

Regular Board Meeting
February 12, 2018, at 7:30 PM
Southern School District

Notice is hereby given of a meeting of the Board of Education, Southern School District #1 on February 12, 2018, at 7:30 PM at Southern Jr./Sr. High School Board Room in Wymore. A current agenda is also available at the office of the Superintendent.

I hereby certify that the above notice was posted in three public places as follows:

Southern Elementary School

Southern Jr./Sr. High School

U.S. Post Office in Wymore

- I. Call Meeting to Order
 - I.A. Roll Call
 - I.B. Notice of Open Meeting Law Posted
- II. Approval of Minutes from the January 8, 2018, Regular Board Meeting
- III. Communications, Audiences, and Recognitions
 - III.A. Public comments will not be received after this period of time. Public comment period is limited to 5 minutes per person and a total of 30 minutes overall.
- IV. Financial Statement: Item for Discussion, Consideration, and/or Action
 - IV.A. Approval of Bills
 - IV.A.1. General Fund, Special Building Fund, Depreciation Fund, and Qualified Capitol Purpose Fund Claims
 - IV.A.2. Lunch and Activity Claims

- V. Support Service
 - V.A. Facility Update
 - V.B. Personnel Items
 - V.B.1. Resignations
 - V.B.1.1. Sheila Cordry - 1.0 FTE - 7-12 English Language Arts Teacher at the Conclusion of the 2017-2018 School Year
 - V.B.1.2. Denise Pahl - 1.0 FTE - 7-12 Special Education Teacher at the Conclusion of the 2017-2018 School Year
 - V.B.2. Hiring Recommendations
 - V.B.2.1. Caitlin Kalvelage - 1.0 FTE - K-12 Vocal Music Teacher for the 2018-2019 School Year
 - V.C. Technology Update
- VI. Administrative and Committee Reports
 - VI.A. Student Board Member Report
 - VI.B. Elementary Principal's Report
 - VI.C. Secondary Principal's Report
 - VI.D. Superintendent's Report
- VII. Items for Discussion, Consideration, and/or Action
 - VII.A. Principals' Contracts
 - VII.A.1. Principals Contract Extension
 - VII.A.2. Principals' Salaries for 2018-2019
 - VII.B. Classified Salaries for 2018-2019
 - VII.C. Extended Leave Time for Jessie Tjaden for the 2017-2018 School Year
 - VII.D. Extended Leave Time for Jan Carr for the 2017-2018 School Year
 - VII.E. College & Career Ready Science Standards
 - VII.F. Corporation Authorization Resolution with Cornerstone Bank for Employee Payroll Direct Deposit

VII.G. Option Enrollment Applications

VIII. Adjournment

Notice of Regular Board Meeting
February 12, 2018, at 7:30 p.m.
Southern School District #1

Notice is hereby given of a meeting of the Board of Education, Southern School District #1 on February 12, 2018, at 7:30 p.m. at Southern Jr./Sr. High School Board Room in Wymore. A current agenda is also available at the office of the Superintendent.

I hereby certify that the above notice was posted in three public places as follows:

Southern Elementary School
Southern Jr./Sr. High School
U.S. Post Office in Wymore

- I. Call Meeting to Order
 - A. Roll Call
 - B. Notice of Open Meeting Law Posted
- II. Approval of Minutes from the January 8, 2018, Regular Board Meeting
- III. Communications, Audiences, and Recognitions
 - A. Public comments will not be received after this period of time. Public comment period is limited to 5 minutes per person and a total of 30 minutes overall.
- IV. Financial Statement: Item for Discussion, Consideration, and/or Action
 - A. Approval of Bills
 - B. General Fund, Special Building Fund, Depreciation Fund, and Qualified Capitol Purpose Undertaking Fund Claims
 - C. Lunch and Activity Claims
- V. Support Service
 - A. Facility Update
 - B. Personnel Item
 - a. Resignation of Sheila Cordry (1.0 FTE – 7-12 English Language Arts Teacher) at the Conclusion of the 2017-2018 School Year
 - b. Resignation of Denise Pahl (1.0 FTE – 7-12 Special Education Teacher) at the Conclusion of the 2017-2018 School Year
 - c. Hiring of Caitlin Kalvelage (1.0 FTE – K-12 Vocal Music Teacher) for the 2018-2019 School Year
 - C. Technology Update
- VI. Administrative and Committee Reports
 - A. Student Board Member Report
 - B. Elementary Principal's Report
 - C. Secondary Principal's Report
 - D. Superintendent's Report
- VII. Items for Discussion, Consideration, and/or Action
 - A. Principals' Salaries for 2018-2019
 - B. Classified Salaries for 2018-2019
 - C. Extended Leave Time for Jessie Tjaden for the 2017-2018 School Year
 - D. Extended Leave Time for Jan Carr for the 2017-2018 School Year
 - E. College & Career Ready Science Standards
 - F. Corporation Authorization Resolution with Cornerstone Bank for Employee Payroll Direct Deposit
 - G. Option Enrollment Applications
- VIII. Adjournment

The next Regular Board meeting is scheduled for 7:30 p.m., March 12, 2018, at Southern Jr./Sr. High School Board Room in Wymore. The Board of Education will usually adhere to the sequence of the published agenda, but reserves the right to adjust the order of items if necessary and may elect to amend the agenda as deemed necessary. This meeting will be preceded by a Southern Foundation meeting at 6:30 p.m.

NEBRASKA OPEN MEETINGS ACT

§ 84-1407. ACT, HOW CITED

Sections 84-1407 to 84-1414 shall be known and may be cited as the Open Meetings Act.

§ 84-1408. DECLARATION OF INTENT; MEETINGS OPEN TO PUBLIC

It is hereby declared to be the policy of this state that the formation of public policy is public business and may not be conducted in secret. Every meeting of a public body shall be open to the public in order that citizens may exercise their democratic privilege of attending and speaking at meetings of public bodies, except as otherwise provided by the Constitution of Nebraska, federal statutes, and the Open Meetings Act.

§ 84-1409. TERMS, DEFINED

For purposes of the Open Meetings Act, unless the context otherwise requires:

(1) (a) Public body means (i) governing bodies of all political subdivisions of the State of Nebraska, (ii) governing bodies of all agencies, created by the Constitution of Nebraska, statute, or otherwise pursuant to law, of the executive department of the State of Nebraska, (iii) all independent boards, commissions, bureaus, committees, councils, subunits, or any other bodies created by the Constitution of Nebraska, statute, or otherwise pursuant to law, (iv) all study or advisory committees of the executive department of the State of Nebraska whether having continuing existence or appointed as special committees with limited existence, (v) advisory committees of the bodies referred to in subdivisions (i), (ii), and (iii) of this subdivision, and (vi) instrumentalities exercising essentially public functions; and (b) Public body does not include (i) subcommittees of such bodies unless a quorum of the public body attends a subcommittee meeting or unless such subcommittees are holding hearings, making policy, or taking formal action on behalf of their parent body, except that all meetings of any subcommittee established under section 81-15,175 are subject to the Open Meetings Act, and (ii) entities conducting judicial proceedings unless a court or other judicial body is exercising rulemaking authority, deliberating, or deciding upon the issuance of administrative orders;

(2) Meeting means all regular, special, or called meetings, formal or informal, of any public body for the purposes of briefing, discussion of public business, formation of tentative policy, or the taking of any action of the public body; and

(3) Videoconferencing means conducting a meeting involving participants at two or more locations through the use of audio-video equipment which allows participants at each location to hear and see each meeting participant at each other location, including public input. Interaction between meeting participants shall be possible at all meeting locations.

§ 84-1410. CLOSED SESSION; WHEN; PURPOSE; REASONS LISTED; PROCEDURE; RIGHT TO CHALLENGE; PROHIBITED ACTS; CHANCE MEETINGS, CONVENTIONS, OR WORKSHOPS

(1) Any public body may hold a closed session by the affirmative vote of a majority of its voting members if a closed session is clearly necessary for the protection of the public interest or for the prevention of needless injury to the reputation of an individual and if such individual has not requested a public meeting. The subject matter and the reason necessitating the closed session shall be identified in the motion to close. Closed sessions may be held for, but shall not be limited to, such reasons as: (a) Strategy sessions with respect to collective bargaining, real estate purchases, pending litigation, or litigation which is imminent as evidenced by communication of a claim or threat of litigation to or by the public body; (b) Discussion regarding deployment of security personnel or devices; (c) Investigative proceedings regarding allegations of criminal misconduct; (d) Evaluation of the job performance of a person when necessary to prevent needless injury to the reputation of a person and if such person has not requested a public meeting; (e) For the Community Trust created under section 81-1801.02, discussion regarding the amounts to be paid to individuals who have suffered from a tragedy of violence or natural disaster; or (f) For public hospitals, governing board peer review activities, professional review activities, review and discussion of medical staff investigations or disciplinary actions, and any strategy session concerning transactional negotiations with any referral source that is required by federal law to be conducted at arms length.

Nothing in this section shall permit a closed meeting for discussion of the appointment or election of a new member to any public body.

(2) The vote to hold a closed session shall be taken in open session. The entire motion, the vote of each member on the question of holding a closed session, and the time when the closed session commenced and concluded shall be recorded in the minutes. If the motion to close passes, then the presiding officer immediately prior to the closed session shall restate on the record the limitation of the subject matter of the closed session. The public body holding such a closed session shall restrict its consideration of matters during the closed portions to only those purposes set forth in the motion to close as the reason for the closed session. The meeting shall be reconvened in open session before any formal action may be taken. For purposes of this section, formal action shall mean a collective decision or a collective commitment or promise to make a decision on any question, motion, proposal, resolution, order, or ordinance or formation of a position or policy but shall not include negotiating guidance given by members of the public body to legal counsel or other negotiators in closed sessions authorized under subdivision (1)(a) of this section.

(3) Any member of any public body shall have the right to challenge the continuation of a closed session if the member determines that the session has exceeded the reason stated in the original motion to hold a closed session or if the member contends that the closed session is neither clearly necessary for (a) the protection of the public interest or (b) the prevention of needless injury to the reputation of an individual. Such challenge shall be overruled only by a majority vote of the members of the public body. Such challenge and its disposition shall be recorded in the minutes.

(4) Nothing in this section shall be construed to require that any meeting be closed to the public. No person or public body shall fail to invite a portion of its members to a meeting, and no public body shall designate itself a subcommittee of the whole body for the purpose of circumventing the Open Meetings Act. No closed session, informal meeting, chance meeting, social gathering, email, fax, or other electronic communication shall be used for the purpose of circumventing the requirements of the act.

(5) The act does not apply to chance meetings or to attendance at or travel to conventions or workshops of members of a public body at which there is no meeting of the body then intentionally convened, if there is no vote or other action taken regarding any matter over which the public body has supervision, control, jurisdiction, or advisory power.

§ 84-1411. MEETINGS OF PUBLIC BODY; NOTICE; CONTENTS; WHEN AVAILABLE; RIGHT TO MODIFY; DUTIES CONCERNING NOTICE; VIDEOCONFERENCING OR TELEPHONE CONFERENCING AUTHORIZED; EMERGENCY MEETING WITHOUT NOTICE; APPEARANCE BEFORE PUBLIC BODY

(1) Each public body shall give reasonable advance publicized notice of the time and place of each meeting by a method designated by each public body and recorded in its minutes. Such notice shall be transmitted to all members of the public body and to the public. Such notice shall contain an agenda of subjects known at the time of the publicized notice or a statement that the agenda, which shall be kept continually current, shall be readily available for public inspection at the principal office of the public body during normal business hours. Agenda items shall be sufficiently descriptive to give the public reasonable notice of the matters to be considered at the meeting. Except for items of an emergency nature, the agenda shall not be altered later than (a) twenty-four hours before the scheduled commencement of the meeting or (b) forty-eight hours before the scheduled commencement of a meeting of a city council or village board scheduled outside the corporate limits of the municipality. The public body shall have the right to modify the agenda to include items of an emergency nature only at such public meeting.

(2) A meeting of a state agency, state board, state commission, state council, or state committee, of an advisory committee of any such state entity, of an organization created under the Interlocal Cooperation Act, the Joint Public Agency Act, or the Municipal Cooperative Financing Act, of the governing body of a public power district having a chartered territory of more than one county in this state, of the governing body of a public power and irrigation district having a chartered territory of more than one county in this state, of a board of an educational service unit, of the Educational Service Unit Coordinating Council, of the governing body of a risk management pool or its advisory committees organized in accordance with the Intergovernmental Risk Management Act, or of a community college board of governors may be held by means of videoconferencing or, in the case of the Judicial Resources Commission in those cases specified in section 24-1204, by telephone conference, if: (a) Reasonable advance publicized notice is given; (b) Reasonable arrangements are made to accommodate the public's right to attend, hear, and speak at the meeting, including seating, recordation by audio or visual recording devices, and a reasonable opportunity for input such as public comment or questions to at least the same extent as would be provided if videoconferencing or telephone conferencing was not used; (c) At least one copy of all documents being considered is available to the public at each site of the videoconference or telephone conference; (d) At least one member of the state entity, advisory committee, board, council, or governing body is present at each site of the videoconference or telephone conference; and (e) No more than one-half of the state entity's, advisory committee's, board's, council's, or governing body's meetings in a calendar year are held by means of videoconferencing or telephone conference.

Videoconferencing, telephone conferencing, or conferencing by other electronic communication shall not be used to circumvent any of the public government purposes established in the Open Meetings Act.

(3) A meeting of a board of an educational service unit, of the Educational Service Unit Coordinating Council, of the governing body of an entity formed under the Interlocal Cooperation Act, the Joint Public Agency Act, or the Municipal Cooperative Financing Act, of the governing body of a risk management pool or its advisory committees organized in accordance with the Intergovernmental Risk Management Act, of a community college board of governors, of the governing body of a public power district, of the governing body of a public power and irrigation district, or of the Nebraska Brand Committee may be held by telephone conference call if: (a) The territory represented by the educational service unit, member educational service units, community college board of governors, public power district, public power and irrigation district, Nebraska Brand Committee, or member public agencies of the entity or pool covers more than one county; (b) Reasonable advance publicized notice is given which identifies each telephone conference location at which an educational service unit board member, a council member, a member of a community college board of governors, a member of the governing body of a public power

district, a member of the governing body of a public power and irrigation district, a member of the Nebraska Brand Committee, or a member of the entity's or pool's governing body will be present; (c) All telephone conference meeting sites identified in the notice are located within public buildings used by members of the educational service unit board, council, community college board of governors, governing body of the public power district, governing body of the public power and irrigation district, Nebraska Brand Committee, or entity or pool or at a place which will accommodate the anticipated audience; (d) Reasonable arrangements are made to accommodate the public's right to attend, hear, and speak at the meeting, including seating, recordation by audio recording devices, and a reasonable opportunity for input such as public comment or questions to at least the same extent as would be provided if a telephone conference call was not used; (e) At least one copy of all documents being considered is available to the public at each site of the telephone conference call; (f) At least one member of the educational service unit board, council, community college board of governors, governing body of the public power district, governing body of the public power and irrigation district, Nebraska Brand Committee, or governing body of the entity or pool is present at each site of the telephone conference call identified in the public notice; (g) The telephone conference call lasts no more than two hours; and (h) No more than one-half of the board's, council's, governing body's, committee's, entity's, or pool's meetings in a calendar year are held by telephone conference call, except that a governing body of a risk management pool that meets at least quarterly and the advisory committees of the governing body may each hold more than one-half of its meetings by telephone conference call if the governing body's quarterly meetings are not held by telephone conference call or videoconferencing.

Nothing in this subsection shall prevent the participation of consultants, members of the press, and other nonmembers of the governing body at sites not identified in the public notice. Telephone conference calls, emails, faxes, or other electronic communication shall not be used to circumvent any of the public government purposes established in the Open Meetings Act.

(4) The secretary or other designee of each public body shall maintain a list of the news media requesting notification of meetings and shall make reasonable efforts to provide advance notification to them of the time and place of each meeting and the subjects to be discussed at that meeting.

(5) When it is necessary to hold an emergency meeting without reasonable advance public notice, the nature of the emergency shall be stated in the minutes and any formal action taken in such meeting shall pertain only to the emergency. Such emergency meetings may be held by means of electronic or telecommunication equipment. The provisions of subsection (4) of this section shall be complied with in conducting emergency meetings. Complete minutes of such emergency meetings specifying the nature of the emergency and any formal action taken at the meeting shall be made available to the public by no later than the end of the next regular business day.

(6) A public body may allow a member of the public or any other witness other than a member of the public body to appear before the public body by means of video or telecommunications equipment.

§ 84-1412. MEETINGS OF PUBLIC BODY; RIGHTS OF PUBLIC; PUBLIC BODY; POWERS AND DUTIES

(1) Subject to the Open Meetings Act, the public has the right to attend and the right to speak at meetings of public bodies, and all or any part of a meeting of a public body, except for closed sessions called pursuant to section 84-1410, may be videotaped, televised, photographed, broadcast, or recorded by any person in attendance by means of a tape recorder, camera, video equipment, or any other means of pictorial or sonic reproduction or in writing.

(2) It shall not be a violation of subsection (1) of this section for any public body to make and enforce reasonable rules and regulations regarding the conduct of persons attending, speaking at, videotaping, televising, photographing, broadcasting, or recording its meetings. A body may not be required to allow citizens to speak at each meeting, but it may not forbid public participation at all meetings.

(3) No public body shall require members of the public to identify themselves as a condition for admission to the meeting nor shall such body require that the name of any member of the public be placed on the agenda prior to such meeting in order to speak about items on the agenda. The body may require any member of the public desiring to address the body to identify himself or herself.

(4) No public body shall, for the purpose of circumventing the Open Meetings Act, hold a meeting in a place known by the body to be too small to accommodate the anticipated audience.

(5) No public body shall be deemed in violation of this section if it holds its meeting in its traditional meeting place which is located in this state.

(6) No public body shall be deemed in violation of this section if it holds a meeting outside of this state if, but only if: (a) A member entity of the public body is located outside of this state and the meeting is in that member's jurisdiction; (b) All out-of-state locations identified in the notice are located within public buildings used by members of the entity or at a place which will accommodate the anticipated audience; (c) Reasonable arrangements are made to accommodate the public's right to attend, hear, and speak at the meeting, including making a telephone conference call available at an instate location to members, the public, or the press, if requested twenty-four hours in advance; (d) No more than twenty-five percent of the public body's meetings in a calendar year are held out-of-state; (e) Out-of-state meetings are not used to circumvent any of the public government purposes established in the Open Meetings Act; (f) Reasonable arrangements are made to provide viewing at other instate locations for a videoconference meeting if requested fourteen days in advance and if economically and reasonably available in the area; and (g) The public body publishes notice of the out-of-state meeting at least twenty-one days before the date of the meeting in a legal newspaper of statewide circulation.

(7) The public body shall, upon request, make a reasonable effort to accommodate the public's right to hear the discussion and testimony presented at the meeting.

(8) Public bodies shall make available at the meeting or the instate location for a telephone conference call or videoconference, for examination and copying by members of the public, at least one copy of all reproducible written material to be discussed at an open meeting. Public bodies shall make available at least one current copy of the Open Meetings Act posted in the meeting room at a location accessible to members of the public. At the beginning of the meeting, the public shall be informed about the location of the posted information.

§ 84-1413. MEETINGS; MINUTES; ROLL CALL VOTE; SECRET BALLOT; WHEN

(1) Each public body shall keep minutes of all meetings showing the time, place, members present and absent, and the substance of all matters discussed.

(2) Any action taken on any question or motion duly moved and seconded shall be by roll call vote of the public body in open session, and the record shall state how each member voted or if the member was absent or not voting. The requirements of a roll call or viva voce vote shall be satisfied by a public body which utilizes an electronic voting device which allows the yeas and nays of each member of such public body to be readily seen by the public.

(3) The vote to elect leadership within a public body may be taken by secret ballot, but the total number of votes for each candidate shall be recorded in the minutes.

(4) The minutes of all meetings and evidence and documentation received or disclosed in open session shall be public records and open to public inspection during normal business hours.

(5) Minutes shall be written, except as provided in subsection (6) of this section, and available for inspection within ten working days or prior to the next convened meeting, whichever occurs earlier, except that cities of the second class and villages may have an additional ten working days if the employee responsible for writing the minutes is absent due to a serious illness or emergency.

(6) Minutes of the meetings of the board of a school district or educational service unit may be kept as an electronic record.

§ 84-1414. UNLAWFUL ACTION BY PUBLIC BODY; DECLARED VOID OR VOIDABLE BY DISTRICT COURT; WHEN; DUTY TO ENFORCE OPEN MEETING LAWS; CITIZEN'S SUIT; PROCEDURE; VIOLATIONS; PENALTIES

(1) Any motion, resolution, rule, regulation, ordinance, or formal action of a public body made or taken in violation of the Open Meetings Act shall be declared void by the district court if the suit is commenced within one hundred twenty days of the meeting of the public body at which the alleged violation occurred. Any motion, resolution, rule, regulation, ordinance, or formal action of a public body made or taken voidable by the district court if the suit is commenced more than one hundred twenty days after but within one year of the meeting of the public body in which the alleged violation occurred. A suit to void any final action shall be commenced within one year of the action.

(2) The Attorney General and the county attorney of the county in which the public body ordinarily meets shall enforce the Open Meetings Act.

(3) Any citizen of this state may commence a suit in the district court of the county in which the public body ordinarily meets or in which the plaintiff resides for the purpose of requiring compliance with or preventing violations of the Open Meetings Act, for the purpose of declaring an action of a public body void, or for the purpose of determining the applicability of the act to discussions or decisions of the public body. It shall not be a defense that the citizen attended the meeting and failed to object at such time. The court may order payment of reasonable attorney's fees and court costs to a successful plaintiff in a suit brought under this section.

(4) Any member of a public body who knowingly violates or conspires to violate or who attends or remains at a meeting knowing that the public body is in violation of any provision of the Open Meetings Act shall be guilty of a Class IV misdemeanor for a first offense and a Class III misdemeanor for a second or subsequent offense.

UPDATED EFFECTIVE MAY 2017



www.NASBonline.org

Regular Board Meeting

Monday, January 8, 2018 7:30 PM Central

Southern School District
115 South 11th Street
PO Box 237
Wymore, NE 68466

Branson Husa: Present

Carol Pralle: Present

Harlan Rickers: Present

Emily Shockley: Present

David Zimmerman: Present

Jim Zvolanek: Present

Present: 6.

I. Call Meeting to Order

President Dave Zimmerman called the meeting to order at 7:30 p.m. and the following members were present: Branson Husa, Carol Pralle, Dave Zimmerman, Emily Shockley, Harlan Rickers, and Jim Zvolanek. The following administrator was present: Christopher Prososki. The following visitor was present: Patty Goes.

Reasonable advance publicized notice of the meeting was given according to law by publishing, a designated method for giving notice of the school district. Reasonable advance notice was simultaneously given to board members and a copy of their acknowledgement of receipt of notice and the agenda attached. All proceedings hereafter shown were taken while the convened meeting was open to the attendance of the public.

I.A. Roll Call

I.B. Notice of Open Meeting Law Posted

President Dave Zimmerman announced that a complete copy of the Open Meetings Act is posted in the back of the board of education meeting room.

II. Approval of Minutes from the December 11, 2017, Regular Board Meeting & the December 11, 2017, Special Board Meeting

Motion to approve minutes from the December 11, 2017 Regular Board Meeting and the December 11, 2017 Special Board Meeting. This motion, made by Harlan Rickers and seconded by Branson Husa, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes

yes: 6, no: 0

III. Communications, Audiences, and Recognitions

III.A. Public comments will not be received after this period of time. Public comment period is limited to 5 minutes per person and a total of 30 minutes overall.

IV. Financial Statement: Item for Discussion, Consideration, and/or Action

C.D. Bids for the month were as follows:

Security First Bank, Blue Springs Special Fund: .72%

Wymore State Bank, Special Fund: .74%

IV.A. Approval of Bills

IV.A.1. General Fund, Special Building Fund, Depreciation Fund, Qualified Capital Purpose Undertaking Fund Claims

Motion to approve the General Fund, Special Building Fund, Depreciation Fund, Qualified Capital Purpose Undertaking Fund Claims. This motion, made by Harlan Rickers and seconded by Emily Shockley, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes
yes: 6, no: 0

IV.A.2. Lunch and Activities Claims

V. Support Service

V.A. Facility Update

John Linder gave a written update of items that were completed over the holidays.

V.B. Personnel Items

V.B.1. Resignation

V.B.1.1. Stephanie Mendyk - 1.0 FTE - K-12 Vocal Music Teacher at the Conclusion of the 2017-2018 School Year

Motion to approve the resignation of Stephanie Mendyk at the conclusion of the 2017-2018 school year. This motion, made by Emily Shockley and seconded by Harlan Rickers, passed.
Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes
yes: 6, no: 0

The school board accepted the resignation of Stephanie Mendyk at the conclusion of the 2017-2018 school year with regrets. The school board wanted to thank her for her years of service at Southern Public Schools.

V.C. Technology Update

Dr. Prosocki noted that the new Facebook and Twitter accounts are up and running. These new social media accounts have helped improve communication in our district both internally and externally. This is also the first board meeting that the school board has utilized Sparq paperless board meetings. Dr. Prosocki also noted that parents and patrons can subscribe to Southern Public Schools board meeting for free to keep up-to-date with meetings, agendas, and minutes.

VI. Administrative and Committee Reports

VI.A. Student Board Member Report

VI.B. Elementary Principal's Report

The elementary principal reported on the following items:

Our present K-6 enrollment is 182.

Current enrollment numbers: Kindergarten - 23, 1st Grade - 21, 2nd Grade - 18, 3rd Grade - 38, 4th Grade - 28, 5th Grade - 27, & 6th grade - 27.

Report Cards 2nd Quarter/1st Semester Report cards will be sent out soon.

Just a couple of reminders that we will be hosting the D1-1 Sub-District Basketball tournaments on February 12 - 15 and 19 2- 22.

VI.C. Secondary Principal's Report

The secondary principal reported on the following items:

Mrs. Goes will begin registering students for next year's classes. This process will begin towards the end of January.

We would like to recognize Southern's fall activity Academic All-State winners. Football: Josh Lundstedt & Trevin Saathoff, Play Production: Shelby Decker, Softball: Kimberley Kapustka & Cheyenne Leach, Volleyball: Mariah Murphy & Jayme Ullman. These are hardworking students who are great leaders in our district and are very deserving of this honor.

Our present 7-12 enrollment is 180.

7th Grade - 34, 8th Grade - 27, 9th Grade - 28, 10th Grade - 36, 11th Grade - 24, & 12th Grade - 31, 13th Grade 1.

VI.D. Superintendent's Report

The superintendent reported on the following items:

Dr. Prosocki stated that he wanted to discuss both the classified and principals' salaries and benefits at the February board meeting. Dr. Prosocki presented the 2016-2017 Annual Report at community coffee on Friday, December 15 and he shared the K-2 DIBELS testing results with the board members.

Dr. Prosocki gave an update on the upcoming legislative session and noted the following items from OpenSky Institute (A non-partisan organization). One of the main concerns this legislative session is a budget shortfall over the next two-year biennium that is going to be around \$173 million dollars. Nebraska also currently ranks 49th in the county in the percentage of K-12 Public Education funding that comes from the state and the following information highlights some of the issues with K-12 Public Education funding in the state of Nebraska.

Nebraska K-12 Public Education Funding (Average): 33% State Funding, 59% Local Property Tax Funding, and 8% Federal Funding

National K-12 Public Education Funding (Average): 47% State Funding, 45%, Local Property Tax Funding, and 8% Federal Funding

Dr. Prosocki talked about the current setup of the preschool program and gave an update on the upcoming NRCSA conference in the spring.

VII. Items for Discussion, Consideration, and/or Action

VII.A. Reorganization of Southern School Board

VII.A.1. Election of Officers

Motion to retain the respective positions. This motion, made by Emily Shockley and seconded by Jim Zvolanek, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes
yes: 6, no: 0

President - David Zimmerman, Vice-President - Harlan Rickers, & Secretary - Carol Pralle

VII.A.1.1. President

VII.A.1.2. Vice-President

VII.A.1.3. Secretary

VII.B. Appointments

VII.B.1. Appoint the District's Non-Discrimination Compliance Coordinator

Motion to Appoint Christopher Prosocki as the District's Non-Discrimination Compliance Coordinator. This motion, made by Harlan Rickers and seconded by Branson Husa, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes
yes: 6, no: 0

VII.B.2. Appoint the Treasurer

Motion to appoint Jane Mallam as the Treasurer to the School Board. This motion, made by Branson Husa and seconded by David Zimmerman, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes
yes: 6, no: 0

VII.B.3. Authorized a Representative for State & Federal Programs

Motion to appoint Christopher Prosocki as the Representative for State & Federal Programs. This motion, made by Carol Pralle and seconded by Branson Husa, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes
yes: 6, no: 0

VII.C. Designate the Fund Depository for Southern Public Schools

Motion to designate Security First Bank of Blue Springs and Main Street Bank of Wymore as the Depository for Southern Public Schools. This motion, made by Emily Shockley and seconded by Harlan Rickers, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes
yes: 6, no: 0

VII.D. Designate the Legal Newspaper for Southern Public Schools

Motion to Designate Wymore Arbor State as the Legal Newspaper for Southern Public Schools. This motion, made by Emily Shockley and seconded by Carol Pralle, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes
yes: 6, no: 0

VII.E. Designate the Legal Counsel for Southern Public Schools

Motion to Designate KSB School Law as the Legal Counsel for Southern Public Schools. This motion, made by Harlan Rickers and seconded by Jim Zvolanek, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes
yes: 6, no: 0

VII.F. Appoint School Board Standing Committees

David Zimmerman appointed the following committees:

VII.F.1. Americanism - Carol Pralle, David Zimmerman, & Emily Shockley

VII.F.2. Buildings & Grounds - David Zimmerman, Harlan Rickers, & Jim Zvolanek

VII.F.3. Finance - David Zimmerman, Harlan Rickers, & Jim Zvolanek

VII.F.4. Policy - David Zimmerman, Emily Shockley, & Branson Husa

VII.F.5. Negotiations & Classified Salary - David Zimmerman, Harlan Rickers, & Emily Shockley

VII.F.6. Transportation - Carol Pralle, David Zimmerman, & Branson Husa

VII.G. Approval of Option Enrollment Applications

There were no option enrollment students.

VII.H. Executive Session: Annual Superintendent Evaluation - As Needed to Protect the Interest of the District & to Prevent Needless Injury to the Reputation of an Individual

Motion to enter into executive session at 8:23 p.m. to complete the annual superintendent evaluation as needed to protect the interest of the district and to prevent needless injury to the reputation of an individual. This motion, made by Harlan Rickers and seconded by Branson Husa, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes

yes: 6, no: 0

VII.H.1. Convene in Executive Session: Annual Superintendent Evaluation

VII.H.2. Reconvene Meeting from Executive Session

Motion to Reconvene Meeting from Executive Session at 8:34 p.m. This motion, made by Emily Shockley and seconded by Harlan Rickers, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes

yes: 6, no: 0

VII.H.3. Approval of Any Action Deemed Necessary as a Result of Executive Session

VIII. Superintendent's Contract

VIII.A. Superintendent's Contract Extension

Motion to approve the superintendent's contract extension. This motion, made by Harlan Rickers and seconded by Carol Pralle, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes

yes: 6, no: 0

The school board approved a two-year roll over contract for the 2018-2019 & 2019-2020 school years. In the new updated contract, Dr. Prososki will be required to reside in the district boundaries.

VIII.B. Superintendent's Salary and Benefits

Motion to approve a 2.5% percent raise for the 2018-2019 school year. This motion, made by Emily Shockley and seconded by Harlan Rickers, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes

yes: 6, no: 0

The school board used the same array of schools that the Southern Education Association used (Diller-Odell, Freeman, HTRS, Johnson Brock, JCC, Palmyra, Pawnee City, Thayer Central, Tri County, & Wilber-Clatonia). Based on the array, Dr. Prososki's current base salary ranked 10th out of 11 schools and his total compensation ranked 9th out of 11 schools. The board approved a 2.5% overall increase and that will set his base salary at \$122,225 for the 2018-2019 school year.

IX. Adjournment

Motion to Adjourn the meeting. This motion, made by Branson Husa and seconded by David Zimmerman, passed.

Branson Husa: yes, Carol Pralle: yes, Harlan Rickers: yes, Emily Shockley: yes, David Zimmerman: yes, Jim Zvolanek: yes

yes: 6, no: 0

President David Zimmerman adjourned the meeting at 8:55 p.m. The next Regular Board meeting is scheduled for 7:30 p.m., February 12, 2018, at Southern Jr./Sr. high School Board Room in Wymore. The

Board of Education will usually adhere to the sequence of the published agenda, but reserves the right to adjust the order of items if necessary and may elect to amend the agenda as deemed necessary.

Payable To	Amount
Wal-Mart	\$ 252.32
Wal-Mart	\$ 46.80
Wal-Mart	\$ 54.94
Wal-Mart	\$ 118.56
Stephanie Mendyk	\$ 39.59
Lewiston Schools	\$ 60.00
Sams Club	\$ 45.00
Windstream	\$ 627.23
SHELL	\$ 1,373.14
Norris Public Power	\$ 1,833.00
EASY PERMIT POSTAGE	\$ 43.24
Menards	\$ 219.93
Josh Schmidt	\$ 200.00
Ackerman Lock & Key	\$ 21.22
American Recycling	\$ 45.00
Arden Nitz	\$ 298.41
BEATRICE COMMUNITY HOSPITAL	\$ 191.00
Berniklau Education Solutions Team	\$ 14,813.58
CENTER POINT ENERGY SERVICES RETAIL, LLC	\$ 4,216.95
Chris Prosocki	\$ 61.04
City Of Wymore	\$ 3,407.22
Crawford Public Schools	\$ 450.00
DAS State Accounting-Central Finance	\$ 234.93
DUSTIN ADAMS	\$ 20.00
Echo Group	\$ 309.78
ESU #5	\$ 33,210.52
Fairbury Winnelson Co.	\$ 22.80
Foundation for Educational Services, Inc	\$ 450.00
First Concord Group, Inc	\$ 390.40
First National Bank-Omaha	\$ 559.42
FLOOD COMMUNICATIONS	\$ 120.00
Haug Communications,inc	\$ 182.00
Hometown Leasing	\$ 2,628.45
Jerry Rempe	\$ 629.71
John Linder	\$ 7.50
KSB SCHOOL LAW	\$ 110.00
MICHAEL TODD & COMPANY, INC.	\$ 601.42
Miranda Nyberg	\$ 113.36
MORGAN NEVERVE	\$ 110.09
NASB	\$ 560.00
NASB ALICAP	\$ 882.00
O'Keefe Elevator Co., Inc.	\$ 276.41
SYSCO LINCOLN	\$ 549.58
PITNEY BOWES GLOBAL FINANCIAL SERVICES LLC	\$ 200.67
Presto X	\$ 83.56
Region V Services	\$ 2,466.10
Sandra Pospisil	\$ 82.50

Sapp Brothers	\$	306.53
Security Services	\$	212.55
SOUTHERN GAGE COMM. PRIDE ASSOCIATION	\$	12.00
SHELL	\$	1,613.00
Sherwin Williams	\$	50.16
Southern Lunch Fund	\$	345.75
Southern Payroll	\$	411,789.67
Sparq Data	\$	4,100.00
Stephanie Mendyk	\$	58.86
TEHRADIUM, INC.	\$	375.00
Temps Disposal Service, Inc.	\$	623.00
Wymore Arbor State	\$	181.25
Wymore Lumber	\$	74.66
Wymore Oil Company	\$	107.10
Wymore Superfoods	\$	155.44
DEPRECIATION FUND		
Pearson Education	\$	23,278.83
TECH BOND		
Pearson Education	\$	20,000.00
Apple	\$	33,598.00

Sheila Cordry
411 South 7th Street
Beatrice, NE 68310
sheilacordry@gmail.com
(402) 988-8839

January 3, 2018

SPS School Board
% Southern Public Schools
115 South 11th Street
Wymore, NE 68466

Dear Southern Board of Education, Dr. Prososki, and Mr. Murphy;

It is with ambiguity that I am tendering my resignation as English and speech teacher and speech and drama coach from Southern Public Schools at the end of the 2017-2018 contract.

It has been an honor and a pleasure to serve this school district, the students, and community for the many years that I have, and I thank you for the many opportunities you afforded me to grow as an educator. I have many friends among the teachers and staff that I will truly miss, and you have top notch principal that has been a great guide in my career. I am leaving my current position to move south to explore other options in the education field and be closer to my daughter.

There are many talented teachers seeking full-time employment. I am confident you will find one who will be a perfect fit for my classroom and the students I am leaving and one who will continue to promote Southern in a positive light and help it to move in the right direction under your leadership. If there is anything I can do to help ease this transition, please do not hesitate to ask.

Thank you for the tremendous support you have provided to me over the years. It has never gone unnoticed and has always been appreciated.

Sincerely,



Sheila M. Cordry

February 6, 2018

Denise L. Pahl
2718 Elk Street
Beatrice, NE 68310

Southern Public Schools
P.O. Box 237
Wymore, NE 68466

Dear Southern Administration and School Board:

It is with a great deal of mixed emotions that I am submitting my resignation from Southern Public Schools effective the end of the 2017-18 school year. I have truly been blessed over the last 20 years with a supportive administration and board members. I'd like to think I've brought some joy to Steve Whitwer and Jeff Murphy, but perhaps a few gray hairs as well. I certainly will miss my co-workers who have become lifelong friends.

The support has carried over into my new venture of Tall Tree Tastings. Many of you have been supportive of that growing business as well and I am eternally grateful for that. I am looking forward to continued growth at Tall Tree. If I can be of any assistance in that manner please do not hesitate to call.

Sincerely,



Denise L. Pahl

Southern Public Schools Technology Rotation

Year of Implementation

- 2018-2019
 - Teacher/Counselor Laptops
 - 44 MacBook Airs Purchased
 - School Board Members
 - 6 iPads Purchased
- 2019-2020
 - Elementary School
 - 40 iPads Purchased
 - Jr./Sr. High School
 - 30 MacBook Airs Purchased
 - Principals/Technology Director
 - 3 MacBook Pros Purchased
- 2020-2021
 - Elementary School
 - 30 MacBook Airs Purchased
 - Jr./Sr. High School
 - 10 MacBook Airs Purchased
 - Library/Office Staff
 - 7 iMac Purchased (Move Extra iMacs to Kitchen Staff)
- 2021-2022
 - Elementary School
 - 20 MacBook Airs Purchased
 - Jr./Sr. High School
 - 25 MacBook Airs Purchased
- 2022-2023
 - Teacher/Counselor Laptops
 - 44 MacBook Airs Purchased
 - School Board Members
 - 6 iPads Purchased
- 2023-2024
 - Elementary School
 - 40 iPads Purchased
 - Jr./Sr. High School
 - 30 MacBook Airs Purchased
 - Principals/Technology Director
 - 3 MacBook Pros Purchased
- 2024-2025
 - Elementary School
 - 30 MacBook Airs Purchased
 - Jr./Sr. High School
 - 10 MacBook Airs Purchased
 - Library/Office Staff
 - 7 iMac Purchased (Move Extra iMacs to Kitchen Staff)
- **Other Items That Need Addressed**
 - Elementary Lab?
 - Jr./Sr. High School Labs?
 - Preschool Technology Items?

2018 NRCSA Spring Conference

The 2018 NRCSA Spring Conference will be held on March 22 & 23, 2018, at the Holiday Inn and Convention Center in Kearney.

There will be many informative and timely sessions regarding law, TEEOSA, school finance, curriculum development, updates from the Department of Ed, staff and board development, updates regarding current federal and state legislation and others. Sessions highlighting special programs and initiatives are always a plus. A total of 35 sessions will be provided at the conference. As always, the general sessions will feature music groups, speakers on Thursday and Friday, scholarships, awards, recognitions, and the traditional meals that have become a mainstay of the conference.

As usual, there will be many opportunities for networking and informal discussions with attendees from other schools!

Be sure and make plans to attend!!

Room Reservations

There are several hotels in and around the area. Attendees will need to make room arrangements for the conference. When booking a room at any of these facilities, be sure to tell them you are attending the NRCSA Spring Conference.

Holiday Inn (308) 237-5971

Fairfield Inn (308) 236-4200

Hampton Inn (308) 234-3400

Holiday Inn Express (308) 234-8100

Wingate Inn (308) 237-4400

Program Highlights

Wednesday March 21, 2018

6:30 PM Exhibitor Check-In and Set-Up occurs in the Grand Ballroom

7:00 PM Early Registration and Hospitality Rooms Open

Thursday March 22, 2018

7:30 AM Registration & Exhibit Hall Open

8:00 AM General Session

11:00 AM - 11:50 AM Select-a-Session I

12:00 PM General Session

2:20 PM - 3:10 PM Select-a-Session II

3:35 PM - 4:25 PM Select-a-Session III

4:30 PM- NRCSA Closing the Gap Team

5:00 PM- Administrators Fellowship Time

6:00 PM Country Buffet

7:00 PM Hospitality Rooms Open

Friday March 23, 2018

7:30 AM Registration Open

8:00 AM- 8:50 AM Select-a-Session IV

9:00 AM - 9:50 AM Select-a-Session V

10:00 AM Brunch

10:50 AM Closing Session

12:50 PM Gifts, Prizes, & Giveaways

2018 NRCSA Spring Conference

March 22 & 23, 2018

Kearney Holiday Inn

Billy Riggs



Billy Riggs has been called “The Dr. Phil of Magic,” and “a psychologist masquerading as a comedian and magician.” He was voted one of America’s Top Five Most Entertaining Speakers in a 2014 nationwide poll of conference attendees. This past June he received a standing ovation from 11,000 people for his inspiring message at the prestigious Million Dollar Round Table in Orlando, Florida. As a highly skilled orator Billy moves audiences to action with his message of hope and inspiration. Add in his talent as a master magician, illusionist, and spellbinding entertainer, and he delivers a presentation that audiences will remember long after the event ends. Billy’s presentations change lives, improve attitudes, turbocharge sales, and inspire exceptional service. Through television, radio, books, videos, and live keynote speeches, Billy continues to spread his message and currently more than a million people on five continents have benefitted from his work. In 2010, Billy made his debut on public television starring in his own special, “The Magic of Attitude.”

Awarded the prestigious CSP designation in 2002, Billy’s skill as a professional speaker has been perfected over nearly 4 decades. Audiences are stirred by his sincerity and power on the platform. When Billy Riggs appears, things on stage disappear, time flies, and no one leaves the room! Using Las Vegas-quality magic and illusions to drive home his points, Billy’s presentations have transformed hundreds of otherwise ordinary conferences into events that are truly special. His quick wit and quicker hands spread laughter and raise morale as listeners learn to reshape their destinies by eliminating their “Grand Illusions” and embracing even grander realities.

Dr. Matthew Blomstedt



Dr. Matthew Blomstedt was named Commissioner of Education by the State Board of Education on January 2, 2014.

Dr. Blomstedt served as the Executive Director of the Nebraska Educational Service Unit Coordinating Council until December 2013. He previously served as the first full-time Executive Director of the Nebraska Rural Community Schools Association, a research analyst for the Education Committee of the Nebraska Legislature, and has worked in a variety of policy research roles over the past 16 years. Dr. Blomstedt earned a Ph.D. in Educational Leadership and Higher Education from the University of Nebraska-Lincoln as well as a Master’s Degree in Community and Regional Planning.

Dr. Blomstedt is a native Nebraskan whose career has focused on local, regional and statewide education issues. Blomstedt’s experience includes education finance and organization, assessment and accountability, professional development, and the development of systems to enhance blended and distance learning opportunities across the state.

His address is a welcome opportunity to hear the latest happening with the State Board of Education and the Department of Education.

Kevin Kush



Kevin Kush, M.A., has been a teacher and coach for more than twenty-eight years and is widely recognized as an outstanding motivational speaker. In 2005, he was honored as ABC News “Person of the Week” for leading his Boys Town High School football team of at-risk youth to an undefeated regular season. Coach Kush presents to many different types of organizations including medical, educational, and corporate agencies. Coach Kush’s knowledge and keys to motivation are delivered with captivating energy, passion, and spirit!

Preschool/ Elementary News

Southern Preschool is accepting applications for 2018/19 school year. Registration starts

February 1st-March 15th.

Registration day is February 8th
@ 3:00 p.m.-8:00 p.m. @ the
elementary library.

6th grade students are
participating in the Service Units
Robotics Competition from
January 17th - February 4th.

Students in grades 1st-6th
will participate in the spelling
bee on **February 1st.**

Southern Elementary has
started an after school
homework clinic for grades
**3rd-6th, from 3:20 p.m. -
4:00 p.m.**

For more information go to:
www.southernpublicschools.org



Follow us on:
Twitter
[@SHSRaiders1](https://twitter.com/SHSRaiders1)

Follow us on: Facebook
[@southernpublicschools](https://www.facebook.com/southernpublicschools)

Southern High School

SENCAP course of study to prepare
students for a more informed career
decision. Southern students are
enrolled in:

SENCAP (Southeast Nebraska Career Academy Partnership)

- Ag Academy
- Health Academy Business Academy
- Criminal Justice Academy

Other academies offered:

- Computer Information
- Technology
- Construction, Manufacturing-Energy
- Manufacturing-Welding
- Early Childhood Education
- Education

**10 students are enrolled in dual credit
classes through**

- SENCAP
- SCC
- Peru State
- UNL

**One senior will have 27
college credits when she
graduates from Southern
High School!**

Southern Siarad



**2017 graduates granted
\$153,450 scholarships.**

- 3 were Susan Thompson Buffet Foundation-pays for all tuition in a state college up to five years
- 2 were James Cox Foundation pays up to \$1000
- **\$23,700 local scholarships!**

10 seniors are taking work release
and learning on the job skills while
still enrolled in high school. **Thanks
to these employers for hiring**

Southern students:

- Brett Wells Construction
- Philippi Electric
- Sasse Trucking
- Walmart
- Circle D Manufacturing
- Cambridge Place
- Rush Creek Quarry
- Beatrice Health and Rehab
- Sunmart
- Subway

**PRINCIPAL'S CONTRACT OF EMPLOYMENT
SOUTHERN SCHOOL DISTRICT #1**

THIS CONTRACT is made by and between the **Board of Education of Southern School District #1**, legally known as **Gage County School District No. 34-0001**, and referred to as "the Board" and "the School District" respectively, and **Jeff Murphy**, referred to herein as "the Principal". In accordance with its action taken and recorded in the minutes of a duly advertised board meeting, the Board agrees to employ the Principal, and the Principal agrees to accept such employment, subject to the terms and conditions set forth herein.

Section 1. Term of Contract. The Principal shall be employed for 1 year beginning on August 1, 2018, and expiring on July 31, 2019. During this and any subsequent year under this contract, the Principal shall render at least 220 working days of service in the performance of his duties as Principal. "Working days" typically will not include Saturdays, Sundays, and legal holidays, but it shall include all days on which the Principal actually and necessarily completes his contractual duties. The Principal agrees to work sufficient hours and days to satisfactorily complete the duties of this contract. The Principal shall keep complete and accurate records of his working days and shall provide the Superintendent with a report of his accumulated working days at least quarterly.

Section 2. Renewal of Contract. Unless the Superintendent recommends the nonrenewal, termination, amendment, and/or cancellation of this contract, the contract will automatically renew for a period of **one contract year**, as defined in Section 1, from and after the expiration date provided in Section 1 of this contract.

Section 3. Salary. The Principal's salary for the contract year shall be \$____,____.00 which shall be paid in 12 equal monthly installments beginning in the month of August 2018. The Board shall not reduce the Principal's salary during the term of the contract, but may increase it and/or the benefits during the term of this contract, as an amendment to the contract, without the amendment constituting a new contract, requiring a hearing, or extending the term of this contract.

Section 4. Deductions. This contract shall conform to the statutes and regulations governing deductions from compensation. The Principal authorizes the District to deduct or withhold from each and every period of pay any amounts necessary to offset any damages caused by the Principal or the value of property or money entrusted to the Principal or owed by the Principal to the District during the course of or as a result of the Principal's

employment, if such property or money have not properly been returned to the District. The School District shall withhold other deductions as the Principal and Board may agree.

Section 5. Professional Status. The Principal affirms that he is not under contract with any other board of education covering any part or all of the term provided in this contract. Throughout the contract term, he will hold a valid and appropriate certificate to act as a principal in the State of Nebraska which he will register and maintain on file in the School District's central administrative office. This contract shall not be valid and the Board will not compensate the Principal for any service performed prior to the date that he registers his certificate. The Principal represents that: (1) all information he provided in connection with his application for employment with the District was true and accurate at the time of application, and if there is or has been a material change in such information, he will advise the Board immediately; (2) he has never been convicted of or plead no contest to, a felony as defined in Title 92, Chapter 21, Sections 003.11 and 003.13 of the Nebraska Administrative Code ("Rule 21"), or any offense involving moral turpitude, abuse, neglect, or sexual misconduct, as defined in Title 92, Chapter 21, Sections 003.12 and 003.13 of the Nebraska Administrative Code; and (3) he has not had any professional licenses or certificates suspended or revoked.

Section 6. Principal's Duties. The Principal's duties shall be as prescribed by statute and by Board policies, rules, regulations and directives. The Principal agrees to devote his time, skill, labor and attention to his duties throughout the contract term. He shall be subject to the direction and control of the Superintendent at all times and shall perform such administrative duties as the Superintendent or Board assigns to him. By agreement with the Superintendent, he may undertake consultative work, speaking engagements, writing, lecturing, or other professional duties and obligations as long as they do not interfere with carrying out his duties and obligations to the School District.

Section 7. Nonrenewal, Termination, Cancellation, or Mid-Term Amendment. Nonrenewal, termination, cancellation, or amendment of this contract shall be in accordance with state statutes. During any applicable probationary period, the Board may nonrenew or amend this contract for any reason so long as it is not unconstitutional. At all other times, the Board may terminate, cancel, or amend this contract for any of the following reasons: (a) the cancellation, termination, revocation, or suspension of the Principal's certificate (Nebraska Administrative and Supervisory Certificate, or the Nebraska Professional Administrative and Supervisory Certificate) by the State Board of Education; (b) any of the reasons set forth in this contract; (c) the breach of any of the material provisions of this contract; (d) incompetence:

(e) neglect of duty; (f) unprofessional conduct; (g) insubordination; (h) conduct involving moral turpitude; (i) physical or mental incapacity; (j) immorality; (k) conviction of a felony; (l) any conduct that substantially interferes with the Principal's continued performance of his duties; (m) any arrest, criminal charge, or criminal conviction of Principal or the failure to report the same; (n) any filing against the Principal under Neb. Rev. Stat. Section 43-247 or any other provision of the Nebraska Juvenile Code for child abuse and/or neglect or the failure to report the same; (o) knowingly falsifying School District records or documents; (p) misrepresentation of fact to the district and its personnel in the conduct of the district's official business; (q) the use or possession of illegal drugs or controlled substances except as prescribed by a physician; or (r) being under the influence of illegal drugs, controlled substances, or alcohol while on school grounds, at school events, or in a vehicle owned, leased or contracted by the district except as prescribed by a physician.

Section 8. Disability. If the Principal is unable to perform his duties by reason of illness, accident or other disability beyond his control, and the disability continues for a period of more than the Principal's then-current, accumulated sick leave, or if the disability is permanent, irreparable, or of such a nature as to make performance of his duties impossible, the Board may initiate action to cancel this contract, whereupon the respective rights, duties and obligations of the parties hereunder shall terminate, with the exception of any benefits to be paid to the Principal under any insurance coverage furnished by the School District.

Section 9. Transportation. The Board shall provide the Principal with transportation or reimburse him for mileage required in the performance of his official duties at the rate approved by the Board.

Section 10. Fringe Benefits. The Board shall provide the Principal with the following fringe benefits:

a. Health Insurance. Family health insurance that is provided to certificated staff through the District's health insurance carrier.

b. Dental Insurance. Family dental insurance that is available to certificated staff through the District's health insurance carrier.

c. Sick Leave. The Principal shall be entitled to 10 days of sick leave per year which may accumulate to a total of 50 days. Sick leave may only be used for personal illness or as

otherwise provided in District policy. If the Principal qualifies for disability pay under a long-term disability policy, he shall be required to take the disability pay instead of sick leave pay. The Principal shall keep complete and accurate records of his sick days. The Principal shall not be compensated for unused days of sick leave upon the ending of his employment with the District.

- d. Disability Insurance.** The Principal shall purchase long-term disability insurance from the School District's carrier at his own expense. The Board will increase his salary by the amount of the premium cost.
- e. Personal Days.** The Principal shall have 3 personal days for the 2018-2019 contract year which he may use at times he chooses so long as his absence does not interfere with the proper performance of his duties. All parties will cooperate in arranging personal time so as to cause the least inconvenience to the normal operation of the District.
- f. Professional Development.** The Principal is expected to continue his professional development and to participate in relevant learning experiences. With the approval of the Superintendent or Board, he may attend appropriate professional meetings at the local and state level; and the Board will pay for valid expenses of attendance.
- g. Professional Dues.** The School District will pay the annual dues for the Principal's membership in the following organizations: Nebraska Council of School Administrators (NCSA), Nebraska State Association of Secondary School Principals (NSASSP), Nebraska Association of Elementary School Principals (NAESP), and Nebraska State Interscholastic Athletic Administrators Association (NSIAAA), National Interscholastic Athletic Administrators Association (NIAAA), and Nebraska Coaches Association (NCA).
- h. Bereavement Leave.** The Principal shall be permitted bereavement leave as provided in District policy. In the event that the District does not have a bereavement leave policy, the Principal will be allowed up to 3 days of paid bereavement leave per year.

- i. **Cell Phone.** The Principal shall be required to purchase and maintain a cellular phone so that he can be reached at all times for work-related emergencies or while away from school grounds during the work day. The School District will reimburse the Principal up to a maximum of **\$50 per month** for the actual cost of a cellular phone service plan.

Section 11. Residence/Domicile in School District. The Principal shall have his domicile and principal residence within the boundaries of the District as they exist on the first duty day for the Principal under the terms of this contract; and, the Principal shall maintain his domicile and residence within the boundaries of the District during the term of this agreement, or any renewal, amendment, or continuation thereof, except as otherwise provided herein. If the Principal is in his first year of employment with the District and does not have his domicile and principal place of residence within the District at the time of his employment, the Principal shall move his domicile and principal place of residence into the corporate limits of the District before the expiration of the first six months from the Principal's first duty day under this contract. It is the purpose of this paragraph to require the Principal to, at all times during such employment, live and maintain his domicile and principal place of residence in the District to encourage the Principal: (1) to be highly motivated and deeply committed to the District's educational system; (2) to speak to and vote on ballot issues affecting the district as a legal voter of the School District; (3) to be involved in school and community activities bringing his in contact with parents and community leaders and be committed to the future of the district and its schools; (4) to be accessible to parents and students, and allow parents and students to become personally acquainted with the Principal; and, (5) to gain sympathy and understanding for the cultural basis of the community, and the social, economic, and environmental problems of the children of the school community and are thus less likely to be considered isolated from the community in which he is the educational leader.

Section 12. No Penalty for Release or Resignation. There shall not be a penalty for the release or resignation of the Principal from this contract; provided no resignation shall become effective until the expiration of the contract unless it is accepted by the Board, and the Board shall fix the date at which the resignation shall take effect.

Section 13. Evaluation. The Superintendent shall evaluate the Principal as required by state statute. The Principal agrees that the full instructional/observational evaluation period, as required by section 79-828, shall mean any observation of the Principal's duties for at least 40 minutes, whether consecutive or as aggregated throughout the period applicable to the

evaluation. The Principal agrees that time spent working in conjunction with the Superintendent on school-related matters may be counted toward observation for a full instructional period.

Section 14. Legal Actions. The Board will support the Principal if there is a legal dispute caused by his carrying out his duties properly. If a legal action, including a professional practice complaint, is threatened or filed against the Principal as a result of his performance of his duties or his position as Principal of the district, the Board will provide him with a legal defense to the maximum extent permitted by law so long as he acted in good faith and in a manner which he reasonably believes to be in or not opposed to the best interests of the district and, with respect to any criminal action or proceeding, had no reasonable cause to believe that his conduct was unlawful.

Section 15. Physical or Mental Examination. The Principal agrees that, at the request of the Board or Superintendent, he will have a comprehensive physical and/or mental examination performed by one or more licensed physicians or psychologists of the Board's choosing during the term of this Contract. In deference to the requirements of the Americans with Disabilities Act and HIPAA, the physician's report to the Board and/or Superintendent must address whether the Principal is able to perform the "essential functions" of his position.

Section 16. Governing Laws. The parties shall be governed by all applicable state and federal laws, rules, and regulations in performance of their respective duties and obligations under this contact.

Section 17. Amendments to be in Writing. This contract may be modified or amended only by a writing duly authorized and executed by the Principal and the Board.

Section 18. Severability. If any portion of this contract is declared invalid or unenforceable by a court of competent jurisdiction, such declaration shall not affect the validity or enforcement of the remaining provisions of this contract.

IN WITNESS WHEREOF, the parties have executed this contract on the dates indicated below.

Executed by the Board this ____ day of _____, 20__.

President, Board of Education

Secretary, Board of Education

Executed by the Principal this ____ day of _____, 20__.

Principal

PRINCIPAL'S CONTRACT OF EMPLOYMENT SOUTHERN SCHOOL DISTRICT #1

THIS CONTRACT is made by and between the **Board of Education of Southern School District #1**, legally known as **Gage County School District No. 34-0001**, and referred to as "the Board" and "the School District" respectively, and **Jerry Rempe**, referred to herein as "the Principal". In accordance with its action taken and recorded in the minutes of a duly advertised board meeting, the Board agrees to employ the Principal, and the Principal agrees to accept such employment, subject to the terms and conditions set forth herein.

Section 1. Term of Contract. The Principal shall be employed for 1 year beginning on August 1, 2018, and expiring on July 31, 2019. During this and any subsequent year under this contract, the Principal shall render at least 220 working days of service in the performance of his duties as Principal. "Working days" typically will not include Saturdays, Sundays, and legal holidays, but it shall include all days on which the Principal actually and necessarily completes his contractual duties. The Principal agrees to work sufficient hours and days to satisfactorily complete the duties of this contract. The Principal shall keep complete and accurate records of his working days and shall provide the Superintendent with a report of his accumulated working days at least quarterly.

Section 2. Renewal of Contract. Unless the Superintendent recommends the nonrenewal, termination, amendment, and/or cancellation of this contract, the contract will automatically renew for a period of **one contract year**, as defined in Section 1, from and after the expiration date provided in Section 1 of this contract.

Section 3. Salary. The Principal's salary for the contract year shall be \$____,____.00 which shall be paid in 12 equal monthly installments beginning in the month of August 2018. The Board shall not reduce the Principal's salary during the term of the contract, but may increase it and/or the benefits during the term of this contract, as an amendment to the contract, without the amendment constituting a new contract, requiring a hearing, or extending the term of this contract.

Section 4. Deductions. This contract shall conform to the statutes and regulations governing deductions from compensation. The Principal authorizes the District to deduct or withhold from each and every period of pay any amounts necessary to offset any damages caused by the Principal or the value of property or money entrusted to the Principal or owed by the Principal to the District during the course of or as a result of the Principal's

employment, if such property or money have not properly been returned to the District. The School District shall withhold other deductions as the Principal and Board may agree.

Section 5. Professional Status. The Principal affirms that he is not under contract with any other board of education covering any part or all of the term provided in this contract. Throughout the contract term, he will hold a valid and appropriate certificate to act as a principal in the State of Nebraska which he will register and maintain on file in the School District's central administrative office. This contract shall not be valid and the Board will not compensate the Principal for any service performed prior to the date that he registers his certificate. The Principal represents that: (1) all information he provided in connection with his application for employment with the District was true and accurate at the time of application, and if there is or has been a material change in such information, he will advise the Board immediately; (2) he has never been convicted of or plead no contest to, a felony as defined in Title 92, Chapter 21, Sections 003.11 and 003.13 of the Nebraska Administrative Code ("Rule 21"), or any offense involving moral turpitude, abuse, neglect, or sexual misconduct, as defined in Title 92, Chapter 21, Sections 003.12 and 003.13 of the Nebraska Administrative Code; and (3) he has not had any professional licenses or certificates suspended or revoked.

Section 6. Principal's Duties. The Principal's duties shall be as prescribed by statute and by Board policies, rules, regulations and directives. The Principal agrees to devote his time, skill, labor and attention to his duties throughout the contract term. He shall be subject to the direction and control of the Superintendent at all times and shall perform such administrative duties as the Superintendent or Board assigns to him. By agreement with the Superintendent, he may undertake consultative work, speaking engagements, writing, lecturing, or other professional duties and obligations as long as they do not interfere with carrying out his duties and obligations to the School District.

Section 7. Nonrenewal, Termination, Cancellation, or Mid-Term Amendment. Nonrenewal, termination, cancellation, or amendment of this contract shall be in accordance with state statutes. During any applicable probationary period, the Board may nonrenew or amend this contract for any reason so long as it is not unconstitutional. At all other times, the Board may terminate, cancel, or amend this contract for any of the following reasons: (a) the cancellation, termination, revocation, or suspension of the Principal's certificate (Nebraska Administrative and Supervisory Certificate, or the Nebraska Professional Administrative and Supervisory Certificate) by the State Board of Education; (b) any of the reasons set forth in this contract; (c) the breach of any of the material provisions of this contract; (d) incompetence:

(e) neglect of duty; (f) unprofessional conduct; (g) insubordination; (h) conduct involving moral turpitude; (i) physical or mental incapacity; (j) immorality; (k) conviction of a felony; (l) any conduct that substantially interferes with the Principal's continued performance of his duties; (m) any arrest, criminal charge, or criminal conviction of Principal or the failure to report the same; (n) any filing against the Principal under Neb. Rev. Stat. Section 43-247 or any other provision of the Nebraska Juvenile Code for child abuse and/or neglect or the failure to report the same; (o) knowingly falsifying School District records or documents; (p) misrepresentation of fact to the district and its personnel in the conduct of the district's official business; (q) the use or possession of illegal drugs or controlled substances except as prescribed by a physician; or (r) being under the influence of illegal drugs, controlled substances, or alcohol while on school grounds, at school events, or in a vehicle owned, leased or contracted by the district except as prescribed by a physician.

Section 8. Disability. If the Principal is unable to perform his duties by reason of illness, accident or other disability beyond his control, and the disability continues for a period of more than the Principal's then-current, accumulated sick leave, or if the disability is permanent, irreparable, or of such a nature as to make performance of his duties impossible, the Board may initiate action to cancel this contract, whereupon the respective rights, duties and obligations of the parties hereunder shall terminate, with the exception of any benefits to be paid to the Principal under any insurance coverage furnished by the School District.

Section 9. Transportation. The Board shall provide the Principal with transportation or reimburse him for mileage required in the performance of his official duties at the rate approved by the Board.

Section 10. Fringe Benefits. The Board shall provide the Principal with the following fringe benefits:

a. Health Insurance. Family health insurance that is provided to certificated staff through the District's health insurance carrier.

b. Dental Insurance. Family dental insurance that is available to certificated staff through the District's health insurance carrier.

c. Sick Leave. The Principal shall be entitled to 10 days of sick leave per year which may accumulate to a total of 50 days. Sick leave may only be used for personal illness or as

otherwise provided in District policy. If the Principal qualifies for disability pay under a long-term disability policy, he shall be required to take the disability pay instead of sick leave pay. The Principal shall keep complete and accurate records of his sick days. The Principal shall not be compensated for unused days of sick leave upon the ending of his employment with the District.

- d. Disability Insurance.** The Principal shall purchase long-term disability insurance from the School District's carrier at his own expense. The Board will increase his salary by the amount of the premium cost.
- e. Personal Days.** The Principal shall have 3 personal days for the 2018-2019 contract year which he may use at times he chooses so long as his absence does not interfere with the proper performance of his duties. All parties will cooperate in arranging personal time so as to cause the least inconvenience to the normal operation of the District.
- f. Professional Development.** The Principal is expected to continue his professional development and to participate in relevant learning experiences. With the approval of the Superintendent or Board, he may attend appropriate professional meetings at the local and state level; and the Board will pay for valid expenses of attendance.
- g. Professional Dues.** The School District will pay the annual dues for the Principal's membership in the following organizations: Nebraska Council of School Administrators (NCSA), Nebraska State Association of Secondary School Principals (NSASSP), Nebraska Association of Elementary School Principals (NAESP), and Nebraska State Interscholastic Athletic Administrators Association (NSIAAA), National Interscholastic Athletic Administrators Association (NIAAA), and Nebraska Coaches Association (NCA).
- h. Bereavement Leave.** The Principal shall be permitted bereavement leave as provided in District policy. In the event that the District does not have a bereavement leave policy, the Principal will be allowed up to 3 days of paid bereavement leave per year.

- i. **Cell Phone.** The Principal shall be required to purchase and maintain a cellular phone so that he can be reached at all times for work-related emergencies or while away from school grounds during the work day. The School District will reimburse the Principal up to a maximum of **\$50 per month** for the actual cost of a cellular phone service plan.

Section 11. Residence/Domicile in School District. The Principal shall have his domicile and principal residence within the boundaries of the District as they exist on the first duty day for the Principal under the terms of this contract; and, the Principal shall maintain his domicile and residence within the boundaries of the District during the term of this agreement, or any renewal, amendment, or continuation thereof, except as otherwise provided herein. If the Principal is in his first year of employment with the District and does not have his domicile and principal place of residence within the District at the time of his employment, the Principal shall move his domicile and principal place of residence into the corporate limits of the District before the expiration of the first six months from the Principal's first duty day under this contract. It is the purpose of this paragraph to require the Principal to, at all times during such employment, live and maintain his domicile and principal place of residence in the District to encourage the Principal: (1) to be highly motivated and deeply committed to the District's educational system; (2) to speak to and vote on ballot issues affecting the district as a legal voter of the School District; (3) to be involved in school and community activities bringing his in contact with parents and community leaders and be committed to the future of the district and its schools; (4) to be accessible to parents and students, and allow parents and students to become personally acquainted with the Principal; and, (5) to gain sympathy and understanding for the cultural basis of the community, and the social, economic, and environmental problems of the children of the school community and are thus less likely to be considered isolated from the community in which he is the educational leader.

Section 12. No Penalty for Release or Resignation. There shall not be a penalty for the release or resignation of the Principal from this contract; provided no resignation shall become effective until the expiration of the contract unless it is accepted by the Board, and the Board shall fix the date at which the resignation shall take effect.

Section 13. Evaluation. The Superintendent shall evaluate the Principal as required by state statute. The Principal agrees that the full instructional/observational evaluation period, as required by section 79-828, shall mean any observation of the Principal's duties for at least 40 minutes, whether consecutive or as aggregated throughout the period applicable to the

evaluation. The Principal agrees that time spent working in conjunction with the Superintendent on school-related matters may be counted toward observation for a full instructional period.

Section 14. Legal Actions. The Board will support the Principal if there is a legal dispute caused by his carrying out his duties properly. If a legal action, including a professional practice complaint, is threatened or filed against the Principal as a result of his performance of his duties or his position as Principal of the district, the Board will provide him with a legal defense to the maximum extent permitted by law so long as he acted in good faith and in a manner which he reasonably believes to be in or not opposed to the best interests of the district and, with respect to any criminal action or proceeding, had no reasonable cause to believe that his conduct was unlawful.

Section 15. Physical or Mental Examination. The Principal agrees that, at the request of the Board or Superintendent, he will have a comprehensive physical and/or mental examination performed by one or more licensed physicians or psychologists of the Board's choosing during the term of this Contract. In deference to the requirements of the Americans with Disabilities Act and HIPAA, the physician's report to the Board and/or Superintendent must address whether the Principal is able to perform the "essential functions" of his position.

Section 16. Governing Laws. The parties shall be governed by all applicable state and federal laws, rules, and regulations in performance of their respective duties and obligations under this contract.

Section 17. Amendments to be in Writing. This contract may be modified or amended only by a writing duly authorized and executed by the Principal and the Board.

Section 18. Severability. If any portion of this contract is declared invalid or unenforceable by a court of competent jurisdiction, such declaration shall not affect the validity or enforcement of the remaining provisions of this contract.

IN WITNESS WHEREOF, the parties have executed this contract on the dates indicated below.

Executed by the Board this ____ day of _____, 20__.

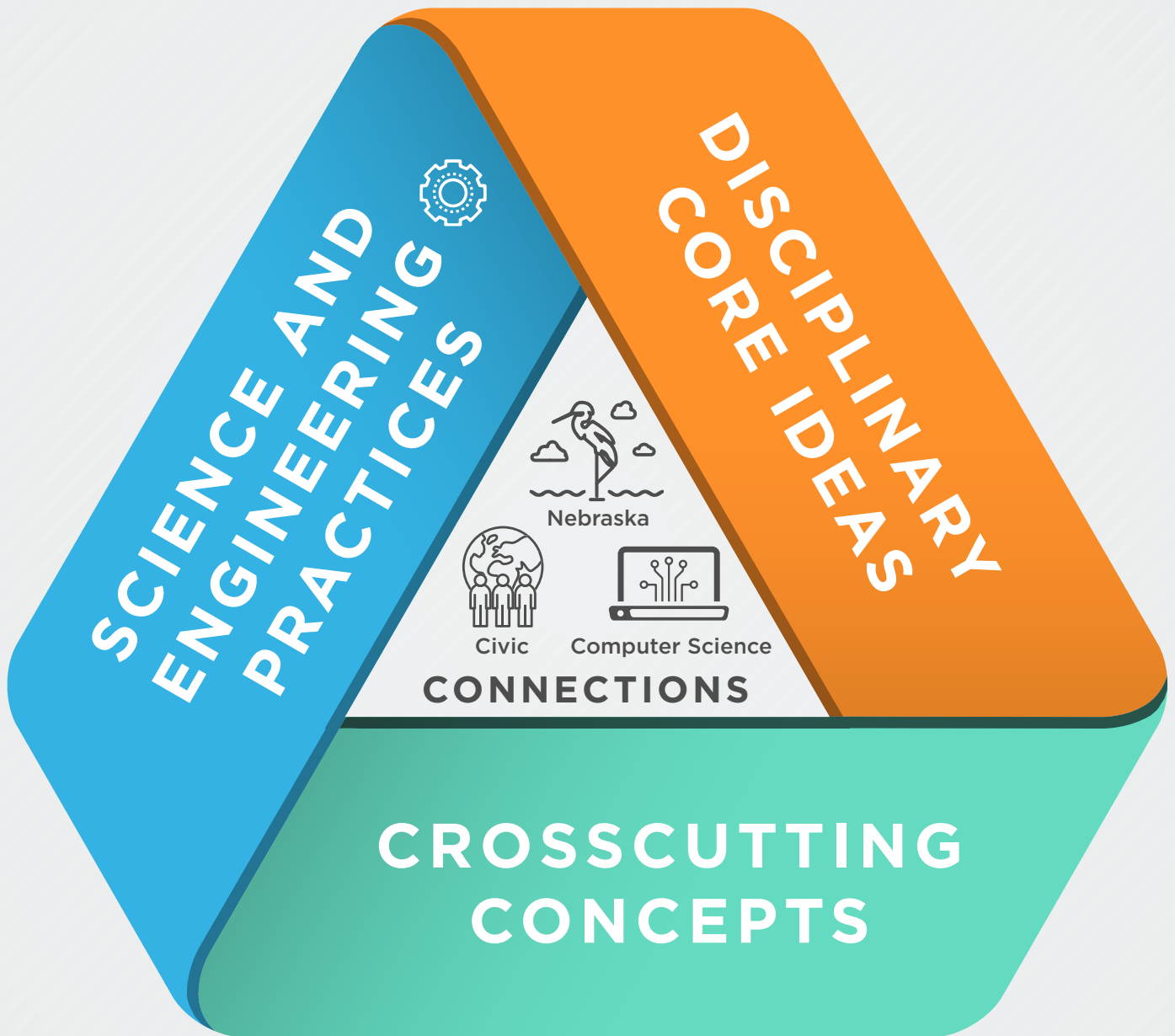
President, Board of Education

Secretary, Board of Education

Executed by the Principal this ____ day of _____, 20__.

Principal

NEBRASKA'S COLLEGE AND CAREER READY STANDARDS FOR SCIENCE



Nebraska's College and Career Ready Standards for Science 2017

Table of Contents

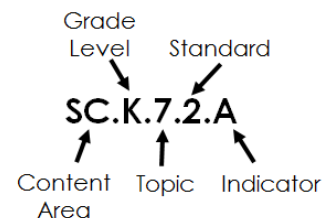
Overview.....	1-4
Kindergarten Standards	5-6
Grade 1 Standards	7-8
Grade 2 Standards	9-10
Grade 3 Standards	11-13
Grade 4 Standards	14-16
Grade 5 Standards	17-19
Grade 6 Standards	20-22
Grade 7 Standards	23-26
Grade 8 Standards	27-29
HS Physical Science Standards	30-33
HS Life Science Standards	34-37
HS Earth and Space Science Standards.....	38-40
HS Plus Standards: Physics.....	41-43
HS Plus Standards: Chemistry.....	44-45
HS Plus Standards: Biology.....	46-49
HS Plus Standards: Anatomy and Physiology.....	50-53
Appendix A Topic Progression.....	54

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**. At the broadest level, **standards** include 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 does not mandate the curriculum used within a local school.

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



Organization and Structure of CCR-Science Standards

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.

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 science topics. This 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*¹. Each CCR-Science indicator includes a disciplinary core idea, a crosscutting concept (underline), and a **science and engineering practice** (bold).

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).

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.

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. Instruction aimed toward preparing students should use crosscutting concepts and **science and engineering practices** that go beyond what is stated in the indicator to better reflect authentic science practice.

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"> • 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 • Obtaining, Evaluating, and Communicating Information 	<p>LS1: From Molecules to Organisms: Structures and Processes</p> <p>LS2: Ecosystems: Interactions, Energy, and Dynamics</p> <p>LS3: Heredity: Inheritance and Variation of Traits</p> <p>LS4: Biological Evolution: Unity & Diversity</p> <p>PS1: Matter and Its Interactions</p> <p>PS2: Motion and Stability: Forces and Interactions</p> <p>PS3: Energy</p> <p>PS4: Waves and Their Applications in Technologies for Information Transfer</p> <p>ESS1: Earth’s Place in the Universe</p> <p>ESS2: Earth’s Systems</p> <p>ESS3: Earth and Human Activity</p> <p>ETS1: Engineering Design</p>	<p> Patterns</p> <p> Cause and Effect</p> <p> Scale, Proportion, and Quantity</p> <p> Systems and System Models</p> <p> Energy and Matter</p> <p> Structure and Function</p> <p> Stability and Change</p>

Interdisciplinary Connections

The crosscutting concepts and **science and engineering practices** provide opportunities for developing strong interdisciplinary connections across all content areas (English Language Arts, mathematics, social studies, fine arts, career/technical education, etc.). Disciplinary core ideas can be a context for helping students master key competencies from other content areas while promoting essential career readiness skills, including communication, creativity, collaboration, and critical thinking.



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 call-out the importance for students to engage 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 student 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 help 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. These connections highlight the interdependence of science, engineering, and technology that drives the research, innovation, and development cycle where discoveries in science lead to new technologies developed using the engineering design process. Additionally, 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.

Instructional Shifts

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.

3-Dimensional teaching and learning: Effective science teaching, learning, and assessment should integrate disciplinary core ideas, crosscutting concepts, and **science and engineering practices**. Integration of the three dimensions will allow students to explain scientific phenomena, design solutions to real-world challenges, and build a foundation upon which they can continue to learn and to apply science knowledge and skills within and outside the K-12 education arena.

Integrated science: Natural phenomena serve as the context for the work of both scientists and engineers. As students explain natural phenomena and design solutions to real-world challenges they connect ideas across science domains. The crosscutting concepts serve as tools that bridge domain boundaries and allow students to deepen their understanding of disciplinary core ideas while using **science and engineering practices** as they explore natural phenomena.

Interdisciplinary approaches: The overlapping skills included in the **science and engineering practices** and the intellectual tools provided by the crosscutting concepts build meaningful and substantive connections to interdisciplinary knowledge and skills in all content areas (English Language Arts, mathematics, social studies, fine arts, career/technical education, etc.) This affords all students equitable access to learning and ensures all students are prepared for college, career, and citizenship.

Implementation and Educator Support

To support educators while they explore and implement the CCR-Science standards, the Nebraska Department of Education is developing a five-year implementation plan that includes; exploration, initial implementation, scale up, deep implementation, and sustainability. Included in the implementation plan will be guidance related to systems alignment, professional learning, curriculum, instruction, resources, and assessment. A new statewide summative assessment aligned to these standards will be operational in 2021.

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

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.

(including humans) need to survive and the relationship between their needs and where they live

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

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.

FIRST GRADE

The first grade 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.

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 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.

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 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.

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 account 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 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.

SECOND GRADE

The second grade 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 of how each performs.



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.



Manmade 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

THIRD GRADE

The third grade 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.

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, and 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 and analyze data to communicate an understanding 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 **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 variation 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.

FOURTH GRADE

The fourth grade 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.

How can water, ice, wind and vegetation change the land?

Students are expected to develop an understanding of the effects of weathering or the rate of erosion by water, ice, wind or vegetation. They apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of such processes on humans.

What patterns of Earth's features can be determined with the use of maps?

In order to describe patterns of Earth's features, students analyze and interpret data from maps.

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.

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.

FIFTH GRADE

The fifth grade 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.

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. 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, 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.

SIXTH GRADE

The sixth grade 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.

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, the type of matter, the mass, and the change in the average kinetic energy of the 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 the 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 different numbers and types of 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 cells 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 storage 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 the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

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



NE systems

7TH GRADE

The seventh grade 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.

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 that synthetic materials come from natural resources and impact 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 **Evaluate competing design solutions** for maintaining 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 natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

8TH GRADE

The eighth grade 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.

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 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 the masses 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 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 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 Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. Assessment does not include binary counting. Assessment does not include the specific mechanism of any given device.

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 of an object and to the 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 and 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 from rock strata 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 questions about the advantages of using 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

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 the role of group behavior on individual and species' chances to survive and reproduce.



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 **Develop a model** based on evidence to illustrate the stages of stars, like the sun, and the role of nuclear fusion in the sun’s core to release energy that eventually 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.



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.



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.



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 **Create a computational simulation** to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. Assessment for computational simulations 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 recomposition, 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 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.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.



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.



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.

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.



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.



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).



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



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.



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.



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.



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.



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 cell signaling and cell communication in producing and maintaining cellular functions 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.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.



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 simulation to test 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 **Use a model** to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.



SC.HSP.9.4.B **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.C **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.D **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.E **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.F **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 **Communicate scientific information** that explains the 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 proteins and 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 **Construct a scientific explanation** based on evidence for the role of cell division in integumentary system dysfunction.



SC.HSP.6.2.F **Develop and use a model** to explain the relationship between the integumentary system and other body systems. Emphasis is on the endocrine system.



SC.HSP.6.2.G **Construct and revise an explanation** based on evidence for the role of the integumentary system in the cycling of matter and flow of energy among body systems.

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 **Communicate scientific information** that explains the 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 **Plan and conduct an investigation** to gather evidence 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 **Construct and present arguments** using evidence to support claims about the causes of dysfunction in the skeletal system. Evidence could include data obtained from case studies.



SC.HSP.6.3.F **Develop and use a model** to explain the relationship between the skeletal system and other body systems. Include the endocrine system.

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 **Communicate scientific information** that explains the 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 **Construct an argument** based on evidence that muscle contraction is the result of biochemical reactions.



SC.HSP.6.4.D **Plan and conduct an investigation** to gather evidence that feedback mechanisms in the muscular system help maintain homeostasis. Investigations could include micro stimulation of muscle tissues.



SC.HSP.6.4.E **Construct and present arguments** using evidence to support claims about the causes of dysfunction in the muscular system. Evidence could include data obtained from case studies.



SC.HSP.6.4.F **Develop and use a model** to explain the relationship between the muscular system and other body systems. Include the endocrine system.



SC.HSP.6.4.G **Construct and revise an explanation** based on evidence for the role of the muscular system in the cycling of matter and flow of energy among body systems.

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 **Communicate scientific information** that explains the 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 **Construct an argument** based on evidence that production of a nerve impulse is the result of biochemical reactions.



SC.HSP.6.5.D **Plan and conduct an investigation** to gather evidence that feedback mechanisms in the nervous system help maintain homeostasis.



SC.HSP.6.5.E **Construct and present arguments** using evidence to support claims about the causes of dysfunction in the nervous system. Evidence could include data obtained from case studies.



SC.HSP.6.5.F **Develop and use a model** to explain the relationship between the nervous system and other body systems. Include the endocrine system.



SC.HSP.6.5.G **Construct and revise an explanation** based on evidence for the role of the nervous system in the cycling of matter and flow of energy among body systems.

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 **Communicate scientific information** that explains the 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 **Plan and conduct an investigation** to gather evidence that feedback mechanisms in the cardiovascular/respiratory systems help maintain homeostasis.



SC.HSP.6.6.D **Construct and present arguments** using evidence to support claims about the causes of dysfunction in the cardiovascular/respiratory systems. Evidence could include data obtained from case studies.



SC.HSP.6.6.E **Develop and use a model** to explain the relationship between the cardiovascular/respiratory systems and other body systems. Include the endocrine and lymphatic systems.



SC.HSP.6.6.F **Construct and revise an explanation** based on evidence for the role of the cardiovascular/respiratory systems in the cycling of matter and flow of energy among body systems.

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 **Communicate scientific information** that explains the 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 **Plan and conduct an investigation** to gather evidence that feedback mechanisms in the digestive system help maintain homeostasis.



SC.HSP.6.7.D **Construct and present arguments** using evidence to support claims about the causes of dysfunction in the digestive system. Evidence could include data obtained from case studies.



SC.HSP.6.7.E **Develop and use a model** to explain the relationship between the digestive system and other body systems. Include the endocrine and lymphatic systems.



SC.HSP.6.7.F **Construct and revise an explanation** based on evidence for the role of the digestive system in the cycling of matter and flow of energy among body systems.

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 **Communicate scientific information** that explains the 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 **Plan and conduct an investigation** to gather evidence that feedback mechanisms in the urinary system help maintain homeostasis.



SC.HSP.6.8.D **Construct and present arguments** using evidence to support claims about the causes of dysfunction in the urinary system. Evidence could include data obtained from case studies.



SC.HSP.6.8.E **Develop and use a model** to explain the relationship between the urinary system and other body systems. Include the endocrine and reproductive systems.



SC.HSP.6.8.F **Construct and revise an explanation** based on evidence for the role of the urinary system in the cycling of matter and flow of energy among body systems.

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 **Communicate scientific information** that explains the 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 **Plan and conduct an investigation** to gather evidence that feedback mechanisms in the reproductive system help maintain homeostasis.



SC.HSP.6.9.D **Construct and present arguments** using evidence to support claims about the causes of dysfunction in the reproductive system. Evidence could include data obtained from case studies.



SC.HSP.6.9.E **Develop and use a model** to explain the relationship between the reproductive system and other body systems. Include the endocrine and nervous systems.



SC.HSP.6.9.F **Construct and revise an explanation** based on evidence for the role of the reproductive system in the cycling of matter and flow of energy among body systems.

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. 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 and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts. Solutions could include the effects on the human body or solutions for environmental public health issues.

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.6.6			SC.HS.6
7 Inter-dependent Relationships in Ecosystems	SC.K.7		SC.2.7	SC.3.7				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