Suite A  
Columbus, NE 68601

Candace Becher: Present  
Michael Jeffryes: Present  
Doug Molczyk: Absent  
Theresa Seipel: Present  
Douglas Willoughby: Present  
Present: 4, Absent: 1.

#### I. CALL TO ORDER

#### II. ROLL CALL OF THE BOARD

#### III. EXCUSE BOARD MEMBERS

Motion to excuse board members. Passed with a motion by Candace Becher and a second by Michael Jeffryes.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 4, Nay: 0, Absent: 1

Doug Molczyk was excused from the meeting.

#### IV. PLEDGE OF ALLEGIANCE

#### V. NOTICE OF OPEN MEETINGS ACT

V.A. President ensures all can hear proceedings

#### VI. MISSION STATEMENT

Doug Willoughby read the Mission Statement.

#### VII. PUBLIC COMMENT

#### VIII. RECOGNITIONS BY BOARD

VIII.A. 2024 Girls Golf - State Qualifying Team

#### IX. CONSENT AGENDA

Motion to approve the consent agenda Passed with a motion by Michael Jeffryes and a second by Candace Becher.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 4, Nay: 0, Absent: 1

IX.A. Items to be removed from the Consent Agenda

There were no items removed from the Consent Agenda.

IX.B. Meeting Minutes

IX.C. Finance Reports

Jason Schapmann, Director of Human Resources and Fiscal Support, talked about payments that were made showing on Financial Reports M5 that included: BlazerWorks for Special Education, Loup Power District for September utilities, Inspira, one of the payflex accounts, Newsela for the language arts online resource and Amplify for reading curriculum among others listed.

#### IX.D. Staffing Reports

#### IX.E. Professional Travel

### X. FOUNDATION REPORT

The Superintendent recommends that the board approve the Foundation Report, as submitted. Passed with a motion by Theresa Seipel and a second by Candace Becher.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea  
Yea: 4, Nay: 0, Absent: 1

### XI. DIRECTOR & SUPERINTENDENTS REPORTS OR UPDATES

#### XI.A. Director of Teaching and Learning

No Updates.

#### XI.B. Director of Special Education

No Updates.

#### XI.C. Assistant Director for Student Services

No Updates.

#### XI.D. Director of Human Resources

No Updates.

#### XI.E. Director of Operations

No Updates.

#### XI.F. Superintendent

Dr. Kay said suspended or expelled students are typically placed outside the district. At this time, we do not have any places because of the changes Boys Town has made. Dr. Kay is proposing a Rule 17 Program to provide a place for these students. He said the trailer we run the Pathways Program out of is vacant on one side and that program is only in session for half the day. Dr. Kay discussed what the requirements would be for employees of the program and students to be placed in the program. This program may also save us some money. Some funding would come from money that would have been paid to Boys Town. Dr. Kay asked the board to consider this proposal and, if need be, there would be a special meeting planned to vote for approval.

### XII. DISCUSSION ITEMS

### XIII. ACTION ITEMS FOR THIS MEETING

XIII.A. Accept the bid for Qualified Capital Purpose Undertaking Fund Bond Services.

The Superintendent recommends that the Board Accept the bid for Qualified Capital Purpose Undertaking Fund Bond Services, as submitted. Passed with a motion by Candace Becher and a second by Michael Jeffryes.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea  
Yea: 4, Nay: 0, Absent: 1

XIII.B. Accept the bid for Design Services for the Qualified Purpose of Undertaking Fund Projects 1a-1d and 6b.

The Superintendent recommends that the Board Accept the bid for Design Services for the Qualified Purpose of Undertaking Fund Projects 1a-1d and 6b, as submitted. Passed with a motion by Douglas Willoughby and a second by Candace Becher.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea  
Yea: 4, Nay: 0, Absent: 1

XIII.C. Accept the bid for Consulting Services from AAIS for a Non-traditional Learning and Support Center

The Superintendent recommends that the Board Accept the bid for Consulting Services from AAIS for a Non-traditional Learning and Support Center, as submitted. Passed with a motion by Michael Jeffryes and a second by Theresa Seipel.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea  
Yea: 4, Nay: 0, Absent: 1

Chip Kay, Superintendent, said the bond attorney said it was this consultation is required.

XIII.D. Kramer BP #3B - Bids to be approved

The Superintendent recommends that the Board approve the Kramer BP #3B, as submitted. Passed with a motion by Candace Becher and a second by Michael Jeffryes.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea  
Yea: 4, Nay: 0, Absent: 1

Leonard Kwapnioski, Director of Operations discussed alternate bids for the empty shell at Kramer. This memo shows some of them, he said there will be more for items such as flooring, metal frames, furnishings. Completion is scheduled for June 1, 2025.

XIII.E. Accept bid for Qualified Capital Purpose Undertaking Fund Checking Account and Tax Receipts/Bond Account

The Superintendent recommends that the Board Accept the bid for Qualified Capital Purpose Undertaking Fund Checking Account and Tax Receipts/Bond Account, as submitted. Passed with a motion by Douglas Willoughby and a second by Theresa Seipel.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea  
Yea: 4, Nay: 0, Absent: 1

### XIII.F. 2024-2029 Strategic Plan

The Superintendent recommends that the Board approve the 2024-2029 Strategic Plan, as submitted. Passed with a motion by Candace Becher and a second by Theresa Seipel.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 4, Nay: 0, Absent: 1

Dr. Kay said there will be an update every 6 months with information on what has been accomplished. The Strategic Plan will be on the district webpage.

### XIII.G. Board Vacancy Appointment

The Superintendent recommends that the Board approve the Resolution to Fill the School Board Vacancy by Appointment. Passed with a motion by Michael Jeffryes and a second by Douglas Willoughby.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 4, Nay: 0, Absent: 1

Dr. Kay said that he met with Marv Zoucha regarding serving out Mark Brown's term. Mr. Zoucha has accepted. He said it was a good meeting, discussed many of the items that have been approved in the last few months.

The Resolution Filling School Board Vacancy by Appointment was approved and signed. Mr. Zoucha's first meeting will be in November.

### XIII.H. Fundraising Applications

The Superintendent recommends that the Board approve the Fundraising Applications, as submitted. Passed with a motion by Douglas Willoughby and a second by Michael Jeffryes.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 4, Nay: 0, Absent: 1

### XIII.I. Surplus Request

The Superintendent recommends that the Board approve the Surplus Requests, as submitted. Passed with a motion by Theresa Seipel and a second by Candace Becher.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 4, Nay: 0, Absent: 1

### XIII.J. Computer Science and Technology Standards

The Superintendent recommends that the Board approve the Computer Science and Technology Standards, as submitted. Passed with a motion by Theresa Seipel and a second by Douglas Willoughby.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 4, Nay: 0, Absent: 1

## XIV. BOARD REQUESTS FOR INFORMATION

Information on Boyd Jones contract

Proposal for a Rule 17 classroom including costs.

XV. BOARD SHARING

The board is happy to get to welcome Marv Zoucha to the board. All commented on the first semester flying by, with winter activities starting up soon. Congrats to the girls' golf team. Also talked about the activity in the building, the preschool was hosting Fall Family Night at Kramer.

XVI. EXECUTIVE SESSION

The board did not go into Executive Session.

XVII. ADJOURN

Motion to adjourn Passed with a motion by Douglas Willoughby and a second by Michael Jeffryes.

Doug Molczyk: Absent, Candace Becher: Yea, Michael Jeffryes: Yea, Theresa Seipel: Yea, Douglas Willoughby: Yea

Yea: 4, Nay: 0, Absent: 1

The meeting was adjourned at 6:54.

I, the undersigned, being the duly qualified Secretary for the School District No. 1 of Columbus, Nebraska, certify that the preceding is a true and correct copy of the minutes of the Regular meeting of Monday, October 21, 2024.

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President

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Secretary

Columbus Public Schools  
 Summary of Cash Balances  
 October 31, 2024

	DESCRIPTION	BEGINNING BALANCE	MONTH TO DATE RECEIPTS	MONTH TO DATE EXPENDITURES	END OF MONTH BALANCE	YTD BALANCE PRIOR YEAR
General Fund	Attachment M4a			\$ 275,608.61		
	Attachment M5 (prior Bd Mtg)			\$ 5,449,348.04		
	Transfer to GP ICS Savings			\$ 3,500,000.00		
	Transfer from GP ICS Savings		\$ 6,500,000.00			
	Receipts GP checking		\$ 2,845,299.10			
	<b>GENERAL FUND - GREAT PLAINS STATE BANK</b>	\$ 8,995,695.12	\$ 9,345,299.10	\$ 9,224,956.65	\$ 9,116,037.57	\$ 4,297,395.96
	Transfer to GP Checking			\$ 6,500,000.00		
	Transfer from GP Checking		\$ 3,500,000.00			
	Interest		\$ 4,475.56			
	<b>GEN FUND - GP ICS SAVINGS</b>	\$ 3,002,273.71	\$ 3,504,475.56	\$ 6,500,000.00	\$ 6,749.27	
	<b>General Fund - Cash Balance</b>				\$ 9,122,786.84	
Depr Fund	Commonwealth Electric Midwest			\$ 12,500.00		
	Receipts		\$ -			
	Interest		\$ 4,695.42			
	<b>DEPRECIATION - GREAT PLAINS STATE BANK</b>	\$ 1,282,819.48	\$ 4,695.42	\$ 12,500.00	\$ 1,275,014.90	\$ 1,508,721.33
Temporary Funds -GF	<i>Glitch from Microsoft issue 7/19/24. Employee paid.</i>		\$ 324.00			
	<b>PAYROLL - PINNACLE BANK</b>	\$ 222,836.14	\$ 4,022,529.92	\$ 3,994,726.12	\$ 250,963.94	\$ 229,717.62
	<b>PAYFLEX - PINNACLE BANK</b>	\$ 65,102.49	\$ 16,194.47	\$ 12,963.74	\$ 68,333.22	\$ 58,533.95
Activities	Administration	\$ 436,550.73	\$ 116,093.22	\$ 125,906.98	\$ 426,736.97	\$ 908,467.34
	Middle School	\$ 163,383.44	\$ 16,139.47	\$ 25,521.72	\$ 154,001.19	\$ 137,266.62
	High School	\$ 680,558.00	\$ 117,627.37	\$ 108,186.96	\$ 689,998.41	\$ 636,763.47
	<b>ACTIVITY FUNDS - COLUMBUS BANK</b>	\$ 1,280,492.17	\$ 249,860.06	\$ 259,615.66	\$ 1,270,736.57	\$ 1,682,497.43
Nutrition Fund	Interest Income		\$ 628.65			
	State Reimbursement		\$ -			
	Rct to Expenditures		\$ 8,326.83			
	Return Checks		\$ (250.00)			
	Student/ Staff meals		\$ 97,804.41			
	<b>NUTRITION FUND - CORNERSTONE BANK</b>	\$ 218,993.71	\$ 106,509.89	\$ 210,465.29	\$ 115,038.31	\$ 203,288.68
Bond Fund	Platte County Treasurer		\$ 113,433.40			
	Butler County Treasurer		\$ 1,234.91			
	Polk County Treasurer		\$ 612.93			
	Investment Gain		\$ 14,418.57			
	<b>BOND FUND - FNB</b>	\$ 4,558,306.47	\$ 129,699.81	\$ -	\$ 4,688,006.28	\$ 4,382,802.64
Special Building Fund	<b>Building Fund - FNB - account closed</b>	\$ -			\$ -	
	Captial One Public Funding			\$ 407,974.29		
	Receipts		\$ 36,732.02			
	<b>SPECIAL BLDG FUND - BANK OF THE VALLEY</b>	\$ 634,386.97	\$ 36,732.02	\$ 407,974.29	\$ 263,144.70	\$ 61,625.88

Columbus Public Schools  
 General Fund Revenue Detail  
 October 31, 2024

Account Number	Description	Budget	Month to Date	Year to Date	Balance	% Bud
01.1.01100.000.000	Property Taxes	(\$26,625,735.00)	(\$874,686.83)	(\$8,943,559.13)	(\$17,682,175.87)	33.59%
01.1.01115.000.000	Carline Taxes	(\$8,000.00)	\$0.00	(\$1,847.33)	(\$6,152.67)	23.09%
01.1.01120.000.000	Public Power District Sales Ta	(\$850,000.00)	\$0.00	\$0.00	(\$850,000.00)	0.00%
01.1.01125.000.000	Motor vehicle Taxes	(\$2,345,000.00)	(\$182,504.21)	(\$392,724.30)	(\$1,952,275.70)	16.75%
01.1.01125.733.001	Alternate Education	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.01140.000.000	Interest on Taxes	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.01312.000.000	Tuition, Summer School	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.01323.000.000	Tuition, SpEd School Age	(\$3,250.00)	\$0.00	\$0.00	(\$3,250.00)	0.00%
01.1.01510.000.000	Interest	(\$15,000.00)	(\$15,917.33)	(\$29,516.47)	\$14,516.47	196.78%
01.1.01540.000.000	Income from Real Property	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.01801.000.000	CASP /Parent Fees	(\$35,000.00)	(\$10,727.00)	(\$18,570.00)	(\$16,430.00)	53.06%
01.1.01910.000.000	Rental Fees	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.01911.000.000	Local License Fees	(\$25,000.00)	(\$3,735.00)	(\$3,735.00)	(\$21,265.00)	14.94%
01.1.01990.000.000	Miscellaneous Local Receipts	(\$20,000.00)	\$0.00	\$0.00	(\$20,000.00)	0.00%
01.1.02110.000.000	County Fines&License Fees	(\$150,000.00)	(\$15,983.73)	(\$31,997.71)	(\$118,002.29)	21.33%
01.1.02120.733.001	School Counselors	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.02230.000.000	Technology Services	\$0.00	(\$477.80)	(\$477.80)	\$477.80	#DIV/0!
01.1.02790.580.001	School Field Trips	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.03110.000.000	State Aid	(\$16,417,109.00)	(\$1,638,085.00)	(\$3,312,427.00)	(\$13,104,682.00)	20.18%
01.1.03120.000.000	SpEd Receipts from the State	(\$5,508,698.00)	\$0.00	\$0.00	(\$5,508,698.00)	0.00%
01.1.03125.000.000	SpEd Transportation Receipts f	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.03130.000.000	Homestead Exemption	\$0.00	(\$60.26)	(\$60.26)	\$60.26	#DIV/0!
01.1.03131.000.000	Property Tax Credit	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.03155.000.000	Textbook Loan Receipts	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.03180.000.000	Pro-Rate Motor Vehicle	(\$18,000.00)	(\$3.66)	(\$3.66)	(\$17,996.34)	0.02%
01.1.03301.000.000	After School Program	\$0.00	(\$3,396.73)	(\$3,396.73)	\$3,396.73	#DIV/0!
01.1.03400.000.000	State Apportionment	(\$500,000.00)	\$0.00	\$0.00	(\$500,000.00)	0.00%
01.1.03500.110.000	Elementary Attendance Monitor	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.03535.000.000	High Ability Learners Allocati	(\$25,599.00)	\$0.00	\$0.00	(\$25,599.00)	0.00%
01.1.03540.000.000	State Early Childhood Grant	(\$150,000.00)	\$0.00	(\$136,942.00)	(\$13,058.00)	91.29%
01.1.03541.000.000	Early Childhood Endowment Gran	(\$164,500.00)	(\$17,711.00)	(\$17,711.00)	(\$146,789.00)	10.77%
01.1.03551.000.000	CTE Grant	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.03590.000.000	Opportunity Grant	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.03599.000.000	Education Quest College Access	\$0.00	(\$17,275.17)	(\$17,275.17)	\$17,275.17	#DIV/0!
01.1.03599.000.001	Education Quest College Access	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.03995.000.000	Nebraska VR	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04421.000.000	IDEA (611) ARP B-21	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04423.000.000	IDEA (PRO) ARP NonPub	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04505.000.000	ESSA Title I Receipts	(\$781,419.00)	\$0.00	\$0.00	(\$781,419.00)	0.00%
01.1.04509.000.000	ESSA Title II Receipts	(\$140,788.00)	\$0.00	\$0.00	(\$140,788.00)	0.00%
01.1.04510.000.000	ESSA Title IV SSAE Grant	(\$38,872.00)	\$0.00	\$0.00	(\$38,872.00)	0.00%

Account Number	Description	Budget	Month to Date	Year to Date	Balance	% Bud
01.1.04516.000.000	IDEA Preschool Enrollment/Pove	(\$25,237.00)	\$0.00	\$0.00	(\$25,237.00)	0.00%
01.1.04518.000.000	IDEA Enrollment/Poverty Grant	(\$1,013,657.00)	\$0.00	\$0.00	(\$1,013,657.00)	0.00%
01.1.04521.000.000	IDEA Proportionate Share	(\$124,753.00)	\$0.00	\$0.00	(\$124,753.00)	0.00%
01.1.04524.000.000	ECF	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04525.000.000	Carl Perkins Grants	(\$53,095.00)	\$0.00	(\$32,326.00)	(\$20,769.00)	60.88%
01.1.04526.000.000	Perkins Revision Grant	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04527.000.000	ESSA Title III LEP Grant	(\$96,829.00)	\$0.00	\$0.00	(\$96,829.00)	0.00%
01.1.04528.000.000	Title III Immigrant	(\$25,169.00)	\$0.00	\$0.00	(\$25,169.00)	0.00%
01.1.04530.000.000	Federal Grant NC/FF/ECF	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04531.000.000	ESSA Title IV Part B 21st Cent	(\$157,550.00)	\$0.00	\$0.00	(\$157,550.00)	0.00%
01.1.04708.000.000	Medicaid in Public Schools/DS	(\$45,988.00)	(\$17,632.42)	(\$17,632.42)	(\$28,355.58)	38.34%
01.1.04709.000.000	Medicaid in Public Schools/MAC	\$0.00	(\$12,447.52)	(\$12,447.52)	\$12,447.52	#DIV/0!
01.1.04969.000.000	ESSA Title IV SSAE Grant	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04988.000.000	ESSER - ELO/ASP	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04994.000.000	HYC Grant (6994)	(\$14,230.00)	\$0.00	\$0.00	(\$14,230.00)	0.00%
01.1.04995.000.000	FEMA/Federal Disaster Funds	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04996.000.000	Carres Esser I	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04997.000.000	CRRSA Esser II	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.04998.000.000	ARP Esser III	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.05200.000.000	Transfers from Other Funds	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.05301.000.000	Insurance Claims	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
01.1.05690.000.000	Other Non-Revenue Receipts (Rt	\$0.00	\$0.00	\$0.00	\$0.00	#DIV/0!
		(\$55,378,478.00)	(\$2,810,643.66)	(\$12,972,649.50)	(\$42,405,828.50)	23.43%
	Transfers		(\$6,500,000.00)			
	Reimbursements/ Refunds		(\$41,183.68)			
	Interest - other accounts		\$6,528.24			
	<b>Total Revenue</b>		<b><u>(\$9,345,299.10)</u></b>			

<b>Check Number</b>	<b>Vendor</b>	<b>Amount</b>
18414	FIRST NATIONAL BANK OMAHA	\$304.13
18415	ASSOCIATED STAFFING, INC	\$15,138.06
18416	COMMONWEALTH ELECTRIC MIDWEST	\$4,250.00
18417	DUSH, REGINA	\$194.77
18418	FATHER FLANAGAN'S BOYS' HOME	\$26,000.00
18419	FIRST NATIONAL BANK OMAHA	\$1,063.56
18420	FIRST NATIONAL BANK OMAHA	\$142.00
18421	FIRST NATIONAL BANK OMAHA	\$1,219.88
18422	FIRST NATIONAL BANK OMAHA	\$1,631.59
18423	FIRST NATIONAL BANK OMAHA	\$1,788.44
18424	HAMPTON INN-KEARNEY	\$2,529.55
18425	LUDENA CASTILLO, MARIAPAZ	\$62.40
18426	MATHESON TRI-GAS INC	\$212.80
18427	METAL DOORS & HARDWARE CO.	\$85.00
18428	NASB (NE. ASSOCIATION OF SCHOOL BOARDS)	\$574.00
18429	NCSA	\$805.00
18430	PITNEY BOWES - RESERVE ACCOUNT	\$1,000.00
18431	PLUNKETTS PEST CONTROL	\$309.98
18432	SCHIEFFER SIGNS	\$62.00
18433	VALENTINOS OF COLUMBUS	\$654.00
18434	AMAZON CAPITAL SERVICES	\$7,467.74
18435	CAPITAL ONE/WALMART	\$330.94
18436	HOBBY LOBBY	\$143.97
18437	HY-VEE FOOD STORES	\$467.70
18438	SUPER SAVER	\$608.60
18439	ACE HARDWARE-COLUMBUS	\$109.52
18440	ADVANCED FIRE & SAFETY	\$1,093.16
18441	AMPLIFY EDUCATION, INC.	\$8,607.50
18442	BOMGAARS	\$183.68
18443	CAPITAL SANITARY SUPPLY	\$1,153.83
18444	CAROLINA BIOLOGICAL SUPPLY CO.	\$18.33
18445	CENTRAL PROGRAMS, INC	\$352.77
18446	COLUMBUS ARNOLD MOTOR SUPPLY	\$113.68
18447	COMMONWEALTH ELECTRIC MIDWEST	\$5,000.00
18448	DONOGHUE, TRACY	\$435.37
18449	EAKES OFFICE SOLUTIONS	\$739.99
18450	ERIE MARKING, INC - ERIE CUSTOM SIGNS	\$936.87
18451	FATHER FLANAGAN'S BOYS' HOME	\$356.00
18452	FOLLETT CONTENT SOLUTIONS, LLC	\$583.95
18453	GEHRING CONST. & READY MIX CO.	\$350.38
18454	GOPHER	\$576.89
18455	GREAT PLAINS BUILDING SUPPLY CO.	\$49.52
18456	HD SUPPLY	\$1,646.43
18457	IMAGE TECH & PRINTING	\$243.00
18458	INTERSTATE ALL BATTERY CENTER	\$328.80

<b>Check Number</b>	<b>Vendor</b>	<b>Amount</b>
18459	J.W. PEPPER & SON, INC	\$28.24
18460	JACKSON SERVICES INC.	\$30.00
18461	KELLY SUPPLY CO.	\$20.18
18462	LAKESHORE LEARNING MATERIALS	\$179.00
18463	MENARDS-COL	\$1,849.62
18464	MIDWEST DOOR & HARDWARE	\$889.00
18465	NEWZBRAIN EDUCATION	\$309.00
18466	PLATTE VALLEY PRINTING	\$630.20
18467	PRINTCO GRAPHICS, INC	\$321.50
18468	REARDON LAWN & GARDEN EQUIP.	\$41.99
18469	ROBERTSON, KATIE	\$267.33
18470	SPORTS FACILITY MAINTENANCE LLC	\$11,640.00
18471	TIRE OUTLET INC	\$300.00
18472	TRUCK CENTER COMPANIES	\$1,331.69
18473	TUCKER, JEREMY	\$800.00
18474	TURNITIN LLC	\$7,127.40
18475	TYLER TECHNOLOGIES	\$67,041.21
18476	WEMHOFF, ASHLEY	\$343.71
18477	WOODWORKER'S HARDWARE	\$383.22
18478	BLAZERWORKS, LLC	\$19,807.05
18479	COLUMN SOFTWARE PBC	\$328.53
18480	EAKES OFFICE SOLUTIONS	\$709.52
18481	ESU #7 SPECIAL EDUCATION	\$63,432.88
18482	FIRST NATIONAL BANK OMAHA	\$2,756.09
18483	GRACE ABBOTT SCHOOL OF SOCIAL WORK	\$120.00
18484	HACKETT, KRISTI	\$22.33
18485	HERNANDEZ, MAGALY	\$72.00
18486	JACKSON SERVICES INC.	\$288.92
18487	NEBRASKA EXT- PLATTE COUNTY	\$329.00
18488	NOVAK, MEGAN	\$140.00
18489	PACHECO ROBLEDO, YARA	\$38.40
18490	PITNEY BOWES GLOBAL FINANCIAL SERVICES L	\$1,486.98
18491	PITNEY BOWES, INC - SUPPLIES	\$132.79
18492	SCHIEFFER SIGNS	\$190.00
18493	SIKES, DONNA	\$38.05
18494	U AND I SANITATION LLC	\$2,235.00
18495	ZYWIEC, GARY	\$22.00
Total Fund Expenditures		\$275,608.61

The Administration recommends the School Board approve the following Certified hirings (November 2024)

Name	Position	Building	Replaces
McKenna, Ethan	STS - Auto	CHS	Haefner, Ronald
Zacarias, Austin	7th Math	CMS	Erin McKee
Gutierrez, Ashley	Early Childhood Sped	KR	New position
Leifeld, Austin	9-12 Math	CHS	

The Administration recommends the School Board approve the following October 2024 Certified resignations:

Name	Position	Building	



# COLUMBUS PUBLIC SCHOOLS

## Certified Employee Hiring Recommendation

To: Board of Education, Dr. Kay, and Mr. Schapmann

From: \_\_\_\_\_

Date: \_\_\_\_\_

I am recommending \_\_\_\_\_ as a new certified employee hire for the \_\_\_\_\_ school year.

The anticipated position is \_\_\_\_\_.

We received \_\_\_\_\_ applicants and interviewed \_\_\_\_\_ for the open position.

### Bio:

Highest Degree \_\_\_\_\_ Credits Beyond \_\_\_\_\_

College/University: \_\_\_\_\_ Degree Earned \_\_\_\_\_

\_\_\_\_\_ Degree Earned \_\_\_\_\_

\_\_\_\_\_ Degree Earned \_\_\_\_\_

### Educational Work Experience:

Total Years of Prior Educational Work Experience: \_\_\_\_\_

School: \_\_\_\_\_ Position: \_\_\_\_\_ Years: \_\_\_\_\_

School: \_\_\_\_\_ Position: \_\_\_\_\_ Years: \_\_\_\_\_

School: \_\_\_\_\_ Position: \_\_\_\_\_ Years: \_\_\_\_\_

School: \_\_\_\_\_ Position: \_\_\_\_\_ Years: \_\_\_\_\_

### Related/Other Background/Hiring Information:

***“Engaging All Learners to Achieve Success”***

2508 27th Street | Columbus, Nebraska, 68601 | Ph: 402.563.7000 | Fx: 402.563.7005

[ColumbusPublicSchools.org](http://ColumbusPublicSchools.org)



# Columbus Public Schools

2508 27th Street, Columbus NE 68601 402.563.7000

The Administration has hired the following Classified employees:

NAME	TITLE	LOCATION	HIRE DATE
Leo Saldana	ASP Lead Staff	North Park	10/21/2024
Kimberly Kern	Para Sped	High School	10/16/2024
Stephanie Aguirre	Para Sped	High School	10/15/2024
Maribel Espinoza Aguirre	Para Sped High Needs	Middle School	10/28/2024
Brittney Moore	Para Sped	Middle School	10/29/2024
Nicole Lockhart	Para Sped	Lost Creek	11/6/2024
Tina Speicher	Para Sped Non-Public	Admin	11/18/2024

The Administration has accepted the following Classified resignations/retirements:

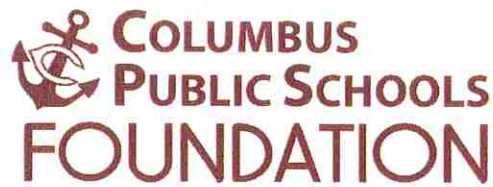
NAME	TITLE	LOCATION	TERM DATE
Julia Knapp	Para Sped	West Park	10/14/2024 (last day was 10/11/2024)
Audrie Mecek	Para Bilingual (EL Fluent)	High School	11/11/2024
Giselle Arroyo	Secondary Attendance Monitor	High School & Middle School	11/22/2024
Courtney Hamling	Para Sped	Lost Creek	11/1/2024
Luis de la Cruz Zacarias	Night Custodian	High School	11/4/2024

Last Update 11/7/2024

## Columbus Public Schools Professional Travel - October 2024

Professional - Personal (3 Max)

Employee full Name	Job Start Date	Job End Date	Job Notes to Administrator
Nicole Anderson	2024-09-30	2024-10-02	School CEO Conference, Little Rock AR
Jason Schapmann	2024-10-02	10/3/24	NCSA Labor Law Conference, Lincoln
Jillian Lumbr	2024-10-02	2024-10-02	Masters with an endorsement in school library - North Bend
Kim Loeffelholz	2024-10-02	2024-10-02	UNO Counselor meeting
Eric Edzards	2024-10-03	2024-10-04	NACIA Fall Retreat in Nebraska City
Brandi Fleming	2024-10-03	2024-10-04	NACIA Conference Nebraska City
Teresa Hausmann	2024-10-03	2024-10-04	NACIA Conference Nebraska City
Michelle Oppliger	2024-10-03	2024-10-04	NACIA Conference Nebraska City
Jason Harris	2024-10-03	2024-10-03	Norfolk to write our Indicator 13 Corrective Action Plan
Leonard Kwapnioski	2024-10-07	2024-10-07	Training on Geothermal Vaults in Elkhorn.
John Harger	2024-10-07	2024-10-07	Confined Space training in Elkhorn
Michael Grutsch	2024-10-07	2024-10-07	Training on Geothermal Vaults in Elkhorn.
Jill Lorenz	2024-10-08	2024-10-09	Policy Leadership Academy in Kearney.
Amy Moore	2024-10-10	2024-10-10	Master's Program-Lakeview
Leonard Kwapnioski	2024-10-11	2024-10-11	NATA Meeting in Fremont
Kari Tunink	2024-10-17	2024-10-17	BMIT Fall Workshop at NECC Lifelong Learning Center
David Hiebner	2024-10-17	2024-10-17	NDE Safety and Security Conference - Kearney
Alexandra Bastian	2024-10-17	2024-10-17	BMIT Fall Workshop at NECC Lifelong Learning Center
Nathan Sliva	2024-10-17	2024-10-17	BMIT Fall Workshop at NECC Lifelong Learning Center
Jeffery Peabody	2024-10-17	2024-10-17	I am attending a safety and security lunch in Kearney.
Amy Moore	2024-10-17	2024-10-17	Master's Program-Lakeview
Jordon Anderson	2024-10-17	2024-10-17	Nebraska School Safety and Security Summit in Kearney.
Sara Colford	2024-10-17	2024-10-17	Safety Committee Conference in Kearney
Katie Kruse	2024-10-17	2024-10-17	I am attending a safety and security lunch in Kearney.
Chip Kay	2024-10-17	2024-10-17	Safety Summit - Kearney
Aaron Rose	2024-10-17	2024-10-17	BMIT Fall Workshop at NECC Lifelong Learning Center
Nicole Anderson	2024-10-17	2024-10-17	Kearney - School Safety Summit
Leonard Kwapnioski	2024-10-17	2024-10-17	Safety Summit in Kearney
Adriana Carnes	2024-10-17	2024-10-17	Safety Award @ Kearney, NE
Katie Rose	2024-10-17	2024-10-17	Safety Summit in Kearney for Award Lunch
Amy Haynes	2024-10-17	2024-10-17	Safety Award in Kearney
Abbygail Pelc	2024-10-18	2024-10-18	NATM Conference in Kearney
Kristin Biggs	2024-10-18	2024-10-18	NATM Conference in Kearney
Jayson Klaumann	2024-10-18	2024-10-18	NATM Conference in Kearney
Jennifer Lange	2024-10-18	2024-10-18	NATM conference in Kearney
Anne Novicki	2024-10-18	2024-10-18	NATM conference in Kearney
Sara Schwartz	2024-10-18	2024-10-18	NATM conference in Kearney
Julie Kreikemeier	2024-10-18	2024-10-18	NATM conference in Kearney
Nicole Anderson	2024-10-18	2024-10-18	NebSPRA monthly meeting - Lincoln
Amy Haynes	2024-10-23	2024-10-23	Wayne State Teacher Job Fair
Chip Kay	2024-10-23	2024-10-23	NCSA Executive Board Mtg - Lincoln
Jason Schapmann	2024-10-23	2024-10-23	Wayne State Teacher Job Fair
Sara Colford	2024-10-23	2024-10-23	Wayne State Teacher Job Fair
Jordon Anderson	2024-10-23	2024-10-23	Great Plains Athletic Conference AD meeting in GI
Ryan Goetsch	2024-10-24	2024-10-25	TEAM Steps - Special Education at ESU 7
Julie Kreikemeier	2024-10-24	2024-10-24	Instructional Coaching Network meeting at ESU 6 in Milford.
Kristine Hackett	2024-10-24	2024-10-24	Instructional Coaching Network meeting at ESU 6 in Milford.
Leonard Kwapnioski	2024-10-24	2024-10-25	NATA Retreat - Kearney
Amy Moore	2024-10-24	2024-10-24	Master's Program-Lakeview
Lori Focher	2024-10-28	2024-10-28	NPERS in Lincoln
Sara Colford	2024-10-28	2024-10-28	UNL Teacher Job Fair
Jason Schapmann	2024-10-28	2024-10-28	UNL Teacher Job Fair
David Hiebner	2024-10-28	2024-10-28	UNL Teacher Job Fair
Erica Gable	2024-10-29	2024-10-29	Attending required JAG training in Omaha
Jason Schapmann	2024-10-29	2024-10-29	Nebraska Wesleyan Career Fair
Chip Kay	2024-10-30	2024-10-30	Chadron State College Career Fair
Jordon Anderson	2024-10-30	2024-10-30	Emerging Superintendents workshop - Lincoln
Jason Harris	2024-10-30	2024-10-30	RDA Stakeholders Meeting with NDE. Lincoln, NDE.
Kari Tunink	2024-10-31	2024-10-31	PERKINS. NECC - Lifelong Learning Center, Norfolk, NE, for the Northeast Nebraska CTE Collaboration Day
Alexandra Bastian	2024-10-31	2024-10-31	PERKINS. NECC - Lifelong Learning Center, Norfolk, NE, for the Northeast Nebraska CTE Collaboration Day
Cletus Arasmith	2024-10-31	2024-10-31	PERKINS. NECC - Lifelong Learning Center, Norfolk, NE, for the Northeast Nebraska CTE Collaboration Day
Jason Harris	2024-10-31	2024-10-31	NASES Region 3 Meeting in Norfolk.
Adam Whitmore	2024-10-31	2024-10-31	Presenting at the Nebraska Latino Youth Summit with two students / LaVista



2508 27th Street, P.O. Box 947, Columbus, NE 68602-0947 Phone: 402-563-7000, Ext. 13033 Fax: 402-563-7005

November 1, 2024

Doug Willoughby  
Board of Education  
Columbus Public Schools

Dear President Willoughby and Members of the Board:

The Foundation contributed the following items to Columbus Public Schools during the month of October. On behalf of the Board of Directors for the CPS Foundation and the officers of the thirteen umbrella organizations, we respectfully submit these items to the Board of Education for acceptance.

**Foundation**

\$609.65 - Discoverer Dash	\$1,567.87 - Pregame Pep Rally Supplies
\$275.88 - Shopping for Charities Prizes	\$2,500.00 - Scholarships
\$960.00 - Dual Credit Scholarships	\$600.00 - STS Dual Credit Scholarships
\$1,103.50 - Shopping for Charities T-Shirts	\$11,867.70 - Athletic Hall of Fame
\$10,637.23 - Columbus After School Program Supplies	\$283.65 - Comfort Closet
\$20,000.00 - Nantkes Screen & Projector, Casey's Grant	

**Band Boosters**

\$90.00 - Window Decals  
\$4,518.22 - Columbus Marching Festival  
\$1,399.00 - American AED  
\$252.00 - Senior Plaques

**Centennial PAC**

\$270.99 - Staff Meeting Supplies  
\$202.80 - Popcorn Supplies  
\$286.34 - Parent Teacher Conference Meals  
\$739.16 - Heritage Day Supplies  
\$27.16 - Teacher Supplies  
\$332.00 - Fall Event Supplies

**CMS PAC**

\$150.00 - CMS PAC Scholarship

**Emerson PTO**

\$752.00 - Field Trips  
\$290.25 - Parent Teacher Conference Meals  
\$34.98 - Trunk or Treat  
\$10.45 - Fundraiser Postage

**Lost Creek PTO**

\$34.50 - Staff Appreciation  
\$72.95 - Parent Teacher Conference Meals  
\$104.00 - Library Fines  
\$237.77 - Fall Family Fun Night Supplies

**Sports Boosters**

\$646.90 - Golf Tournament Reimbursement  
\$45.00 - Business Award  
\$2,432.44 - Program Printing  
\$600.00 - Golf Tournament Support

**North Park PTO**

\$393.32 - Classroom Supplies  
\$112.30 - Parent Teacher Conference Meals  
\$60.84 - Fall Event Supplies  
\$200.00 - End of Year DJ

**West Park PTO**

\$512.00 - Field Trip  
\$177.75 - WP Stickers  
\$78.93 - Parent Teacher Conference Meals  
\$31.07 - Printing  
\$1,310.21 - Fall Festival Supplies

The total contributions for the month of October was \$66,810.81

The total contributions for the FY 2024 total is **\$487,854.11**

*\*CPS Foundation's fiscal year is January 1 through December 31.*

Thank you for your consideration.

Sincerely,

Nicole Anderson  
Director of Marketing & Foundation

# MID-WEST 3D SOLUTIONS

Iowa Office  
P.O. Box 86  
Boone IA 50036  
Ph:888-509-0690  
Fax: 515-598-5129

Nebraska Office  
P.O. Box 69  
Panama, Ne 68419  
Ph:888-509-0690  
Fax: 402-788-2802

## QUOTE

Customer
COLUMBUS HIGH SCHOOL 3434 Discoverer Dr. Columbus NE 68601 Attn: Benjamin Loeffelholz

Quote #	13942-D
Date:	10/23/2024
Terms:	NET30
F.O.B.	FACTORY
Ship VIA:	BEST WAY

QTY	UNIT	DESCRIPTION	UNIT PRICE	AMOUNT
<b>FOREST CNC</b>				
1	PMF 4896	FOREST CNC 48X96" MakerFab Series Plasma system	29,999.00	29,999.00
1	PMS-65	Powermax Sync 65 Plasma generator-upgrade	2,500.00	2,500.00
<p><b>SPECS/ KEY POINTS:</b>  Standard packge is TURN-KEY.  HyBrid Servo control assures accuracy at the fastest speeds. Includes Control Computer, CAD/CAM software, Heavy duty welded steel frame, built in water table commercial grade.</p> <p><b>*SINGLE SOURCE 3YR ONSITE PARTS &amp; LABOR WARRANTY</b>  <b>*ONSITE DELIVERY / SETUP BY FACTORY PERSONEL</b>  <b>*LIFETIME PHONE / REMOTE SUPPORT BY FACTORY</b></p>				
1	Ship	Estimated Freight Charges	1,500.00	1,500.00
			<b>TOTAL</b>	<b>\$33,999.00</b>

Note: Actual shipping charges will be added to the above amounts

Note: Pricing is good for 30 Days

**Note: Credit Card payments will incur a 4% fee to be added to the above amounts.**

Tim Waters  
Authorized By

10/23/2024  
Date



# C-SERIES PLASMA CUTTING TABLES PROPOSAL

With MyPlasm CNC



*Figure 1 – Piranha C Series Plasma Cutting Table*

## Piranha C-Series Plasma Cutting Tables

### INCLUDED FEATURES

- Rugged Construction** - All-Welded Steel Frame (not bolt-together) with high accuracy linear guides and bearings. Machine is assembled complete at the factory
- Dual Side Drive** – gantry driven on both sides for maximum stability
- CNC Control (PC)** – software download included
- Panasonic servo motors and drives** – Powerful 400 watt servo motors (not stepper motors) on both X-axis and Y-axis with a maximum traverse speed of 8000mm/min.
- Down draft exhaust system** – Pre-vented duct work with exhaust fan for plasma dust extraction – no messy sludge to clean out and dispose of.
- Breakaway Torch Mounting** – protects the torch from inadvertent part tip-ups
- MyPlasm CNC Software** – download included.

*NOTE: Additional full CAD/CAM software is available for purchase if 2D CAD drawing and additional nesting capabilities are needed. See options list for ProNest® LT details.*

### MACHINE PRICES

MODEL	C510 5' X 10'	STANDARD CUTTING TABLE
NO PLASMA	\$21,950	Downdraft
w/ Powermax 45	\$25,950	Downdraft
w/ Powermax 65 SmartSYNC	\$27,950	Downdraft
w/ Powermax 85 SmartSYNC	\$29,950	Downdraft
w/ Powermax 105 SmartSYNC	\$31,950	Downdraft
w/ Powermax 125	\$35,950	Downdraft

*NOTE: Prices are good for up to 30 days from the date of the proposal but are subject to change without notice. Any applicable sales tax will be billed on the final invoice.*

**MACHINE SPECIFICATIONS**

FEATURE	SPECIFICATION
Maximum Rapid Speed	314 IPM
CNC Control	PC Based Control
Frame and Bridge Construction	Welded Tubular Steel
Drive Motors	X-axis – Two Servo Motors Y-axis – Servo Motor Torch Height Control – Stepper Motor
Drive System	X-axis – Rack and Pinion each side Y-axis – Rack and Pinion Z-axis – Ball Screw
Torch Control	Arc Voltage with Initial Height Sensing
Torch Protection	Pneumatic Breakaway
Exhaust Fan	6500 cfm @ 3" H <sub>2</sub> O

**AVAILABLE SIZES**

MODEL	CUTTING AREA	MACHINE SIZE*	MACHINE WEIGHT
Piranha C510	5' x 10'	158"L x 102"W x 60"H	2,500 lbs

\* Excludes optional tube cutting attachment

**AVAILABLE PLASMA SYSTEMS**

PLASMA SYSTEM**	MAX MAT'L THICKNESS Mild Steel
Powermax45XP	1/2" (12mm) Production / 1/2" (12mm) Maximum
Powermax65 SmartSYNC	5/8" (16mm) Production / 5/8" (16mm) Maximum
Powermax85 SmartSYNC	3/4" (20mm) Production / 3/4" (20mm) Maximum
Powermax105 SmartSYNC	3/4" (20mm) Production / 7/8" (22mm) Maximum
Powermax125	3/4" (20mm) Production / 1" (25mm) Maximum

\*\* Includes interface cable

**CUSTOMER PROVIDED PLASMA SYSTEMS**

Piranha can integrate existing air plasma systems up to 125A. The customer must provide details and specifications on the existing air plasma system for review before Piranha can approve the integration. There will be a minimum charge of \$1,000 for systems not supplied by Piranha. Charges for additional components, cables, and shipping may be required after review. Piranha will not provide any warranty on the existing system and will not guarantee the cut quality.

**PLASMA CUTTING SPEEDS**

Plasma cutting speed cannot exceed the maximum cutting speed of 314 IPM (8,000 mm/min). Recommended cutting speeds in the Hypertherm Powermax cut charts will be limited to a maximum of 314 IPM.

**HYPERTHERM PLASMA SPECIFICATIONS****Powermax45XP**

MATERIAL THICKNESS		MAXIMUM CUTTING SPEED	
10 GA MS		181 IPM	
1/4" MS		72 IPM	
3/8" MS		38 IPM	
1/2" MS		24 IPM	
GAS TYPE		AIR <i>(Preferred for all materials)</i>	NITROGEN <i>(Stainless &amp; aluminum only No cut chart data available)</i>
Gas Quality		Clean, dry, oil-free per ISO 8573-1 Class 1.2.2	99.95% pure
Recommended gas inlet flow and pressure		400 scfh @ 85 psi (190 slpm @ 5.9 bar)	

**Power Connections for the Powermax45XP (CSA Models)**

INPUT VOLTAGE	INPUT CURRENT AT RATED OUTPUT (A)	INPUT CURRENT AT ARC STRETCH (A)	FUSE/BREAKER SIZE (SLOW-BLOW) (A)
200-240V SINGLE PHASE	39	44	50A
208V SINGLE PHASE	37	43	50A
480V THREE-PHASE*	9.4	17	20A

**NOTE:** Plasma table and CNC control require separate 230V single phase / 20A supply

**REF:** Hypertherm Operator Manual 809240 Revision 1

**\*480V THREE PHASE configuration is available as a special order. Please contact your Piranha Sales Representative for lead times.**

## Powermax65 SmartSYNC

MATERIAL THICKNESS		MAXIMUM CUTTING SPEED	
10 GA MS		224 IPM	
1/4" MS		116 IPM	
3/8" MS		62 IPM	
1/2" MS		40 IPM	
5/8" MS		26 IPM	
GAS TYPE		AIR	NITROGEN
		<i>(Preferred for all materials)</i>	<i>(Stainless &amp; aluminum only No cut chart data available)</i>
Gas Quality		Clean, dry, oil-free per ISO 8573-1 Class 1.2.2	99.995% pure
Recommended gas inlet flow and pressure		Cutting: 400 scfh @ 85 psi (190 slpm @ 5.9 bar)	

## Power Connections for the Powermax65 (CSA Models)

INPUT VOLTAGE	INPUT CURRENT AT RATED OUTPUT (A)	INPUT CURRENT AT ARC STRETCH (A)	FUSE/BREAKER SIZE (SLOW-BLOW) (A)
200-208V SINGLE-PHASE	52	74	80
230-240V SINGLE-PHASE	44	74	80
480V SINGLE PHASE	22	38	40
200-208V THREE-PHASE	32	45	50
230-240V THREE-PHASE	27	45	50
400V THREE-PHASE	15	27	30
480V THREE-PHASE	13	23	25
600V THREE-PHASE	13	23	25

**NOTE:** Plasma table and CNC control require separate 230V single phase / 20A supply

**REF:** Hypertherm Operator Manual 806650 Revision 3

### Powermax85 SmartSYNC

MATERIAL THICKNESS		MAXIMUM CUTTING SPEED	
10 GA MS	314 IPM		
1/4" MS	164 IPM		
3/8" MS	80 IPM		
1/2" MS	48 IPM		
5/8" MS	30 IPM		
3/4" MS	24 IPM		
GAS TYPE	AIR <i>(Preferred for all materials)</i>		NITROGEN <i>(Stainless &amp; aluminum only No cut chart data available)</i>
Gas Quality	Clean, dry, oil-free per ISO 8573-1 Class 1.2.2		99.995% pure
Recommended gas inlet flow and pressure	Cutting: 400 scfh @ 85 psi (190 slpm @ 5.9 bar)		

### Power Connections for the Powermax85 (CSA Models)

INPUT VOLTAGE	INPUT CURRENT AT RATED OUTPUT (A)	INPUT CURRENT AT ARC STRETCH (A)	FUSE/BREAKER SIZE (SLOW-BLOW) (A)
200-208V SINGLE-PHASE	70	98	100
230-240V SINGLE PHASE	60	98	100
480V SINGLE PHASES	29	50	50
200-208V THREE-PHASE	42	60	60
230-240V THREE-PHASE	36	60	60
400V THREE PHASE	21	38	40
480V THREE-PHASE	18	31	30
600V THREE-PHASE	17	30	30

**NOTE:** Plasma table and CNC control require separate 230V single phase / 20A supply

**REF:** Hypertherm Operator Manual 806650 Revision 3

**Powermax105 SmartSYNC**

MATERIAL THICKNESS		MAXIMUM CUTTING SPEED	
10 GA MS (85 amp process)	314 IPM		
1/4" MS	192 IPM		
3/8" MS	116 IPM		
1/2" MS	76 IPM		
5/8" MS	52 IPM		
3/4" MS	40 IPM		
GAS TYPE	AIR <i>(Preferred for all materials)</i>	NITROGEN <i>(Stainless &amp; aluminum only No cut chart data available)</i>	
Gas Quality	Clean, dry, oil-free per ISO 8573-1 Class 1.2.2	99.995% pure	
Recommended gas inlet flow and pressure	Cutting: 460 scfh @ 85 psi (220 slpm @ 5.9 bar)		

**Power Connections for the Powermax105 (CSA Models)**

INPUT VOLTAGE	INPUT CURRENT AT RATED OUTPUT (A)	INPUT CURRENT AT ARC STRETCH (A)	FUSE/BREAKER SIZE (SLOW-BLOW) (A)
200V THREE-PHASE	58	82	80
208V THREE-PHASE	56	82	80
240V THREE-PHASE	49	78	80
480V THREE-PHASE	25	40	40
600V THREE-PHASE	22	35	40

**NOTE:** Plasma table and CNC control require separate 230V single phase / 20A supply

**REF:** Hypertherm Operator Manual 817390 Revision 2

**Powermax125**

MATERIAL THICKNESS		MAXIMUM CUTTING SPEED	
10 GA MS (65 amp process)	296 IPM		
1/4" MS	225 IPM		
3/8" MS	138 IPM		
1/2" MS	93 IPM		
5/8" MS	66 IPM		
3/4" MS	48 IPM		
GAS TYPE	AIR <i>(Preferred for all materials)</i>	NITROGEN <i>(Stainless &amp; aluminum only No cut chart data available)</i>	
Gas Quality	Clean, dry, oil-free per ISO 8573-1 Class 1.2.2	99.995% pure	
Recommended gas inlet flow and pressure	Cutting: 550 scfh @ 85 psi (260 slpm @ 5.9 bar)		

**Power Connections for the Powermax125 (CSA Models)**

INPUT VOLTAGE	INPUT CURRENT AT RATED OUTPUT (A)	INPUT CURRENT AT ARC STRETCH (A)	FUSE/BREAKER SIZE (SLOW-BLOW) (A)
480V THREE-PHASE	31	50	50
600V THREE-PHASE	24	38	40

**NOTE:** Plasma table and CNC control require separate 230V single phase / 20A supply

**REF:** Hypertherm Operator Manual 808080 Revision 3

### **Hypertherm SmartSYNC Plasma Torches (STANDARD on 65, 85, and 105A systems)**

SmartSYNC torches feature RFID capability that when coupled with a Hypertherm cartridge will communicate with a Powermax SYNC system to automatically set the amperage and process on the power supply.

The Hypertherm cartridge consumable platform is a revolutionary change to standard air plasma consumables. Each single-piece cartridge is optimized by process and amperage to ensure performance while dramatically simplifying the parts needed to cut or gouge with plasma.



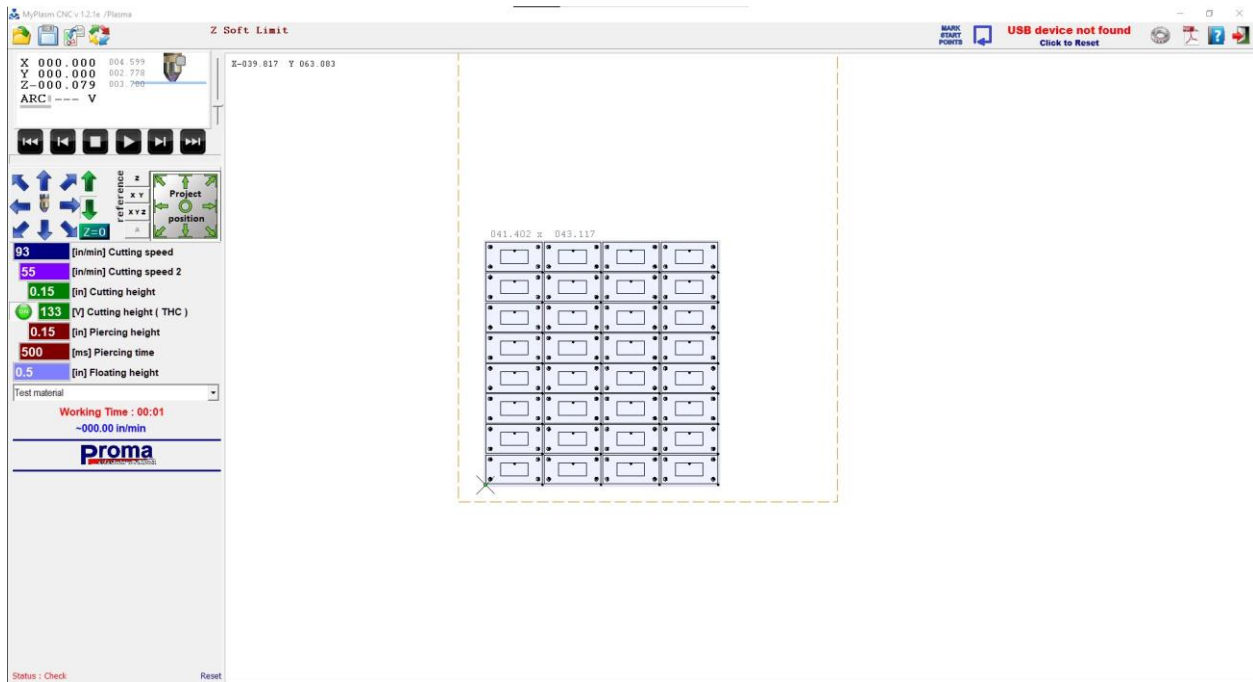
Hypertherm cartridges for Powermax systems are manufactured to uphold our high standards for quality and reliability. As part of the manufacturing process, we test-fire each cartridge to ensure proper assembly and function. As a result, there may be burn marks on the tip of the cartridge. This is normal and not a sign of damage.

Powermax65, Powermax85, and Powermax105 plasma systems come with SmartSYNC torches as standard equipment.

Powermax45XP and Powermax125 plasma systems are not available with SmartSYNC torches.

## **MyPlasm CNC Software (INCLUDED)**

MyPlasm CNC software includes everything needed to control the machine and the automated torch height control. The software is pre-installed at the PC Control at the machine. It includes a DXF import function so you can quickly and easily pull in and cut parts utilizing a clean line connected DXF (or similar supported file type). Cut parameters can be set and saved within this windows-based program. MyPlasm software is simple to learn and to operate. With a minimum level of knowledge, operators can learn that with a few clicks they can cut a part directly from the DXF. They can also draw simple shapes in the MyMini CAD module, included for free.



MyPlasm is windows based software that allows operators to quickly cut parts without the need to learn coding or complex control settings. You can simulate cut paths to help position your material correctly on the table prior to cutting and resume cut paths easily. Torch homing , cut parameters, torch height , and lead in - lead out settings are all easily accessed from the home screen.

### **ProNest® LT Smart Start (OPTIONAL)**

Hypertherm ProNest® LT Smart Start is a powerful CAD/CAM nesting software designed for light industrial, mechanized cutting in production environments. It provides a single software solution for all your conventional plasma cutting machines. ProNest® LT Smart Start helps fabricators and manufacturers increase material savings, boost productivity, reduce operating costs, and improve part quality by offering the right level of cutting expertise for your needs. It also supports Hypertherm SureCut™ technology, including easy setup, optimized process parameters, and easy trouble shooting. In addition, ProNest LT® Smart Start is backed by Hypertherm’s global network of professionals, meaning you’ll always have access to the service and support you need.



FEATURE	BENEFIT
Part design and development	<ul style="list-style-type: none"> <li>• Integrated 2D CAD program to create and edit CAD files</li> <li>• Variable Shape Parts feature to develop common parts from templates</li> </ul>
CAD/CAM import and conversion	<ul style="list-style-type: none"> <li>• Import CAD files (industry-standard file formats)</li> <li>• Raster to vector converts static images to CAD</li> <li>• Automatic CAD file correction and error notification</li> <li>• Automatic spline/ellipse smoothing and reduction</li> <li>• Separate multiple parts from a single CAD file</li> <li>• Automatic mapping of CAD layers to processes (cut, mark)</li> </ul>
Job Set-Up	<ul style="list-style-type: none"> <li>• Material database (with grade and gauge)</li> <li>• Custom remnant creation (define irregular shapes for nesting)</li> <li>• Grain constraint</li> <li>• Safe zones for plate clamping applications</li> </ul>
SureCut™ technology and built-in process expertise	<ul style="list-style-type: none"> <li>• Material type, thickness, grade and class-based process parameters:               <ul style="list-style-type: none"> <li>– Separations for part, plate, and pierce spacing</li> <li>– Kerf compensation and feed rate</li> <li>– Lead-in/out style optimized for part geometry and quality</li> <li>– Cutting techniques</li> </ul> </li> <li>• Cut sequencing – automatic or manual</li> </ul>

FEATURE	BENEFIT
<b>Interactive manual nesting</b>	<ul style="list-style-type: none"> <li>• Group parts into clusters for nesting</li> <li>• Color parts according to part property</li> <li>• Drag, drop, bump, and auto-bump parts on the nest</li> <li>• Move, mirror, and drag to rotate parts</li> <li>• Click and drag to automatically array parts</li> <li>• Prohibit/permit nesting inside of a part</li> <li>• Part interference detection</li> <li>• Edit lead-in/out position and properties within the nest</li> <li>• Animated cutting sequence simulation</li> <li>• Control cut direction and cut sequencing on part-by-part basis</li> <li>• Plate cropping</li> </ul>
<b>Detailed reporting</b>	<ul style="list-style-type: none"> <li>• Management and shop reports</li> <li>• Export reports directly to PDF, Excel spreadsheet, CSV, or webpage</li> </ul>

### **ProNest® Essentials (OPTIONAL)**

Includes:

Automatic Nesting – nest with the click of a button. Choose a preferred nesting strategy to control the balance between nesting speed and material utilization or select “IntelliChoice” and ProNest will determine a strategy and nest. Parts are nested for maximum cutting efficiency and material utilization, without any operator intervention required.

### **ProNest® Unlimited (OPTIONAL)**

Includes:

Automatic Nesting – nest with the click of a button. Choose a preferred nesting strategy to control the balance between nesting speed and material utilization or select “IntelliChoice” and ProNest will determine a strategy and nest. Parts are nested for maximum cutting efficiency and material utilization, without any operator intervention required.

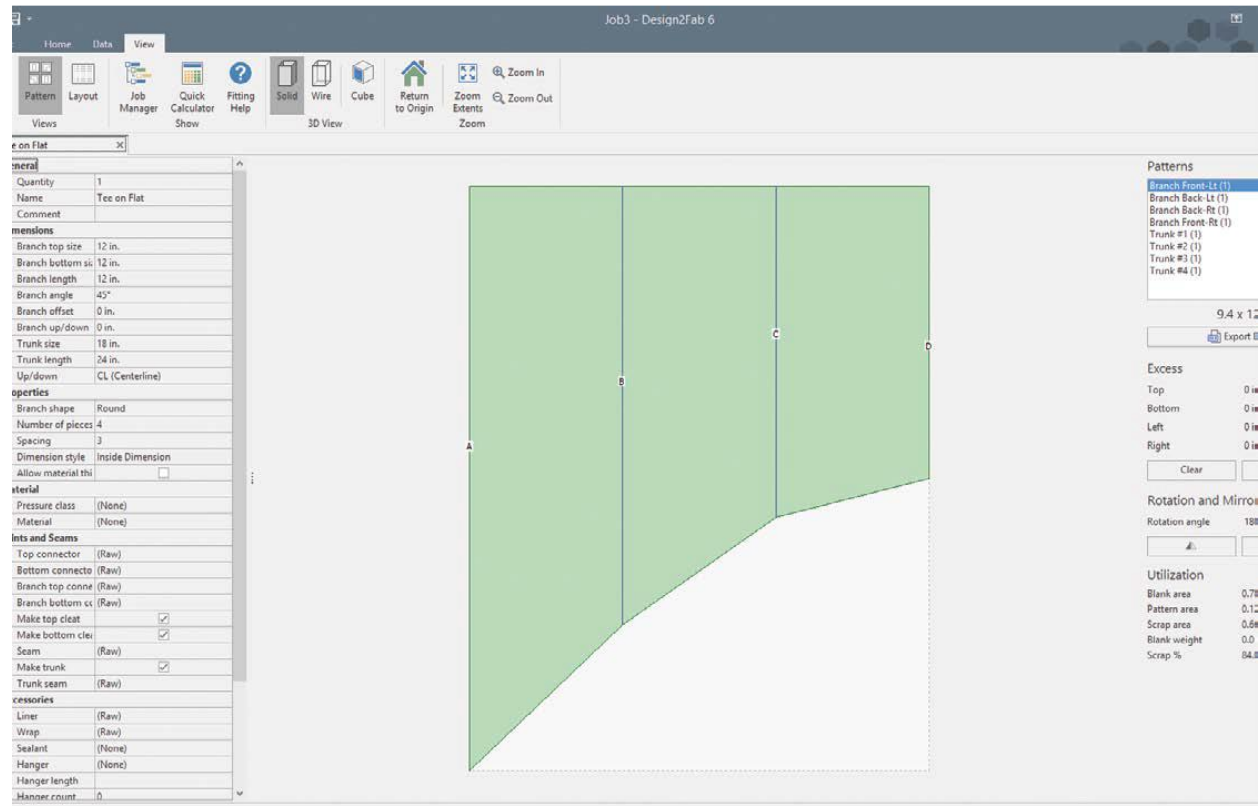
Common Line Cutting – share the common edges of adjacent parts. This feature can be applied automatically to similar parts or manually for dissimilar part profiles. Kerf compensation is applied automatically. Fewer pierces and reduced cutting distance will maximize productivity and consumable life. It also can save material by eliminating the separation between parts that otherwise becomes scrap.

Chain and Bridge Cutting -- link multiple part profiles into one continuous cut. The chain can be created manually, after parts have been nested, or automatically as an array of parts. Use Bridge Cutting to create a thin web of material between parts, which helps prevent tip-ups on small parts. This forms a single exterior profile, which can stabilize parts during separation from the plate, making them less prone to the effects of thermal movement. Both techniques result in fewer pierces and greater consumable life.

Skeleton Cut-Up – makes dedicated cuts to a sheet, making it easier to remove skeleton material from the table. Skeleton cuts are added automatically; and can be edited to meet your needs. Skeleton lines may be cut before or after the parts are cut

## Design2Fab® Sheet Metal Layout Software (OPTIONAL)

Design2Fab sheet metal layout software makes it easy to create HVAC duct, mechanical, kitchen, industrial, roofing, and other specialty fitting layouts. Engineered to dramatically reduce the time it takes to develop and lay out flat patterns, Design2Fab provides sheet metal fabricators, HVAC shops, and MEP contractors with the ability to create complex custom fitting layouts in minutes, rather than hours. Design2Fab also helps ensure perfect fit-up when installing parts in the field, contributing to increased productivity and lower operating costs to accomplish more, while increasing profitability.



Starting with the parametric fittings library, you will have access to a complete range of templates including all core shapes and sizes which can be customized to virtually any design. You can apply SMACNA or DIN based shop standards to any fitting in the job, including pressure class, metal gauge, seam styles, joints, stiffeners, wrap, acoustic liner, and sealant. Once the design is complete, it can export patterns to DXF for automated cutting. You can also export patterns for manual cutting using HPGL print files, printed to a plotter, or laid out manually using XY or triangulation points

- Comprehensive fittings library with unlimited customization
- 3D view verification of fittings
- 2D layout view of pattern fitting
- Job manager for multi-level zones
- Copy fitting or zone
- Fully customizable shop standards
- Based on SMACNA and DIN standards
- DXF export for nesting and automated cutting
- HPGL export for printing and manual cutting
- Custom seam and joint types
- Custom list of liners, wrap, sealant, stiffeners, vanes, and hangers
- Shear list – blank sizes calculated
- Fitting list – quick list of fittings in job
- Detail list – shop ticket format shows fitting, details, and dimensions
- Shear list – blank sizes calculated
- Multiple reports

## **TRAINING**

All Piranha training will require a minimum of one-week advance notice.

Training on Hypertherm ProNest and ProNest LT software is supplied by Hypertherm and is not included in any of the training sessions described below. Find more information at the [Hypertherm Knowledge Base](https://www.hypertherm.com/en-US/support/software/knowledge-base/) (<https://www.hypertherm.com/en-US/support/software/knowledge-base/>) or contact your Piranha sales representative for assistance.

### **Piranha Factory Group Training**

Piranha Factory Group Training at the Piranha facility in Rockford, IL, is available to supplement the information provided with your Piranha plasma machine. Joining other Piranha plasma cutting table users, you will be trained by an experienced Piranha applications engineer on a system as close as possible to your machine configuration. Class size is limited to available openings at the time of enrollment. Contact Piranha for availability.

### **Piranha Factory Private Training**

Piranha Factory Private Training at the Piranha facility in Rockford, IL, is available to supplement the Piranha instructional videos. Working specifically with your parts and drawings, you will be trained on a system as close as possible to your machine configuration. A maximum of three (3) of your team members will be hosted and trained by an experienced Piranha applications engineer.

### **Customer Location Training**

A Piranha application engineer is available to assist with training at your location based on our standard application engineering rates. A one-day training session (maximum of 3 of your team members) will include travel time, expenses, and one day of machine training. Multiple day sessions are available if needed. Contact your Piranha sales representative for a quote based on your location. The machine must be operational before the training starts. Contact Piranha service for assistance as needed.

	PIRANHA FACTORY GROUP TRAINING	PIRANHA FACTORY PRIVATE TRAINING	CUSTOMER LOCATION TRAINING
Self-Installation "How To"	X	X	X
Start-up	X	X	X
Basic Plasma Cutting	X	X	X
Control Operation	X	X	X
Shape Library	X	X	X
Plasma Processes	X	X	X
Plasma Consumables	X	X	X
Plasma Parameters Set-up	X	X	X
Hands-On Operation	X	X	X
Hands-On Basic Maintenance	X	X	X
Programming and Running Typical Parts	X	X	X
Programming and Running Your Specific Parts		X	X

**OPTIONS AND PRICING**

OPTION	DESCRIPTION	INVESTMENT (USD)
Tube Cutting Attachment (see note)	Side mount for round tubing from 2" up to 11-1/2" diameter x 4', 8', or 10' long cutting capacity (based on the length of the table), no additional torch required. <i>NOTE: Not available as a field retrofit</i> <i>NOTE: Tube cutting attachment is located outside of the cutting table and will require additional customer-supplied dust extraction.</i>	\$6,500
Air Dryer Unit (see note)	Water-oil separator and post filter. This option requires separate 120VAC electrical service. <i>NOTE: Not needed if Three-Stage Filter System is ordered.</i>	\$1,750
Three-Stage Filter System (see note)	A series of three different filters to remove moisture, oil, and particulate. <i>NOTE: Not needed if Air Dryer Unit is ordered.</i>	\$739
Consumable Kit Powermax45	Includes consumables for the Powermax 45XP cutting system.	\$111
Consumable Kit Powermax65 SmartSYNC	Includes consumables for the Powermax 65 cutting system.	QUOTED ON REQUEST
Consumable Kit Powermax85 SmartSYNC	Includes consumables for the Powermax 85 cutting system.	QUOTED ON REQUEST
Consumable Kit Powermax105 SmartSYNC	Includes consumables for the Powermax 105 cutting system.	QUOTED ON REQUEST
Consumable Kit Powermax125	Includes consumables for the Powermax 125 cutting system.	\$286
Dust Collection System -- Steel Cutting Only (see note)	Camfil Farr GS4 4-Cartridge Dust Collector (see description) Requires separate 460v supply <i>NOTE – Not available with Powermax 105 and Powermax 125</i>	\$27,500
Dust Collection System -- Water Table (see note)	Water Table Upgrade.	\$3,000
Plasma Green Rust Inhibitor & Biocide - 5 gal (see note)	For use in the water table at a 20:1 ratio. <i>NOTE: REQUIRED for C-series plasma tables with the water table option</i>	\$265
Factory Group Training	At Piranha (per person)	\$500
Factory Private Training	At Piranha (per company, maximum 3 attendees)	\$2,500
Customer Location Training	At your location (per company, maximum 3 attendees)	QUOTED ON REQUEST
ProNEST® LT Optional Packages	Optional seat of ProNEST LT® Smart Start	Contact Hypertherm
	ProNEST® LT Essentials	Contact Hypertherm
	ProNEST® LT Unlimited	Contact Hypertherm
	Design2Fab®6	Contact Hypertherm
Certification / Inspection	UL/CSA Compliance	\$3,000

## **DUST COLLECTION SYSTEM\* – STEEL CUTTING ONLY (OPTIONAL)**

### **FARR GOLD SERIES® Packaged (GSP-4) Dust Collector**

- Built-in spark baffle inlet to protect cartridges.
- Standard easy-to-remove dust drawer(s).
- Factory installed sprinkler head mounted in dust collector.



### **CONSTRUCTION**

- Gold Series module is constructed of 7 gauge steel.
- Door, hopper, inlet and panels are all 10 gauge steel.
- Powder Paint Finish

### **AUTOMATIC FILTER CLEANING**

- Filters are automatically back-flush cleaned with periodic pulses of compressed air.
- Vertical design of the Camfil APC cartridges provides more efficient pulsing of dust, thus eliminating uneven dust loading associated with horizontally mounted cartridges.

### **INTEGRATED CONTROLS**

- Hand/off/auto switch for direct control of dust collector
- On-demand pulse cleaning controls
- Digital and analog readout of filter pressure differential, alarm output of high pressure
- Control voltage transformer

### **FILTER ACCESS**

- Tool-less quick-open access door(s).
- Cam-operated clamp bars.

### **INLET**

- Standard collared inlet allows for quick and easy hose connection.
- Perforated plate installed in the inlet protect the filters from incoming dust and separates the larger dust particles directly into the hopper, reducing the load on the filters.
- Includes integral inlet damper for airflow control.

## **UTILITY REQUIREMENTS**

Required:

- 230V SINGLE PHASE AC / 30A service for table, CNC control, and exhaust fan.

*NOTE: A transformer will be required if other voltages, such as 208V, are supplied.  
Connection of other voltages to the machine will void the warranty unless approved  
in writing by Piranha.*

- Separate Electrical Service for Hypertherm Plasma System. The Hypertherm Powermax series is available with several power options. Consult factory for information.
- Dry Compressed air – 90 psi minimum
- Earth Ground Rod with separate green insulated number 4 stranded copper welding cable leading to plasma cutting system

Recommended:

- Air Dryer Unit or Three-Stage Filter System

## **INSTALLATION**

Customer is responsible for the complete installation of the equipment including (but not limited to):

1. Rigging
2. Leveling
3. Electrical Installation
4. Start-up

Piranha will supply appropriate installation and operations manuals for performing installation. Installation and training by Piranha field service technicians is available at prevailing rates. Technical support for installation and ongoing operation is available via phone at no charge.

If customer purchases plasma system from another source, then customer will be responsible for the connection and integration of the plasma system to the machine.

## **WARRANTY**

Twelve (12) month parts warranty, covering defects in materials or workmanship.

## **DELIVERY**

Normal delivery is from stock subject to confirmation at the time of order. Price is FOB factory Rockford, Illinois and does not include any applicable sales tax or installation. The machine is shipped totally wired through to the electrical enclosure box. It has been left to the purchaser's discretion whether to wire direct to a disconnect or to install a cord and plug for mobility.

**SHIPMENT REQUIREMENTS**

MegaFab requires Flatbed Trailer(s), with adequate Chains and tarps (to cover full height and width), to assure protection of this equipment when using truck transportation. Please make sure that adequate deck space is allotted for machine and all accessories shipping with order. Upon request, MegaFab will arrange shipping to destination. Freight and insurance charges are the responsibility of the customer and will be invoiced on machine order. Please consult the factory for any questions regarding shipping requirements.

**PAYMENT TERMS**

Stock machines require 100% payment prior to shipment. Non-stock machines require a down payment of 50%, with the remaining 50% due prior to shipment.

**\*Prices and specs subject to change without notice.**



650 Race Street • PO Box 1206 • Rockford, IL 61105

t: 800.338.5471 • f: 815.964.3175 • megafab.com

#### TERMS & CONDITIONS OF SALE

1. **ACCEPTANCE.** Seller makes all quotations and accepts orders only on the terms and conditions stated herein. All orders are subject to acceptance only at Seller's facility in Rockford, IL. No conditions stated by Buyer shall be binding upon Seller and are hereby rejected, unless expressly accepted in a writing signed by the Seller. In the event of conflict or differences in the terms of Buyer's order form and the terms stated herein, the terms stated herein shall govern. Seller shall have no responsibility to commence any of its obligations related to the order until Seller's receipt of the initial down payment. Acceptance by Seller of any order, and therefore the imposition of responsibilities by Seller, is expressly made conditional on Buyer's assent of all Terms and Conditions set forth, herein, and this writing shall constitute the entire Terms and Conditions of the contract of sale notwithstanding any different or additional provisions on Buyer's order, unless otherwise expressly agreed in writing by Seller.
2. **SHIPMENTS AND DELIVERY.** All orders are Ex Works Seller's facility in Rockford, Illinois USA (or Ex Works at such warehousing facilities as Seller may establish) as defined by the International Chamber of Commerce (ICC) Incoterms 2010 unless otherwise agreed to in writing. If Seller has agreed to a delivery location other than Seller's facility, Buyer is responsible for all costs associated with the shipment of goods and insurance from Seller's facility to Buyer's final destination. Buyer's freight carrier must be approved by Seller to provide for the safe and proper delivery of goods to Buyer's final destination. The scheduled shipment date is to be considered an estimate and is not guaranteed by Seller.
3. **PRICE AND PAYMENT TERMS.** All prices are in US Dollars. Prices are subject to all federal, state and local taxes upon the production, sale or shipment of the goods sold hereunder, now or hereafter becoming effective, and if not included in the invoice, such amount may be invoiced later, and Buyer shall pay all such taxes. If the goods are exempt from such taxes, Buyer must furnish Seller with an applicable exemption certificate. Unless otherwise agreed to in writing by Seller, payment terms are 100% Paid Prior to Shipping. Partial invoices may be issued for partial shipments of goods. In the event that Seller extends payment terms to Buyer, Buyer hereby grants to Seller a purchase money security interest in all of the equipment, together with any proceeds of the equipment. Buyer authorizes Seller to file a uniform commercial code financing statement or take such other action necessary to perfect or otherwise provide notice of its security interest, without Buyer's signature or further authorization in order to perfect such security interest.
4. **INSURANCE.** The risk of loss passes to Buyer upon delivery of the goods to the freight carrier at Seller's facility. Insurance against loss or damage to the goods during shipment is the responsibility of Buyer. Claims against a carrier for damage caused during transport to the destination will be made by the Buyer. Until the entire purchase price for the goods is paid in full, Buyer will keep the goods insured against loss or damage by fire and other risks and hazards included with so-called "extended coverage" insurance, in an amount at least equal to such purchase price. Losses under such insurance shall be made payable to Seller and any payments under such insurance shall be paid to Seller and applied to the unpaid balance of the purchase price. Buyer will furnish Seller with copies of the policies of such insurance and each renewal thereof.
5. **CANCELLATION AND RETURN.** Unless otherwise agreed in writing by Seller, all orders are non-cancellable and non-refundable. No equipment will be accepted for return without prior written authorization from the Seller. All returns are subject to Seller's inspection upon receipt. Credit will not be allowed on damaged or used material. If a return is allowed by Seller, a restocking charge equal to 20% of the invoice price. All equipment authorized for return shall be shipped prepaid by Buyer to Seller. Risk of loss of all returned goods shall remain with Buyer until Seller's acceptance of delivery at Seller's premises.
6. **PATENT INDEMNITY.** Seller agrees to defend any suit or proceeding brought against Buyer based on the claim that the equipment as furnished by Seller infringes any claim of any currently existing patent, other than a claim covering a process or product thereof, provided Seller is given: (i) prompt written notice of any such claim, together with copies of all demands and complaints; (ii) the opportunity to procure for Buyer or such user the right to continue using the equipment, or to modify it so that any infringement no longer exists, to remove the product or part thereof and refund the original user's net book value thereof; and (iii) control over any negotiations looking toward settlement and the defense of any such suit or proceeding. Buyer shall provide full cooperation to Seller in all such matters. This agreement shall not apply to infringements by reason of the manufacture, use or sale of the equipment in combination with other products or in the operation of any process, or the product of any process. The foregoing states the entire obligation of Seller for patent infringement and is in lieu of any statutory warranty relating to infringements. Under no circumstances shall Seller be liable for loss of production, loss of profits or any other indirect, consequential or incidental damages. The foregoing indemnity shall not apply to any products manufactured by Seller in accordance with drawings, specifications or designs furnished by Buyer but in such case, Buyer shall indemnify Seller in the same manner set forth above.
7. **NO LICENSE/PATENTS.** Equipment (including Software Materials) can be employed as a part of or in a large number of complete systems and processes, certain of which are covered by presently existing or future patents or patent applications owned by or licensed to Seller. Notice is hereby given that the sale of the equipment does not include an express or implied license to construct any system or practice any process covered by patents or patent applications owned by or licensed to Seller; provided, however, that this provision shall not prevent Buyer from utilizing the equipment for the purposes for which it was constructed and intended.
8. **SOFTWARE LICENSING.** By accepting and using a CNC control incorporating application software licensed from the control manufacturer and Seller, Buyer agrees that such software (Software) constitutes valuable trade secrets and proprietary information of the control manufacturer and Seller, and/or its licensors and that you shall hold the Software in confidence and secrecy and shall not, in whole or in part, copy or disclose the Software to any third party or make any unauthorized use thereof. Authorized use shall

be limited to the CNC control upon which the Software is initially supplied. You further agree that this Agreement shall inure to the benefit of control manufacturer and Seller, any third party holding any right, title or interest in the Software, or any software from which it is derived, and their respective transferees, successors, and assignees.

9. **SAFETY.** It is the responsibility of Buyer to know, understand and comply with the work and safety laws and regulations in effect and governing Buyer's use of the goods sold hereunder. Seller assumes no responsibility for damages, injuries or accidents caused by improper or other than normal use, as directed by Seller, of the equipment. The equipment includes Seller's standard safety devices normal to such system or equipment. Additional safety devices may be required by laws and regulations applicable to the Buyer. It is Buyer's responsibility to identify and furnish any additional safety devices required for Buyer's intended usage and location.
10. **CONFIDENTIALITY.** Any proposals, prints, brochures, drawings, or other information furnished to the Buyer by Seller is intended for confidential use by the Buyer (or Buyer's original user), shall remain the property of Seller and shall not be used or disclosed by Buyer except as necessary for the use and maintenance of equipment. Should such confidential information ever be used or disclosed in violation of this Section, Seller shall be entitled to liquidated damages in the amount equal to the purchase price of the purchased goods, an injunction by any competent court or arbitrator to enjoin and restrain the unauthorized disclosure of such information, and any other available remedy at law or in equity.
11. **WARRANTY; LIMITATION OF REMEDY.** Seller warrants the equipment sold hereunder (excluding software): (a) will conform to the specifications provided, or agreed to in writing, by Seller; and (b) will be free from defects in material and workmanship, for a period of twelve (12) months from date of shipment (the "Warranty Period"). Seller grants no warranty on tooling and consumables, and other perishable items including but not limited to punches and dies, plasma nozzles and electrodes, and laser cutting head optics, cover slides, nozzles, fiber tips, nozzle adapters, ceramic insulators and any other items located below the lower cover slide. Any goods covered by this warranty that are defective, will be repaired or replaced at Seller's option, as the sole and exclusive remedy available to Buyer under this warranty. Seller reserves the right to inspect the goods that are asserted to be defective to confirm its condition. THE WARRANTY CONTAINED HEREIN IS IN LIEU OF ANY OTHER WARRANTY, WHETHER EXPRESSED OR IMPLIED BY STATUTE OR OTHERWISE, INCLUDING ANY WARRANTY OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR NONINFRINGEMENT (WHICH WARRANTIES ARE HEREBY SPECIFICALLY DISCLAIMED AND EXCLUDED UNDER THIS CONTRACT). The warranties provided herein shall be void if (i) equipment is utilized by Buyer for a purpose or to perform a function for which such equipment was not designed or originally intended; (ii) any change, addition, alteration, modification or repairs have been made in or to equipment without Seller's prior written consent; (iii) where equipment is used with consumables, tooling, and/or accessories not furnished by Seller and/or modifications that have not been recommended or approved by Seller in writing; (iv) where Buyer has failed to utilize qualified maintenance and operating personnel in the operation and/or repair of the equipment; (v) where installation, maintenance and operation of the equipment has not been in strict accordance with applicable manuals and instructions furnished by Seller; or (vi) where equipment has been subject to misuse, negligence or accident in installation or operation beyond Seller's control.
12. **LIMITATION OF LIABILITY.** SELLER'S LIABILITY ON ANY CLAIM(S) OF ANY KIND, INCLUDING NEGLIGENCE OR STRICT LIABILITY, FOR ANY LOSS OR DAMAGE ARISING OUT OF, CONNECTED WITH, OR RESULTING FROM THE PERFORMANCE OR BREACH OF THE TERMS HEREOF, SHALL IN NO CASE EXCEED THE PRICE ALLOCABLE TO THE GOODS WHICH GIVE RISE TO THE CLAIM. IN NO EVENT SHALL SELLER HAVE ANY LIABILITY FOR ANY INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH A BREACH OF THE CONTRACT OF SALE OR ANY OTHER DUTY OF SELLER WITH RESPECT TO THESE GOODS INCLUDING, BUT NOT LIMITED TO, INCIDENTAL OR CONSEQUENTIAL DAMAGES SUCH AS FOR LOST PRODUCTION, LOST PROFITS, LOST SALES, EVEN IF SELLER HAS BEEN ADVISED OF THE POSSIBILITY THEREOF, OR INJURY TO PERSONS OR PROPERTY.
13. **NOTICE OF CLAIMS.** Buyer shall inspect the goods upon receipt and shall notify Seller in writing of any claims, including claims for shortage or breach of warranty, within 14 days after Buyer discovers or should have discovered facts upon which the claim is based. Failure of Buyer to give written notice of a claim within the time period or in the form specified above shall be deemed to be a waiver of such claim.
14. **INDEMNITY.** BUYER SHALL INDEMNIFY, SAVE AND HOLD HARMLESS TO THE FULLEST EXTENT PERMITTED BY LAW, SELLER AND ANY OF ITS OFFICERS, AGENTS, EMPLOYEES, PARENTS OR AFFILIATES FROM AND AGAINST ANY LOSS, DAMAGES, CLAIMS, ACTIONS, PENALTIES, LIABILITIES AND COSTS, INCLUDING ATTORNEY'S FEES, ARISING FROM ANY LOSS OR DAMAGE TO PROPERTY OR INJURY TO PERSONS, INCLUDING, WITHOUT LIMITATION, ANY INJURY, DISABILITY OR DEATH OF WORKERS OR EMPLOYEES, CAUSED BY OR IN ANY MANNER CAUSED OR ALLEGEDLY CAUSED DIRECTLY OR INDIRECTLY BY: (i) OPERATION OF THE EQUIPMENT WITHOUT ALL SAFETY DEVICES, GUARDS AND PROPER SAFE OPERATING PROCEDURES OR WITH PERSONS OTHER THAN QUALIFIED OPERATING PERSONNEL; OR (ii) THE POSSESSION, USE, MODIFICATION, OR OPERATION OF THE GOODS AFTER DELIVERY. BUYER'S OBLIGATION HEREUNDER IS IN NO WAY LIMITED TO ANY PROTECTION AFFORDED IT UNDER WORKERS' COMPENSATION ACTS, DISABILITY BENEFITS ACTS, OR OTHER EMPLOYEE BENEFITS ACTS.
15. **FORCE-MAJEURE.** The Seller is released of the obligation for full, partial, and proper performance of its obligations under the contract for goods, if resulting from circumstances beyond its reasonable control (including, but not limited to, government action, war/armed hostilities, military actions, embargo, fire, flood, earthquake, strike, epidemic, act of God, or tornado). The delivery dates stipulated by this Contract shall extend for the duration of such circumstances.
16. **CHOICE OF LAW AND FORUM.** All rights of the parties hereto shall be governed by and construed in accordance with the laws of the State of Illinois, and, to the extent the arbitration clause above may be held unenforceable, such dispute or cause of action shall be heard exclusively in Winnebago County, State of Illinois, for state jurisdiction, and the Northern District of Illinois, Western Division, for federal jurisdiction.
17. **EXPORT RESTRICTIONS.** Any commodities, technology, or software that will be exported from the United States by Buyer will be done so in accordance with the Export Administration Regulations. Diversion contrary to U.S. law is prohibited.

## RESOLUTION FOR THE SURPLUS AND SALE OF REAL PROPERTY

WHEREAS, the Columbus Public Schools Board of Education has determined that certain real property owned by the District, described as “Cassette House”, 2662 Pershing Road, Columbus, Nebraska; Lot 3 Blk I North Park 1<sup>st</sup> Columbus is no longer necessary for school district operations and is considered surplus property;

WHEREAS, the District desires to sell said surplus property in accordance with applicable state laws and regulations;

NOW, THEREFORE, BE IT RESOLVED by the Columbus Public Schools Board of Education as follows:

**1. Declaration of Surplus Property:**

The property described and referred to as “Cassette House” above is hereby declared as surplus real property of the Columbus Public Schools.

**2. Sale Authorization:**

The Superintendent of Schools is hereby authorized to initiate the process of selling the surplus property, utilizing the following method(s):

- **Listing Agent:** The property will be listed by a licensed listing agent or agents in order to attract a suitable buyer.
- **Negotiated Sale:** If a suitable buyer is identified, the Superintendent may negotiate a sale price with the approval from the Board of Education.

**3. Sale Requirements:**

- **Appraisal:** Prior to the sale, the property will be appraised by a qualified real estate appraiser to establish a fair market value.
- **Sale Proceeds:** Proceeds from the sale will be deposited into the District's Special Building Fund and used for purposes defined under statute.

**4. Compliance with Law:**

The sale of surplus property shall be conducted in full compliance with all applicable state laws and regulations regarding the sale of public property.

**5. Board Approval:**

The final approval for the sale of the property listed above will be made at a regular meeting of the Board of Education and with an affirmative recorded vote of at least two-thirds of all the members of the board. (Reference: NE §79-10,114)

BE IT FURTHER RESOLVED that the Superintendent of Schools shall provide regular updates to the Board of Education regarding the progress of the sale process.

Adopted by the Columbus Public Schools Board of Education this \_\_\_\_\_[Date].

\_\_\_\_\_  
[Signature of Board President]

\_\_\_\_\_  
[Signature of Board Secretary]



# COLUMBUS PUBLIC SCHOOLS FOUNDATION

2508 27th Street, P.O. Box 947, Columbus, NE 68602-0947 ☐ Phone: 402-563-7000, Ext. 13033 ☐ Fax: 402-563-7005

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Nicole Anderson  
Executive Director

The Discoverers of Distinction nominating committee and the CPS Foundation Board ask permission of the CPS Board of Education to induct the following individuals on April 10, 2025 as Discoverers of Distinction. Their likeness and short biography will be on display in the front entrance of Columbus High School.

**Honorary** - Fred Bellum, Retired Superintendent Columbus Public Schools 20+ years, NASA Superintendent of the Year 1993, NCSA Distinguished Service Award 1985, Chamber president in 1980's, served on several local boards, passed bond issue to build 2 new schools, returned as interim. Founding member of GNSA legislative lobbying group.

### Legacy

Michael Floyd - Class of 1967

Founding partner of QVerity and a NY Times Best Selling co-author of *Spy the Lie: Former CIA Officers Teach You How To Detect Deception and Get the Truth: Former CIA Officers Teach You How to Persuade Anyone to Tell All*. He provides training and consulting services for local, state and federal law enforcement and intelligence agencies; high net worth families; and large corporations and firms throughout North America, Europe and Asia. He is widely recognized as a leading authority on interviewing, detection of deception and elicitation in cases involving criminal activity, personnel screening and national security issues. He is the founder of Advanced Polygraph Services, where he spent 10 years conducting high profile interviews and interrogations for law enforcement agencies, law firms and private industry.

He began his career as a commissioned officer in the US army military police, serving in the US and Asia. After spending 6 years on the staff of John E Reid & Assoc as a polygraph examiner and instructor of deception, interviewing and interrogation, he subsequently served as an officer with the Central Intelligence Agency and the National Security Agency. A graduate of the University of South Dakota with a BS in Education, Michael also holds an MS Degree in Detection of Deception from Reid College and a JD Degree from Seattle University School of Law.

*The mission of the Columbus Public Schools Foundation is to inspire learning, enrich teaching, and create opportunities for students and staff through community support.*



# COLUMBUS PUBLIC SCHOOLS FOUNDATION

Karen Blessen - Class of 1969

A graduate of University of Nebraska Lincoln.

She worked for three years as a full time artist for the Dallas Morning News. In 1989 while at DMN, Karen was the first graphic artist named as a winner of the Pulitzer Prize. The Pulitzer was awarded in the category of Explanatory Journalism for work done with teammates David Hanners and William Snyder on a special section, 'Anatomy of an Air Crash.' Though her work has been primarily as an artist, since 1999 she has incorporated her writing with her art in feature contributions to The Dallas Morning News. "ONE BULLET", a story and art package that followed the emotional aftermath of a murder in front of her home, received an Honorable Mention in the Texas Associated Press Managing Editor's 2003 competition. On New Year's Eve of the Millennium, she was a crew chief for a team of "Times Square Confetti and Airborne Materials Engineers," dropping three tons of confetti onto the crowd of celebrants below. She wrote and illustrated a story about the experience, "Diary of a Confetti Engineer", The Dallas Morning News, January 16, 2000.

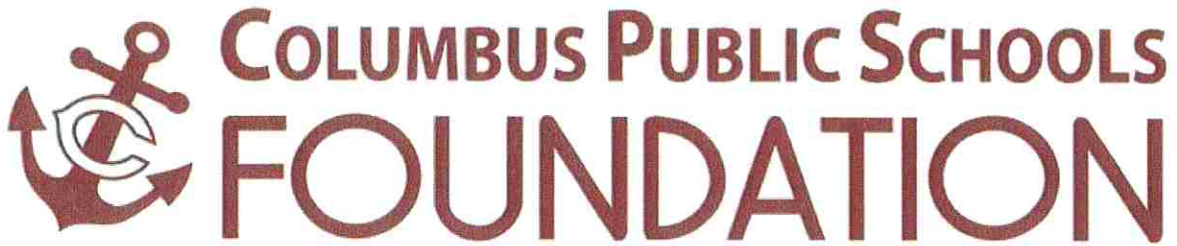
She has traveled to Africa as a member of the HIV/AIDS Advisory Committee of the international relief organization, Save the Children. On a 2002 trip to Malawi, Mozambique and South Africa, she interviewed women dealing with HIV/AIDS, and then wrote and illustrated "Faces of a Plague" for The Dallas Morning News. That piece was adapted into a theatrical production Today Marks the Beginning, which raised over \$40,000 to "adopt" two villages in Malawi.

Other major project experience includes, Be an Angel, a book collaboration with author Dana Reynolds. It was published in 1994 by Simon and Schuster. From 1994 to the present, she has worked with the Times Square Business Improvement District in New York City, creating art for the BID's banners, posters, billboards, sides of buses, maps, guidebooks, events, and web site. She represented Texas in Absolut Statehood - a series of artworks commissioned by Absolut Vodka, benefitting the Design Industries Foundation for AIDS.

She is now working on the art and design for a Dallas Area Rapid Transit rail station and adjacent two acre park. Themed 'On the Pulse,' the park incorporates five meandering sidewalks, each adorned with a 10-15 ft. mosaic, representing one of the five senses. She is also collaborating with British activist and author, Jeremy Gilley, on a children's book for Penguin Putnam. I Can Make a Difference is the story of Mr. Gilley's work with the United Nations to name September 21 as an annual global day of peace.

Other clients include Adobe Software, The Park Ridge Center (a Chicago based bioethics think-tank), RCA, Texas Instruments, The Greenwich Village Alliance, The Hartford Courant, Simon and Schuster, Harcourt-Brace, Galison Press, Microsoft, American Lawyer, Klutz Publishing, Neiman Marcus, The League of American Theatres, The Los Angeles Times, UCLA Magazine, The Wall Street Journal, Money Magazine, Smart Money Magazine, Lucent Technologies, and The Gap.

She is the founder of 29 Pieces and 29 Pieces Education: artists making a kinder world. This is just a small piece of her joy.



Connie and Jim Hellbush - Class of 1966 and 1964

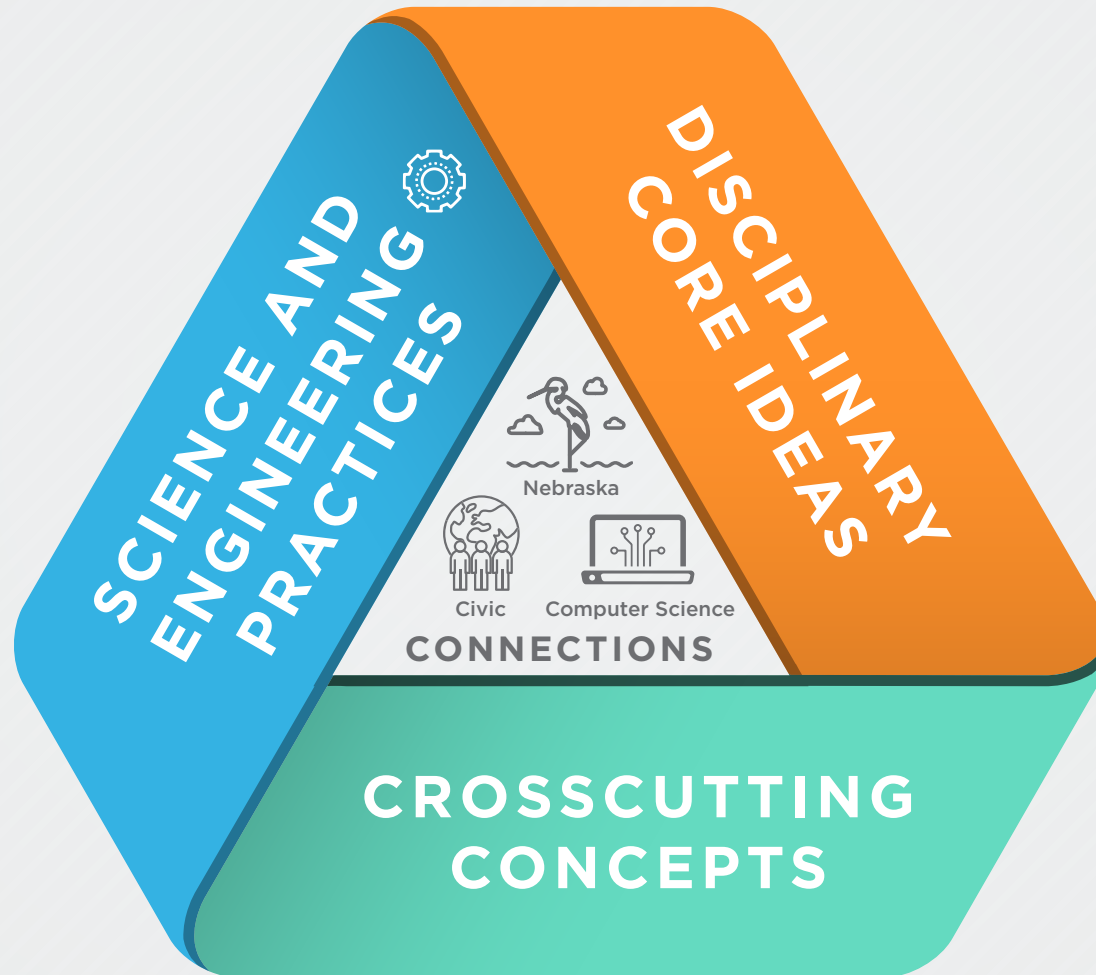
Integral in helping to start the current STEM area at Columbus High School. Instrumental in the painting of the Anchor Project. Jim graduated from University of Nebraska Lincoln and returned to Columbus to join his father's company which has grown to have an international reach with the help of Connie. Both have been very active in the Columbus Community.

Jill Hoops Seidel - Class of 2003

Was valedictorian. Attended West Point. Earned a degree in Mechanical Engineering. While at West Point she earned the West Point's Superintendent's Award of Achievement given to cadets graduating in the top 15%. UH-60 blackhawk helicopter pilot and holds pilot in command certification. While deployed in Iraq she served as flight platoon leader. While deployed in Afghanistan she managed all aviation current operations for eastern Afghanistan. She was awarded the meritorious service medal and bronze star.

She has earned a graduate degree from Northwestern University Kellogg School of Management and McCormick School of Engineering. She has served as the Director of Project Management for Angie's List and HomeAdvisor. She is currently the Technical Product Manager for Amazon in their Measurement and Data Science Team focused on advertising.

# NEBRASKA'S COLLEGE AND CAREER READY STANDARDS FOR SCIENCE



# NEBRASKA'S COLLEGE AND CAREER READY STANDARDS FOR SCIENCE 2024

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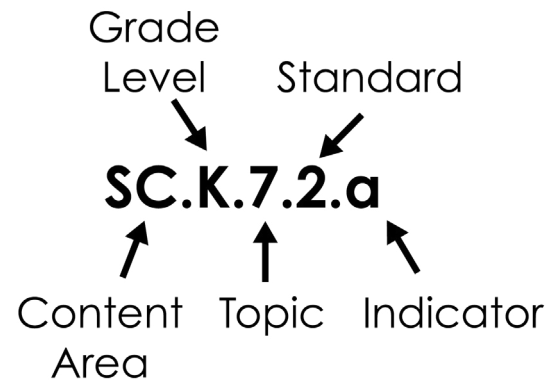
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# CONTENT AREA STANDARDS STRUCTURE

The overall structure of Nebraska's College and Career Ready Standards for Science (CCR-Science) reflects the two-tier structure common across all Nebraska content area standards. The two levels within the structure include **standards** and **indicators**. The standards are broad, overarching content-based statements that describe the basic cognitive, affective, or psychomotor expectations of student learning. The standards, across all grade levels, reflect long-term goals for learning. **Indicators** further describe what students must know and be able to do to meet the standard. These performance-based statements provide clear expectations related to student learning in each content area. Additionally, indicators provide guidance related to the assessment of student learning. This guidance is articulated by including **assessment boundary** statements.

The CCR-Science standards describe the knowledge and skills that students should learn, but they do not prescribe particular curriculum, lessons, teaching techniques, or activities. Standards describe what students are expected to know and be able to do, while the local curriculum describes how teachers will help students master the standards. A wide variety of instructional resources may be used to meet the state content area standards. Decisions about curriculum and instruction are made locally by individual school districts and classroom teachers. The Nebraska Department of Education provides guidance related to high-quality instructional materials selection and implementation. Please visit the [Nebraska Instructional Materials Collaborative](#).

In addition to a common structure for content area standards, a consistent numbering system is used for content area standards. The numbering system is as follows:



# CONTENT AREA STANDARDS OVERVIEW

Nebraska Revised Statute 79-760.01 requires the State Board of Education to adopt measurable academic content standards for the areas of reading, writing, mathematics, science, and social studies. Standards describe grade-level expectations for given content areas and provide a framework upon which Nebraska districts develop, establish, and implement curriculum. For effective teaching and learning to occur, the content area standards should drive local decisions related to instructional materials, resources, and interim, formative, and summative assessments.

The Nebraska Department of Education has identified quality criteria in the development of content area standards. These criteria ensure that standards are grounded in a strong research base of human cognition, motivation, and teaching and learning and describe essential knowledge and skills for college, career, and civic readiness. The revised science standards, written by teams of Nebraska educators and reviewed by local and national experts, were developed with the following indicators of quality:

**Measurable:** Standards provide benchmarks against which student progress toward learning goals can be measured.

**Appropriately challenging:** Standards must build in complexity so that by the end of grade 12, students are prepared for postsecondary education and the workforce.

**Connected:** Student learning is most effective when it connects knowledge and skills to related topics and authentic applications.

**Clearly worded:** Content area standards must effectively communicate what students should know and be able to do.

**Scaffolded:** Indicators in the Nebraska content area standards scaffold student learning by sequencing connected knowledge and skills across grades so that students build and deepen understanding and ability over time.

**Specific:** Specificity assures that the language used in standards and indicators is sufficiently detailed to be accurately interpreted by educators

## ORGANIZATION AND STRUCTURE OF COLLEGE AND CAREER READY STANDARDS FOR SCIENCE (CCR-SCIENCE)

Nebraska's College and Career Ready Standards for Science (CCR-Science) are organized by grade level for grades K-8 and by grade span in high school. K-5 standards are organized to reflect the developmental nature of learning for elementary students and attend to the learning progressions that build foundational understandings of science. By the time students reach middle school (Grades 6-8), they build on this foundation in order to develop more sophisticated understandings of science concepts through high school. The topic progression for the CCR-Science standards is included in [Appendix A: Topic Progression](#).

Within each grade level/span the standards are organized around topics, and each standard addresses one topic. Each CCR-Science standard begins with the common stem: "Gather, analyze, and communicate..." This stem highlights long-term learning goals associated with rigorous science standards and provides guidance for high quality classroom instruction. To facilitate high-quality instruction, students actively gather evidence from multiple sources related to the topics. Evidence is carefully analyzed in order to describe and explain natural phenomena, and then, students communicate their understanding of the content using a variety of tools and strategies. It is important to note that while topics are introduced in a spiraled model, they are connected, and deeper understanding at subsequent

grade levels and spans requires foundational understanding of multiple topics.

The indicators reflect the three dimensions of science learning outlined in A Framework for K-12 Science Education<sup>1</sup>. Each CCR-Science indicator includes a disciplinary core idea, a crosscutting concept (underline), and a **science and engineering practice** (**bold**).

### **Disciplinary Core Ideas (DCI)**

The disciplinary core ideas are the focused, limited set of science ideas identified in the Framework as necessary for ALL students throughout their education and beyond their K-12 school years to achieve scientific literacy. The limited number of disciplinary core ideas allows more time for students and teachers to engage in the science and engineering practices as they deeply explore science ideas. To allow students to continually build on and revise their knowledge and abilities, the disciplinary core ideas are built on developmental learning progressions (Appendix A).

### **Crosscutting Concepts (CCC)**

The crosscutting concepts are used to organize and make sense of disciplinary core ideas. They serve as tools that bridge disciplinary boundaries and deepen understanding of science content. With grade-appropriate proficiency, students are expected to use patterns (cause and effect, scale, proportion, and quantity), systems and system models (energy and matter, structure and function) and stability and change as they gather, analyze, and communicate scientific understanding.








These crosscutting concepts provide structure for synthesizing knowledge from various fields into a coherent and scientifically-based view of the world.

### **Science and Engineering Practices (SEP)**

The **science and engineering practices** are used by students to demonstrate understanding of the disciplinary core ideas and crosscutting concepts. Engaging in the practices of science and engineering helps students understand the wide range of approaches used to investigate natural phenomena and develop solutions to challenges. Students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems, developing and using models, planning and carrying out investigations, analyzing and interpreting data, using mathematics and computational thinking, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information as they gather, analyze, and communicate scientific information.

Each science indicator focuses on one crosscutting concept and one **science and engineering practice** as an example to guide assessment. Curriculum, instruction, and assessment should reflect authentic science practice and be phenomena-based. Furthermore, curriculum, instruction, and assessment should use crosscutting concepts and **science and engineering practices** that go beyond what is stated in the indicator to better reflect authentic science practice. Utilizing the range of SEPs and CCCs will support deeper learning and greater understanding of the DCIs.

The following table lists the disciplinary core ideas, crosscutting concepts, and **science and engineering practices**:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<ul style="list-style-type: none"> <li>Asking Questions and Defining Problems</li> <li>Developing and Using Models</li> <li>Planning and Carrying Out Investigations</li> <li>Analyzing and Interpreting Data</li> <li>Using Mathematics and Computational Thinking</li> <li>Constructing Explanations and Designing Solutions</li> <li>Engaging in Argument from Evidence</li> <li>Obtaining, Evaluating, and Communicating Information</li> </ul>	<p> <b>LS1: From Molecules to Organisms: Structures and Processes</b>  <b>LS2: Ecosystems: Interactions, Energy, and Dynamics</b>  <b>LS3: Heredity: Inheritance and Variation of Traits</b>  <b>LS4: Biological Evolution: Unity &amp; Diversity</b>  <b>PS1: Matter and Its Interactions</b>  <b>PS2: Motion and Stability: Forces and Interactions</b>  <b>PS3: Energy</b>  <b>PS4: Waves and Their Applications in Technologies for Information Transfer</b>  <b>ESS1: Earth's Place in the Universe</b>  <b>ESS2: Earth's Systems</b>  <b>ESS3: Earth and Human Activity</b>  <b>ETS1: Engineering Design</b> </p>	<ul style="list-style-type: none"> <li> <b>Patterns</b></li> <li> <b>Cause and Effect</b></li> <li> <b>Scale, Proportion, and Quantity</b></li> <li> <b>Systems and System Models</b></li> <li> <b>Energy and Matter</b></li> <li> <b>Structure and Function</b></li> <li> <b>Stability and Change</b></li> </ul>

<sup>1</sup> *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Washington, DC: The National Academies Press, 2012.

### Icon Titles & Descriptions



#### Nebraska Connections

Opportunities to teach science using topics directly relevant to our state (e.g. Ogallala Aquifer, agriculture, Nebraska-specific flora and fauna, Nebraska's rich geologic history, etc.) are listed throughout the CCR-Science standards as "Nebraska Connections." These connections allow educators to use local, regional, and state-specific contexts for teaching, learning, and assessment. Educators should use these as recommendations for investigation with students. Additionally, assessment developers have the opportunity to use the Nebraska contexts to develop Nebraska-specific examples or scenarios from which students would demonstrate their general understanding. This approach provides the opportunity for educators to draw upon Nebraska's natural environment and rich history and resources in engineering design and scientific research to support student learning.



#### Civic Science Connections

Within the CCR-Science standards, opportunities to create civic science connections have been identified. These connections are designed to highlight the importance of students engaging in the study of civic ideals, principles, and practices through participation in the act of "citizen science." Citizen science is the public involvement in inquiry and discovery of new scientific knowledge. This engagement helps students build science knowledge and skills while improving social behavior, increasing engagement, and strengthening community partnerships. Citizen science projects enlist K-12 students to collect or analyze data

for real-world research studies. Citizen science, in conjunction with the CCR-Science standards, helps bridge our K-12 students with stakeholders in the community, both locally and globally.



### **Computer Science Connections**

Natural connections between science and computer science have been identified throughout the standards, especially in the middle level and in high school as students expand their ability to use computational thinking to develop complex models and simulations of natural and designed systems. Computers and other digital tools allow students to collect, record, organize, analyze, and communicate data as they engage in science learning.



### **Engineering, Technology, and Applications of Science Connections**

Connections to engineering, technology, and applications of science are included at all grade levels and in all domains. They highlight the interdependence of science, engineering, and technology. Additionally, these connections drive the research and development cycle where discoveries in science lead to new technologies developed using the engineering design process. These connections call attention to the effects of scientific and technological advances on society and the environment.



### **Engineering Design**

Performance indicators for the engineering design process are intentionally embedded in all grade levels. These indicators allow students to demonstrate their ability to define problems, develop possible solutions, and improve designs. ***These indicators should be reinforced whenever students are engaged in practicing engineering design during instruction.*** Having students engage in the engineering design process will prepare them to solve challenges both in and out of the classroom.

## **EDUCATOR SUPPORT & RESOURCES**

### **Implementation**

Effective science teaching, learning, and assessments should integrate disciplinary core ideas, crosscutting concepts, and **science and engineering practices**. Integration of the three dimensions will allow students to explain scientific phenomena, engage in sensemaking, design solutions to problems, and build a foundation upon which they can continue to learn and be able to apply science knowledge and skills within and outside the K-12 education arena. While each indicator incorporates the three dimensions, this alone does not drive student outcomes. Ultimately, student learning depends on how the standards are translated to instructional practices.

To support educators while they explore and implement content standards, the Nebraska Department of Education has developed the [Content Area Standards Implementation Framework](#). The Framework is based on implementation science and includes stages from “Exploration” to “Deep Implementation,” the types of work and activities associated with each stage, and roles of educators in ensuring successful implementation. The goal of the framework is to guide the alignment of standards, instruction, materials, and assessment to create a coherent system of learning.

### **Phenomenon-based Instruction**

Three-dimensional instruction offers authentic learning experiences when students engage in describing and explaining the natural world. This involves focusing the conceptual learning on anchoring and investigative phenomena to better comprehend their observations. Students utilize evidence in the sensemaking process to build concepts in their minds. Phenomena are natural, observable events that we can explain or predict using our science knowledge (the singular form of phenomena is phenomenon).

Teachers are encouraged to adopt phenomenon-based instruction to fully engage students in three-dimensional science learning. This method can be summarized in three steps:

1. Introduce a new unit or concept with a phenomenon: Start by presenting a phenomenon that is relevant to students' lives. This engages them in asking questions about their observations and fosters a desire to learn more. Many teachers already use this approach by introducing new units or concepts with tangible examples such as pictures, videos, demonstrations, or laboratory experiences.
2. Engaging in science and engineering practices: Provide opportunities for students to gather and reason about information to explain the phenomenon. Sensemaking represents a shift in science instruction where teachers refrain from giving students direct answers. Instead, they should offer multiple opportunities for students to explore the phenomenon individually and in groups, while scaffolding their learning. This approach supports students in developing an understanding of scientific concepts and constructing their own explanations for the phenomenon.
3. Communicating understanding: Ensure students have multiple opportunities to articulate their thinking about why the phenomenon occurs. To deepen their understanding, check that student explanations progress from simple descriptions of what they observe to more complex explanations and predictions of what they think is happening with the phenomenon.

Throughout this process, teachers should not provide direct answers about the phenomenon. Instead, they should facilitate experiences that help students reach an appropriate understanding. Often, this involves engaging students in scientific arguments where they challenge each other's claims and explanations using their observations and collected evidence.

### **Teacher Guides**

The [Teacher Guides](#) were created to provide guidance for developing effective instruction aligned to Nebraska's College and Career Ready Science Standards. They are intended to support teachers, administrators, science specialists, ESU's, instructional coaches, parents, and other stakeholders as they plan instruction and assessment at a local level.

The [Teacher Guides](#) are meant as a resource document which unwraps the indicators to support teacher's understanding of the standards. They are not meant to be used by students, and therefore they are not written in student-friendly language.

### **Nebraska Science Classroom Formative Task Repository**

[The Nebraska Science Classroom Formative Task Repository](#) is a collection of K-12 formative tasks aligned to the indicator level of the standards. Tasks were developed by Nebraska educators and cover the breadth of the standards giving students an opportunity to provide evidence of what they can know and can do related to that standard.

### **Graduation Requirements**

The high school life science, physical science, and Earth and space science standards are intended for **ALL** students to have learned by the end of 30 credit hours of high school science courses.

#### **Rule 10**

003.05 Graduation Requirements. Each high school must require from grades nine through twelve at least 200 credit hours for graduation, for which at least 80 percent must be from the core curriculum. The number of credit hours given for a course may be less than the number of instructional units and may be increased up to 25 percent above the number of instructional units.

003.05A3 Science. Thirty credit hours of science with course content that includes biological, earth/space, and physical science concepts with corresponding science inquiry skills and laboratory experience.

Course examples that offer the scope and sequence to include all three domains are included in [Appendix B: HS Integrated Science Course Model](#).

### **High School Plus Standards (HSP)**

The High School Plus (HSP) standards represent advanced science topics designed to enhance the rigor of general science curricula or supplement additional advanced science courses. The standards were developed using postsecondary syllabi from entry level science courses for science majors (e.g. UNL LIFE 120, CHEM 109). Introducing the content to high school students will scaffold their learning providing a bridge between high school science coursework and postsecondary level coursework. If the indicator includes HSP, it is a plus standard which is supplemental.

# KINDERGARTEN

The Kindergarten standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## What happens if you change how hard you push or pull an object?

Students are able to apply an understanding of the effects of different strengths or different directions of pushes and pulls on the motion of an object to analyze a design solution.

## What is the weather like today and how is it different from yesterday?

Students are expected to develop understanding of patterns and variations in local weather and the purpose of weather forecasting to prepare for and respond to, severe weather.

## Where do animals live and why do they live there?

Students are also expected to develop understanding of what plants and animals (including humans) need to survive and the relationship between their needs and where they live.

.....

### SC.K.1 Forces and Interactions: Pushes and Pulls

SC.K.1.1 Gather, analyze, and communicate evidence of forces and their interactions.



SC.K.1.1.a **Plan and conduct an investigation to compare the effects of** different strengths or different directions of pushes and pulls on the motion of an object. Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.



SC.K.1.1.b **Analyze data to determine if a design solution works** as intended to change the speed or direction of an object with a push or a pull. Assessment does not include friction as a mechanism for change in speed.

### SC.K.7 Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment

SC.K.7.2 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.



SC.K.7.2.a **Use observations to describe patterns** of what plants and animals (including humans) need to survive.



SC.K.7.2.b **Construct an argument supported by evidence for how plants and animals (including humans) can change the environment** to meet their needs.



SC.K.7.2.c **Use a model to represent the relationship between the needs** of different plants or animals (including humans) and the places they live.

 *NE plants and animals*



SC.K.7.2.d **Communicate solutions** that will increase the positive impact of humans on the land, water, air, and/or other living things in the local environment.

 *NE conservation organizations and agricultural practices*

## SC.K.12 Weather and Climate

SC.K.12.3 Gather, analyze, and communicate evidence of weather and climate.



SC.K.12.3.a **Use and share observations** of local weather conditions to describe patterns over time. Assessment of quantitative observations limited to whole numbers and relative measures such as warmer/cooler.



SC.K.12.3.b **Ask questions to obtain information** about the purpose of weather forecasting to prepare for, and respond to, severe weather.

 *emphasis on blizzards, tornadoes, drought, and floods*



SC.K.12.3.c **Make observations to determine** the effect of sunlight on Earth's surface.



SC.K.12.3.d **Use tools and materials to design and build a structure** that will reduce the warming effect of sunlight on an area.



SC.K.12.3.e **Ask questions, make observations, and gather information** about a situation people want to change to **define a simple problem that can be solved** through the development of a new or improved object or tool.

# GRADE 1

The grade 1 standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## What happens when materials vibrate?

Students are expected to develop understanding of the relationship between sound and vibrating materials.

## How are parents and their children similar and different?

The understanding is developed that young plants and animals are like, but not exactly the same as, their parents.

## What happens when there is no light?

Students are expected to develop understanding of the relationship between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level through determining the effect of placing objects made with different materials in the path of a beam of light.

## What objects are in the sky and how do they seem to move?

Students are able to observe, describe, and predict some patterns of the movement of objects in the sky.

## What are some ways plants and animals meet their needs so they can survive and grow?

Students are also expected to develop understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs as well as how the behaviors of parents and offspring help offspring survive.

.....

## SC.1.2 Waves: Light and Sound

SC.1.2.1 Gather, analyze, and communicate evidence of light and sound waves.



SC.1.2.1.a **Plan and conduct investigations** to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.



SC.1.2.1.b **Make observations to construct** an evidence-based explanation that objects can be seen only when illuminated.



SC.1.2.1.c **Plan and conduct an investigation** to determine the effect of placing objects made with different materials in the path of a beam of light. *Assessment does not include the speed of light.*



SC.1.2.1.d **Use tools and materials to design and build** a device that uses light or sound to solve the problem of communicating over a distance. *Assessment does not include technological details for how communication devices work.*

## SC.1.6 Structure, Function, and Information Processing

SC.1.6.2 Gather, analyze, and communicate evidence to show the relationship between structure and function in living things.



SC.1.6.2.a **Use materials to design a solution** to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

 *NE plants and animals*



SC.1.6.2.b **Develop a simple sketch, drawing, or physical model** to illustrate how the shape of an object helps it function as needed to solve a given problem.



SC.1.6.2.c **Read grade appropriate texts and use media to determine patterns** in a behavior of parents and offspring that help offspring survive.

 *NE plants and animals*



SC.1.6.2.d **Make observations to construct an evidence-based account** that young plants and animals are like, but not exactly like, their parents. Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.

 *NE plants and animals*

### SC.1.11 Space Systems: Patterns and Cycles

SC.1.11.3 Gather, analyze, and communicate evidence of patterns and cycles of space systems.



SC.1.11.3.a **Use observations** of the sun, moon, and stars to describe patterns that can be predicted. Assessment of star patterns is limited to stars being seen at night and not during the day.



SC.1.11.3.b **Make observations** at different times of the year to relate the amount of daylight to the time of year. Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.

# GRADE 2

The grade 2 standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## How are materials similar and different from one another and how do the properties of the materials relate to their use?

An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials.

## What do plants need to grow?

Students are expected to develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination.

## How many types of living things live in a place?

Students are expected to compare the diversity of life in different habitats.

## How does land change and what causes it to change?

Students are able to apply their understanding of the idea that wind and water can change the shape of land to compare design solutions to slow or prevent such change.

## What are the different kinds of land and bodies of water?

Students are able to use information and models to identify and represent the shapes and kinds of land and bodies of water in an area and where water is found on Earth.

.....

## SC.2.3 Structure and Properties of Matter

SC.2.3.1 Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter.



SC.2.3.1.a **Plan and conduct an investigation** to describe and classify different kinds of materials by their observable properties.

 *Soil properties*



SC.2.3.1.b **Analyze data obtained from testing different materials** to determine which materials have the properties that are best suited for an intended purpose. *Assessment of quantitative measurements is limited to length and weight.*



SC.2.3.1.c **Analyze data** from tests of two objects, **designed to solve the same problem**, to compare the strengths and weaknesses based on the properties.



SC.2.3.1.d **Make observations to construct an evidence-based account** of how an object made of a small set of pieces can be disassembled and made into a new object.



SC.2.3.1.e **Construct an argument with evidence** that some changes caused by heating or cooling can be reversed and some cannot.

## SC.2.7 Interdependent Relationships in Ecosystems

SC.2.7.2 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.



SC.2.7.2.a **Plan and conduct an investigation** to determine if plants need sunlight and water to grow. *Assessment is limited to testing one variable at a time.*



SC.2.7.2.b **Develop a simple model** that mimics the function of an animal in dispersing seeds or pollinating plants.

SC.2.7.2.c **Make observations** of plants and animals **to compare** the diversity of life in different habitats. Assessment does not include specific animal and plant names in specific habitats.

 *NE habitats*

### SC.2.13 Earth's Systems: Processes That Shape the Earth

SC.2.13.3 Gather, analyze, and communicate evidence of the processes that shape the earth.



SC.2.13.3.a **Use information from several sources to provide evidence** that Earth events can occur quickly or slowly.

Assessment does not include quantitative measurements of timescales.

 *Flooding and tornadoes quickly cause change; wind slowly formed the Sandhills*



SC.2.13.3.b **Compare multiple solutions designed to** slow or prevent wind or water from changing the shape of the land.

 *Soil conservation*



SC.2.13.3.c **Develop a model to represent** the shapes and kinds of land and bodies of water in an area. Assessment does not include quantitative scaling in models.

 *Human made dams, sandbagging, windbreaks, terracing*



SC.2.13.3.d **Obtain information to identify** where water is found on Earth and that it can be solid or liquid.

 *NE water bodies*

# GRADE 3

The grade 3 standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## How do equal and unequal forces on an object affect the object?

Students are able to determine the effects of balanced and unbalanced forces on the motion of an object and the cause and effect relationships of electrical or magnetic interactions between two objects not in contact with each other.

## How can magnets be used?

Students are able to apply their understanding of magnetic interactions to define a simple design problem that can be solved with magnets.

## How do organisms vary in their traits?

Students are expected to develop an understanding of the similarities and differences of organisms' life cycles. Students develop an understanding that organisms have different inherited traits and that the environment can also affect the traits that an organism develops. In addition, students are able to construct an explanation using evidence for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

## How are plants, animals, and environments of the past similar or different from current plants, animals, and environments?

Students are expected to develop an understanding of types of organisms that lived long ago, and also about the nature of their environments.

## What happens to organisms when their environment changes?

Students are expected to develop an understanding of the idea that when the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die.

## What is typical weather in different parts of the world and during different times of the year?

Students are able to organize and use data to describe typical weather conditions expected during a particular season.

## How can the impact of weather-related hazards be reduced?

By applying their understanding of weather-related hazards, students are able to make a claim about the merit of a design solution that reduces the impacts of such hazards.

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### SC.3.1 Forces and Interactions: Motion and Stability

SC.3.1.1 Gather, analyze, and communicate evidence of forces and their interactions.



SC.3.1.1.a **Plan and conduct an investigation** to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.



SC.3.1.1.b **Make observations and/or measurements** of an object's motion to provide evidence that a pattern can be used to predict future motion. Assessment does not include technical terms such as period and frequency.



SC.3.1.1.c **Ask questions** to determine cause and effect relationships of electrical or magnetic interactions between two objects not in contact with each other. Assessment is limited to forces produced by objects that can be manipulated by students. Electrical interactions are limited to static electricity.



SC.3.1.1.d **Define a simple design problem** that can be solved by applying scientific ideas about magnets.

### SC.3.7 Interdependent Relationships in Ecosystems

SC.3.7.2 Gather, analyze, and communicate evidence of the interdependent relations in ecosystems.



SC.3.7.2.a **Construct an argument** that some animals form groups that help members survive.

 *NE animals*



SC.3.7.2.b **SC.3.7.2.b Analyze and interpret data** from fossils to provide evidence of the organisms and environments in which they lived long ago. Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.

 *NE fossils; NE geologic history*



SC.3.7.2.c **Construct an argument with evidence** that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

 *NE habitats*



SC.3.7.2.d **Make a claim about the merit of a solution to a problem** caused when the environment changes and the types of plants and animals that live there may change. Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.

 *NE habitats*



SC.3.7.2.e **Generate and compare multiple possible solutions to a problem** based on how well each is likely to meet the criteria and constraints of the problem.

### SC.3.9 Inheritance and Variation: Life Cycles and Traits

SC.3.9.3 Gather and analyze data to communicate an understanding of inheritance and variation of traits through life cycles and environmental influences.



SC.3.9.3.a **Develop models** to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.

 *NE plants and animals*



SC.3.9.3.b **Analyze and interpret data** to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.

 *NE plants and animals*



SC.3.9.3.c **Use evidence to support the explanation** that traits can be influenced by the environment.

 *NE plants, animals, and habitats*



SC.3.9.3.d **Use evidence to construct an explanation** for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

 *NE plants, animals, and habitats*

### SC.3.12 Weather and Climate

SC.3.12.4 Gather and analyze data to communicate an understanding of weather and climate.



SC.3.12.4.a **Represent data** in table, pictograph, and bar graph displays to describe typical weather conditions expected during a particular season. Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.

 *NE weather and climate*



SC.3.12.4.b **Obtain and combine information** to describe climates in different regions of the world.



SC.3.12.4.c **Make a claim about the merit of a design solution** that reduces the impacts of a weather-related hazard.

# GRADE 4

The grade 4 standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## **What are waves and what are some of the things they can do?**

Students are able to use a model of waves to describe patterns of waves in terms of amplitude and wavelength, and that waves can cause objects to move.

## **What is energy and how is it related to motion?**

Students are able to use evidence to construct an explanation of the relationship between the speed of an object and the energy of that object.

## **How is energy transferred?**

Students are expected to develop an understanding that energy can be transferred from place to place by sound, light, heat, and electrical currents or from object to object through collisions.

## **How can energy be used to solve a problem?**

They apply their understanding of energy to design, test, and refine a device that converts energy from one form to another.

## **How do internal and external structures support the survival, growth, behavior, and reproduction of plants and animals?**

Students are expected to develop an understanding that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. By developing a model, students describe that an object can be seen when light reflected from its surface enters the eye.

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## **SC.4.2 Waves: Waves and Information**

SC.4.2.1 Gather, analyze, and communicate evidence of waves and the information they transfer.



SC.4.2.1.a **Develop a model** of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.



SC.4.2.1.b **Generate and compare multiple solutions** that use patterns to transfer information.

## SC.4.4 Energy: Conservation and Transfer

SC.4.4.2 Gather, analyze and communicate evidence of energy conservation and transfer.



SC.4.4.2.a Use evidence to **construct an explanation** relating the speed of an object to the energy of that object. Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.



SC.4.4.2.b **Make observations** to provide evidence that energy can be transferred from place to place by sound, light, heat, and electrical currents. Assessment does not include quantitative measurements of energy.

 *NE energy producers*



SC.4.4.2.c **Ask questions** and predict outcomes about the changes in energy that occur when objects collide. Assessment does not include quantitative measurements of energy.



SC.4.4.2.d Apply scientific ideas to **design, test, and refine a device** that converts energy from one form to another. Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.



SC.4.4.2.e **Plan and carry out fair tests in which variables are controlled** and failure points are considered to identify aspects of a model or prototype that can be improved.



SC.4.4.2.f **Obtain and combine information** to describe that energy and fuels are derived from natural resources and that their uses affect the environment.

 *NE ethanol production*

## SC.4.6 Structure, Function, and Information Processing

SC.4.6.3 Gather and analyze data to communicate an understanding of structure, function and information processing of living things.



SC.4.6.3.a **Develop a model** to describe that light reflecting from objects and entering the eyes allows objects to be seen. Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.



SC.4.6.3.b **Construct an argument** that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. Assessment is limited to macroscopic structures within plant and animal systems.

 *NE plants and animals*



SC.4.6.3.c **Use a model** to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information. Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.

 *NE plants and animals*

## SC.4.13 Earth's Systems: Processes That Shape the Earth

SC.4.13.4 Gather and analyze data to communicate an understanding of Earth's systems and processes that shape the Earth.



SC.4.13.4.a **Identify evidence** from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.

 *NE fossils and geologic history*



SC.4.13.4.b **Make observations and/or measurements** to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. Assessment is limited to a single form of weathering or erosion.



SC.4.13.4.c **Analyze and interpret data** from maps to describe patterns of Earth's features.

SC.4.13.4.d **Generate and compare multiple solutions** to reduce the impacts of natural Earth processes on humans.  
Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.

# GRADE 5

The grade 5 standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## When matter changes, does its weight (mass) change?

Students are able to describe that matter is made of particles too small to be seen through the development of a model. Students develop an understanding of the idea that regardless of the type of change that matter undergoes, the total weight of matter is conserved.

## Can new substances be created by combining other substances?

Students determine whether the mixing of two or more substances results in new substance.

## How does matter cycle through ecosystems and where does the energy in food come from and what is it used for?

Students develop an understanding of the idea that plants get the materials they need for growth chiefly from air and water. Using models, students can describe the movement of matter among plants, animals, decomposers, and the environment and that energy in animals' food was once energy from the sun.

## How much water can be found in different places on Earth and how does water move through the Earth system?

Students describe and graph data to provide evidence about the distribution of water on Earth. Through the development of a model using an example students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. This model will also allow students to define a simple design problem that relates to the conservation of fresh water.

## How do lengths and directions of shadows or relative lengths of day and night change from day to day, and how does the appearance of some stars change in different seasons?

Students are expected to develop an understanding of patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

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### SC.5.3 Structure and Properties of Matter

SC.5.3.1 Gather, analyze, and communicate evidence of structure and properties of matter.



SC.5.3.1.a **Develop a model** to describe that matter is made of particles too small to be seen. Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.



SC.5.3.1.b **Measure and graph quantities** to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. Assessment does not include distinguishing mass and weight.



SC.5.3.1.c **Make observations and measurements** to identify materials based on their properties. Assessment does not include density or distinguishing mass and weight.



SC.5.3.1.d **Conduct an investigation** to determine whether the mixing of two or more substances results in new substances.

### SC.5.8 Matter and Energy in Organisms and Ecosystems

SC.5.8.2 Gather and analyze data to communicate understanding of matter and energy in organisms and ecosystems.



SC.5.8.2.a **Use models** to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun.



SC.5.8.2.b **Support an argument** that plants get the materials they need for growth chiefly from air and water.



SC.5.8.2.c **Develop a model** to describe the movement of matter among plants, animals, decomposers, and the environment. Assessment does not include molecular explanations or the biochemical mechanisms of photosynthesis.

 *NE ecosystems*

### SC.5.11 Space Systems: Earth's Stars and Solar System

SC.5.11.3 Gather and analyze data to communicate understanding of space systems: Earth's stars and solar system.



SC.5.11.3.a **Support an argument** that the gravitational force exerted by Earth on objects is directed down toward Earth's center. Assessment does not include mathematical representation of gravitational force.



SC.5.11.3.b **Support an argument** that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, and stage).



SC.5.11.3.c **Represent data in graphical displays** to reveal patterns of daily changes in the length and direction of shadows, length of day and night, and the seasonal appearance of some stars in the night sky. Assessment does not include causes of seasons.

### SC.5.13 Earth's Systems

SC.5.13.4 Gather and analyze data to communicate understanding of Earth's systems.



SC.5.13.4.a **Develop a model** using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. Assessment is limited to the interactions of two systems at a time.

 *NE systems*



SC.5.13.4.b **Describe and graph** the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. Assessment is limited to oceans, lakes, rivers, glaciers, groundwater, and polar ice caps but does not include the atmosphere.

 *NE bodies of water*



SC.5.13.4.c **Obtain and combine information** about ways individual communities use science ideas to protect the Earth's resources and environment.

 *NE conservation organizations*



SC.5.13.4.d **Define a simple design problem** that can be solved by applying scientific ideas about the conservation of fresh water on Earth.

 *NE conservation organizations*



SC.5.13.4.e **Define a simple design problem** reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

# GRADE 6

The grade 6 standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## How can energy be transferred from one object or system to another?

Students are expected to know the difference between energy and temperature and begin to develop an understanding of the relationship between force and energy. Students are also expected to apply an understanding of design to the process of energy transfer.

## How do the structures of organisms contribute to life's functions?

Students are expected to understand that all organisms are made of cells, that special structures are responsible for particular functions in organisms, and that for many organisms the body is a system of multiple interacting subsystems that form a hierarchy from cells to the body.

## How do organisms grow, develop, and reproduce?

Students are expected to explain how select structures, functions, and behaviors of organisms change in predictable ways as they progress from birth to old age.

## What factors interact and influence weather and climate?

Students are expected to construct and use models to develop an understanding of the factors that determine weather and climate. A systems approach is also important here, examining the feedbacks between systems as energy from the sun is transferred between systems and circulates through the oceans and atmosphere.

## How does water move through Earth's systems?

Students understand how Earth's geosystems operate by modeling the flow of energy and cycling of matter within and among different systems.

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## SC.6.4 Energy

SC.6.4.1 Gather, analyze, and communicate evidence of energy.



SC.6.4.1.a Apply scientific principles to **design, construct, and test a device** that either minimizes or maximizes thermal energy transfer. Assessment does not include calculating the total amount of thermal energy transferred.



SC.6.4.1.b **Define the criteria and constraints of a design problem** with sufficient precision to ensure a successful solution, taking into account relevant scientific principle and potential impacts on people and the natural environment that may limit possible solutions.



SC.6.4.1.c **Plan an investigation** to determine the relationships among the energy transferred, type of matter, mass, and change in average kinetic energy of particles as measured by the temperature of the sample. Assessment does not include calculating the total amount of thermal energy transferred.



SC.6.4.1.d **Construct, use, and present arguments** to support the claim that when kinetic energy of an object changes, energy is transferred to or from the object. Assessment does not include calculations of energy.

## SC.6.6 Structure and Function and Information Processing

SC.6.6.2 Gather, analyze, and communicate evidence of the relationship between structure and function in living things.



SC.6.6.2.a **Conduct an investigation** to provide evidence that living things are made of cells; either one cell or many varied cells.



SC.6.6.2.b **Develop and use a model** to describe the function of a cell as a whole and ways parts of a cell contribute to the function. Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.



SC.6.6.2.c **Use argument supported by evidence** for how the body is a system of interacting subsystems composed of groups of cells. Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.



SC.6.6.2.d **Gather and synthesize information** that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or stored as memories. Assessment does not include mechanisms for the transmission of this information.

## SC.6.9 Growth, Development, and Reproduction of Organisms

SC.6.9.3 Gather, analyze, and communicate evidence of the inheritance and variation of traits.



SC.6.9.3.a **Construct an argument** based on evidence for how plant and animal adaptations affect the probability of successful reproduction.

 *monarchs/milkweed; seed dispersal in prairie grasses*



SC.6.9.3.b **Construct a scientific explanation** based on evidence for how environmental and genetic factors influence the growth of organisms. Assessment does not include genetic mechanisms, gene regulation, or biochemical processes.

 *NE plants and animals*



SC.6.9.3.c **Develop and use a model** to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.

## SC.6.12 Weather and Climate

SC.6.12.4 Gather, analyze, and communicate evidence of factors and interactions that affect weather and climate.



SC.6.12.4.a **Collect data** to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions. Assessment does not include recalling the names of cloud types or weather symbols used on weather maps or the reported diagrams from weather stations.

 *NE weather conditions*



SC.6.12.4.b **Develop and use a model** to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. Assessment does not include the dynamics of the Coriolis effect.



SC.6.12.4.c **Ask questions** to clarify evidence of the factors that have caused the change in global temperatures over thousands of years.



SC.6.12.4.d **Analyze and interpret data** on weather and climate to forecast future catastrophic events and inform the development of technologies to mitigate their effect.

### SC.6.13 Earth's Systems

SC.6.13.5 Gather, analyze, and communicate evidence of the flow of energy and cycling of matter associated with Earth's materials and processes.



SC.6.13.5.a **Develop a model** to describe how the water cycle is driven by the sun's energy and the force of gravity.

A quantitative understanding of the latent heat of vaporization and fusion is not assessed.

 NE systems

# GRADE 7

The grade 7 standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## How does thermal energy affect particles?

Students will be able to provide molecular level descriptions that explain states of matter and changes between states.

## Why do different pure substances have different physical and chemical properties and how do those properties determine how substances are used?

Students are expected to understand what occurs at the atomic molecular scales.

## What happens when new materials are formed?

Students are expected to provide molecular level descriptions to explain that chemical reactions involve regrouping of atoms to form new substances and that atoms rearrange during chemical reactions.

## How do organisms obtain and use energy?

Students are expected to use conceptual and physical models to explain the transfer of energy and cycling of matter as they construct explanations for the role of photosynthesis in cycling matter in ecosystems.

## How does matter and energy move through an ecosystem?

Students are expected to construct explanations for the cycling of matter in organisms and the interaction of organisms to obtain matter and energy from an ecosystem to survive and grow.

## How do organisms interact with other organisms in the physical environment to obtain matter and energy?

Students are expected to understand that organisms and populations of organisms are dependent on their environmental interactions both with other organisms and with non-living factors.

## How do people figure out that Earth and life on Earth have changed over time?

Students are expected to examine geoscience data in order to understand the processes and events in Earth's history.

## How do the materials in and on Earth's crust change over time?

Students are expected to understand how Earth's geosystems operate by modeling the flow of energy and the cycling of matter within and among different systems.

## How do human activities affect Earth's systems?

Students are expected to understand the ways that human activities impact Earth's other systems

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## SC.7.3 Structure and Properties of Matter

SC.7.3.1 Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter.



SC.7.3.1.a **Develop models** to describe the atomic composition of simple molecules. Assessment does not include valence electrons and bonding energy, discussing the ionic nature of subunits of complex structures, or a complete description of all individual atoms in a complex molecule or extended structure is not required.



SC.7.3.1.b **Gather and make sense of information** to describe how natural materials may undergo chemical reactions to create new synthetic materials and have an impact on society. Assessment is limited to qualitative information.



SC.7.3.1.c **Develop a model** that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

## SC.7.5 Chemical Reactions

SC.7.5.2 Gather, analyze, and communicate evidence of chemical reactions.



SC.7.5.2.a **Analyze and interpret data** on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. Assessment is limited to analysis of the following properties: density, melting point, boiling point, solubility, flammability, and odor.



SC.7.5.2.b **Develop and use a model** to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. Assessment does not include the use of atomic masses, balancing symbolic equations, or intermolecular forces.



SC.7.5.2.c **Undertake a design project** to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes. Assessment is limited to the criteria of amount, time, and temperature of substance in testing the device.



SC.7.5.2.d **Analyze data from tests** to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

## SC.7.7 Interdependent Relationships in Ecosystems

SC.7.7.3 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.



SC.7.7.3.a **Construct an explanation** that predicts patterns of interactions among organisms across multiple ecosystems.

 *NE ecosystems*



SC.7.7.3.b **Develop and use a model** to describe how stable ecosystems maintain biodiversity and ecosystem services.

 *NE endangered species and reintroduction of species*



SC.7.7.3.c **Evaluate competing design solutions** using a systematic process to determine how well they meet the criteria and constraints of the problem.



SC.7.7.3.d Apply scientific principles to **design a method for monitoring and increasing positive human impact** on the environment.

## SC.7.8 Matter and Energy in Organisms and Ecosystems

SC.7.8.4 Gather, analyze, and communicate evidence of the flow of energy and cycling of matter in organisms and ecosystems.



SC.7.8.4.a **Construct a scientific explanation** based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. Assessment does not include the biochemical mechanisms of photosynthesis.

 *NE food webs*



SC.7.8.4.b **Develop a model** to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as matter moves through an organism. Assessment does not include details of the chemical reactions for photosynthesis or respiration.



SC.7.8.4.c **Analyze and interpret data** to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

 *NE plants and animals*



SC.7.8.4.d **Develop a model** to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. Assessment does not include the use of chemical reactions to describe the processes.

 *NE ecosystems*



SC.7.8.4.e **Construct an argument** supported by evidence that changes to physical or biological components of an ecosystem affect populations.

 *NE ecosystems*

### SC.7.13 Earth's Systems

SC.7.13.5 Gather, analyze, and communicate evidence of the flow of energy and cycling of matter associated with Earth's materials and processes.



SC.7.13.5.a **Develop a model** to describe the cycling of Earth's materials and the flow of energy that drives this process. Assessment does not include the identification and naming of minerals.



SC.7.13.5.b **Construct a scientific explanation** based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

 *NE resources*



SC.7.13.5.c **Construct an argument** supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

 *Food security and NE agriculture*

### SC.7.14 History of Earth

SC.7.14.6 Gather, analyze, and communicate evidence to explain Earth's history.



SC.7.14.6.a **Construct an explanation** based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

 *NE geographic features*



SC.7.14.6.b **Analyze and interpret data** on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions. Paleomagnetic anomalies in oceanic and continental crust are not assessed.



SC.7.14.6.c **Analyze and interpret data** on geologic hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

# GRADE 8

The grade 8 standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## How can one describe physical interactions between objects and within systems of objects?

Students will be expected to apply Newton's Third Law of Motion to relate forces to explain the motion of objects. Students also apply ideas about gravitational, electrical, and magnetic forces to explain a variety of phenomena including beginning ideas about why some materials attract each other while other repel.

## How does the energy of an object change related to its mass, speed, and position in a system?

Students understand that objects that are moving have kinetic energy and that objects may also contain stored (potential) energy, depending on their relative positions.

## What are the characteristic properties of waves and how can they be used?

Students are expected to describe and predict characteristic properties and behaviors of waves when the waves interact with matter. Students can apply an understanding of waves as a means to send digital information.

## What factors cause genes to change and how does that affect the structure and function of organisms?

Students are expected to understand the ways humans can select for specific traits, the role of technology, genetic modification, and the nature of ethical responsibilities related to selective breeding.

## How does genetic variation among organisms in a species affect survival and reproduction? How does the environment influence genetic traits in populations over multiple generations?

Students are expected to analyze data from the fossil record to describe evidence of the history of life on Earth and can construct explanations for similarities in organisms. They have a beginning understanding of the role of variation in natural selection and how this leads to speciation.

## What is Earth's place in the Universe? What makes up our solar system and how can the motion of Earth explain seasons and eclipses?

Students are expected to examine the Earth's place in relation to the solar system, Milky Way galaxy, and universe. There is a strong emphasis on a systems approach, using models of the solar system to explain astronomical and other observations of the cyclic patterns of eclipses, tides, and seasons

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### SC.8.1 Forces and Interactions

SC.8.1.1 Gather, analyze, and communicate evidence of forces and interactions.



SC.8.1.1.a Apply Newton's Third Law to **design a solution** to a problem involving the motion of two colliding objects.  
Assessment is limited to vertical or horizontal interactions in one dimension.



SC.8.1.1.b **Develop a model** to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.



SC.8.1.1.c **Plan an investigation** to provide evidence of Newton's Laws that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. Assessment is limited to forces and changes in motion in one-dimension in an inertial reference frame and to change in one variable at a time; does not include use of trigonometry.



SC.8.1.1.d **Ask questions** about data to determine the factors that affect the strength of electrical and magnetic forces. Assessment about questions that require quantitative answers is limited to proportional reasoning and algebraic thinking.



SC.8.1.1.e **Construct and present arguments** using evidence to support the claim that gravitational interactions are attractive and depend on both the mass and distance of interacting objects. Assessment does not include Newton's Law of Gravitation or Kepler's Laws.



SC.8.1.1.f **Conduct an investigation** and evaluate the experimental design to provide evidence that electrical and magnetic fields exist between objects exerting forces on each other even though the objects are not in contact. Assessment is limited to electric and magnetic fields, and limited to qualitative evidence for the existence of fields.

## SC.8.2 Waves and Electromagnetic Radiation

SC.8.2.2 Gather, analyze, and communicate evidence of waves and electromagnetic radiation.



SC.8.2.2.a **Use mathematical representations** to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. Assessment does not include electromagnetic waves and is limited to standard repeating waves.



SC.8.2.2.b **Develop and use a model** to describe that Light and mechanical waves are reflected, absorbed, or transmitted through various materials. Assessment is limited to qualitative applications pertaining to light and mechanical waves.



SC.8.2.2.c **Gather and make sense of information** to support the claim that the structure of analog and digital signals allows for encoding and transmission of information.

## SC.8.4 Energy

SC.8.4.3 Gather, analyze, and communicate evidence of energy.



SC.8.4.3.a **Construct and interpret graphical displays of data** to describe the relationships of kinetic energy to the mass and speed of an object.



SC.8.4.3.b **Develop a model** to describe that when the arrangement of objects interacting at a distance changes, then different amounts of potential energy are stored in the system. Assessment is limited to two objects. Assessment is limited to electric, magnetic, and gravitational interactions.

## SC.8.9 Heredity: Inheritance and Variation of Traits

SC.8.9.4 Gather, analyze, and communicate evidence of the inheritance and variation of traits.



SC.8.9.4.a **Develop and use a model** to describe why structural changes to genes (mutations) may result in harmful, beneficial, or neutral effects to structure and function of organisms. Assessment does not include specific changes at the molecular level, mechanisms for protein synthesis, or specific types of mutations.



SC.8.9.4.b **Gather and synthesize information** about technologies that have changed the way humans influence inheritance of desired traits in organisms.

 *NE agriculture practices*

## SC.8.10 Natural Selection and Adaptations

SC.8.10.5 Gather, analyze, and communicate evidence of natural selection and adaptations.



SC.8.10.5.a **Analyze and interpret data** for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. Assessment does not include the names of individual species or geological eras in the fossil record.

 *NE Geological History*



SC.8.10.5.b **Apply scientific ideas to construct an explanation** for the anatomical similarities and differences among and between modern and fossil organisms to infer evolutionary relationships.

 *NE Geological History*



SC.8.10.5.c **Construct an explanation** based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.



SC.8.10.5.d **Use mathematical representations** to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. Assessment does not include Hardy Weinberg calculations.

 *NE plants and animals*

## SC.8.11 Space Systems

SC.8.11.6 Gather, analyze, and communicate evidence of the interactions among bodies in space.



SC.8.11.6.a **Develop and use a model** of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.



SC.8.11.6.b **Develop and use a model to describe** the role of gravity in the motions within the galaxy and the solar system. Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of planets as viewed from Earth.



SC.8.11.6.c **Analyze and interpret data** to determine scale properties of objects in the solar system. Assessment does not include recalling facts about properties of the planets and other solar system bodies.

## SC.8.14 History of Earth

SC.8.14.7 Gather, analyze, and communicate evidence to explain Earth's history.



SC.8.14.7.a **Construct a scientific explanation** based on evidence found within rock strata, including index fossils, for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. Assessment does not include recalling the names of specific periods or epochs and events within them.

 *NE Geological History*

# HS PHYSICAL SCIENCES

The physical science standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## How can one explain the structure and properties of matter?

Students are expected to develop understanding of the substructure of atoms and provide more mechanistic explanations of the properties of substances. Students are able to use the periodic table as a tool to explain and predict the properties of elements.

## How do substances combine or change (react) to make new substances? How does one characterize and explain these reactions and make predictions about them?"

Students will be able to explain important biological and geophysical phenomena. Students are also able to apply an understanding of the process of optimization in engineering design to chemical reaction systems.

## How can one explain and predict interactions between objects and within systems of objects?

Students are expected to build an understanding of forces and interactions, total momentum of a system of objects is conserved when there is no net force on the system, and predict the gravitational and electrostatic forces between objects. Students are able to apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.

## How is energy transferred and conserved?

Students are expected to develop an understanding that energy at both the macroscopic and the atomic scale can be accounted for as either motions of particles or energy associated with the configuration (relative positions) of particles. In some cases, the energy associated with the configuration of particles can be thought of as stored in fields.

## How are waves used to transfer energy and send and store information?

Students are expected to apply understanding of how wave properties and the interactions of electromagnetic radiation with matter can transfer information across long distances, store information, and investigate nature on many scales.



## SC.HS.1 Forces and Interactions

SC.HS.1.1 Gather, analyze, and communicate evidence of forces and interactions.



SC.HS.1.1.a **Analyze data** to support the claim that Newton's Second Law of Motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. Assessment is limited to one-dimensional motion and to macroscopic objects moving at non-relativistic speeds.



SC.HS.1.1.b **Use mathematical representations** to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. Assessment is limited to systems of two macroscopic bodies moving in one dimension.

 *NE roadside and highway safety*



SC.HS.1.1.c **Apply science and engineering ideas to design, evaluate, and refine** a device that minimizes the force on a macroscopic object during a collision. Assessment is limited to qualitative evaluations and/or algebraic manipulations.



SC.HS.1.1.d **Use mathematical representations** of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. Assessment is limited to systems with two objects.



SC.HS.1.1.e **Plan and conduct an investigation** to provide evidence that an electrical current can produce a magnetic field and that a changing magnetic field can produce an electrical current. Assessment is limited to designing and conducting investigations with provided materials and tools.

 *NE energy producers*

## SC.HS.2 Waves and Electromagnetic Radiation

SC.HS.2.2 Gather, analyze, and communicate evidence of the interactions of waves.



SC.HS.2.2.a **Use mathematical representations** to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. Assessment is limited to algebraic relationships and describing those relationships qualitatively.



SC.HS.2.2.b **Evaluate claims** about the advantages of digital transmission and storage of information.



SC.HS.2.2.c **Evaluate the claims, evidence, and reasoning** behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. Assessment does not include using quantum theory.



SC.HS.2.2.d **Evaluate the validity and reliability of claims** in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. Assessment is limited to qualitative descriptions.



SC.HS.2.2.e **Communicate technical information** about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. Assessments are limited to qualitative information. Assessments do not include band theory.

## SC.HS.3 Structure and Properties of Matter

SC.HS.3.3 Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter.



SC.HS.3.3.a **Use the periodic table as a model** to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. Assessment is limited to main group elements. Assessment does not include quantitative understanding of ionization energy beyond relative trends.

 *NE Geology*



SC.HS.3.3.b **Plan and conduct an investigation** to gather evidence to compare the structure of substances at the macro scale to infer the strength of electrical forces between particles. Assessment does not include Raoult's law calculations of vapor pressure.



SC.HS.3.3.c **Develop models** to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. Assessment does not include quantitative calculation of energy released. Assessment is limited to alpha, beta, and gamma radioactive decays.

 *NE Geologic history and nuclear power production*



SC.HS.3.3.d **Communicate scientific and technical information** about why the molecular-level structure is important in the functioning of designed materials. Assessment is limited to provided molecular structures of specific designed materials.

 *NE manufacturers*

## SC.HS.4 Energy

SC.HS.4.4 Gather, analyze, and communicate evidence of the interactions of energy.



SC.HS.4.4.a **Create a computational model** to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. Assessment is limited to basic algebraic expressions or computations; to systems of two or three components; and to thermal energy, kinetic energy, and/or the energies in gravitational, magnetic, or electric fields.



SC.HS.4.4.b **Develop and use models** to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects).



SC.HS.4.4.c **Design, build, and refine a device** that works within given constraints to convert one form of energy into another form of energy. Assessment for quantitative evaluations is limited to total output for a given input. Assessment is limited to devices constructed with materials provided to students.

 *NE energy producers*



SC.HS.4.4.d **Analyze a major global challenge** to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.



SC.HS.4.4.e **Plan and conduct an investigation** to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). Assessment is limited to investigations based on materials and tools provided to students.



SC.HS.4.4.f **Develop and use a model** of two objects interacting through electrical or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. Assessment is limited to systems containing two objects.

## SC.HS.5 Chemical Reactions

SC.HS.5.5 Gather, analyze, and communicate evidence of chemical reactions.



SC.HS.5.5.a **Construct and revise an explanation** for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. Assessment is limited to chemical reactions involving main group elements and combustion reactions.

 *NE energy and ethanol production*



SC.HS.5.5.b **Develop a model** to illustrate that the release or absorption of energy from a chemical reaction system depends on the changes in total bond energy. Assessment does not include calculating the total bond energy changes during a chemical reaction from the bond energies of reactants and products.

 *NE energy and ethanol production*



SC.HS.5.5.c **Apply scientific principles** and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. Assessment is limited to simple reactions in which there are only two reactants; evidence from temperature, concentration, and rate data; and qualitative relationships between rate and temperature.

 *NE energy and ethanol production*



SC.HS.5.5.d **Refine the design** of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. Assessment is limited to specifying the change in only one variable at a time. Assessment does not include calculating equilibrium constants and concentrations.

 *NE energy and ethanol production*



SC.HS.5.5.e **Design a solution** to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.



SC.HS.5.5.f **Use mathematical representations** to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. Assessment does not include complex chemical reactions.

 *NE energy and ethanol production*

# HS LIFE SCIENCES

The life science standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interest and current topics that may include but are not limited to:

## How do the structures of organisms enable life's functions?

Students are expected to investigate explanations for the structure and function of cells as the basic units of life, the hierarchical systems of organisms, and the role of specialized cells for maintenance and growth. Students will demonstrate understanding of how systems of cells function together to support the life processes.

## How are the characteristics from one generation related to the previous generation?

High school students demonstrate understanding of the relationship of DNA and chromosomes in the processes of cellular division that pass traits from one generation to the next. Students can determine why individuals of the same species vary in how they look, function, and behave. Ethical issues related to genetic modification of organisms and the nature of science can be described.

## How do organisms obtain and use energy they need to live and grow? How do matter and energy move through ecosystems?

Students will be expected to develop understanding of organisms' interactions with each other and their physical environment, how organisms obtain resources, change the environment, and how

these changes affect both organisms and ecosystems. Students will use mathematical concepts to construct explanations for the role of energy in the cycling of matter in organisms and ecosystems.

## How do organisms interact with the living and non-living environment to obtain matter and energy?

Students will be expected to investigate the role of biodiversity in ecosystems and the role of animal behavior on survival of individuals and species. Students will develop increased understanding of interactions among organisms and how those interactions influence the dynamics of ecosystems.

## How can there be so many similarities among organisms yet so many different plants, animals, and microorganisms? How does biodiversity affect humans?

Students will be expected to demonstrate understanding of the factors causing natural selection and the process of evolution of species over time. They demonstrate understanding of how multiple lines of evidence contribute to the strength of scientific theories of natural selection and evolution

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## SC.HS.6 Structure and Function

SC.HS.6.1 Gather, analyze, and communicate evidence of the relationship between structure and function in living things.



SC.HS.6.1.a **Construct an explanation** based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. Assessment does not include identification of specific cell or tissue types, whole body systems, specific protein structures and functions, or the biochemistry of protein synthesis.

 NE agricultural practices



SC.HS.6.1.b **Develop and use a model** to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. Assessment does not include interactions and functions at the molecular or chemical reaction level.



SC.HS.6.1.c **Plan and conduct an investigation** to provide evidence that feedback mechanisms maintain homeostasis. Assessment does not include the cellular processes involved in the feedback mechanism.

 NE agricultural practices



SC.HS.6.1.d **Use a model** to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. Assessment does not include specific gene control mechanisms or rote memorization of the steps of mitosis.

## SC.HS.7 Interdependent Relationships in Ecosystems

SC.HS.7.2 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.



SC.HS.7.2.a **Use mathematical and/or computational representations to support explanations** of factors that affect carrying capacity of ecosystems at different scales. Assessment does not include deriving mathematical equations to make comparisons.



SC.HS.7.2.b **Use mathematical representations** to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. Assessment is limited to provided data.



SC.HS.7.2.c **Evaluate the claims, evidence, and reasoning** that the interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

 *NE river systems and ecosystems*



SC.HS.7.2.d **Evaluate the evidence** for how group behavior has evolved because membership can increase the chances of survival for individuals and their genetic relatives.



SC.HS.7.2.e **Design, evaluate, and refine a solution** for increasing the positive impacts of human activities on the environment and biodiversity.

 *NE native species, conservation organizations, agriculture practices*



SC.HS.7.2.f **Use a computer simulation** to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. Assessment is limited to testing solutions for a proposed problem related to threatened or endangered species, or to genetic variation of organisms for multiple species.

## SC.HS.8 Matter and Energy in Organisms and Ecosystems

SC.HS.8.3 Gather, analyze, and communicate evidence of the flow of energy and cycling of matter in organisms and ecosystems.



SC.HS.8.3.a **Use a model** to illustrate how photosynthesis transforms light energy into stored chemical energy. Assessment does not include specific biochemical steps.



SC.HS.8.3.b **Construct and revise an explanation** based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other molecules to form the four basic macromolecules. Assessment does not include the details of the specific chemical reactions or identification of macromolecules.



SC.HS.8.3.c **Use a model** to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules are broken and bonds in new compounds are formed resulting in a net transfer of energy. Assessment should not include identification of the steps or specific processes involved in cellular respiration.



SC.HS.8.3.d **Construct and revise an explanation** based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. Assessment does not include the specific chemical processes of either aerobic or anaerobic respiration.

 *NE ethanol production*



SC.HS.8.3.e **Use mathematical representations** to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. Assessment is limited to proportional reasoning to describe the cycling of matter and flow of energy.

 *NE agricultural practices*



SC.HS.8.3.f **Develop a model** to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. Assessment does not include the specific chemical steps of photosynthesis and respiration.

## SC.HS.9 Heredity: Inheritance and Variation of Traits

SC.HS.9.4 Gather, analyze, and communicate evidence of the inheritance and variation of traits.



SC.HS.9.4.a **Develop and use a model** to explain the relationships between the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. Assessment does not include the phases of meiosis or the molecular mechanism of specific steps in the process.

 NE agricultural practices



SC.HS.9.4.b **Make and defend a claim** based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. Assessment does not include the phases of meiosis or the molecular mechanism of specific steps in the process.

 NE plants and animals



SC.HS.9.4.c **Apply concepts of statistics and probability** to explain the variation and distribution of expressed traits in a population. Assessment does not include Hardy-Weinberg calculations.

 NE plants and animals

## SC.HS.10 Biological Evolution

SC.HS.10.5 Gather, analyze, and communicate evidence of biological evolution.



SC.HS.10.5.a **Communicate scientific** information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

 NE fossil record



SC.HS.10.5.b **Construct an explanation** based on evidence that natural selection primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. Assessment does not include other mechanisms of evolution, such as genetic drift, gene flow through migration, and co-evolution.

 NE plants and animals



SC.HS.10.5.c **Apply concepts of statistics and probability** to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. Assessment is limited to basic statistical and graphical analysis. Assessment does not include allele frequency calculations.

 NE plants and animals



SC.HS.10.5.d **Construct an explanation** based on evidence for how natural selection leads to adaptation of populations.



SC.HS.10.5.e **Evaluate the evidence** supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

 NE plants and animals

# HS EARTH AND SPACE SCIENCES

The earth and space science standards and indicators help students gather, analyze, and communicate evidence as they formulate answers to questions tailored to student interests and current topics that may include but are not limited to:

## **What is the universe and what goes on in stars? What are the predictable patterns caused by Earth's movement in the solar system?**

Students examine the processes governing the formation, evolution, and workings of the solar system and universe in order to understand how matter in the universe formed and how short-term changes in the behavior of the sun directly affect humans. Engineering and technology play a large role here in obtaining and analyzing data that support theories of the formation of the solar system and universe.

## **How do people reconstruct and date events in Earth's planetary history? Why do the continents move?**

Students can construct explanations for the scales of time over which Earth processes operate. An important aspect of the earth and space sciences involves making inferences about events in Earth's history based on a data record that is increasingly incomplete the farther one goes back in time.

## **How do the properties and movements of water shape Earth's surface and affect its systems?**

Students develop models and explanations for the ways that

feedbacks between different Earth systems control the appearance of Earth's surface. Central to this is the tension between internal systems, which are largely responsible for creating and at Earth's surface and the sun-driven surface systems that tear down land through weathering and erosion. Students understand the role water plays in affecting weather and understand chemical cycles in Earth's systems.

## **What regulates weather and climate?**

Students understand the system interactions that control weather and climate. Students can understand the analysis and interpretation of different kinds of geoscience data allow student to construct explanations for the many factors that drive climate change over a wide range of timescales.

## **How do humans depend on Earth's resources? How do people model and predict the effects of human activities?**

Students understand the complex and significant interdependencies between humans and the rest of Earth's systems through the impacts of natural hazards, our dependencies on natural resources, and the environmental impacts of human activities



## **SC.HS.11 Space Systems**

SC.HS.11.1. Gather, analyze, and communicate evidence to defend that the universe changes over time.



SC.HS.11.1.a **Use a model** based on evidence to illustrate how the stages of stars and the role of nuclear fusion in a star's core releases energy that reaches Earth in the form of radiation. Assessment does not include details of the atomic and sub-atomic processes involved with the sun's nuclear fusion.



SC.HS.11.1.b **Construct an explanation** of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.



SC.HS.11.1.c **Communicate scientific ideas** about the way stars, throughout their stellar stages, produce elements. Details of the many different nucleosynthesis pathways for stars of differing masses are not assessed.



SC.HS.11.1.d **Use mathematical or computational representations** to predict the motion of orbiting objects in the solar system. Mathematical representations for the gravitational attraction of bodies and Kepler's Laws of orbital motions should not deal with more than two bodies, nor involve calculus.

## SC.HS.12 Weather and Climate

SC.HS.12.2 Gather, analyze, and communicate evidence to support that Earth's climate and weather are influenced by energy flow through Earth systems.



SC.HS.12.2.a **Construct an explanation based on evidence** for how the sun's energy moves among Earth's systems.



SC.HS.12.2.b **Use a model** to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. Assessment of the results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.



SC.HS.12.2.c **Analyze geoscience data** and the results from global climate models to make an evidence-based forecast of the current rate and scale of global or regional climate changes.

 *NE data*



SC.HS.12.2.d **Evaluate the validity and reliability** of past and present models of Earth conditions to make projections of future climate trends and their impacts.

## SC.HS.13 Earth's Systems

SC.HS.13.3 Gather, analyze, and communicate evidence to defend the position that Earth's systems are interconnected and impact one another.



SC.HS.13.3.a **Analyze geoscience data** to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.

 *NE geologic time scale and fossil record*



SC.HS.13.3.b **Develop a model** based on evidence of Earth's interior to describe the cycling of matter.



SC.HS.13.3.c **Construct an argument based on evidence** to explain the multiple processes that cause Earth's plates to move.



SC.HS.13.3.d **Plan and conduct an investigation** of the properties of water and their effects on Earth materials, surface processes, and groundwater systems.

 *NE water systems*



SC.HS.13.3.e **Develop a quantitative model** to describe the cycling of carbon and other nutrients among the hydrosphere, atmosphere, geosphere, and biosphere, today and in the geological past.

## SC.HS.14 History of Earth

SC.HS.14.4 Gather, analyze, and communicate evidence to interpret Earth's history.



SC.HS.14.4.a **Evaluate evidence** of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the differences in age, structure, and composition of crustal and sedimentary rocks.



SC.HS.14.4.b **Apply scientific reasoning** and evidence from ancient Earth materials, meteorites, and other planetary surfaces to reconstruct Earth's formation and early history.



SC.HS.14.4.c **Develop a model** to illustrate how Earth's internal and surface processes operate over time to form, modify, and recycle continental and ocean floor features. Assessment does not include memorization of the details of the formation of specific geographic

features of Earth's surface.

 *NE water systems and surface processes*



SC.HS.14.4.d **Construct an argument** based on evidence to validate coevolution of Earth's systems and life on Earth. Assessment does not include a comprehensive understanding of the mechanisms of how the biosphere interacts with all of Earth's other systems.

## SC.HS.15 Sustainability

SC.HS.15.5 Gather, analyze, and communicate evidence to describe the interactions between society, environment, and economy.



SC.HS.15.5.a **Construct an explanation based on evidence** for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

 *NE historical events*



SC.HS.15.5.b **Evaluate competing design solutions** for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.



SC.HS.15.5.c **Use a computational simulation** to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. Assessment is limited to using provided multi-parameter programs or constructing simplified spreadsheet calculations.

 *NE resource management*



SC.HS.15.5.d **Evaluate or refine a technological solution** that increases positive impacts of human activities on natural systems.



SC.HS.15.5.e **Evaluate a solution to a complex real-world problem** based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.



SC.HS.15.5.f **Use a computational representation** to illustrate the relationships among Earth systems and the degree to which those relationships are being modified due to human activity. Assessment does not include running computational representations but is limited to using the published results of scientific computational models.

# PLUS STANDARDS (OPTIONAL)

The High School Plus (HSP) standards represent advanced science topics designed to enhance the rigor of general science curricula or supplement additional advanced science courses. The standards were developed using postsecondary syllabi from entry level science courses for science majors (e.g. UNL LIFE 120, CHEM 109). Introducing the content to high school students will scaffold their learning providing a bridge between high school science coursework and postsecondary level coursework.

## PHYSICS

### SC.HSP.1 Forces, Interactions, and Motion

SC.HSP.1.1 Gather, analyze, and communicate evidence of forces, interactions, and motion.



SC.HSP.1.1.a **Generate and interpret mathematical and graphical representations** to describe the relationships between position, velocity, acceleration and time. Examples of data could include tables or graphs of position or velocity as a function of time for objects subject to no acceleration and objects undergoing a constant acceleration, including projectile motion, free fall, and circular motion. Examples should also include both average and instantaneous velocities. Assessment is limited to one and two-dimensional motion and to objects moving at non-relativistic speeds.



SC.HSP.1.1.b **Use mathematical and pictorial models** as applied to Newton's second law of motion describing the relationship among the net force on a macroscopic object, its mass, and its acceleration. Examples include drawing and using free body diagrams to analyze the net force on the object and the resulting motion; vectors including decomposition and recombination, addition and subtraction. Assessment is limited to two-dimensional motion.



SC.HSP.1.1.c **Use mathematical representations** of momentum to predict the outcome of a collision. Emphasis is on the quantitative conservation of momentum in interactions and the qualitative meaning of this principle. **Assessment is limited to quantitative analysis of systems of two macroscopic bodies moving in one-dimension and qualitative analysis of multiple macroscopic bodies moving in two or three-dimensions.**



SC.HSP.1.1.d **Apply scientific and engineering ideas** to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. Examples of evaluation and refinement could include determining the success of the device at protecting an object from damage and modifying the design to improve it by applying the impulse-momentum theorem. Examples of a device could include a football helmet or an airbag. **Assessment is limited to qualitative evaluations and/or algebraic manipulations.**



SC.HSP.1.1.e **Use mathematical representations** of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. Emphasis is on both quantitative and conceptual descriptions of forces from gravitational and electric sources. **Assessment can be expanded to systems with multiple objects.**

### SC.HSP.2 Waves, Electromagnetic Radiation, and Optics

SC.HSP.2.2 Gather, analyze, and communicate evidence of the interactions of waves and optics.



SC.HSP.2.2.a **Use mathematical representations** to describe the relationships among the frequency, wavelength, and speed of waves traveling in various media. Examples of data could include electromagnetic radiation traveling in a vacuum and glass, sound waves traveling through air and water, and seismic waves traveling through the Earth. Examples also include descriptive changes in observed frequency based on relative motion of observer or source (Doppler effect). **Assessment is limited to algebraic relationships and describing those relationships qualitatively.**



SC.P.2.2.b **Develop and use models** to predict interactions of longitudinal and transverse waves in various media. Examples could include P, S and Surface seismic waves, water waves, and waves on a spring. Emphasis is on structure and function of waves.



SC.HSP.2.2.c **Develop and use models** to describe the behavior of light at the boundary of various media. Emphasis is on both geometric (ray diagrams) and algebraic models (mirror and thin lens equation, Snell's Law).



SC.HSP.2.2.d **Evaluate the claims, evidence, and reasoning** behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than

the other. Emphasis is on how the experimental evidence supports the claim and how a theory is generally modified in light of new evidence. Examples of a phenomenon could include resonance, interference, diffraction, photoelectric effect and the idea that photons associated with different frequencies of light have different energies. **Assessment includes qualitative and quantitative models of light.**



SC.HSP.2.2.e **Use evidence to support explanations** for causes of emission and absorption spectra of electromagnetic radiation. Emphasis is on the idea that photons associated with different frequencies of light have different energies. This could include the displacement and broadening of spectral lines (redshift and blueshift). Examples could include different elements absorb or emit specific frequencies of light. Assessment is limited to qualitative descriptions.



SC.HSP.2.2.f **Communicate technical information** about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. Examples could include solar cells capturing light and converting it to electricity; medical imaging; communications technology; lasers. **Assessments are limited to qualitative information. Assessments do not include band theory.**

## SC.HSP.4 Energy: Physics

SC.HSP.4.3 Gather, analyze, and communicate evidence of the interactions of energy.



SC.HSP.4.3.a **Create a computational model** to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. Emphasis is on explaining the meaning of mathematical expressions used in the model including the Work-Energy theorem. **Assessment is limited to basic algebraic expressions or computations; to systems of two or three components; and to thermal energy, kinetic energy, and/or the energies in gravitational, magnetic, or electric fields.**



SC.HSP.4.3.b **Plan and conduct an investigation** to rate the power and efficiency used in performing work on a system. Emphasis is on the quantitative determination of power in interactions. Examples could include use of pulleys and electric motors.



SC.HSP.4.3.c **Design, build, and refine a device** that works within given constraints to convert one form of energy into another form of energy. Emphasis is on both qualitative and quantitative evaluations of devices. Examples of devices could include Rube Goldberg devices, wind turbines, solar cells, solar ovens, generators, heat engines and heat pumps. Examples of constraints could include use of renewable energy forms and efficiency. **Assessment for quantitative evaluations is limited to total output for a given input. Assessment is limited to devices constructed with materials provided to students.**



SC.HSP.4.3.d **Analyze a major global challenge** to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. Examples could include analysis of renewable energy systems for electricity generation and the effect of autonomous electric cars on the economy, society and the environment.



SC.HSP.4.3.e **Plan and conduct an investigation** to provide evidence for the transfer of thermal energy within a system based on the Laws of Thermodynamics. Emphasis is on analyzing data from student investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually, such as changes in entropy of a system. Examples of investigations could include mixing liquids at different initial temperatures or adding objects at different temperatures to water, changes from kinetic to thermal energy, and heat engines and heat pumps. **Assessment is limited to investigations based on materials and tools provided to students.**



SC.HSP.4.3.f **Develop and use a model** of two objects interacting through gravitational, electric, or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. Examples of models could include drawings, diagrams, and texts, such as drawings of what happens when two charges of opposite polarity are near each other. **Assessment is limited to systems containing two objects.**

## SC.HSP.16 Electricity and Magnetism

SC.HSP.16.4 Gather, analyze, and communicate evidence of electricity and magnetism.



SC.HSP.16.4.a **Use mathematical representations** of field forces to describe and predict forces at a distance between objects. Emphasis is on both quantitative and conceptual descriptions of forces from gravitational and electric sources. **Assessment can be expanded to systems with multiple objects.**



SC.HSP.16.4.b **Use models** to visualize and describe gravitational, magnetic and electrical fields and predict resulting forces on nearby objects. Examples of fields include point charges, charged parallel plates/rings/spheres, and bar magnets. Also could include electromagnetic forces, such as the magnetic force acting on a moving charge. **Assessment is limited to descriptive analysis of the fields and the forces they produce.**



SC.HSP.16.4.c **Use mathematical representations** to provide evidence that describes and predicts relationships between power, current, voltage, and resistance. Emphasis is on insulators and conductors accounting for Ohm's Law, total resistance for combinations of resistors and  $P=IV$ .



SC.HSP.16.4.d **Evaluate competing design solutions** for construction and use of electrical consumer products accounting for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. Examples could include efficiency of light bulbs (visible intensity vs. power) and thermal energy limits of wire.



SC.HSP.16.4.e **Obtain and communicate technical information** about how some technological devices use alternating current and others use direct current. Examples could include why public utilities use AC while many devices use DC and energy loss in transmission of electricity.



SC.HSP.16.4.f **Design a solution** to a problem using the fact that an electric current can produce a magnetic field and/or that a changing magnetic field can produce an electric current. Emphasis is on both quantitative and conceptual descriptions of electric and magnetic fields. Examples include designing a generator, motor or transformer. **Assessment is limited to systems with two objects.**



SC.HSP.16.4.g **Analyze a major global challenge** to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. Examples could include analysis of renewable energy systems for electricity generation and the effect of autonomous electric cars on the economy, society and the environment.

# CHEMISTRY

## SC.HSP.3 Structure and Properties of Matter

SC.HSP.3.1 Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter.



SC.HSP.3.1.a **Use the periodic table as a model** to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. Assessment does not include quantitative understanding of ionization energy beyond relative trends.



SC.HSP.3.1.b **Plan and conduct an investigation** to gather evidence to compare the structure of substances at the macro scale to infer the strength of electrical forces between particles. Examples of intramolecular forces include bond type, polarity of bonds and, resonance structures. Examples of intermolecular forces include hydrogen bonds, dipole-dipole. **Assessment does not include Raoult's law calculations of vapor pressure.**



SC.HSP.3.1.c **Develop and use models** to predict and explain forces that are in and between molecules. Examples of intramolecular forces include bond type, polarity of bonds and, resonance structures. Examples of intermolecular forces include hydrogen bonds, dipole-dipole.



SC.HSP.3.3.d **Evaluate a solution** to a complex, real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. Examples could include the effects of concentration of solutions on the freezing/boiling point (melting of ice on roadways), aspartame and caffeine in beverages, fluoride in drinking water.



SC.HSP.3.3.e **Develop models** to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. **Assessment is limited to alpha, beta, and gamma radioactive decays.**



SC.HSP.3.3.f **Develop and use models** to describe and predict mechanisms of the quantum mechanical model of the atom. Examples of representation include Aufbau Diagram, Hund's Rule, Pauli Exclusion, and orbital shapes, Hybridization of orbitals, and electron configuration. (This is an upper-level course indicator. It is not recommended for all students.)



SC.HSP.3.3.g **Evaluate the evidence** supporting claims about how atoms absorb and emit energy in the form of electromagnetic radiation. Examples include using mathematical relationships to demonstrate the relationship between observed light spectrum, wavelength of light and emission spectrum. (This is an upper-level course indicator. It is not recommended for all students.)



SC.HSP.3.3.h **Use mathematical representations** to quantify matter through the analysis of patterns in chemical compounds at different scales. Emphasis is on the mole concept, empirical formula, molecular formula, percent composition, and law of constant composition. (This is an upper-level course indicator. It is not recommended for all students.)

## SC.HSP.4 Energy: Chemistry

SC.HSP.4.2 Gather, analyze, and communicate evidence of the interactions of energy.



SC.HSP.4.2.a **Use statistical and mathematical techniques** to describe qualitative and quantitative thermodynamic relationships. Thermodynamic relationships may include: Enthalpy, Hess's Law, Heats of Formation. Examples of data displays or graphs could include energy diagrams to communicate bond energies of products or reactants. Lab investigations may include calorimetry. (This is an upper-level course indicator. It is not recommended for all students.)



SC.HSP.4.2.b **Plan and conduct an investigation** to gather evidence of how the Kinetic Molecular Theory and gas laws are related. Examples include Dalton's Law of particle pressures, Graham's Law of Diffusion and Effusion, and empirical gas laws. (This is an upper-level course indicator. It is not recommended for all students.)



SC.HSP.4.2.c **Analyze and interpret data** to explain changes in energy within a system and/or energy flows in and out of

a system. Emphasis is on the use of mathematical expressions to describe the change in energy within the system. Investigations could include electrochemistry (electrolysis). (This is an upper-level course indicator. It is not recommended for all students.)



SC.HSP.4.2.d **Analyze a major global challenge** to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. Examples could include alternative energies, carbon footprint, and crude oil refining process.

## SC.HSP.5 Chemical Reactions

SC.HSP.5.3 Gather, analyze, and communicate evidence of chemical reactions.



SC.HSP.5.3.a **Plan and conduct an investigation** to generate evidence that answers scientific questions related to changes in solution chemistry. Examples include titrations, solubility, and Le Chatelier's Principle. (This is an upper-level course indicator. It is not recommended for all students.)



SC.HSP.5.3.b **Use a model** to identify electron transfer and balance a redox reaction. Emphasis would be on using half reaction method for balancing equations and understanding electron transfer. Examples include electrochemical cells and electroplating. (This is an upper-level course indicator. It is not recommended for all students.)



SC.HSP.5.3.c **Use mathematical and/or computational representations** to predict and explain relationships within chemical systems. Examples include stoichiometric calculations, gas stoichiometry, limiting reactant, empirical formula/molecular formula calculations, % comp % yield. (This is an upper-level course indicator. It is not recommended for all students.)



SC.HSP.5.3.d **Use mathematical representations** to analyze the proportion and quantity of particles in solution. Emphasis is on molarity and developing net ionic equations. (This is an upper-level course indicator. It is not recommended for all students.)



SC.HSP.5.3.e **Plan and conduct an investigation** to predict the outcome of a chemical reaction based on patterns of chemical properties. Examples of reaction types could include single replacement, double replacement, etc. Examples of patterns could include the use of solubility rules, activity series. (This is an upper-level course indicator. It is not recommended for all students.)



SC.HS.5.3.f **Construct and revise an explanation** for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

# BIOLOGY

## SC.HSP.6 Structure and Function

SC.HSP.6.1 Gather, analyze, and communicate evidence of the relationship between structure and function in living things.



SC.HSP.6.1.a **Construct an explanation** based on evidence for how the sequence of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.



SC.HSP.6.1.b **Develop and use a model** to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system. **Assessment does not include interactions and functions at the molecular level.**



SC.HSP.6.1.c **Plan and conduct an investigation** to provide evidence that feedback mechanisms maintain homeostasis. Examples of investigations could include heart rate response to exercise, stomate response to moisture and temperature, and root development in response to water levels.



SC.HSP.6.1.d **Use a model** to illustrate the role of cells in producing signals which maintain cellular function within organisms. Emphasis is on conceptual understanding of the types of cell signals, signal reception, signal transduction, and types of cellular responses.



SC.HSP.6.1.e **Construct an explanation** based on evidence that plants have structures that function to support survival, growth, behavior, and reproduction. Emphasis is on plant structure, growth, and development, nutrient uptake and transport, plant reproduction, and plant responses to internal and external stimuli.



SC.HSP.6.1.f **Construct an explanation** based on evidence that animals have structures that function to support survival, growth, behavior, and reproduction. Emphasis is on the basic principles of animal form and functions. Examples of basic principles could include animal nutrition, circulation, gas exchange, immunity, osmoregulation and excretion, hormonal and endocrine control, reproduction, development, neural control systems, and animal behavior.



SC.HSP.6.1.g **Use a model** to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

## SC.HSP.7 Interdependent Relationships in Ecosystems

SC.HSP.7.2 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.



SC.HSP.7.2.a **Use mathematical and/or computational representations** to support explanations of factors that affect carrying capacity of ecosystems at different scales. Emphasis is on quantitative analysis and comparison of the relationships among interdependent factors including boundaries, resources, climate and competition. Examples of mathematical comparisons could include graphs, charts, histograms, and population changes gathered from simulations or historical data sets. **Assessment does not include deriving mathematical equations to make comparisons.**



SC.HSP.7.2.b **Use mathematical representations** to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. Examples of mathematical representations include finding the average, determining trends, and using graphical comparisons of multiple sets of data. Assessment is limited to provided data.



SC.HSP.7.2.c **Evaluate the claims, evidence, and reasoning** related to the principle that complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. Examples of changes in ecosystem conditions could include modest biological or physical changes, such as moderate hunting or a seasonal flood; and extreme changes, such as volcanic eruption or sea level rise.



SC.HSP.7.2.d **Design, evaluate, and refine a solution** for increasing the positive impacts of human activities on the

environment and biodiversity. Examples of human activities can include habitat development and restoration, supporting native pollinators, reducing consumption, rotating crops, using integrated pest management.



**SC.HSP.7.2.e Create or revise a solution** to mitigate the impacts of human activity on biodiversity. Emphasis is on testing solutions for a proposed problem related to threatened or endangered species, or to genetic variation of organisms for multiple species.



**SC.HSP.7.2.f Evaluate evidence** for the role of behavior on individual and species' chances to survive and reproduce. Emphasis is on: (1) distinguishing between group and individual behavior, (2) identifying evidence supporting the outcomes of group behavior, and (3) developing logical and reasonable arguments based on evidence. Examples of behaviors could include fixed action patterns, imprinting, kinesis, taxis, hibernation, estivation, habituation, spatial learning, associative learning, cognition, foraging behavior, agonistic behavior, altruism, social learning, flocking, schooling, herding, and cooperative behaviors such as hunting, migrating, and swarming.

## SC.HSP.8 Matter and Energy in Organisms and Ecosystems

SC.HSP.8.3 Gather, analyze, and communicate evidence of the flow of energy and cycling of matter in organisms and ecosystems.



**SC.HSP.8.3.a Use a model to illustrate how** photosynthesis transforms light energy into stored chemical energy. Emphasis is on illustrating inputs and outputs of matter and the transfer and transformation of energy in photosynthesis by plants and other photosynthesizing organisms. Examples of models could include diagrams, chemical equations, and conceptual models.



**SC.HSP.8.3.b Construct and revise an explanation** based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other molecules to form amino acids and/or other large carbon-based molecules. Emphasis is on using evidence from models and simulations to support explanations.



**SC.HSP.8.3.c Use a model** to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. Emphasis is on the conceptual understanding of the steps or specific processes involved in cellular respiration.



**SC.HSP.8.3.d Construct and revise an explanation** based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. Emphasis is on conceptual understanding of the role of metabolism in different environments.



**SC.HSP.8.3.e Use mathematical representations** to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. Emphasis is on using a mathematical model of stored energy in biomass to describe the transfer of energy from one trophic level to another and that matter and energy are conserved as matter cycles and energy flows through ecosystems. Emphasis is on atoms and molecules such as carbon, oxygen, hydrogen and nitrogen being conserved as they move through an ecosystem. **Assessment is limited to proportional reasoning to describe the cycling of matter and flow of energy.**



**SC.HSP.8.3.f Develop a model to illustrate the role** of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. Examples of models could include simulations and mathematical models.



**SC.HSP.8.3.g Use models** to illustrate how atomic structure and bonding impact the properties of water and their influence on biological systems. Emphasis is on atomic structure, types of chemical bonds, and properties of water and how those properties influence organisms and ecosystems.



**SC.HSP.8.3.h Construct an explanation** based on evidence for how ATP powers cellular work and for how enzymes affect the rate of and the amount of energy needed for metabolic reactions. Emphasis is on the structure of ATP and how ATP is used to power cellular work by coupling exergonic and endergonic reactions. Emphasis is on how enzymes speed up and/or lower the activation energy needed for metabolic reactions and how the regulation of enzyme activity helps control metabolism.

## SC.HSP.9 Inheritance and Variation of Traits

SC.HSP.9.4 Gather, analyze, and communicate evidence of the inheritance and variation of traits.



**SC.HSP.9.4.a Ask questions** to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.



SC.HSP.9.4.b **Make and defend a claim** based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. Emphasis is on using data to support arguments for the way variation occurs.



SC.HSP.9.4.c **Apply concepts of statistics and probability** to explain the variation and distribution of expressed traits in a population. Emphasis is on the use of mathematics to describe the probability of traits as it relates to genetic and environmental factors in the expression of traits [examples could include Hardy-Weinberg calculations and chi-square calculations].



SC.HSP.9.4.d **Evaluate evidence** supporting claims that gene regulation can explain the variation and distribution of expressed traits in a population. Emphasis is on the differences in gene expression of multi-cellular organisms, leading to different cell types within organisms and the distribution of traits in a population.



SC.HSP.9.4.e **Construct an explanation** based on evidence for the role of biotechnology in the research and understanding of biological systems. Emphasis is on the evolution of genomes, how biotechnology allows researchers to study the sequence, expression, and function of genes, and the practical applications of biotechnology.

## SC.HSP.10 Biological Evolution

SC.HSP.10.5 Gather, analyze, and communicate evidence of biological evolution.



SC.HSP.10.5.a **Communicate scientific information** that common ancestry and biological evolution are supported by multiple lines of empirical evidence. Emphasis is on a conceptual understanding of the role each line of evidence has relating to common ancestry and biological evolution. Examples of evidence could include similarities in DNA sequences, anatomical structures, and order of appearance of structures in embryological development.



SC.HSP.10.5.b **Construct an explanation** based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. Emphasis is on using evidence to explain the influence each of the four factors has on number of organisms, behaviors, morphology, or physiology in terms of ability to compete for limited resources and subsequent survival of individuals and adaptation of species. Examples of evidence could include mathematical models such as simple distribution graphs and proportional reasoning.



SC.HSP.10.5.c **Apply concepts of statistics and probability** to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. Emphasis is on analyzing shifts in numerical distribution of traits and using these shifts as evidence to support explanations. Examples of basic statistical and graphical analysis could include allele frequency calculations.



SC.HSP.10.5.d **Construct an explanation** based on evidence for how natural selection leads to adaptation of populations. Emphasis is on using data to provide evidence for how specific biotic and abiotic differences in ecosystems (such as ranges of seasonal temperature, long-term climate change, acidity, light, geographic barriers, or evolution of other organisms) contribute to a change in gene frequency over time, leading to adaptation of populations.



SC.HSP.10.5.e **Evaluate evidence** supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. Emphasis is on determining cause and effect relationships for how changes to the environment such as deforestation, fishing, application of fertilizers, drought, flood, and the rate of change of the environment affect distribution or disappearance of traits in species.



SC.HSP.10.5.f **Develop and use models** to illustrate patterns in the evolutionary history of biological diversity. Emphasis is on how the structure and function of bacteria, archaea, protists, fungi, plants, and animals are used in are related in the tree of life.

# ANATOMY AND PHYSIOLOGY

## SC.HSP.6 Structure and Function: Anatomy & Physiology

SC.HSP.6.2 Gather, analyze, and communicate evidence of the relationship between the structures and physiological processes of the *integumentary system*.



SC.HSP.6.2.a **Plan and conduct an investigation** to identify patterns of organization in the integumentary system. Information could be gathered from dissections, models, simulations, and scientific texts.



SC.HSP.6.2.b **Ask questions** to clarify the role of various structures in integumentary system function.



SC.HSP.6.2.c **Develop and use a model** to identify and describe the relationship between the structures and physiological processes of the integumentary system.



SC.HSP.6.2.d **Plan and conduct an investigation to gather evidence** that feedback mechanisms in the integumentary system help maintain homeostasis.



SC.HSP.6.2.e **Engage in arguments from evidence** for the role of cell division in integumentary system dysfunction.

SC.HSP.6.3 Gather, analyze, and communicate evidence of the relationship between the structures and physiological processes of the *skeletal system*.



SC.HSP.6.3.a **Plan and conduct an investigation** to identify patterns of organization in the skeletal system. Information could be gathered from dissections, models, simulations, and scientific texts.



SC.HSP.6.3.b **Develop and use a model** to identify and describe the relationship between the structures and physiological processes of the skeletal system.



SC.HSP.6.3.c **Obtain, evaluate, and communicate information** that feedback mechanisms in the skeletal system help maintain homeostasis.



SC.HSP.6.3.d **Develop and use a model** to explain the order of events necessary for bone formation.



SC.HSP.6.3.e **Engage in arguments from evidence** to support claims about the causes of dysfunction in the skeletal system. Evidence could include data obtained from case studies.

SC.HSP.6.4 Gather, analyze, and communicate evidence of the relationship between the structures and physiological processes of the *muscular system*.



SC.HSP.6.4.a **Plan and conduct an investigation** to identify patterns of organization in the muscular system. Information could be gathered from dissections, models, simulations, and scientific texts.



SC.HSP.6.4.b **Develop and use a model** to identify and describe the relationship between the structures and physiological processes of the muscular system.



SC.HSP.6.4.c **Engage in arguments from evidence** that muscle contraction is the result of biochemical reactions.



SC.HSP.6.4.d **Obtain, evaluate, and communicate** that feedback mechanisms in the muscular system help maintain homeostasis.



SC.HSP.6.4.e **Engage in arguments from evidence** to support claims about the causes of dysfunction in the muscular system. Evidence could include data obtained from case studies.

SC.HSP.6.5 Gather, analyze, and communicate evidence of the relationship between the structures and physiological processes of the *nervous system*.



SC.HSP.6.5.a **Plan and conduct an investigation** to identify patterns of organization in the nervous system. Information could be gathered from dissections, models, simulations, and scientific texts.



SC.HSP.6.5.b **Develop and use a model** to identify and describe the relationship between the structures and physiological processes of the nervous system.



SC.HSP.6.5.c **Engage in arguments from evidence** that production of a nerve impulse is the result of biochemical reactions.



SC.HSP.6.5.d **Obtain, evaluate, and communicate evidence** that feedback mechanisms in the nervous system help maintain homeostasis.



SC.HSP.6.5.e **Engage in arguments from evidence** to support claims about the causes of dysfunction in the nervous system. Evidence could include data obtained from case studies.

SC.HSP.6.6 Gather, analyze, and communicate evidence of the relationship between the structures and physiological processes of the *cardiovascular/respiratory systems*.



SC.HSP.6.6.a **Plan and conduct an investigation** to identify patterns of organization in the cardiovascular/respiratory systems. Information could be gathered from dissections, models, simulations, and scientific texts.



SC.HSP.6.6.b **Develop and use a model** to identify and describe the relationship between the structures and physiological processes of the cardiovascular/respiratory systems.



SC.HSP.6.6.c **Obtain, evaluate and communicate evidence** that feedback mechanisms in the cardiovascular/respiratory systems help maintain homeostasis.



SC.HSP.6.6.d **Engage in arguments from evidence** to support claims about the causes of dysfunction in the cardiovascular/respiratory systems. Evidence could include data obtained from case studies.

SC.HSP.6.7 Gather, analyze, and communicate evidence of the relationship between the structures and physiological processes of the *digestive system*.



SC.HSP.6.7.a **Plan and conduct an investigation** to identify patterns of organization in the digestive system. Information could be gathered from dissections, models, simulations, and scientific texts.



SC.HSP.6.7.b **Develop and use a model** to identify and describe the relationship between the structures and physiological processes of the digestive system.



SC.HSP.6.7.c **Obtain, evaluate and communicate evidence** that feedback mechanisms in the digestive system help maintain homeostasis.



SC.HSP.6.7.d **Engage in arguments from evidence** to support claims about the causes of dysfunction in the digestive system. Evidence could include data obtained from case studies.

SC.HSP.6.8 Gather, analyze, and communicate evidence of the relationship between the structures and physiological processes of the *urinary system*.



SC.HSP.6.8.a **Plan and conduct an investigation** to identify patterns of organization in the urinary system. Information could be gathered from dissections, models, simulations, and scientific texts.



SC.HSP.6.8.b **Develop and use a model** to identify and describe the relationship between the structures and physiological processes of the urinary system.



SC.HSP.6.8.c **Obtain, evaluate and communicate evidence** that feedback mechanisms in the urinary system help maintain homeostasis.



SC.HSP.6.8.d **Engage in arguments from evidence** to support claims about the causes of dysfunction in the urinary system. Evidence could include data obtained from case studies.

SC.HSP.6.9 Gather, analyze, and communicate evidence of the relationship between the structures and physiological processes of the *reproductive system*.



SC.HSP.6.9.a **Plan and conduct an investigation** to identify patterns of organization in the reproductive system. Information could be gathered from dissections, models, simulations, and scientific texts.



SC.HSP.6.9.b **Develop and use a model** to identify and describe the relationship between the structures and physiological processes of the reproductive system. Include spermatogenesis, oogenesis, and menstruation.



SC.HSP.6.9.c **Obtain, evaluate and communicate evidence** that feedback mechanisms in the reproductive system help maintain homeostasis.



SC.HSP.6.9.d **Engage in arguments from evidence** to support claims about the causes of dysfunction in the reproductive system. Evidence could include data obtained from case studies.

## SC.HSP.17 Engineering in Health Sciences

SC.HSP.17.1 Gather, analyze, and communicate evidence of the connection between health science careers and engineering.



SC.HSP.17.1.a **Obtain, evaluate, and communicate information** related to health science careers and the various roles they fulfill within the health care system. Examples include researcher, bio-medical engineer, medical professional, technician, manufacturer and distributor, administrator, and data storage and security professional.



SC.HSP.17.1.b **Design a solution** to a complex, real-world problem affecting body systems that can be solved through engineering. Solutions could include prosthetics, mobility enhancement, engineered body parts, treatment processes, and disease control.



SC.HSP.17.1.c **Evaluate a solution** to a complex, real-world human health problem based on prioritized criteria constraints that account for interactions within and between systems. Solutions could include the effects on the human body or solutions for environmental public health issues.

## SC.HSP.18 Body Systems

SC.HSP.18.1 Gather, analyze, and communicate evidence of the connections between body systems.



SC.HSP.18.1.a **Construct and revise an explanation** based on evidence for the cycling of matter and flow of energy within and between body systems.



SC.HSP.18.1.b **Develop and use models** to explain the interactions between body systems. Emphasis should also include interactions with the endocrine system.

# APPENDIX A: TOPIC PROGRESSION

TOPIC/GRADE	K	1	2	3	4	5	6	7	8	HS
1. Forces & Interactions	SC.K.1			SC.3.1					SC.8.1	SC.HS.1
2. Waves & Electro-magnetic Radiation		SC.1.2			SC.4.2				SC.8.2	SC.HS.2
3. Structure & Properties of Matter			SC.2.3			SC.5.3		SC.7.3		SC.HS.3
4. Energy					SC.4.4		SC.6.4		SC.8.4	SC.HS.4
5. Chemical Reactions								SC.7.5		SC.HS.5
6. Structure & Function		SC.1.6			SC.4.6					SC.HS.6
7. Inter-dependent Relationships in Ecosystems	SC.K.7		SC.2.7	SC.3.7			SC.6.7	SC.7.7		SC.HS.7
8. Matter & Energy in Organisms & Ecosystems						SC.5.8		SC.7.8		SC.HS.8
9. Heredity: Inheritance & Variation of Traits				SC.3.9			SC.6.9		SC.8.9	SC.HS.9
10. Biological Evolution									SC.8.10	SC.HS.10
11. Space Systems		SC.1.11				SC.5.11			SC.8.11	SC.HS.11
12. Weather & Climate	SC.K.12			SC.3.12			SC.6.12			SC.HS.12
13. Earth's Systems			SC.2.13		SC.4.13	SC.5.13	SC.6.13	SC.7.13		SC.HS.13
14. History of Earth								SC.7.14	SC.8.14	SC.HS.14
15. Sustainability										SC.HS.15

# APPENDIX B: HS INTEGRATED SCIENCE COURSE MODEL

This appendix provides two examples of possible high school science course sequences. The first example outlines the NE Integrated Food, Energy, and Water Model, a series of interdisciplinary classes that blend Nebraska-specific contexts with global science issues. This example of standard bundles was developed in collaboration with University of Nebraska-Lincoln faculty. The second example presents course mapping of Disciplinary Core Ideas (DCIs) into a coherent sequence as outlined in A Framework for K-12 Science Education.

**Course 1: Science Foundations** seeks to lay a foundation for understanding the complexities of the biological and physical domains by deeply understanding the driving principles that allow matter to exist and function as it does in the universe. The topics in this course will be explored through the lens of the Nebraska Career Education Model.

Unit 1: Newtonian Forces	Unit 2: Gravity/ Electro-magnetism	Unit 3: Energy	Unit 4: Waves & Electromagnetic Radiation	Unit 5: Earth's Interior	Unit 6: Structure and Properties of Matter	Unit 7: Molecular Level Design	Unit 8: Space Exploration
HS.1.1.a HS.1.1.b HS.1.1.c	HS.1.1.d HS.1.1.e HS.4.4.f	HS.4.4.a HS.4.4.b HS.4.4.c HS.15.4.b	HS.2.2.a HS.2.2.b HS.2.2.c HS.2.2.d HS.2.2.e	HS.13.3.b HS.13.3.c	HS.3.3.a HS.3.3.c	HS.3.3.b HS.3.3.d	HS.11.5.a HS.11.5.b HS.11.5.c HS.11.5.d

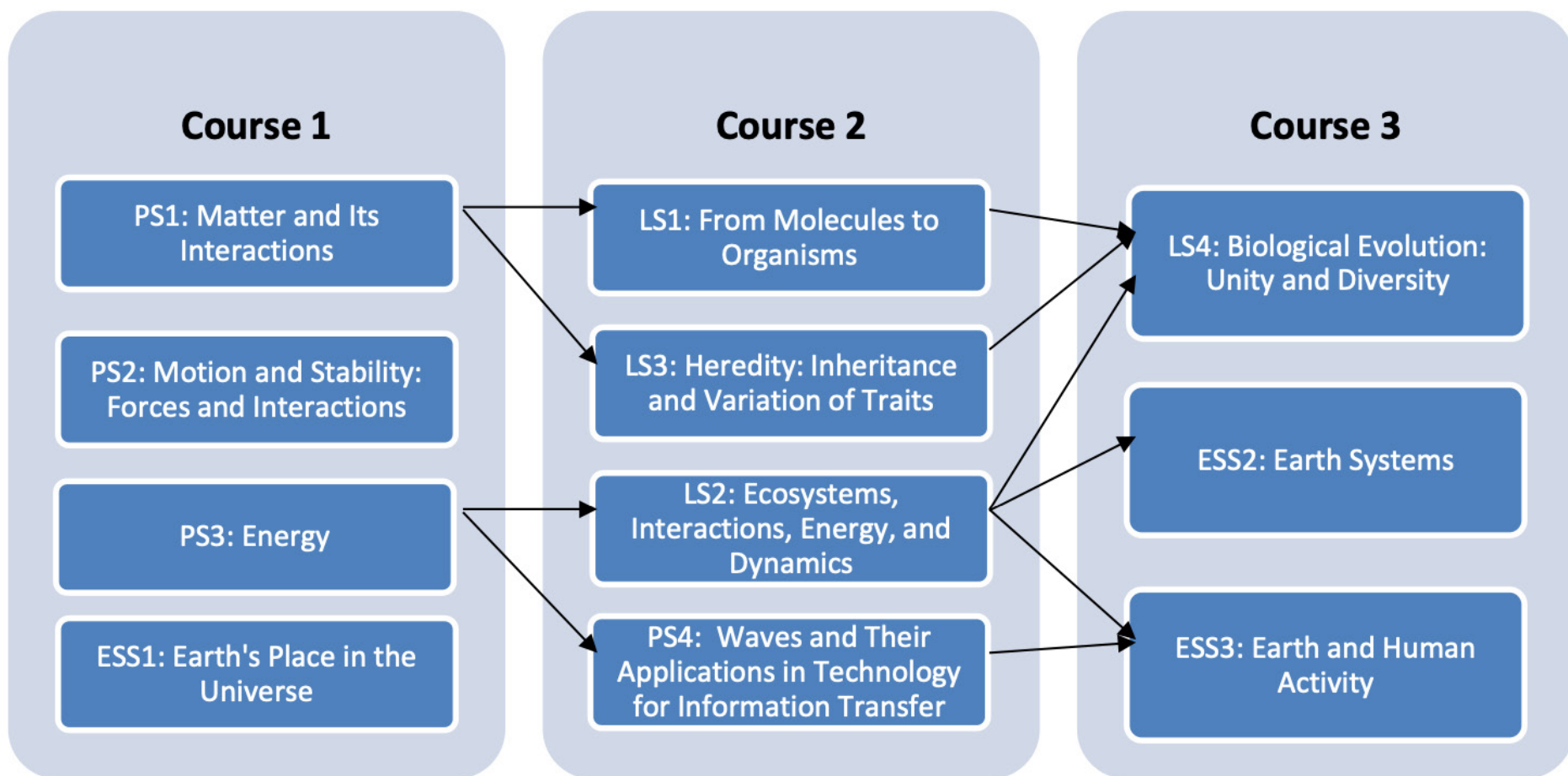
**Course 2: Water in Society** begins by expanding upon what was learned in Course 1 by taking a deeper look into matter and energy through the lens of water. It includes general chemistry concepts as they relate to water and life processes & systems. The course then focuses on how organisms and global systems maintain stability, transfer energy, and cycle matter. The final focus is on the sustainability of water.

Unit 1: Introduction to Water	Unit 2: Chemistry Between Life & Water	Unit 3: Small Systems Equilibrium	Unit 4: Systems: Energy in Balance	Unit 5: Movement of Matter in Global Systems	Unit 6: Sustainability of Water
SC.HS.13.3.d SC.HS.5.5.a	SC.HS.8.3.a SC.HS.5.5.f SC.HS.8.3.b SC.HS.8.3.c SC.HS.5.5.b	SC.HS.8.3.e SC.HS.5.5.c SC.HS.5.5.d	SC.HS.6.1.c SC.HS.13.3.a SC.HS.4.4.e SC.HS.14.2.c SC.HS.12.1.b	SC.HS.13.3.e SC.HS.8.3.f	SC.HS.15.4.a SC.HS.12.1.c SC.HS.15.4.d

**Course 3: Land, Food, and People** expands upon what was learned in both Course 1 and 2 taking a deeper dive into the coevolution of Earth systems and organisms. It is designed to introduce students to information, ideas, and concepts about the interactions of people, land and the demands for food. Students will investigate the history of the Earth, biological adaptation, heredity, and interdependent relationships in ecosystems. At the end of the course, students will be able to analyze, synthesize and communicate information about the dynamic relationships of land, food, and people from ethical, civic and stewardship perspectives and explain the impacts of human decisions on renewable and non-renewable resources.

Unit 1: Earth's History	Unit 2: Biological Evolution	Unit 3: Heredity: Inheritance & Variation	Unit 4: Structure & Function	Unit 5: Interdependent Relationships in Organisms	Unit 6: Sustainability
SC.HS.14.2.a SC.HS.14.2.b HS.12.1.a HS.12.1.d SC.HS.14.2.d	SC.HS.10.5.a SC.HS.10.5.b SC.HS.10.5.c SC.HS.10.5.d SC.HS.10.5.e SC.HS.7.2.e	HS.9.4.a HS.9.4.b HS.9.4.c	HS.6.1.a HS.6.1.b HS.6.1.d	HS.7.2.a HS.7.2.b HS.7.2.c HS.8.3.d	HS.7.2.d HS.15.4.c HS.15.4.f HS.7.2.f

## NGSS Conceptual Progressions Model



# COLUMBUS PUBLIC SCHOOLS PROPOSAL FOR RULE 17 PROGRAM



## OVERVIEW

Columbus Public Schools currently uses placement outside of the school district to serve students who have been expelled. With changes in those programs, openings for regular education students who are expelled have become limited or non-existent. The proposed program would meet requires under Nebraska Title 92, Chapter 17 for alternative school, classes, or programs for expelled students. The proposed program run by Columbus Public Schools would align the academic, social, emotional, accountability, support, and skills-based readiness to improve outcomes for students completing the program.

### The Objective

- Need #1: Provide dedicated space, academic support, school readiness skills, flexible scheduling, and individualized instruction for expelled and mandatory reassigned students.
- Need #2: Provide appropriate services for expelled and mandatory reassigned students within Columbus Public Schools.
- Need #3: Provide appropriate services for expelled students that emphasizes accountability, support, and attendance in a collaborative partnership with the parent/guardian, student, and school district.

### The Opportunity

- Goal #1: Develop and implement a positive alternative to expulsion.
- Goal #2: Create an individualized and flexible program to meet the needs to the student.
- Goal #3: Utilize the robust services and supports offered by the school district and community in a collaborative and coordinated effort to improve outcomes for expelled students.

### The Solution

- Recommendation #1: Utilize existing district space at the Pathways Trailer to house the program.
- Recommendation #2: Hire a certified teacher and registered-behavior technician to provide services.
- Recommendation #3: Implement the program, measure outcomes, and evaluate effectiveness.

## OUR PROPOSAL

The Columbus Public Schools Rule 17 Program is aligned to meet Title 92, Chapter 17 of Nebraska Statute directly serving students who have been expelled from Columbus Public Schools. The academic, social, emotional, and school readiness skills will be combined into an individualized program supervised by a certified teacher and supporter by a register behavior technician along with the resources offered within the School District. Those resources may include our licensed mental health practitioner, social workers, counselors, nurses, and school psychologists.

The program is designed to ensure the student is successful in returning to their regular education placement at the end of the expulsion and a positive, collaborative relationship has been built between the family, student, and school to improve potential outcomes for the student.

The basic program parameters would be as follows:

- Placement into the program will be at the discretion of the Superintendent of Columbus Public Schools
- Each student's schedule will be determined by the placement team which will consist of the following team members: building administrator, school counselor, program teacher and Assistant Director for Student Services.
- Placement meetings and progress monitoring meetings will include a parent/guardian, the student, the placement team members: building administrator, school counselor, program teacher and Assistant Director for Student Services.
- Students will take classes through the online learning platform Acellus and other assign work determined necessary by the team.
- The program will offer support in social-emotional learning with a focus on CASEL Core Competencies:
  - Self Management (how they manage their behaviors, reactions towards others, and impulse-control)
  - Self Awareness (how they identify their emotions, self-perception, recognizing their strengths, self-confidence and self-efficacy)
  - Social Awareness (respect for others, empathy, appreciating diversity of others, understanding non-verbal communication)
  - Relationship Skills (getting along with others, teamwork, taking turns, and communication)
  - Responsible Decision Making (identifying the problem, explore options, select solutions, reflect on outcomes, consider how choices affect themselves and others)
- Students will park in designated parking areas only. Violation of this expectation will result in the revocation of parking on school property.
- Students are not allowed to participate or attend extracurricular activities and should only be on school property during assigned times.
- A placement agreement will be presented and signed by the parent/guardian, student, building administrator and/or Assistant Director for Student Services.
- Students will be permitted to remain in the program and progress toward earning credit and serving out their expulsion unless they lose 10 points in the program. Points are lost as follows:
  - 10 for possession of a weapon, drugs, or alcohol; being under the influence of an illegal substance; and/or causing physical harm to another student or employee.
  - 5 for physically aggressive behavior.
  - 4 for property destruction.
  - 3 for verbal aggression.
  - 1 for insubordination and/or not following program rules, including unexcused absences.

## Rationale

- Loss of existing placement options to service students.
- Research
- Need
- Ability to individualize services for each student.

## Resources

- New Certified Teacher
- New Registered Behavior Technician (Aide)
- Existing use of District Staff
- Existing Acellus License
- Existing Pathways Trailer

## Timeline for Execution

Description	Start Date	End Date	Duration
Prepare Classroom Space	11/19/24	11/26/24	1 week
Hire Personnel	11/19/24	11/26/24	1 week
Students Identified/Parent Meeting/Support Team Planning Meeting	11/26/24	12/6/24	1 Week
Students Begin Program	12/9/24		

## EXPECTED RESULTS

We expect our proposed program to provide the following outcomes:

### Outcomes

- Result #1: Students maintain academic progress while gaining the skills necessary to address the reasons influencing their expulsion and gaining school readiness skills to return to their regular building follow the expulsion.
- Result #2: Reduce student drop out as a result of being expelled.
- Result #3: Reduce the number of students who are repeat offenders.

## BUDGET

Anticipated Annual Budget for the proposed program, with a capacity of 16 students per day, with flexible scheduling limiting 3 to 5 maximum during scheduled service times.

Description	Annual Cost
Certified Teacher (including benefits) assuming MA, Step 7 placement.	\$82,152
Registered Behavior Technician (including benefits) 188 Day Contract	\$47,000
Acellus License(s) – Is used already for expelled students.	\$0
Facility Costs (materials, furniture, and annual utilities)	\$500
Existing Staff Serving the Program	\$0
<b>Total Annual Cost</b>	<b>\$129,652</b>

## COST COMPARISON TO CURRENT SERVICES

To compare annual costs above, this would replace students who typically attended Boys Town or would require contracted out services.

BT-Duncan operates on a 3:1 ratio. Our program, with flexible scheduling will operate under that same ratio depending on the needs of the student(s) in the program.

Cost comparison to our current and proposed options:

- Boys Town charges \$260 per day whether the student is in attendance or not. **To serve 3 to 5 students at Boys Town – Duncan the cost is \$780 to \$1,300 per day.**
- According to the 23-24 NDE rates, a teacher and RBT would be charged to CPS at \$88 per hour, per student by an outside agency. **To serve 3 to 5 students by contracting the service would cost \$792 to \$1,320 per day.**
- The **daily cost of our proposed program would be \$690.** It breaks out to \$86.25 per hour and we would serve 3 to 5 students at one time.

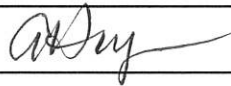
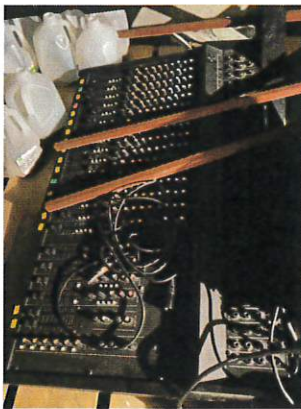
DATE	10/25/2025
BUILDING:	COLUMBUS MIDDLE SCHOOL
PROGRAM	Band/Music/Department
PRINCIPAL/DIRECTOR SIGNATURE	
Description of materials to surplus: A soundboard. The soundboard does not work any longer. It is no longer needed.	

IMAGE INSERTED (If available)	DESCRIPTION	HOW WILL ITEMS BE DISPOSED OF
To insert an image here, place your cursor in this box and select insert from the menu bar, then select image and choose the appropriate image.	Give a description and the reason the item is being declared surplus property.	Examples: trash, recycle, donated, etc. Items being moved to other CPS locations should not be declared surplus property.
	The soundboard does not work any longer. It is no longer needed.	Recycle/Dispose of.

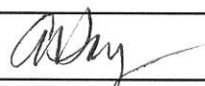
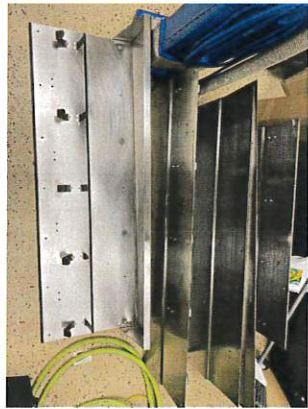
DATE	10/25/24
BUILDING	COLUMBUS MIDDLE SCHOOL
PROGRAM	Student Bathrooms
PRINCIPAL/DIRECTOR SIGNATURE	
Description of materials to surplus: Steel Shelves (4 each).	

IMAGE INSERTED (If available)	DESCRIPTION	HOW WILL ITEMS BE DISPOSED OF
	The Steel Shelves were removed from the Student Bathrooms during the Summer of 2024 in order to make room for the automated hand dryers. The shelves are in excellent condition. The shelves are heavy and very solid and could be rehomed to another school rather than being thrown away. There is a shelf on the top and 5 hooks on each for hanging items.	Re-house at another school. These are too nice to dispose of.

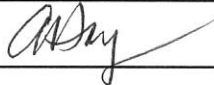


DATE	10/25/24
BUILDING	COLUMBUS MIDDLE SCHOOL
PROGRAM	Band/Music Department
PRINCIPAL/DIRECTOR SIGNATURE	
<p>Description of materials to surplus:                  The Electric Piano is from the Band Room and it does not work.                  This Piano was tucked back in a closet because it did not work.                  The closet was cleaned out and the Piano was worked on, but no luck.                  The Piano could be disposed of.                  A large dumpster would be needed.</p>	

IMAGE INSERTED (If available)	DESCRIPTION	HOW WILL ITEMS BE DISPOSED OF
	<p>Electric Piano.                      The Electric Piano is from the Band Room and it does not work.                      This Piano was tucked back in a closet because it did not work.                      The closet was cleaned out and the Piano was worked on, but no luck.                      The Piano could be disposed of.                      A large dumpster would be needed.</p>	Dispose
		




DATE	10/30/2024
BUILDING:	COLUMBUS MIDDLE SCHOOL
PROGRAM	IMC
PRINCIPAL/DIRECTOR SIGNATURE	
Earphones.	

IMAGE INSERTED (If available)	DESCRIPTION	HOW WILL ITEMS BE DISPOSED OF
<p>To insert an image here, place your cursor in this box and select insert from the menu bar, then select image and choose the appropriate image.</p>	<p>Give a description and the reason the item is being declared surplus property.</p>	<p>Examples: trash, recycle, donated, etc. Items being moved to other CPS locations should not be declared surplus property.</p>
	<p>These earphones were given to the CMS IMC from a teacher. They have broken wires and do not work. Unfortunately, they are unrepairable and cannot be used.</p>	<p>Dispose.</p>
		

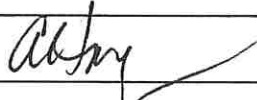
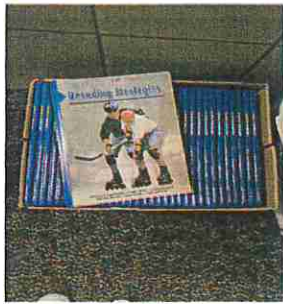

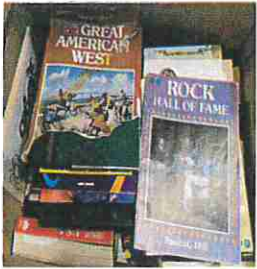
DATE	10/30/2024
BUILDING:	COLUMBUS MIDDLE SCHOOL
PROGRAM	Storage Closet - CHS Books
PRINCIPAL/DIRECTOR SIGNATURE	
<p>CHS books that were left in one of the Auditoriums closets. These books were left after CHS moved to the new CHS and CMS moved to CHS in 2017. The books have not been used or moved since 2017. The books are outdated. Mr. Hiebner was contacted and he verified that the books were no longer needed.</p>	

IMAGE INSERTED (If available)	DESCRIPTION		HOW WILL ITEMS BE DISPOSED OF
	Decoding Strategies - dated 2012. There are 2 cases of these books.	The books are in excellent condition and look like they have never been used. These books are in excellent condition.	Dispose.
	Galleria Books - dated 2010. There are 2 ½ cases of these books.	These books are in excellent condition and look like they have never been used.	Dispose.
	Miscellaneous Resource Items. Readers Digests, World Atlas, Rock Hall of Fame. 2 boxes full of items listed at Resource Items.	The books are not in good condition. They are ripped and used and worn.	Dispose.



Columbus Public Schools

Date:

### School Fundraising Application

Please submit this application to the building principal at least two weeks in advance of the proposed date of your money-raising project. Please read the eight guides on page two. They will help you in answering the questions below.

School: Columbus High School Name: Fine Arts Department: Art & Music

**Fund Raising Company (if applicable):**

*(School/Group Name), submits the following plans for its money-earning project, and requests permission to carry them out.* The Waffleman (Bill Maltas) 2440 Jameson South, Lincoln, NE 68512 402.560.0938

**What is your school/group's money-earning plan?**

Winter Fine Arts Festival: Art Club selling homemade cookies during the Art Show & The Waffleman  
Approximately how much does your school/group expect to earn from this project?

Art Club Cookie Sales: \$500 Goal; The Waffleman: \$1800 (Waffleman is split between Art/Mus)  
How will this money be used?

Art Club: Overnight Field Trip (Omaha) expenses; Music Dept - Concert Hall Upgrades  
What are the proposed dates? Monday, December 16th

Is this a recurring activity?  Yes  No  
(If you selected yes, please specify the dates on which the activity will occur during the next twelve months.)

Are you selling tickets or a product?  Tickets  Product  Neither  
(If you selected product, please specify the product that you are selling.) Homemade Cookies

Will members be identified by t-shirts, etc. while carrying out this project?  Yes  No

Have you checked with other schools to avoid any overlapping while working?  Yes  No

Is your product/service in direct conflict with that offered by local merchants?  Yes  No

Are any contracts to be signed?  Yes  No If yes, by whom? Peabody - The Waffleman

Has your school/group devised a budget plan to expend earnings?  Yes  No

Does the building principal give full approval for this plan?  Yes  No

Principal's Signature  Date 11/1/2024

*(for district use only)*

Approved by \_\_\_\_\_ Date \_\_\_\_\_

Approved subject to the following conditions \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

# Columbus Public Schools

## District Technology & Operations

To: Board of Education  
:  
From: Leonard Kwapnioski  
CC: Dr. Kay  
Date: November 8, 2024  
Re: Kramer BP #3B-2

I recommend that you accept the bids as submitted below. We still have some left and will get those in as soon as possible. I will discuss on Monday additional details about the project and insert/update bids that I'm still waiting on

Please let me know if you have questions.

Thanks

Leonard

● Midwest Door & Hardware – Doors, Frames, Locks	\$114,701.00
● TC Ceilings – Acoustical Ceilings	\$60,700.00
● EPCO - Marker Boards, Bathroom items, Fire Protection	\$280,470.00
● Carrol Seating - Casework	\$14,200.00
● Midwest Automatic Fire Sprinkler Company - Fire Sprinkler	\$45,285.00
● Flooring – Finalizing pricing Tile & Carpet	\$
<b>Total</b>	<b>\$251,237.00</b>

**Total cost of project to date \$2,036,120.00**