ELD STANDARDS FRAMEWORK FOR DEVELOPING THE LANGUAGE OF SCIENCE GRADES 9-12

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Section 1A: Purpose

The purpose of the English Language Development (ELD) Standards Framework and Instructional Guidance documents is to provide clarity in the implementation and integration of the Nevada ELD Standards with Nevada Academic Content Standards and instruction. In addition, they support the application of the Nevada Educator Performance Framework (NEPF) Standards of best practices for multilingual learners and other diverse student populations.

These Nevada ELD Standards documents specify the connection between the WIDA ELD Standards and the content disciplinary practices of English Language Arts (ELA), Mathematics (MA), Next Generation Science Standards (NGSS) and Social Studies (SS) Practices. The practices identified in this document were created within the **Next Generation Science Standards (NGSS) and National Science Teachers Association (NSTA**. The ELD Standards Instructional Guidance documents conceptualize the Nevada ELD Standards as intertwined with learning the Nevada Academic Content Standards and College and Career Readiness Standards.

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Section 1B: Key Uses of Academic Language

These purposes, referred to as **Key Uses**, were identified based on reviews of literature and a language analysis of college and career readiness standards:

KEY USES	KEY USES DESCRIPTION
NARRATE	Highlights language to convey real or imaginary experiences through stories and histories. Example tasks for the Key Use of **Narrate** include telling or summarizing stories, sharing past experiences, recounting an incident, or to chronicle a report.
INFORM	Highlights language to provide factual information, to tell, give knowledge, apprise, notify, to make aware of ideas, actions, or phenomena. Example tasks for the Key Use of **Inform** include defining, describing, comparing, contrasting, categorizing, or classifying concepts, ideas, or phenomena.
EXPLAIN	Highlights language to give an account for how things work or why things happen to clarify ideas, actions, or phenomena. Example tasks for the Key Use of **Explain** include interpreting, elaborating, illustrating, simplifying ideas, actions, or phenomena.
ARGUE	Highlights language to justify claims using evidence and reasoning, constructing arguments with evidence, or stating preferences or opinions. Example tasks for the Key Use of **Argue** include advancing or defending an idea or solution, changing the audience's point of view, or evaluating an issue.
DISCUSS	Highlights language to interact with others to build meaning and to share knowledge. Example tasks for the Key Use of **Discuss** includes participating in small or large group activities and projects. **Discuss** can be found in Standard 1: Language of Social and Instructional Purposes of the WIDA 2002 Standards Framework.

SECTION 2: ELD FRAMEWORK FOR DEVELOPING THE LANGUAGE OF SCIENCE GRADES 9-12

Section 2A: Student Moves: Language Expectations

With appropriate instructional support (visual, graphic, and interactive), multilingual learners can…

Language Domains	Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Interpretive: Listening, Reading, & Viewing	With appropriate visual, graphic, interactive, or L1 support, students can… ● **Match** scientific tools or instruments with pictures from oral statements (e.g., sundial). ● **Classify** scientific tools or instruments with pictures and labels from oral directions (e.g., telescopes and sundials go with the sky.). ● **Match** labeled diagrams of cycles or processes with vocabulary from word/phrase banks (e.g., nitrogen cycle). ● **Sort** or **classify** descriptive phrases and diagrams by cycles or processes.	With appropriate visual, graphic or interactive support, as necessary, students can… ● **Identify** examples of scientific tools or instruments and their uses from pictures and oral discourse. ● **Compare/contract** examples of scientific tools or instruments and uses from oral descriptions (e.g., differences between telescopes and microscopes). ● **Sequence** descriptive sentences and diagrams according to cycles or processes (e.g., mitosis or meiosis). ● **Identify** cycles or processes from descriptive paragraphs and diagrams.	● **Infer** uses of scientific tools or instruments from oral reading of grade level materials. ● **Predict** consequences of alteration of cycles or processes from grade-level text.

Section 2A: Student Moves: Language Expectations (continued)

With appropriate instructional support (visual, graphic, and interactive), multilingual learners can…

Language Domains	Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Expressive: Speaking, Writing, & Representing	With appropriate visual, graphic, interactive, or L1 support, students can… ● **Use** vocabulary associated with scientific discoveries based on illustrations (e.g., machine or x-ray). ● **Describe** scientific inventions or discoveries based on illustrations. ● **Match** or **classify** forms of energy from everyday illustrated examples and models (e.g., light, sound, heat). ● **List** and **describe** examples of illustrated forms of energy from word/phrase banks.	With appropriate visual, graphic or interactive support, as necessary, students can… ● **Compare/contrast** scientific discoveries described orally with visual support (e.g., _ is similar to/different from – because). ● **Imagine** future scientific inventions or discoveries based on oral and visual clues. ● **Compare/contrast** two forms of energy depicted visually (e.g., _____ and_____are alike/different in these ways). ● **Explain** uses of different forms of energy depicted visually (e.g., _____is used to_____.).	● **Predict** potential impact of scientific inventions or discoveries on life based on oral evidence (e.g., "in 100 years, we could/may/might"). ● **Predict** consequences of alternation of cycles or processes from grade- level text.

Section 2B: Teacher Moves: Supports for Developing Interpretive and Expressive Language

What general supports can teachers provide to students at **different language proficiency levels** to interpret and express **academic language** in all language domains?

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
• **Build** background in key language and concepts. • **Provide** explicit instruction and practice in key social and instructional vocabulary. • **Model** orally the academic language and specific vocabulary. • **Provide** explicit instruction and practice for students to construct the language using sentence and discourse starters and visual aids from the text. • **Use** physical gestures to accompany oral directives. • **Label v**isuals and objects with target vocabulary. • **Introduce** cognates to aid comprehension. • **Give** two step Contextualized directions. • **Restate/rephrase** and **use** Patterned Oral Language routines. • **Preview** the text content with pictures, demos, charts, or experiences. • **Use** K-W-L charts before reading. • **Use** wait time. • **Preview** text with a Picture Walk. • **Provide** a list of important concepts on a graphic organizer. • **Use** Shared Reading and/or simplify the text. • **Provide** a content vocabulary Word Bank with non-linguistic representations. • **Provide** opportunities for translanguaging and multilingual supports during the task.	• **Build** background in key language and concepts. • **Model** orally the academic language and specific vocabulary. • **Provide** explicit instruction and practice for students to construct the language using sentence and discourse starters and visual aids from the text. • **Provide** a system for students to record and process key academic and content- specific vocabulary. • **Check** Comprehension of all students frequently. **Use** Wait Time. • **Require** full sentence responses by asking open ended questions. • **Use** Varied Presentation Formats such as role plays. • **Scaffold** oral reports with note cards and provide time for prior practice. • **Require** the use of academic language. • **Require** oral reporting for summarizing group work. • **Pair** students to read one text together. • **Use** K-W-L charts before reading. • **Provide** a list of important concepts on a graphic organizer. • **Provide** a content vocabulary Word Bank with non-linguistic representations. • **Use** wait time. • **Provide** opportunities for translanguaging and multilingual supports during the task.	• **Build** background in key language and concepts. • **Use** complex sentence and discourse starters. • **Model** orally the academic language and specific vocabulary. • **Use** Video Observation Guides. • **Confirm** students' prior knowledge of content topics. • **Ask** students to analyze text structure and select an appropriate Graphic Organizer for summarizing. • **Use** Reciprocal Teaching to scaffold independent reading. • **Extend** content vocabulary with multiple examples and non-examples. • **Provide** opportunities for translanguaging during the task.

Section 2C: Teacher Moves: Supports for Collaborating in the Academic Language

How can teachers provide ongoing opportunities for students to collaborate using academic language?

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Prior to reading, writing, and discussion, Teacher prepares collaborative discourse structures for students to… ● **Engage in pair work (in L1 if possible)** to prepare questions for discussion using graphic, interactive, and/or language supports. ● **Participate in pair/triad/small group** discussions using graphic, interactive, and/or language supports (including L1 as appropriate). ● **Use** Clock Buddies. ● **Use** Numbered Heads Together. ● **Use** Think-Pair-Share Squared. ● **Use** key sentence frames for pair interactions. ● **Participate with Strategic Partners** at a higher English proficiency level and/or with same primary language peer(s). ● **Use** a Roving Chart in small group work. ● **Use** Interactive Journals. ● **Use** Think-Write-Pair Share. ● **Use** Cloze sentences with a Word Bank. ● **Use dialogue structures** (e.g.): My turn/ your turn; Partner A/Partner B; Collaborative groups.	**Prior to reading, writing, and discussion**, Teacher prepares collaborative discourse structures for students to… ● **Engage pair work** to prepare questions for discussion using graphic, interactive, and/or language supports as needed. ● **Contribute to pair/triad/small group discussions** by supporting with examples, asking clarifying questions, and using graphic, interactive, and/or language supports as needed. ● **Engage with whole/large group discussions** by connecting ideas with supporting details, generating original questions, and using graphic, interactive, and/or language supports as needed. ● **Use** Graphic Organizers or notes to scaffold oral retelling. ● **Use** Think-Pair-Share. ● **Repeat and expand** their responses and other students' responses in a Collaborative Dialogue. ● **Use dialogue structures** (e.g.): My turn/ your turn; Partner A/Partner B; Collaborative groups.	**Prior to reading, writing, and discussion**, Teacher prepares collaborative discourse structures for students to… ● **Engage in structured pair work** to process. ● **Inform and formulate** thinking, then prepare questions for discussion. ● **Contribute to pair/triad/small group discussions** to share individual ideas and compare with other ideas in the group, using graphic, interactive, and/or language supports as needed. ● **Engage with whole/large group discussions** by generating original questions and/or building on the ideas of others using graphic, interactive, and/or language supports as needed. ● **Use** oral reporting for summarizing group work. ● **Use dialogue structures** (e.g.): My turn/ your turn; Partner A/Partner B; Collaborative groups.

SECTION 3: INSTRUCTIONAL GUIDANCE

for English Language Development in the Content Area of Science and Engineering Practices Grades 9-12

Based on the **Science & Engineering Practices** (SEPs) developed by the National Science Teachers Association (NSTA)

Science and Engineering Practices

SECTION 3: INSTRUCTIONAL GUIDANCE: SCIENCE AND ENGINEERING PRACTICES GRADES 9-12

Section 3A: Summary: Content Disciplinary Practices and Example Tasks (Next Generation Science Standards)

Table of example tasks for each practice, with sample proficiency descriptors for each **Key Use of Academic Language**: (For a complete continuum of grade-level Proficiency Level Descriptors to support mastery of content area standards see WIDA ELD Standards 2020)

WIDA English Language Development Standards Framework, 2020 Edition Kindergarten - Grade 12 (wisc.edu)

Science & Engineering Practices	Example Tasks	Narrate/Inform	Explain	Argue	Discuss
1. **Asking** Questions and **Defining** Problems HS-PS4-2 Waves and their Applications in Technologies for Information Transfer HS-ETS1-1 Engineering Design	• **Evaluate questions** about the advantages of using digital transmission and storage of information. • **Analyze a major global challenge** to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	Proficient students can… • Understand how to elaborate or condense ideas, using a variety of noun groups and nominalization, pre- and post-modifiers to **restate** and/or **describe** key ideas and new information in a problem as presented in multiple representations, such as spoken language, written texts, models, diagrams, drawings, tables, graphs, and mathematical expressions or equations.	Proficient students can… • Understand how to elaborate or condense ideas using technical vocabulary, expanded noun groups to ask questions to **determine** relationships, including quantitative relationships, between independent and dependent variables. • Ask questions to **clarify** and **refine** a model, an explanation, or an engineering problem.	Proficient students can… • Use technical nouns, a variety of clause types (embedded clauses, relating verbs, and noun group) to state logical relationships among reasoning, evidence, data, and/or a model to ask questions that arise from examining models or a theory, to **clarify** and/or **seek** additional information and relationships. • Ask and/or evaluate questions that **challenge** the premise(s) of an argument by describing reliable and valid evidence from multiple sources.	Proficient students can… • **Discuss** the validity of questions in order to advance their understanding and move investigations forward using everyday, cross-disciplinary and technical language.

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Science & Engineering Practices	Example Tasks	Narrate/Inform	Explain	Argue	Discuss
2. **Developing** and **Using** Models HS-PS3-5 Energy	• **Develop and use a model** of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction	Proficient students can… • **Develop** and **describe** a complex model that allows for manipulation and testing of a proposed process or system, (using pictures, drawings/diagrams, and/or technical language, in order to develop reasoning given/new patterns to link relationships, add new details, and to condense information.	Proficient students can • **Evaluate** and **explain** the merits and limitations of two different models of the same proposed tool, process, mechanism, or system by summarizing patterns in evidence, making trade-offs, revising and retesting. to select best fit or design criteria.	Proficient students can • **Develop and/or use** a model (including mathematical and computational) to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems, by supporting a claim based on data and evidence through connectors to link clauses and establish logical relationships (as a result, therefore, however, on the other hand).	Proficient students can • **Synthesize** ideas of several speakers, **posing** questions, and **responding** with evidence, examples, and ideas to establish and maintain a neutral or objective stance through passive voice and declarative statements to establish a factual stance.

Science & Engineering Practices	Example Tasks	Narrate/Inform	Explain	Argue	Discuss
3. **Planning** and **Carrying** out Investigations HS-ESS2-5 Earth's Systems	• **Plan** and **conduct** an investigation of the properties of water and its effects on Earth materials and surface processes.	Proficient students can… • **Select** and **describe** the appropriate tools to collect, record, analyze, and evaluate data by summarizing patterns in evidence through labeling/describing diagrams, graphics, data, statistics to add information about a phenomenon.	Proficient students can… • **Plan** and **explain** an investigation designed individually and/or collaboratively to produce data to serve as the basis for evidence as part of building and revising models, supporting explanations for phenomena, or testing solutions to problems to introduce and contextualize phenomena in issues related to the natural and designed world(s) through a variety of abstract nouns - concepts, ideas, and technical terms.	Proficient students can… • **Make and reason** directional hypotheses that specify what happens to a dependent variable when an independent variable is manipulated by summarizing and refining solutions using conditional clauses (if/then) to generalize a phenomenon to additional contexts.	Proficient students can… • **Present** organized ideas and information on content topics including the use of graphics and multimedia, utilizing everyday, cross disciplinary, and technical language.

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Science & Engineering Practices	Example Tasks	Narrate/Inform	Explain	Argue	Discuss
4. **Analyzing** and **Interpreting** Data HS-PS2-1 Motion and Stability: Forces and Interactions HS-LS3-3 Heredity: Inheritance and Variation of Traits	• **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. • **Apply concepts** of statistics and probability **to explain** the variation and distribution of expressed traits in a population.	Proficient students can… • **Apply** and **describe concepts** of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible for coherence and cohesion throughout graphical displays using technical nouns and organizational features, such as headings.	Proficient students can… • **Analyze** and **illustrate** data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution to defend claim through connectors to link clauses and establish logical relationships and/or a variety of clause types. • **Consider** limitations of data analysis (e.g., measurement error, sample selection) when analyzing and interpreting data.	Proficient students can… • **Evaluate and defend** the impact of new data on a working explanation and/or model of a proposed process or system by stating logical relationships among reasoning, evidence, data, and/or models through given/new patterns using abstract nouns and technical language.	Proficient students can… • **Present** organized ideas and information on content topics including the use of graphics and multimedia to maintain a neutral or objective stance through passive voice and declarative statements to establish a factual stance. • **Synthesize** ideas of several speakers, **posing** questions, and **responding** with evidence, examples, and ideas

Science & Engineering Practices	Example Tasks	Narrate/Inform	Explain	Argue	Discuss
5. **Using** Mathematics and Computational Thinking HS-PS2-2 Motion and Stability: Forces and Interactions	• **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.	Proficient students can… • **Apply** and **convey** Inform techniques of algebra and functions to represent and solve scientific and engineering problems, utilizing everyday, cross disciplinary, and technical language. • **Apply** ratios, rates, percentages, and unit conversions in the context of complicated measurement problems.	Proficient students can… • **Decide and explain** if qualitative or quantitative data are best **to determine** if a proposed object or tool meets criteria for success by introducing and contextualizing topic/phenomenon in issues related to the natural and designed world(s) through a variety of ways to define phenomenon (relative clauses, declarative statements, relational verbs) • **Create** and/or **revise** a computational model or simulation of a phenomenon, designed device, process, or system.	Proficient students can… • **Use** mathematical, computational, and/or algorithmic representations of phenomena or design solutions **to describe** and/or support claims and/or explanations, through connectors to link clauses and establish logical relationships and a variety of clause types. • **Use** simple limit cases to test mathematical expressions, computer programs, algorithms, or simulations of a process or system **to see** if a model "makes sense" by comparing the outcomes with what is known about the real world.	Proficient students can… • **Present** organized ideas and information on content topics including the use of graphics and multimedia, utilizing everyday, cross disciplinary, and technical language. • **Synthesize** ideas of several speakers, **posing** questions, and **responding** with evidence, examples, and ideas, by using a variety of clause types to express causality.

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Science & Engineering Practices	Example Tasks	Narrate/Inform	Explain	Argue	Discuss
6. **Constructing** Explanations and **Designing** Solutions HS-PS1-2 Matter and its Interactions	• **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.	Proficient students can… • **Make** a quantitative and/or qualitative claim regarding the relationship between dependent and independent variables, by summarizing scientific knowledge, evidence, criteria, and/or trade-offs through clauses (if, then) to generalize a phenomenon to additional contexts.	Proficient students can… • **Construct, revise and clarify** an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, peer review), by describing reliable and valid evidence through a variety of structures (embedded clauses, relating verbs, nominalizations, and noun groups) to define a phenomenon. • **Design, evaluate,** and/or **refine** a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and trade-off considerations.	Proficient students can… • **Apply** scientific reasoning, theory, and/or models to link evidence to the claims **to assess** the extent to which the reasoning and data support the explanation or conclusion, by defending a claim based on data and evidence through connectors to link clauses and establish logical relationships (as a result, therefore, to be more precise, instead, however, on the other hand).	Proficient students can… • **Present** organized ideas and information on content topics including the use of graphics and multimedia, utilizing everyday, cross disciplinary, and technical language. • **Synthesize** ideas of several speakers, **posing** questions, and **responding** with evidence, examples, and ideas.

Science & Engineering Practices	Example Tasks	Narrate/Inform	Explain	Argue	Discuss
7. **Engaging** in Argument from Evidence HS-LS4-5 Biological Evolution: Unity and Diversity	• **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.	Proficient students can… • Respectfully **provide** and/or receive critiques on scientific arguments by probing reasoning and evidence and challenging ideas and conclusions, **responding** thoughtfully to diverse perspectives, and determining what additional information is required to resolve contradictions to establish and maintain a neutral or objective stance through word choices to moderate stance (hedging) (could/might, a possibility, usually, often).	Proficient students can… • **Compare, evaluate**, and **clarify** competing arguments or design solutions in light of currently accepted explanations, new evidence, limitations (e.g., trade-offs), constraints, and ethical issues by signaling/stating logical relationships among reasoning, evidence, data, and/or models when making and defending a claim counterclaim, and/or rebuttal through given/new patterns to link relationships, add new details, and condense information into abstract nouns.	Proficient students can… • **Construct, use,** and **present** an oral and written argument or counterarguments based on data and evidence and **defend** a claim based on evidence about the natural world or the effectiveness of a design solution that reflects scientific knowledge, and student-generated evidence by connectors to link clauses and establish logical relationships (as a result, therefore, to be more precise, instead, however, on the other hand).	Proficient students can • **Present** organized ideas and information on content topics including the use of graphics and multimedia, utilizing everyday, cross disciplinary, and technical language. • **Synthesize i**deas of several speakers, **posing** questions, and **responding** with evidence, examples, and ideas.

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Science & Engineering Practices	Example Tasks	Narrate/Inform	Explain	Argue	Discuss
8. **Obtaining**, **Evaluating**, and **Communicating** Information HS-ESS1-3 Earth's Place in the Universe	• **Communicate** scientific ideas about the way stars over their life cycle produce elements.	Proficient students can… • Critically **read** scientific literature adapted for classroom use to determine the central ideas or conclusions and/or to obtain scientific and/or technical information to **paraphrasing** them in simpler but still accurate terms **and summarizing** complex evidence, concepts, processes, or information presented in a text through labeling/describing diagrams, graphics, data statistics to add information about a phenomenon.	Proficient students can… • **Compare, integrate, evaluate** and **explain** sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a scientific question or solve a problem by **summarizing** referenced scientific knowledge, evidence, criteria, and/or trade-offs through asking and answering questions to theorize, clarify, and make extrapolations about a phenomenon.	Proficient students can… • **Evaluate** and **justify** the validity and reliability of and/or synthesize multiple claims, methods, and/or designs that appear in scientific and technical texts or media reports, verifying the data, when possible, by signaling/stating logical relationships among reasoning, evidence, data, and/or models when making and defending a claim given/new patterns to link relationships, add new details, and condense information into abstract nouns.	Proficient students can… • **Present** organized ideas and information on content topics including the use of graphics and multimedia, utilizing everyday, cross disciplinary, and technical language • **Synthesize** ideas of several speakers, **posing** questions, and **responding** with evidence, examples, and ideas.

Distribution of Science Key Language Uses in Grades 9-12				
WIDA ELD STANDARD	Narrate	Inform	Explain	Argue
1. Language for Science	○	◐	●	●

● Most Prominent ◐ Prominent ○ Present

Adapted from the WIDA 2020 Standards Framework p. 290-292

Section 3B: Science and Engineering Disciplinary Practices

Practice 1a: Asking Questions and Defining Problems – Teacher Moves

Teacher Moves: What supports can teachers provide students at different proficiency levels **to use language to interpret or make meaning** of the content? Examples:

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
• **Provide** an illustrated word bank and labeled illustrations of key technical vocabulary found in investigations and orally model cross-disciplinary academic language and specific vocabulary required to ask and answer simple and wh- questions. • Provide guided practice with specific feedback. • **Use** text with picture support for students to elaborate and ask and answer questions about key details in a text or investigation. • **Provide** language frames to develop simple questions and simple sentence or phrase responses. • Utilize partner or triad support. • Utilize L1 resources (spoken, written, and viewed) to build schema. ❖ **Ex 1:** How does (the independent variable) affect the (dependent variable)? ➢ e.g. How does digital wave affect transmitting and storing information?) ❖ **Ex 2:** The successful design of (an engineering solution) includes: (list of success criteria) ➢ e.g. The successful design of an independent house includes: ✓ independent power ✓ systems for clean and dirty water equal cost to other homes **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	• **Model** orally the academic language and specific vocabulary required to ask and answer simple questions about key details in the investigation and observations specific to this practice. • Provide guided practice with specific feedback. • **Provide** an illustrated word bank/ labeled illustrations of key technical vocabulary, as they occur during investigations and explanations. • **Provide** language frames to develop questions and sentence or paragraph responses with details. ❖ **Ex 1:** How does (the independent variable) affect the (dependent variable)? ➢ e.g. How does using digital waves affect transmission and storage of information? ❖ **Ex 2:** The criteria for a successful design of (an engineering solution) include: (list of success criteria) ➢ e.g. The criteria for a successful design of self-sustainable house include: ✓ independent power source ✓ water and sanitation systems equal cost to other homes **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	• **Provide** mentor questions for students to pose independently testable *yes/no* and *wh-* (information) questions for driving investigations and defining problems. • **Provide** an illustrated word bank/ labeled illustrations of key technical vocabulary, as they occur during investigations and explanations. • **Provide** language frames to develop complex questions, paragraph responses, and elaboration of content. • Provide guided practice with specific feedback. ❖ **Ex 1:** How does (the independent variable) affect the (dependent variable)? ➢ e.g. How does the use of digital waves affect the quality of transmissions and storage of information? ❖ **Ex 2:** The criteria for a successful design of (an engineering solution) include: (list of success criteria) ➢ e.g. The criteria for a successful design of self-sustainable house include: ✓ self-sufficient power source ✓ water and sanitation systems ✓ cost of building is equivalent to other homes **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 1b: Asking Questions and Defining Problems – Success Criteria

Success Criteria: How will students be able to **communicate or demonstrate** their learning of language and content at **different language proficiency levels**? Examples: Task formats: See STEM Teaching Tools, #30 (pp.2-5)

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Success Criteria **With prompting and supports,** students will use simple sentence starters, frames, visuals, and L1 supports to**…** ● **Identify** testable scientific questions by generating simple questions using sentence frames and word banks and by sorting them based on criteria for testability. ● Based on visual/multimedia descriptions of a scenario or phenomenon supported by simplified text students will: ➢ **describe** the problem using simple sentences (with frames as needed) ➢ **define** the criteria and constraints for acceptable solutions using simple language (with frames as needed) ● **Determine** what evidence is needed to evaluate the solution's viability by providing simplified question and answer stems and/or selecting from predetermined options. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** **With appropriate supports, s**tudents will use compound and complex sentence starters, frames, and visual supports to… ● **Identif**y testable scientific questions by generating questions using sentence frames (and word banks as needed) and by working with a group to apply criteria for testability. ● Based on a textual and visual/multimedia description of a scenario or phenomenon students will: ➢ **describe** the problem using simple and complex sentences (with frames as needed) ➢ **define** the criteria and constraints for acceptable solutions using appropriate language (with frames as needed) ● **Determine** what evidence is needed to evaluate the solution's viability by providing appropriate question and answer stems (as needed). **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** **With appropriate supports,** students will use complex language frames to… ● Identify testable scientific questions by generating questions (using complex sentence frames as needed), discussing and refining them with a group, and applying criteria for testability. ● Based on a (textual) description of a scenario or phenomenon (supported by visuals/multimedia) students will: ➢ **describe** the problem (using complex sentence frames as needed) ➢ **define** the criteria and constraints for acceptable solutions (using language frames as needed) ● Determine what evidence is needed to evaluate the solution's viability (by providing question and answer stems as needed). **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 2a: Developing and Using Models – Teacher Moves

Teacher Moves: What supports can teachers provide students at different proficiency levels **to use language to interpret or make meaning** of the content? Examples:

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
● **Provide** an illustrated word bank/ labeled illustration of key technical vocabulary, as they occur during investigations and explanations. ● **Use** text with picture support for students to elaborate on newly acquired knowledge. ● **Provide** language frames to: ➢ **describe** in simple sentences or phrases using key vocabulary how a model (pictorial, verbal, graphical, mathematical, physical) predicts or explains a phenomenon ➢ **identify, explain**, and **elaborate** on the components of a model in simple sentences or phrases using key vocabulary ➢ Utilize cooperative structures for work in pairs and small groups. ➢ Provide guided practice with specific feedback. ➢ **justify** predictions based on changes to a model in simple sentences or phrases using key vocabulary. ❖ **Ex 1 (prediction)**: I predict when (change to one element of the model) then (effect). This is because (relationship between the elements of the model). ➢ e.g. I predict when two magnets are close then potential energy increases.	● **Provide** an illustrated word bank/ labeled illustration of key technical vocabulary, as they occur during investigations and explanations. ● **Provide** language frames to: ➢ describe in simple or complex sentences with detail how a model (pictorial, verbal, graphical, mathematical, physical) predicts or explains a phenomenon ➢ identify, explain, and elaborate on the components of a model using sentence or paragraph responses with detail ➢ justify predictions using sentence or paragraph responses with detail based on changes to a model. ❖ **Ex 1 (prediction):** I predict that if (change to one element of the model) then (effect) because (relationship between the elements of the model). ➢ e.g. I predict that if the North side of Magnet A moves closer to the North side of Magnet B then the potential energy of both magnets will increase because when the magnets are closer the field force increases, and when the field force increases then there is more potential for both magnets to do work.	● **Provide** language frames to: ➢ describe how a model (pictorial, verbal, graphical, mathematical, physical) predicts or explains a phenomenon using complex questions, paragraph responses, and elaboration of content ➢ identify, explain, and elaborate using complex questions, paragraph responses, and elaboration of content on the components of a model ➢ **justify** predictions using complex questions, paragraph responses, and elaboration of content based on changes to a model. ❖ **Ex 1 (prediction)**: If (change to one element of the model) then (effect) because (relationship between the elements of the model). ➢ e.g. If the North side of Magnet A moves closer to the North side of Magnet B then the potential energy of Magnet A will increase because the field force increases as distance decreases and this increasing force has a greater potential to do work on either or both magnets.

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
This is because more field force makes more potential energy. ❖ **Ex 2 (explanation):** The reason (that) (change to one element of the model) is (that) (cause). This happens because (relationship between the elements of the model). ➢ e.g. The reason that urban temperatures are high is that their heat capacity is high. This happens because buildings and sidewalks absorb more solar radiation than trees and rocks. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	❖ **Ex 2 (explanation):** The reason that (a change to one element of the model) is that (cause) because (relationship between the elements of the model). ➢ e.g. The reason that temperatures are higher in urban areas is that their heat capacity is higher because urban materials like asphalt absorb more solar radiation than natural materials like trees. ➢ Provide guided practice with specific feedback. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	❖ **Ex 2 (explanation):** (A change to one element of the model) is due to (cause) because (relationship between the elements of the model). ➢ e.g. The higher temperatures experienced in urban areas is due to their higher heat capacity because asphalt, concrete, metal and other urban materials absorb more solar radiation than forests, stone, and other natural materials. ➢ Provide guided practice with specific feedback. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 2b: Developing and Using Models – Success Criteria

Success Criteria: How will students be able to **communicate or demonstrate their learning** of language and content at **different language proficiency levels?** Examples: STEM Teaching Tool #30 (p.6)

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Success Criteria **With prompting and supports,** students will… ● Be presented with a visual, multimedia representation of an observable scientific phenomenon with simplified text, and ➢ using a word bank **as needed**, draw and label (in writing or orally) a model and its components, interactions among components, and mechanisms in the model, and ➢ using a simplified paragraph frame, write (or speak) an explanation for the phenomenon, using the model as supporting evidence ● Be presented with a visual, multimedia representation of an observable scientific phenomenon with simplified text, and ➢ using a word bank **as needed**, draw and label (in writing or orally) a model that helps explain how this phenomenon occurs by applying their understanding of a disciplinary core idea, using a paragraph frame **as needed**, write a prediction about something that might happen in the future that could be explained by the model. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** **With appropriate supports,** students will… ● Be presented with a simplified textual description of an observable scientific phenomenon, and ➢ using a word bank **as needed**, draw and label a model and its components, interactions among components, and mechanisms in the model, and ➢ using a paragraph frame **as needed**, write an explanation for the phenomenon, using the model as supporting evidence ● Be presented with a simplified textual representation of an observable scientific phenomenon with simplified text, and ➢ using a word bank **as needed**, draw and label a model that helps explain how this phenomenon occurs by applying their understanding of a disciplinary core idea, and using a paragraph frame **as needed**, write a prediction about something that might happen in the future that could be explained by the model. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** **With appropriate supports, s**tudents will… ● Be presented with a textual description of an observable scientific phenomenon, and ➢ draw and label a model and its components, interactions among components, and mechanisms in the model, and ➢ using a paragraph frame **as needed**, write an explanation for the phenomenon, using the model as supporting evidence. ● Be presented with a textual description of an observable scientific phenomenon, and ➢ draw a model that helps explain how this phenomenon occurs by applying their understanding of a disciplinary core idea, and using a paragraph frame **as needed**, write a prediction about something that might happen in the future that could be explained by the model **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 3a: Planning and Carrying out Investigations – Teacher Moves

Teacher Moves: What supports can teachers provide students at different proficiency levels **to use language to interpret or make meaning** of the content? Examples:

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
● To support planning and carrying out investigations provide illustrated, kinesthetic (sorts), and/or annotated (in L1) graphic organizers to aid in: ➢ planning the structure of an investigation; collecting and organizing data; interpreting data. ➢ Utilize partner/triad collaboration. ➢ Utilize L1 resources (spoken, written, and viewed) to build schema. ➢ Embed guided practice with feedback ● **Provide** language frames to: ➢ **describe** investigation structure; **identify**, **explain**, and **elaborate** on the components of the investigation and **justify** answers to scientific questions based on data and evidence collected through investigations using simple sentences or phrases and key vocabulary. ❖ **Ex 1 (describe):** This investigation will give evidence for how (variable 2) affect(s) (variable 1). e.g. This investigation will give evidence for how chemical properties of water affect composition of Earth. ❖ **Ex 2 (justify):** This investigation shows that (conclusion) because in the data/evidence we see: (list of evidence/data). e.g. This investigation shows that electric current affects the magnetic field because in the evidence we see _____. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	● To support planning and carrying out investigations provide illustrated, kinesthetic (sorts), and/or annotated graphic organizers to aid in: ➢ planning the structure of an investigation; collecting and organizing data, and interpreting data. ● **Provide** language frames to: ➢ **describe** investigation structure; **identify, explain**, and **elaborate** on the components of the investigation and **justify** answers to scientific questions based on data and evidence collected through investigations using simple sentence or paragraph responses and key details. ❖ **Ex 1 (describe):** This investigation will explain with evidence how (variable 2) affect(s) (variable 1). e.g. This investigation will explain with evidence how the chemical properties of water affect the composition of Earth materials. ❖ **Ex 2 (justify):** This investigation shows that (conclusion) because in the data/evidence we can see how (connect evidence/data to conclusion). e.g. This investigation shows that electric current affects a magnetic field because in the evidence we can see how using more electric current created a stronger magnetic field. ❖ Provide guided practice with specific feedback. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	● To support planning and carrying out investigations provide graphic organizers: ➢ planning the structure of an investigation; collecting and organizing data, and interpreting data ● **Provide** language frames to: ➢ **describe** investigation structure; **identify**, **explain**, and **elaborate** on the components of the investigation, and justify answers to scientific questions based on data and evidence collected through investigations using complex statements, paragraph responses, and elaboration of content. ❖ **Ex 1 (describe):** This investigation will provide evidence to explain how the change in (variable 1) is affected by (variable 2). e.g. This investigation will provide evidence to explain how the change in the composition of Earth materials is affected by the chemical properties of water. ❖ **Ex 2 (Justify):** This investigation indicates/ proves that (conclusion) because the data/ evidence shows that/how (connect evidence/ data to conclusion). e.g. This investigation indicates that electric current affects a magnetic field because the evidence shows that increasing the electric current resulted in a stronger magnetic field. ❖ Provide guided practice with specific feedback. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 3b: Planning and Carrying out Investigations – Success Criteria

Success Criteria: How will students be able to **communicate or demonstrate their learning** of language and content at **different language proficiency levels?** Examples: STEM Teaching Tool #30

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Success Criteria	**Success Criteria**	**Success Criteria**
Students will use simple sentence starters, frames, visuals, and L1 supports to… ● **Read, listen to, and/or observe** an adapted, illustrated or simply annotated scientific phenomenon or scientific model to **generate** a research question to investigate the phenomenon or model using question frames and word banks. ● **evaluate** different ways of observing or measuring the phenomenon by sorting or matching illustrations and simple descriptions. ● **identify** the variables needed in the investigation to explain the phenomenon or model by selecting from an illustrated or annotated list. ● **characterize** each variable as dependent or independent by sorting picture cards with simple descriptions. ● working with a partner and/or L1 and other language supports, conduct the investigation and collect data to serve as evidence to answer the scientific question. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Students will** use compound and complex sentence starters, frames, and visual supports to… ● **Read, listen to, and/or observe** an adapted, illustrated or annotated scientific phenomenon or scientific model, then, using question/sentence frames, word banks, or other language supports as needed to **generate** a research question to investigate the phenomenon or model with classroom resources. ● **evaluate** different ways of observing or measuring the phenomenon to determine which will best answer the question. ● **characterize** each variable as dependent or independent and explain any variables to be controlled and why. ● **create** an investigation plan to study the scientific phenomenon or model that includes variables, tools used, and methods for recording observations. ● **describe** how the investigation will generate relevant patterns of evidence for answering the scientific question or supporting the model. ● **conduct** the investigation and collect data to serve as evidence to answer the scientific question. (**NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Students will** use complex language frames and other supports as needed to… ● **Read, listen to, and/or observe** a scientific phenomenon or scientific model, to **generat**e a research question to investigate the phenomenon or model with classroom resources. ● **evaluate** different ways of observing or measuring the phenomenon to determine which will best answer the question. ● **characterize** each variable as dependent or independent and explain any variables to be controlled and why. ● **create** an investigation plan to study the scientific phenomenon or model that includes variables, tools used, and methods for recording observations. ● **describe** how the investigation will generate relevant patterns of evidence for answering the scientific question or supporting the model. ● **conduct** the investigation and collect data to serve as evidence to answer the scientific question. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 4a: Analyzing and Interpreting Data – Teacher Moves

Teacher Moves: What supports can teachers provide students at different proficiency levels **to use language to interpret or make meaning** of the content? Examples:

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
● To support comprehending, interpreting and analyzing data provide illustrated, kinesthetic (sorts), and/or annotated graphic organizers to aid in: organization, representation, categorization, comparison/contrast and examination. ● Utilize partners/triads for collaboration. ● Utilize L1 resources (spoken, written, and viewed) to build schema. ● Provide guided practice with feedback. ● Provide language frames to: ➢ describe how the organization of data helps them to analyze the data using simple sentences. ➢ describe patterns or relationships inferred from data using simple sentences with comparatives. ❖ **Ex 1** (describe organization): We used (variable 1 noun) to organize the data. This shows the effect of (variable 1) on (variable 2). e.g. We used force to organize the data. This shows the effect of force on acceleration. ❖ **Ex 2** (describe patterns**):** More/less (variable 1) results in more/less (variable 2 noun). e.g. More variation in parent genes results in more variation in offspring (babies). **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	● To support comprehending, interpreting and analyzing data provide illustrated, kinesthetic (sorts), and/or annotated graphic organizers to aid in: organization, representation, categorization, comparison/contrast, and examination. ● Provide language frames to: ➢ describe how the organization of data helps them to analyze the data using extended sentences with prepositions ➢ describe patterns or relationships inferred from data using comparative sentences. ❖ **Ex 1** (describe organization): We used (variable 1 noun) to organize the data. This shows the effect of (variable 1) on (variable 2). e.g. We used force to organize the data. This shows the effect of force on acceleration. ❖ **Ex 2** (describe patterns): More/less (variable 1 noun, possibly + adjective) results in more/less (variable 2 noun, possibly + adjective). e.g. More variation in parent genes results in more variation in offspring (babies). ❖ Provide guided practice with specific feedback. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	● To support comprehending, interpreting and analyzing data, provide graphic organizers to aid in: organization, representation, categorization, comparison/contrast, and examination. ● Provide language frames to: ➢ describe how the organization of data helps them to analyze the data using extended sentences and elaboration of content ➢ describe patterns or relationships inferred from data using comparative sentences and elaboration of content ❖ **Ex 1** (describe organization): This data is organized by (variable 1 noun/noun phrase) in order to show (effect on variable 2). e.g. This data is organized by the amount of force applied to a constant mass in order to show how acceleration changes. ❖ **Ex 2** (describe patterns): The more/less/-er (variable 1 noun/noun phrase) the more/less/-er (variable 2 noun/noun phrase). e.g. The higher genetic variation in a parent population the higher genetic variation in the offspring population. ❖ **Ex 3** (describe patterns): As (variable 1) increases/decreases, the (variable 2) increases/decreases. e.g. As genetic variation of a parent population decreases, the genetic variation of the offspring population decreases. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 4b: Analyzing and Interpreting Data – Success Criteria

Success Criteria: How will students be able to **communicate or demonstrate their learning** of language and content at **different language proficiency levels?** Examples: See STEM Teaching Tool #30

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Success Criteria **With prompting and supports,** students will read, listen to, and/or observe a simplified visual, multimedia representation of an observable scientific phenomenon with simplified text, then using a word bank **as needed**, draw and label (in writing or orally) a model and its components, interactions among components, and mechanisms in the model, and ● using a simplified paragraph frame, write (or speak) an explanation for the phenomenon, using the model as supporting evidence; ● using a word bank **as needed**, draw and label (in writing or orally) a model that helps explain how this phenomenon occurs by applying their understanding of a disciplinary core idea; and ● using a simplified paragraph frame, write (or speak) a prediction about something that might happen in the future that could be explained by the model. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** **With appropriate supports,** students will read, listen to, and/or observe a simplified textual description of an observable scientific phenomenon, then using a word bank **as needed**, draw and label a model and its components, interactions among components, and mechanisms in the model, and ● using a paragraph frame **as needed**, write an explanation for the phenomenon using the model as supporting evidence; ● using a word bank **as needed**, draw and label a model that helps explain how this phenomenon occurs by applying their understanding of a disciplinary core idea; and ● using a paragraph frame **as needed**, write a prediction about something that might happen in the future that could be explained by the mode. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** **With appropriate supports,** students will read, listen to, and/or observe recorded observations from an investigation, then organize the data (tables, graphs etc.) and describe how organization aids in analysis, ● identify and describe patterns within the organized data; ● recorded observations from an investigation; and ● determine whether data presented provide causal or correlational evidence. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 5a: Using Mathematics and Computational Thinking – Teacher Moves

Teacher Moves: What supports can teachers provide students at different proficiency levels **to use language to interpret or make meaning** of the content? Examples:

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
● To support comprehending, interpreting and analyzing data **provide** illustrated, kinesthetic (sorts), and/or annotated graphic organizers to aid in: using mathematical representations to support claims; evaluating the requirements of an investigation, and creating/writing algorithms (series of steps) to solve a problem. ● Utilize partners/triads to collaborate. ● Utilize L1 resources (spoken, written, and viewed) to build schema. ● Provide guided practice with feedback. ● Provide keys or glossaries for putting mathematical symbols into words, e.g.: ➢ ρ = momentum ➢ m = mass ➢ v = velocity ● Provide language frames for using mathematical representations to describe scientific phenomena in simple sentences. ❖ **Ex 1:** The equation (equation) means (mathematical symbols written with words). For example, if we (mathematical function), then we have to (mathematical function). e.g. The equation momentum = mass x velocity means that momentum is equal to mass times velocity. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	● To support comprehending, interpreting and analyzing data **provide** illustrated, kinesthetic (sorts), and/or annotated graphic organizers to aid in: using mathematical representations to support claims; evaluating the requirements of an investigation, and creating/writing algorithms (series of steps) to solve a problem. ● Provide keys or glossaries for putting mathematical symbols into words, e.g.: ➢ ρ = momentum ➢ m = mass ➢ v = velocity ● Provide language frames to use mathematical representations to describe scientific phenomena with increasingly complex sentences and vocabulary. ❖ **Ex 1:** The equation (equation) means (mathematical symbols written with words). For example, if we change (variable 1) by (description of change), then we have to change (variable 2) by (description of change). e.g. The equation ρ = m*v means momentum of an object is equal to the mass of the object times the velocity. For example, if we change the mass or velocity by a factor of x, then momentum changes by a factor of x, then momentum changes by a factor of x. ❖ Provide guided practice with specific feedback. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	● To support using mathematics and computational thinking, **provide** graphic organizers to aid in: using mathematical representations to support claims; evaluating the requirements of an investigation, and creating/writing algorithms (series of steps) to solve a problem. ● **Provide** language frames to use mathematical representations to describe scientific phenomena using extended sentences and elaboration of content **Ex 1:** The equation (equation) explains the relationship between (the variables found in the equation). This means (the mathematical relationship explained in words). e.g. The equation ρ = m*v explains the relationship between momentum, mass and velocity of an object. This means the momentum of an object is equal to the product of mass and velocity of the object. Ex 2: The pattern in the data shows us that when (variable 1) (undergoes a mathematical change) and (variable 2) stays the same, then (variable 3) (undergoes a mathematical change). e.g. The pattern in the data shows us that when the velocity of an object doubles and mass stays the same, then momentum of the object doubles. e.g. The pattern in the data shows us that when the mass of an object doubles and velocity stays the same, then momentum of the object doubles. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 5b: Using Mathematics and Computational Thinking – Success Criteria

Success Criteria: How will students be able to **communicate or demonstrate their learning** of language and content at **different language proficiency levels?** Examples: STEM Teaching Tool #30 (pp.11)

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Success Criteria With prompting and supports, students will read and interpret a simplified textual description or visual/multimedia representation, measured quantities of data, and a mathematical equation of an observable scientific phenomenon, then: ● select from visual options to make a prediction about the state of the phenomenon in the future that the equation can be used to support; label the selected option using a word bank (as needed). ● using a simplified paragraph frame, write an explanation for the prediction, using the mathematical model as supporting evidence. ● using a large data set from an investigation, the question the data are intended to answer in simplified/present tense), and computer tools for analyzing the data set develop statistical summaries (mean, median, mode, variability) of the data set. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** With appropriate supports, students will read and interpret a simplified textual description, measured quantities of data, and a mathematical equation of an observable scientific phenomenon, then: ● using a simplified paragraph frame, write a prediction and explanation for the prediction, using the mathematical model as supporting evidence. ● using a large data set from an investigation, the question the data are intended to answer, and computer tools for analyzing the data set, then develop statistical summaries (mean, median, mode, variability) of the data set that help them answer the question about the dataset. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** With appropriate supports, students will read and interpret a textual description, measured quantities of data, and a mathematical equation of an observable scientific phenomenon, then: ● make a prediction about the state of the phenomenon in the future that the equation can be used to support. ● write an explanation for the prediction, using the mathematical model as supporting evidence. ● using a large data set from an investigation, the question the data are intended to answer, and computer tools for analyzing the data set, then develop statistical summaries (mean, median, mode, variability) of the data set that help them answer the question about the dataset. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 6a: Constructing Explanations and Designing Solutions – Teacher Moves

Teacher Moves: What supports can teachers provide students at different proficiency levels **to use language to interpret or make meaning** of the content? Examples:

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
● To support constructing explanations and designing solutions provide illustrated, kinesthetic (sorts), and/or annotated (in L1) graphic organizers to aid in: identifying and organizing cause/effect relationships and sequencing the engineering design process. ● Use partners/triads to collaborate. ● Provide guided practice with feedback. ● **Provide** language frames to: ➢ respond to Why/How questions with explanations using simple sentences and content vocabulary; and ➢ propose and evaluate engineering design solutions using complex questions, paragraph responses, and elaboration of content. ❖ **Ex 1 (explanation):** (factual statement) (cause/ result transition signal) (factual statement). e.g. Vinegar is acetic acid (HCH_3COO) and baking soda (NaHCO)is a base, so they create an acid-base reaction. ❖ **Ex 2** (propose/evaluate): (This aspect) of solution A was successful. (This aspect) of solution B was successful. We can optimize our design by (combining them). e.g. We can optimize our design by combining the one-bin recycling and education programs. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	● To support constructing explanations and designing solutions provide illustrated, kinesthetic (sorts), and/or annotated graphic organizers to aid in: identifying and organizing cause/effect relationships and sequencing the engineering design process. ● **Provide** language frames to: ➢ respond to Why/How questions with explanations using extended sentences, simple paragraphs, content vocabulary, and content details; and ➢ propose and evaluate engineering design solutions using extended sentences, simple paragraphs, content vocabulary, and content details. ❖ **Ex 1** (explanation**):** (factual statement) (cause/ result transition signal) (factual statement). e.g. Baking soda and vinegar create an acid-base reaction because vinegar is acetic acid (HCH_3COO) and baking soda (NaHCO), is a base. ❖ **Ex 2** (explanation): (Cause/ result transition signal) (factual statement), (factual statement). e.g. Because vinegar is an acid and baking soda is a base, they will create an acid-base reaction. ❖ **Ex 3** (propose/evaluate): (This aspect) of solution A was successful and (this aspect) of solution B was successful. As a result, we propose to optimize our design by (combining them). e.g. As a result, we propose to optimize our design by using both the one bin recycling program and the educational outreach program. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	● To support constructing explanations and designing solutions, provide graphic organizers to aid in: identifying and organizing cause/effect relationships and sequencing the engineering design process. ● **Provide** language frames to: ➢ respond to Why/How questions with explanations using complex sentences, paragraph responses, content vocabulary, and elaboration of content; and ➢ propose and evaluate engineering design solutions using complex questions, paragraph responses, and elaboration of content. ❖ **Ex 1** (explanation**):** (factual statement) (cause/ result transition signal) (factual statement). e.g. Baking soda reacts with vinegar in an acid-base reaction because vinegar is acetic acid (HCH_3COO) and baking soda is bicarbonate (NaHCO), which is a base. ❖ **Ex 2** (explanation): (Cause/ result transition signal) (factual statement), (factual statement). e.g. Because vinegar is acetic acid (HCH_3COO) and baking soda is a bicarbonate (NaHCO), which is a base, they will react in an acid-base reaction. ❖ **Ex 3** (propose/evaluate): Because (this aspect) of solution A was successful and (this aspect) of solution B was successful, we propose to optimize our design by (combining them). e.g. Because the one-bin recycling program of solution A was successful and the educational outreach program of solution B were successful, we propose to optimize our design by expanding both the one bin recycling program and the educational outreach program. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 6b: Constructing Explanations and Designing Solutions – Success Criteria

Success Criteria: How will students be able to **communicate or demonstrate their learning** of language and content at **different language proficiency levels?** Examples: STEM Teaching Tool #30, (pp. 12-13)

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Success Criteria With prompting and support, students will read, listen to, and/or observe a simplified, illustrated, and/or labeled description of a phenomenon and the data for independent and dependent variables, then: ● orally or in writing, use sentence frames and word banks to produce a causal account that explains how the independent variables relate to the dependent; ● read, listen to, and/or observe a simplified and/or illustrated and labeled description of a designed system and data from a failure scenario associated with the design, then ● analyze the data; and ● identify the scientific causes of the failure by selecting from a range of visual or simply stated options; sketch a design iteration that may be an improvement to the design. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** With appropriate supports, students will read, listen to, and/or observe a simplified description of a phenomenon and the qualitative and quantitative data for independent and dependent variables, then: ● orally or in writing, use paragraph frames and word banks to produce a causal account that explains how the independent variables relate to the dependent variables; ● read, listen to, and/or observe a simplified description of a designed system and data from a failure scenario associated with the design; then ● analyze the data; ● identify the scientific causes of the failure by selecting from a range of simply stated options; and ● sketch or describe in simple terms a design iteration that may be an improvement to the design. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** With appropriate supports, students read, listen to, and/or observe the description of a phenomenon and the qualitative and quantitative data for independent and dependent variables, then: ● orally or in writing, use paragraph frames as needed to produce a causal account that explains how the independent variables relate to the dependent variables; ● read, listen to, and/or observe the description of a designed system and data from a failure scenario associated with the design; then ● analyze the data; ● identify the scientific causes of the failure; and ● sketch or describe a design iteration that may be an improvement to the design. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 7a: Engaging in Argument from Evidence – Teacher Moves

Teacher Moves: What supports can teachers provide students at different proficiency levels **to use language to interpret or make meaning** of the content? Examples:

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
● To support engaging in argument from evidence provide illustrated, kinesthetic (sorts), and/or annotated graphic organizers to aid in: connecting evidence to claims and comparing and evaluating evidence based on a claim. ● Use partners/triads to collaborate. ● Utilize L1 resources (spoken, written, and viewed) to build schema. ● Provide guided practice with feedback. ● **Provide** language frames to: ➢ **Compare** and **critique** arguments by citing evidence and posing questions using simple and compound sentences ➢ **Use** scientific reasoning supported by language frames and language banks to explain why or how evidence supports a claim. ❖ **Ex 1** (compare/critique): The arguments for both/all claims emphasize (type of evidence). ❖ **Ex 2** (contrast/critique): The argument for claim 1 emphasizes (type of evidence), but the argument for claim 2 emphasizes (different type of evidence). (e.g., The argument for claim 1 emphasizes the number of birds, but the argument for claim 2 emphasizes different types of birds.) ❖ **Ex 3** (critique/response): The evidence for (claim) is data from (source). (e.g., The evidence for more birds is data from the National Audubon Society.)	● To support engaging in argument from evidence provide illustrated, kinesthetic (sorts), and/or annotated graphic organizers to aid in: connecting evidence to claims and comparing and evaluating evidence based on a claim. ● Provide guided practice with feedback. ● **Provide** language frames to: ➢ **Compare** and **critique** arguments by citing evidence and posing questions using compound and increasingly complex sentences. ➢ **Use** scientific reasoning supported by complex language frames and language banks to explain why or how evidence supports a claim. ❖ **Ex 1** (compare/critique): The arguments for both/all claims emphasize (type of evidence). (e.g., The arguments for both claims emphasize the increases in the number of some species.) ❖ **Ex 2** (contrast/critique): The argument for claim 1 emphasizes (type of evidence); however, the argument for claim 2 emphasizes (different type of evidence). (e.g., The argument for claim 1 emphasizes the increase in number of some species; however, the argument for claim 2 emphasizes the appearance of new species over time.)	● To support engaging in argument from evidence, provide graphic organizers to aid in: connecting evidence to claims and comparing and evaluating evidence based on a claim. ● Provide guided practice with feedback. ● **Provide language frames to:** ➢ **Compare** and **critique** arguments by citing evidence and posing questions using extended sentences and elaboration of content ➢ **Use** scientific reasoning and extended sentences and elaboration of content to explain why or how evidence supports a claim. ❖ **Ex 1** (compare/critique): The argument for claim 1 emphasizes (type of evidence), as does the argument for claim 2. (e.g., The argument for claim 1 emphasizes increases in the number of individuals of some species, as does the argument for claim 2.) ❖ **Ex 2** (contrast/critique): The argument for claim 1 emphasizes (type of evidence), while the argument for claim 2 emphasizes (different type of evidence). (e.g., The argument for claim 1 emphasizes increases in the number of individuals of some species, while the argument for claim emphasizes the emergence of new species over time.)

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Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
❖ **Ex 4** (critique/response)**:** How does (specific evidence) support/refute the claim that (simple statement of claim)? (e.g., How does data on the number of species support the claim that changing temperature can affect unity and diversity of species?) ❖ **Ex 5** (Claim) (Evidence) (Reasoning): Provide sentence frames and language banks based on the specific topic. (e.g., (Claim)____is affecting ____on Earth. (Evidence) Data from_____show _____. The data also show____. (Reasoning) The evidence shows that when_____then____. For this reason, we conclude that_____. ❖ **Sample Language Bank:** nouns/adjectives/verbs • biological/changing/change • organisms/decreasing/decrease • population/environmental • conditions/increase/increasing • species/extinct • environment/new • type (of)/some • the EPA, unity, and diversity of • species, humans, number (of) ❖ **Sample Response:** (e.g., (Claim) Global warming is affecting the number and type of species on Earth. (Evidence) Data from the EPA show changing environment. The data also show new species, decreasing species, and extinct species. (Reasoning) The evidence shows that when environment changes then numbers of some species increase and decrease. For this reason, we conclude that global warming is affecting unity and diversity of species.) **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	**Ex 3** (critique/response)**:** The evidence for (claim) is data from (source)The evidence for the appearance of new species over time is data from a 22-year study produced by the Environmental Protection Agency.) ❖ **Ex 4** (critique/response)**:** How does (specific evidence) support/refute the claim that (simple statement of claim)? (e.g., How do the increase in some species, the appearance of new species, and the extinction of other species support the claim that changing environmental conditions can affect unity and diversity of species?) ❖ **Ex 5:** (Claim) (Evidence) (Reasoning): Provide language banks based on the specific topic. ❖ **Sample Language Bank:** nouns/adjectives/ verbs • biological/changing/effect • organisms/decreasing/decrease • number (of)/environmental • conditions/increasing/decrease • population/extinct/increase, show • diversity, species, environment • type (of), the EPA, unity • global warming, humans ❖ **Sample Response:** (e.g., (Claim) Changing environmental conditions can affect unity and diversity of species. (Evidence) Data from the EPA show that some species are increasing in numbers, some species are decreasing in numbers and new species are appearing with changing environmental conditions. (Reasoning) The conclusion is the changing environment affects the unity and diversity of species because changes in the species correspond to the changing environmental conditions.) **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	❖ **Ex 3** (critique/response)**:** The evidence for (claim) is data from (source). Emergence of new species over time is data from a 22-year study produced by the Environmental Protection Agency.) ❖ **Ex 4** (critique/response)**:** How do/does (specific evidence) support/refute the claim that (claim)? (e.g., How do the increase in the number of individuals of some species, the emergence of new species over time, and the extinction of other species support the claim that changing environmental conditions can affect unity and diversity of species?) ❖ **Ex 5:** (Claim) (Evidence) (Reasoning) (e.g., (Claim) Changing environmental conditions can affect unity and diversity of species. (Evidence) Data from the EPA show that some species are increasing in numbers, some species are decreasing in numbers, and new species are emerging with changing environmental conditions. (Reasoning) We can conclude that the changing environment affects the unity and diversity of species because the changes in the species correspond to the changing environmental conditions.) **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 7b: Engaging in Argument from Evidence – Success Criteria

Success Criteria: How will students be able to **communicate or demonstrate their learning** of language and content at **different language proficiency levels?** Examples: STEM Teaching Tool #30 (pp. 14)

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Success Criteria With prompting and supports, students will read, listen to, and/or observe a simplified and/or illustrated and labeled description of a phenomenon, then, using graphic organizers, simple sentence frames, and glossaries/dictionaries: ● state a claim about that phenomenon; ● identify or match evidence that supports that claim; and ● match the scientific principle(s) that connect each piece of evidence to the claim. **NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** With appropriate supports, students will read, listen to, and/or observe an illustrated and/or labeled description of a phenomenon, then, using graphic organizers, paragraph frames, and/or glossaries or dictionaries **as needed**: ● articulate (construct) a claim about that phenomenon; ● identify evidence that supports that claim; and ● articulate or match the scientific principle(s) that connect each piece of evidence to the claim. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	**Success Criteria** With appropriate supports, students will read, listen to, and/or observe a description of a phenomenon, then, using graphic organizers, complex sentence frames, and glossaries or dictionaries **as needed**: ● articulate (construct) a claim about that phenomenon; ● identify evidence that supports that claim; and ● articulate the scientific principle(s) that connect each piece of evidence to the claim. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 8a: Obtaining, Evaluating, and Communicating Information – Teacher Moves

Teacher Moves: What supports can teachers provide students at different proficiency levels **to use language to interpret or make meaning** of the content? Examples:

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
❖ For critically reading scientific texts, supports may include: ● ordering or sorting central ideas, events, and conclusions ● matching details, evidence, causes, etc. to central ideas or conclusions ● highlighting text evidence ● categorizing details obtained from oral, written, or multimedia L1 texts to build schema ❖ For gathering, synthesizing, and integrating, and assessing information, supports may include: ● graphic organizers for gathering and classifying information ● a list of relevant questions for analyzing and evaluating information ● working with a partner to sort a list of sources according to credibility ❖ For communicating scientific and/or technical information, supports may include: ● graphic organizers and other supports noted above and in all other practices ● sentence frames and other linguistic supports as described in all other practices	❖ For critically reading scientific texts, supports may include: ● ordering or sorting central ideas, events, and conclusions ● matching details, evidence, causes, etc. to central ideas or conclusions ● highlighting text evidence ● categorizing details obtained from oral, written, or multimedia texts ❖ For gathering, synthesizing, and integrating, and assessing information, supports may include: ● graphic organizers for gathering and classifying information ● a list of relevant questions for analyzing and evaluating information ● working with a partner to sort a list of sources according to credibility ❖ For communicating scientific and/or technical information, supports may include: ● graphic organizers and other supports noted above and in all other practices ● sentence frames and other linguistic supports as described in all other ❖ Provide guided practice with specific feedback.	❖ For critically reading scientific texts, supports may include: ● ordering or sorting central ideas, events, and conclusions ● matching details, evidence, causes, etc. to central ideas or conclusions ● highlighting text evidence ● categorizing details obtained from oral, written, or multimedia texts ❖ For gathering, synthesizing, and integrating, and assessing information, supports may include: ● graphic organizers for gathering and classifying information ● a list of relevant questions for analyzing and evaluating information ● working with a partner to sort a list of sources according to credibility ❖ For communicating scientific and/or technical information, supports may include: ● graphic organizers and other supports noted above and in all other practices ● sentence frames and other linguistic supports as described in all other practices ❖ Provide guided practice with specific feedback.

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
❖ **Ex:** Students use word banks and partially completed graphic organizers to record information from multiple adapted/simplified and/or L1 sources about how nucleosynthesis occurs in stars to create atoms bigger than hydrogen. They integrate the information by sorting/categorizing the evidence in English by star size (mass). Students then present their findings in a pre-recorded (e.g. a narrated PowerPoint) oral presentation supported by illustrations. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	❖ **Ex:** Students use word banks and partially completed graphic organizers to record information from multiple adapted/simplified sources about how nucleosynthesis occurs in stars to create atoms bigger than hydrogen. They integrate the information by categorizing the evidence by star size (mass). Students then present their findings in an oral presentation supported by illustrations and multiple note cards containing key points. practices **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**	❖ **Ex:** Students use word banks and partially completed graphic organizers to record information from multiple adapted/simplified sources about how nucleosynthesis occurs in stars to create atoms bigger than hydrogen. They integrate the information by categorizing the evidence by star size (mass). Students then present their findings in an oral presentation supported by illustrations and multiple note cards containing key points. **(NEPF – IP.1.2; 2.1; 2.2; 3.1; 3.2; 5.3)**

Section 3B: Science and Engineering Disciplinary Practices (continued)

Practice 8b: Obtaining, Evaluating, and Communicating Information – Success Criteria

Success Criteria: How will students be able to **communicate or demonstrate their learning** of language and content at **different language proficiency levels?** Examples: STEM Teaching Tool #30, (pp. 15)

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
Success Criteria With prompting and supports, students will read and/or listen to an adapted/simplified description of a phenomenon that includes a (multimodal), adapted, illustrated or annotated set of resources including adapted/simplified grade- appropriate texts, data displays, tables, diagrams, equations, graphs, and models, then, using simple language frames, L1 resources, and other linguistic supports, ● synthesize the information from across the texts by categorizing or sorting, and/or ● compare and contrast information across the texts in a graphic organizer to determine which are most relevant to explaining the phenomenon, and/or ● communicate information from the resources in oral or written form using simple language frames and other linguistic supports, and/or ● construct a visual, oral, or written (using sentence frames) explanation of the phenomenon, and/or ● integrate information across the resources using graphic organizers, L1, and other language supports in order to explain or ask questions about claims and findings.	**Success Criteria** With prompting and supports, students will be presented with a scenario that describes a phenomenon and includes a (multimodal), adapted, illustrated or annotated set of resources including grade- appropriate texts, data displays, tables, diagrams, equations, graphs, and models, then, using graphic organizers, language frames, and other linguistic supports **as needed**, ● synthesize the information from across the resources and/or ● compare and contrast information across the resources to determine which are most relevant to explaining the phenomenon, and/or ● communicate information from the resources in oral or written form, and/or ● construct a visual, oral, or written (using paragraph frames) explanation of the phenomenon, and/or ● integrate information across the resources using graphic organizers and language frames in order to explain, clarify, or ask questions about claims and findings.	**Success Criteria** With appropriate supports, students will be presented with a scenario that describes a phenomenon and includes a (multimodal) set of resources including grade- appropriate texts, data displays, tables, diagrams, equations, graphs, and models, then ● synthesize the information from across the resources, and/or ● compare and contrast information across the resources to determine which are most relevant to explaining the phenomenon, and/or ● communicate information from the resources in oral or written form, and/or ● construct an explanation of the phenomenon, and/or ● integrate information across the resources in order to explain, clarify, or ask questions about claims and findings, and/or ● evaluate and integrate information from across the resources to address a scientific question or solve a problem. ● be presented with a set of scientific texts or a scenario that describes or investigates a phenomenon using text, images, and video.

Practice 8b: Obtaining, Evaluating, and Communicating Information – Success Criteria (continued)

Entering/Emerging (Levels 1-2)	Developing/Expanding (Levels 3-4)	Bridging/Reaching (Levels 5-6)
● evaluate and integrate information from across the resources using graphic organizers and L1 and other language supports to address a scientific question or solve a problem. ● read and/or listen to a set of adapted/simplified scientific texts or a scenario that describes a phenomenon or an investigation of a phenomenon using text, images, video, and/or data, then, using simple language frames, L1 resources, and other linguistic supports, ● analyze using visuals and graphics, then speak or write simple statements about the validity and reliability of the information, and/or ● evaluate and synthesize the information presented using graphic organizers, visuals, and other supports to address a scientific question or solve a problem and/or to ask questions about the phenomenon based on information, and/or use multiple forms of simple scientific texts and multiple ways to present information to communicate visually, orally, or in writing about the phenomenon to a given audience or an audience of their choosing. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	● evaluate and integrate information from across the resources using graphic organizers and language frames to address a scientific question or solve a problem. ● be presented with a set of scientific texts or a scenario that describes a phenomenon or an investigation of a phenomenon using text, images, video, and/or data, then using graphic organizers, language frames, and other linguistic supports **as needed**, ● analyze and write about the validity and reliability of the information, and/or ● evaluate and synthesize the information presented to address a scientific question or solve a problem and/or to ask questions about the phenomenon based on information, and/or use multiple forms of scientific texts and multiple ways to present information to communicate about the phenomenon to a given audience or an audience of their choosing. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**	● analyze and write about the validity and reliability of the information, and/or ● evaluate and synthesize the information presented to address a scientific question or solve a problem and/or to ask questions about the phenomenon based on information, and/or use multiple forms of scientific texts and multiple ways to present information to communicate about the phenomenon to a given audience or an audience of their choosing. **(NEPF – IP.1.3; 2.2; 3.4; 5.3)**