
# NV ELD STANDARDS AND INSTRUCTIONAL SUPPORTS FOR DEVELOPING THE LANGUAGE OF SCIENCE GRADES 9-12

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# SECTION 1: INTRODUCTION TO NV ELD STANDARDS AND INSTRUCTIONAL SUPPORTS FOR DEVELOPING THE LANGUAGE OF SCIENCE GRADES 9-12

## 1A. Purpose and Organization

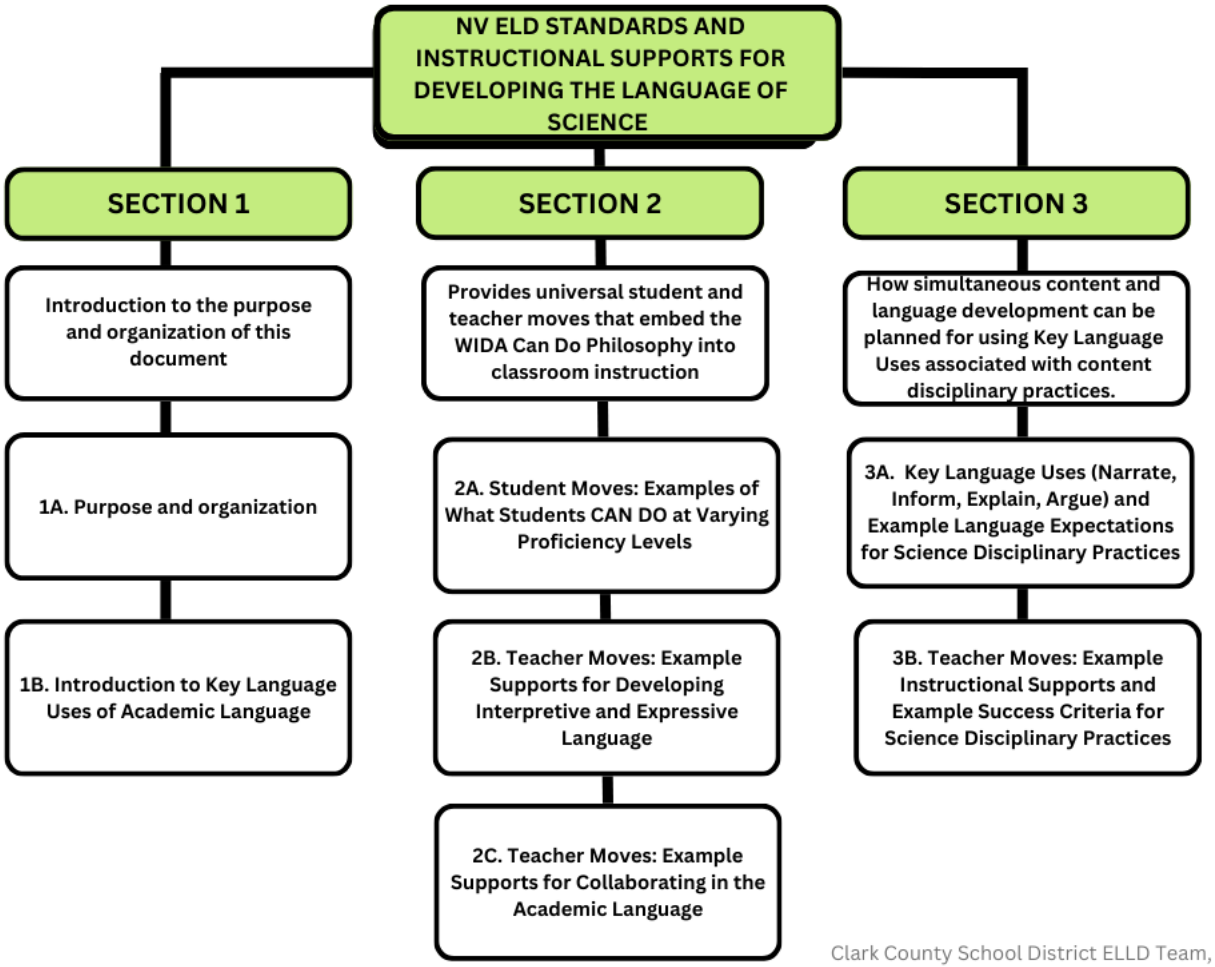
**Purpose**

The purpose of this document is to provide instructional resources for educators to engage their students in *English Language Development Standard 4: English language learners communicate information, ideas, and concepts necessary for academic success in the content area of science.*

In 2012 the Nevada Department of Education adopted the WIDA ELD Standards now also referred to as the Nevada ELD Standards. **The purpose of the Nevada (NV) English Language Development (ELD) Standards and Instructional Supports documents** is to provide content teachers, EL educators, and school leaders with instructional tools to be used to successfully integrate the Nevada English Language Development (ELD) standards with content area instruction leading to student mastery of the Nevada Academic Content Standards (NVACs) for college/career readiness and academic English proficiency. With the use of these tools, educators will be able to make clear instructional connections between the content standards, content disciplinary practices, and the ELD standards. The science practices identified in this document are based on the Nevada Academic Content Standards for Science and the Next Generation Science Standards. For more information about the overview, purpose, and theoretical foundations for using the Nevada English Language Development (ELD) Standards and Instructional Supports documents see the Nevada ELD Standards and Instructional Supports Overview.

**Organization**

The NV ELD Standards and Instructional Supports for Developing the Language of Science Grades 9-12 document is organized into 3 sections.




Clark County School District ELLD Team, 2024

**Section 1 is the introduction to the purpose and organization of this document.**

**Section 1: INTRODUCTION TO NV ELD STANDARDS AND INSTRUCTIONAL SUPPORTS FOR DEVELOPING THE SCIENCE GRADES 9-12**

A. Purpose and Organization
B. Introduction to Key Language Uses of Academic Language

**Section 2 provides universal student and teacher moves that embed the WIDA Can Do Philosophy into classroom instruction.**

Section 2 of the document provides descriptors illustrating what students "Can Do" with academic language at various English Language Proficiency (ELP) levels: Entering/Emerging (Level 1-2), Developing/Expanding (Level 3-4) and Bridging/Reaching (Level 5-6) specific to the grade-level cluster. The section also provides instructional practices and strategies called "Teacher Moves" which are research-based, actionable steps that all teachers can take to support the simultaneous development of academic language and content for multilingual learners at various proficiency levels of English language development. For more descriptions of the ELD Strategies identified in Sections 2 and 3, view the GO TO Strategies document from the CAL website.

**Section 2: CAN DOs AND EXAMPLE INSTRUCTIONAL SUPPORTS FOR DEVELOPING THE LANGUAGE OF SCIENCE GRADES 9-12**

A. Student Moves: Examples of What Students Can Do at Varying Proficiency Levels
B. Teacher Moves: Example Supports for Developing Interpretive and Expressive Language
C. Teacher Moves: Example Supports for Collaborating in the Academic Language

## Section 3 addresses how simultaneous content and language development can be planned for using Key Language Uses associated with content disciplinary practices.

Section 3 provides a table containing exemplars (taken from WIDA 2020) that model for educators the connection of prominent Key Language Uses and Language Expectations to the 9-12 Content Disciplinary Practices of Science. "Teacher Moves" relevant to the content area disciplinary practice are provided. Also included in the section are exemplars of student "Success Criteria", examples of how students will be able to demonstrate their learning of language and content at different language proficiency levels.

**Section 3: INSTRUCTIONAL GUIDANCE FOR SCIENCE DISCIPLINARY PRACTICES GRADES 9-12**

- Snapshot Key Language Uses from the WIDA 2020 ELD Standards Framework

A. Key Language Uses (Inform, Explain, Argue) and Example Language Expectations for Science Disciplinary Practices
   - Prominent Key Language Uses for Science Grades 9-12
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B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science Disciplinary Practices
   - Practice 1: Asking questions and defining problems
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   - Practice 4: Analyzing and interpreting data
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   - Practice 8: Obtaining, evaluating, and communicating information

## 1B. Introduction to Key Language Uses of Academic Language

The WIDA ELD Standards Framework, 2020 Edition maintains the five original ELD standards of the 2012 document and, importantly, operationalizes the WIDA Big Ideas that language development and content learning are to be integrated into assets-based instruction that takes place in the context of a learning environment responsive to cultural and linguistic diversity. These Big Ideas are referred to as the WIDA Can Do Philosophy. Instruction is facilitated by the inclusion of the following components of language which form a common framework within which multilingual students understand academic language: 1) **Interpretive** (listening, reading, viewing) and **Expressive** (speaking, writing, representing) 2) **Key Language Uses**, prominent language uses across content area disciplines, 3) **Language Expectations**, goals for content-driven language learning, and 4) **Language Features**, a continuum of language development indicators.

Key Language Uses (KLUs) of academic language in the core content areas were identified in WIDA 2020 based on reviews of literature and a language analysis of college and career readiness standards. Throughout this document the KLUs provide a focus for instructional supports. See table below for a description of the KLUs.

| KEY LANGUAGE USES | KEY LANGUAGE 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. |

# SECTION 2: CAN DOs AND EXAMPLE INSTRUCTIONAL SUPPORTS FOR DEVELOPING THE LANGUAGE OF SCIENCE GRADES 9-12

Two types of communication modes are incorporated into the WIDA English Language Development Standards Framework: interpretive mode (listening, reading, and viewing) and expressive mode (speaking, writing, and representing). Consistent with the WIDA Can Do Descriptors, the table below provides examples of the academic tasks multilingual learners can successfully carry out in each communication mode. These Student Moves were based on the WIDA K-12 Can Do Descriptors, Key Uses Edition.

## 2A. Student Moves: Examples of What Students Can Do at Varying Proficiency Levels

With appropriate instructional supports multilingual learners can…

| Communication Modes | Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|---|
| **Interpretive: Listening, Reading, & Viewing** | ● match scientific tools or instruments with pictures from oral statements (e.g., sundial).<br>● classify scientific tools or instruments with pictures and labels from oral directions (e.g., telescopes and sundials go with the sky.).<br>● match labeled diagrams of cycles or processes with vocabulary from word/phrase banks (e.g., nitrogen cycle).<br>● sort or classify descriptive phrases and diagrams by cycles or processes.<br>● sort evidence and claims from oral descriptions.<br>● connect the context of informational text with illustrations, diagrams. | ● identify examples of scientific tools or instruments and their uses from pictures and oral discourse.<br>● compare/contract examples of scientific tools or instruments and uses from oral descriptions (e.g., differences between telescopes and microscopes).<br>● sequence descriptive sentences and diagrams according to cycles or processes (e.g., mitosis or meiosis).<br>● identify cycles or processes from descriptive paragraphs and diagrams.<br>● follow tasks and directions with peer support.<br>● sequence events in content-related processes from text. | ● infer uses of scientific tools or instruments from oral reading of grade level materials.<br>● predict consequences of alteration of cycles or processes from grade-level text.<br>● apply information on earth materials to new contexts using grade-level text.<br>● identify related information from multiple sources presented orally.<br>● recognize the key scientific or technical language used in a mini-lecture.<br>● identify the overall structure of events, ideas, concepts, or information in grade-level text. |

## 2A. Student Moves: Examples of What Students Can Do at Varying Proficiency Levels (continued)

With appropriate instructional supports, multilingual learners can…

| Communication Modes | Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|---|
| **Expressive: Speaking, Writing, & Representing** | ● use vocabulary associated with scientific discoveries based on illustrations (e.g., machine or x- ray).<br>● describe scientific inventions or discoveries based on illustrations.<br>● make statements about a concept or phenomenon from illustrations or photographs.<br>● note difference or change in a scientific process or phenomenon by labeling drawings or copying words from word banks and anchor charts.<br>● match or classify forms of energy from everyday illustrated examples and models (e.g., light, sound, heat).<br>● list and describe examples of illustrated forms of energy from word/phrase banks.<br>● classify or give examples of parts of systems depicted visually.<br>● copy names of scientific objects from labeled diagrams<br>● describe features of scientific objects from labeled diagrams.<br>● use key words and phrases in writing related to a concept. | ● compare/contrast scientific discoveries described orally with visual support (e.g., _is similar to/different from – because).<br>● imagine future scientific inventions or discoveries based on oral and visual clues.<br>● compare/contrast two forms of energy depicted visually (e.g., _____ and _____are alike/different in these ways).<br>● explain uses of different forms of energy depicted visually (e.g., _____is used to_____.).<br>● predict scientific phenomena and provide reasons from illustrations, photographs or graphs.<br>● compare/contrast scientific phenomena from illustrations, photographs or graphs.<br>● describe change in processes or cycles depicted in visuals using phrases and short sentences.<br>● compare/contrast change depicted in visuals using a series of sentences.<br>● classify or give examples of parts of systems depicted visually.<br>● discuss relationships between scientific components using diagrams or graphs.<br>● present detailed information orally in a small group with rehearsal opportunities.<br>● answer how or why questions e.g., “How is energy produced?” | ● predict potential impact of scientific inventions or discoveries on life based on oral evidence (e.g., “in 100 years, we could/may/might”).<br>● predict consequences of alternation of cycles or processes from grade- level text.<br>● explain the process of change using extended written or oral discourse.<br>● evaluate potential usefulness of scientific concepts and phenomena.<br>● use technical and specific vocabulary when sharing content information.<br>● expand on topics with descriptive details using varied vocabulary.<br>● summarize discussions on content-related topics.<br>● explain by analyzing how variables contribute to events or outcomes.<br>● maintain a formal register in written and spoken communication. |

## 2B. Teacher Moves: Example Supports for Developing Interpretive and Expressive Language

**What general supports can teachers provide** to students at **different language proficiency levels** to interpret or express **academic language?**

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| ***INSTRUCTIONAL***<br>● Confirm students' prior knowledge of content topics.<br>● Build background in key language and concepts using visual aids, simplified language, gestures and body language and interactive activities, e.g. (hands-on, role playing, games) and L1 support.<br>● Provide explicit instruction and practice in key social and instructional vocabulary utilizing plenty of visuals such as pictures, real objects, or gestures to convey meaning.<br>● Give two-step contextualized directions.<br>● Restate/rephrase and use Patterned Oral Language routines.<br>● Annotate text with non-linguistic representations to scaffold comprehension.<br>● Check comprehension of all students frequently.<br>● Use Wait Time.<br><br>***LANGUAGE***<br>● Model orally the academic language and specific vocabulary.<br>● Label visuals and objects with target vocabulary.<br>● Introduce cognates to aid comprehension.<br>● Provide opportunities for translanguaging and multilingual support during the task.<br><br>***INTERACTIVE***<br>● Provide explicit instruction and practice using Jigsaw Reading to scaffold independent reading.<br>● Pair students to read one text together.<br>● Use Shared Reading. | ***INSTRUCTIONAL***<br>● Confirm students' prior knowledge of content topics.<br>● Build background in key language and concepts using contextualized vocabulary, collaborative learning, visual that introduce more complex texts with accompanying audio.<br>● Provide explicit instruction and practice in key social and instructional vocabulary.<br>● Check comprehension of all students frequently.<br>● Use Wait Time.<br>● Use varied presentation formats such as role plays.<br>● Model processes with Think Alouds.<br>● Scaffold oral reporting and oral reports with student use of note cards and provide time for prior practice with feedback.<br><br>***LANGUAGE***<br>● Model orally the academic language and specific vocabulary.<br>● Provide explicit instruction and practice for students to construct the language using sentence and discourse starters.<br>● Encourage full sentence responses by asking open ended questions with response sentence stem provided.<br>❖ Example**:** In what ways can communities throughout the United States address pertinent global warming issues?<br>One way that a community can address global warming is _____.<br>● Require and support the use of academic language with anchor charts and word banks for students to | ***INSTRUCTIONAL***<br>● Confirm students' prior knowledge of content topics.<br>● Build background in key language and concepts focusing on academic vocabulary and idiomatic expressions. Use content specific texts to build subject knowledge.<br>● Use Reciprocal Teaching to scaffold independent reading.<br><br>***LANGUAGE***<br>● Use complex sentence and discourse starters.<br>● Extend content vocabulary with multiple examples and non-examples.<br>● Provide opportunities for translanguaging during the task.<br><br>***INTERACTIVE***<br>● Structure writing tasks to include opportunity for peer feedback.<br><br>***GRAPHIC***<br>● Ask students to analyze text structure and select an appropriate Graphic Organizer for summarizing.<br>● Provide a graphic organizer system (e.g. Learning Log/Interactive Notebook) for students to regularly record and process key academic vocabulary and content learning throughout an instructional unit. |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| ***GRAPHIC***<br>● Use K-W-L charts before reading.<br>● Provide a list of important concepts on a graphic organizer.<br><br>***SENSORY/MEDIA***<br>● Provide explicit instruction and practice for students to construct the language using visual aids.<br>● Use physical gestures to accompany directions.<br>● Preview the text content with pictures, demos, charts, or experiences.<br>● Preview text with a Picture Walk.<br>● Provide a vocabulary Word Bank with non-linguistic representations.<br>● Annotate text with non-linguistic representations to scaffold comprehension. | reference.<br>● Provide opportunities for translanguaging and multilingual support during the task.<br><br>***INTERACTIVE***<br>● Provide explicit instruction and practice using Jigsaw Reading to scaffold independent reading.<br>● Pair students to read one text together.<br>● Use Shared Reading.<br><br>***GRAPHIC***<br>● Provide a graphic organizer system for students to regularly record and process key academic and content-specific vocabulary.<br>● Provide a list of important concepts on a graphic organizer.<br>● Use K-W-L charts before reading.<br><br>***SENSORY/MEDIA***<br>● Preview the text content with pictures, demos, charts, or experiences. | ***SENSORY/MEDIA***<br>● Use Video Observation Guides. |

## 2C. Teacher Moves: Example Supports for Collaborating in the Academic Language

How can teachers provide ongoing opportunities for students to collaborate using academic language? Below are some examples of universal strategies for engaging students in collaborative discourse practices.

| 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…<br>● engage in pair work (in L1 if possible) to prepare questions for discussion using graphic, interactive, and/or language supports.<br>● participate in pair/triad/small group discussions using graphic, interactive, and/or language supports (including L1 as appropriate).<br>● use Clock Buddies.<br>● use Numbered Heads Together.<br>● use Think-Pair-Share Squared.<br>● use key sentence frames for pair interactions.<br>● participate with Strategic Partners at a higher English proficiency level and/or with the same primary language peer(s).<br>● use a Roving Chart in small group work.<br>● use Interactive Journals.<br>● use Think-Write-Pair-Share.<br>● use Cloze sentences with a Word Bank.<br>● 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…<br>● engage pair work to prepare questions for discussion using graphic, interactive, and/or language supports as needed.<br>● contribute to pair/triad/small group discussions by supporting with examples, asking clarifying questions, and using graphic, interactive, and/or language supports as needed.<br>● 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.<br>● use graphic organizers or notes to scaffold oral retelling.<br>● use Think-Pair-Share.<br>● repeat and expand their responses and other students' responses in a Collaborative Dialogue.<br>● 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…<br>● engage in structured pair work to process.<br>● inform and formulate thinking, then prepare questions for discussion.<br>● 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.<br>● 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.<br>● use oral reporting for summarizing group work.<br>● use dialogue structures (e.g.): My turn/ your turn; Partner A/Partner B; Collaborative groups. |

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

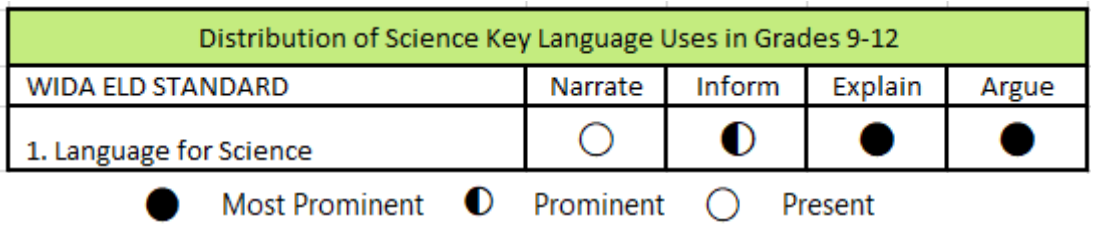
## Snapshot of Key Language Uses from the WIDA 2020 ELD Standards Framework

Key Language Uses—Narrate, Inform, Explain, and Argue—are present across all grade levels and disciplines. Determining Key Language Use is helpful in planning instructional outcomes and supports. The Snapshots table below provides descriptors of some ways students engage in each Key Language Use throughout grades 9-12.

| Snapshots of Key Language Uses in Grades 9 12 | |
|---|---|
| **Narrate** | • Interpret and construct narratives with complex plots, themes, and developments<br>• Identify perspectives in historical narratives and discern authors' intent in presenting history in a particular light<br>• Develop characters in their own stories and connect themes to issues in past and present |
| **Inform** | • Manage information about entities according to their composition, taxonomies, and classifications<br>• Identify and describe various relationships among ideas and information<br>• Use available new information to construct and revise research reports that incorporate multiple sources of information |
| **Explain** | • Analyze and evaluate data in explanations<br>• Identify multilayered causal or consequential relationships in social or scientific phenomena<br>• Apply reasoning or theory to link evidence to the claims in explanations<br>• Construct and revise explanations based on evidence from multiple sources |
| **Argue** | • Construct claims that offer objective stance using less polarized language so that claims appear more "balanced"<br>• Anticipate what evidence audiences will need and adjust evidence and reasoning accordingly<br>• Adjust arguments based on new data from experiments<br>• Discern what types of arguments are needed, when they are needed, and what purposes they meet in different content areas |

## 3A. Key Language Uses (Inform, Explain, Argue) and Example Language Expectations for Science Disciplinary Practices

The Science Key Language Uses in the graphic below are marked with a filled-in circle ( ● ) in the boxes. The half-filled circle and the open circle indicate lesser degrees of prominence of each Key Language Use.



| 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

The table below lists the 8 Science content disciplinary practices from the Nevada Academic Content Standards and provides example Language Expectations for each Prominent and Most Prominent Key Language Use (KLU) of Academic Language associated with WIDA ELD Standard 4 Language for Science. (For a more detailed listing of grade-level Language Expectations to support mastery of content area standards see **WIDA English Language Development Standards Framework, 2020 Edition Kindergarten - Grade 12 (wisc.edu)** Grades 9-12 pp. 194-197.)

| Science & Engineering Practices | KEY LANGUAGE USES | | |
|---|---|---|---|
| | **Inform** | **Explain** | **Argue** |
| 1. Asking Questions and Defining Problems | Multilingual learners summarize the most important aspects of information by asking and answering questions to clarify or hypothesize about phenomena using who, what, when, where, why, how. | Multilingual learners define investigable questions or problems based on observations, information, and/or data about a phenomenon using abstract nouns to introduce concepts, ideas, and technical terms (*effects, impairment, perception, antioxidant*s). | See Science Practice 7: Engaging in Argument from Evidence. |
| 2. Developing and Using Models | Multilingual learners develop and use models to describe the parts and wholes of a system by labeling/describing diagrams, graphics, data, statistics to add information about a phenomenon. | Multilingual learners develop reasoning to illustrate and/ or predict the relationships between variables in a system or between components of a system using connectors to link clauses and combine ideas into logical relationships (*as a result, therefore*). | See Science Practice 7: Engaging in Argument from Evidence. |

| Science & Engineering Practices | KEY LANGUAGE USES | | |
|---|---|---|---|
| | **Inform** | **Explain** | **Argue** |
| 3. Planning and Carrying out Investigations | Multilingual learners plan and carry out investigations by reporting on explicit and inferred characteristics, patterns, or behavior using abstract nouns to introduce concepts, ideas, and technical terms (*effects, impairment, perception, antioxidants*). | Multilingual learners plan and carry out investigations by establishing a neutral or objective stance in how results are communicated using word choices to moderate stance, such as hedging (*could/might, a possibility, usually*). | See Science Practice 7: Engaging in Argument from Evidence. |
| 4. Analyzing and Interpreting Data | Multilingual learners analyze and interpret data by sorting, clarifying, and summarizing relationships using a variety of structures (embedded clauses, relating verbs, nominalizations, and noun groups) to define a phenomenon. | Multilingual learners analyze and interpret data to describe reliable and valid evidence from multiple sources about a phenomenon using relating verb groups to state relationships or attributes (*have, be, belong to*). | See Science Practice 7: Engaging in Argument from Evidence. |
| 5. Using Mathematics and Computational Thinking | Multilingual learners employ mathematics and computational thinking using mathematical terms and phrases to describe concept, process, or purpose (*the sum of the angles of a triangle is 180◦*). | Multilingual learners employ mathematics and computational thinking by describing data and/or steps to solve problems using visual data displays (drawings, software, demonstrations, tables, charts) to clarify approach and/or solution. | See Science Practice 7: Engaging in Argument from Evidence. |
| 6. Constructing Explanations and Designing Solutions | Multilingual learners construct explanations and design solutions by reporting on explicit and inferred characteristics, patterns, or behavior using timeless present verbs to state generalizable truths (*ocean water evaporates*). | Multilingual learners construct explanations and design solutions by summarizing patterns in evidence, making trade-offs, revising, and retesting using conditional clauses (*if/then*) to generalize a phenomenon to additional contexts. | See Science Practice 7: Engaging in Argument from Evidence. |
| 7. Engaging in Argument from Evidence | Multilingual learners engage in argument from evidence by summarizing most important aspects of information using objective language to adjust precision (hedging) (*could/might, a possibility, usually, often*) and/or invite shared | Multilingual learners engage in argument from evidence by developing reasoning to show relationships between evidence and claims using connectors to link clauses and combine ideas into logical relationships (*although, as a result, therefore, to be* | Multilingual learners signal logical relationships among reasoning, relevant evidence, data, and/or a model when making a claim using connectors to signal time (*next, at the same time*), causality (*therefore, consequently, as a* |

| Science & Engineering Practices | KEY LANGUAGE USES | | |
|---|---|---|---|
| | **Inform** | **Explain** | **Argue** |
| | interest. | *more precise, instead, however, on the other hand*) or order events. | *result, because*), clarification (*for example, this shows how*). |
| 8. Obtaining, Evaluating, and Communicating Information | Multilingual learners obtain, evaluate, and communicate information by sorting, clarifying, and summarizing relationships using nominalizations to represent abstract concepts (condense - *condensation,* argue - *argument*, decide - *decision*, abnormal - *abnormality*) and technical terms (*effects, predator-prey relationships, magnetic forces*). | Multilingual learners obtain, evaluate, and communicate information in order to describe valid and reliable evidence from sources about a phenomenon using cohesion to reference ideas and people across text (pronouns, substitutions, renaming, synonyms, collocations). | See Science Practice 7: Engaging in Argument from Evidence. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices

### Practice 1: Asking Questions and Defining Problems

**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) |
|---|---|---|
| ***INSTRUCTIONAL***<br>● Provide guided practice with specific feedback.<br>● Provide mentor questions with L1 support to serve as models for students to pose their own independently testable *yes/no* and *wh-* questions that drive investigations and define problems.<br>● Explicitly model the process of asking questions and defining problems. Think aloud as you demonstrate how to approach a problem.<br><br>***LANGUAGE***<br>● 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.<br>● Utilize L1 resources (spoken, written, and viewed) to build schema.<br>● Provide language frames with word bank support to develop simple questions and simple sentence or phrase responses.<br>❖ Ex 1: Do (the independent variable) affect the (dependent variable)?<br>➢ e.g. Do digital waves affect transmitting and storing information? | ***INSTRUCTIONAL***<br>● Provide guided practice with specific feedback.<br>● Provide mentor questions to serve as models for students to pose their own independently testable *yes/no* and *wh-* questions that drive investigations and define problems.<br><br>***LANGUAGE***<br>● 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.<br>● Provide an illustrated word bank/ labeled illustrations of key technical vocabulary, as they occur during investigations and explanations.<br>● Provide language frames to develop questions and sentence or paragraph responses with details.<br>❖ Ex 1: How does (the independent variable) affect the (dependent variable)?<br>➢ e.g. How does using digital waves affect transmission and storage of information?<br>❖ Ex 2: The criteria for a successful design of (an engineering solution) include: (list of success criteria)<br>➢ e.g. The criteria for a successful design of | ***INSTRUCTIONAL***<br>● Provide mentor questions for students to pose independently testable *yes/no* and *wh-* (information) questions for driving investigations and defining problems.<br>● Provide guided practice with specific feedback.<br>● Encourage the use of higher-order thinking questions (e.g., analytical, evaluative, and creative questions).<br>❖ Examples include: "How can we design an experiment to test…?" "What are the implications of…?"<br>● Assign independent or group research projects where students must define a problem, conduct research, and present their findings.<br><br>***LANGUAGE***<br>● Provide an illustrated word bank/ labeled illustrations of key technical vocabulary, as they occur during investigations and explanations.<br>● Provide language frames to develop complex questions, paragraph responses, and elaboration of content.<br>❖ Ex 1: How does (the independent variable) affect the (dependent variable)?<br>➢ e.g. How does the use of digital waves |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| ❖ Ex 2: The successful design of (an engineering solution) includes: (list of success criteria)<br>➢ e.g. The successful design of an independent house includes:<br>✓ independent power<br>✓ systems for clean and dirty water equal cost to other homes.<br><br>***INTERACTIVE***<br>● Provide students the opportunity to share with a partner or in a small group their questions/responses using sentence frames to support the rehearsal and production of language.<br>● Pair students with more proficient peers or in small groups for collaborative problem-solving activities.<br><br>***GRAPHIC***<br>● Provide graphic organizers with L1 (primary language) translation and non- linguistic representation to guide students in their formulation of questions and responses that include the academic vocabulary and concepts.<br><br>***SENSORY/MEDIA***<br>● Use text with picture support for students to elaborate and ask and answer questions about key details in a text or investigation. | self-sustainable house include:<br>✓ independent power source<br>✓ water and sanitation systems equal cost to other homes.<br><br>***INTERACTIVE***<br>● Provide time for students to write down their questions/responses and rehearse in small groups.<br>● Use interactive science notebooks where students can draw, label, and write about their questions and observations. Include sections for vocabulary, questions, hypotheses, and conclusions.<br><br>***GRAPHIC***<br>● Provide graphic organizers non-linguistic representation to guide students in their formulation of questions and responses that include the academic vocabulary and concepts.<br><br>***SENSORY/MEDIA***<br>● Use text with visual support for students to elaborate and ask and answer questions about key details in a text or investigation. | affect the quality of transmissions and storage of information?<br>❖ Ex 2: The criteria for a successful design of (an engineering solution) include: (list of success criteria)<br>➢ e.g. The criteria for a successful design of self-sustainable house include:<br>✓ self-sufficient power source<br>✓ water and sanitation systems<br>✓ cost of building is equivalent to other homes.<br><br>***INTERACTIVE***<br>● Provide learning tasks for students to pose and respond to questions with a partner or small group.<br>● Pair students with mentors (e.g., teachers, advanced peers, or professionals) to guide them in scientific inquiry and problem-solving.<br>● Promote collaboration on STEM projects with community involvement.<br><br>***GRAPHIC***<br>● Use graphic organizers to provide details, academic language, and concepts that assist students in developing questions and defining investigable questions in an extended discourse format.<br><br>***SENSORY/MEDIA***<br>● Have students ask and answer questions based on new knowledge acquired from a variety of multimedia sources. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 1: Asking Questions and Defining Problems

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

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| **With prompting and supports, multilingual learners will…**<br>Key Language Use - Explain<br>● define investigable questions or problems based on observations, information, and/or data about a phenomenon using abstract nouns to introduce concepts, ideas, and technical terms (effects, impairment, perception, antioxidants) in order to identify testable scientific questions by generating simple questions with the aid of simple sentence frames, word banks/anchor charts, visuals, drawings, and/or L1 support. | **With appropriate supports, multilingual learners will…**<br>Key Language Use - Explain<br>● define investigable questions or problems based on observations, information, and/or data about a phenomenon using abstract nouns to introduce concepts, ideas, and technical terms (effects, impairment, perception, antioxidants) in order to identify testable scientific questions by generating simple questions with the aid of compound and complex sentence starters, frames, and/or visual supports. | **With appropriate supports, multilingual learners will…**<br>Key Language Use - Explain<br>● define investigable questions or problems based on observations, information, and/or data about a phenomenon using abstract nouns to introduce concepts, ideas, and technical terms (effects, impairment, perception, antioxidants) in order to identify testable scientific questions by generating simple questions with the aid of complex language frames and other supports as needed. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 2: Developing and Using Models

**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) |
|---|---|---|
| ***INSTRUCTIONAL***<br>● Explicitly model and provide guided practice using graphic organizers, tables, graphs, and | ***INSTRUCTIONAL***<br>● Explicitly model and provide guided practice using graphic organizers, tables, graphs, and | ***INSTRUCTIONAL***<br>● Assign readings from authentic scientific |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| anchor charts which may include bilingual labels and words.<br>● Provide guided practice with specific feedback.<br><br>***LANGUAGE***<br>● Provide an illustrated word bank/anchor chart with labeled illustration of key technical vocabulary, as they occur during investigations and explanations.<br>● Provide language frames to:<br>➢ describe in simple sentences or phrases using key vocabulary how a model (pictorial, verbal, graphical, mathematical, physical) predicts or explains a phenomenon<br>➢ identify, explain, and elaborate on the components of a model in simple sentences or phrases using key vocabulary<br>➢ Utilize cooperative structures for work in pairs and small groups.<br>➢ Provide guided practice with specific feedback.<br>➢ justify predictions based on changes to a model in simple sentences or phrases using key vocabulary.<br>❖ 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).<br>➢ e.g. I predict when two magnets are close then potential energy increases. This is because more field force makes more potential energy. | anchor charts.<br>● Provide guided practice with specific feedback.<br><br>***LANGUAGE***<br>● Provide an illustrated word bank/anchor chart with labeled illustration of key technical vocabulary, as they occur during investigations and explanations.<br>● Provide language frames to:<br>➢ describe in simple or complex sentences with detail how a model (pictorial, verbal, graphical, mathematical, physical) predicts or explains a phenomenon<br>➢ identify, explain, and elaborate on the components of a model using sentence or paragraph responses with detail<br>➢ justify predictions using sentence or paragraph responses with detail based on changes to a model.<br>❖ Ex 1 (prediction): I predict that if (change to one element of the model) then (effect) because (relationship between the elements of the model).<br>➢ 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.<br>❖ Ex 2 (explanation): The reason that (a change to one element of the | articles or research papers that discuss the application of models in current scientific research.<br>● Encourage students to analyze and critique the models presented in these texts, comparing them with their own understanding.<br>● Engage students in activities that require them to evaluate the strengths and limitations of different types of models in specific scientific or engineering contexts.<br><br>***LANGUAGE***<br>● Provide language frames to:<br>➢ describe how a model (pictorial, verbal, graphical, mathematical, physical) predicts or explains a phenomenon using complex questions, paragraph responses, and elaboration of content<br>➢ identify, explain, and elaborate using complex questions, paragraph responses, and elaboration of content on the components of a model<br>➢ justify predictions using complex questions, paragraph responses, and elaboration of content based on changes to a model.<br>❖ Ex 1 (prediction): If (change to one element of the model) then (effect) because (relationship between the elements of the model).<br>➢ 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 |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| ❖ 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).<br>➢ 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.<br><br>***INTERACTIVE***<br>● Provide students the opportunity to share with a partner or in a small group their questions/responses regarding their model using sentence frames to support the rehearsal and production of language.<br><br>***GRAPHIC***<br>● Provide graphic organizers with L1 (primary language) translation and non- linguistic representation that include the academic vocabulary and concepts to guide students in their development and use of a model.<br>● Use simple diagrams, charts, and graphic organizers to visually represent the steps involved in developing and using models.<br><br>***SENSORY/MEDIA***<br>● Provide visuals which may include bilingual labels.<br>● Use labeled picture support for students to elaborate on newly acquired knowledge about a model in a text or investigation. | model) is that (cause) because (relationship between the elements of the model).<br>➢ 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.<br><br>***INTERACTIVE***<br>● Provide time for students to write down their questions/responses regarding their model and rehearse before small group tasks.<br><br>***GRAPHIC***<br>● Provide graphic organizers that include the academic vocabulary and concepts to guide students in their development and use of a model.<br>● Use diagrams, charts, and graphic organizers to visually represent the steps involved in developing and using models.<br><br>***SENSORY/MEDIA***<br>● Use labeled picture support for students to elaborate and ask and answer questions about a model in a text or investigation.<br>● Incorporate videos, simulations, and interactive websites that demonstrate the development and use of models in various scientific contexts.<br>● Encourage students to create multimedia presentations or posters that explain different types of models. | either or both magnets.<br>❖ Ex 2 (explanation): (A change to one element of the model) is due to (cause) because (relationship between the elements of the model).<br>➢ 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.<br><br>***INTERACTIVE***<br>● Provide learning tasks for students to pose and respond to questions about their model with a partner or small group.<br>● Provide opportunities for students to present their models to their peers and experts in the field, fostering academic language development.<br><br>***GRAPHIC***<br>● Use graphic organizers to provide details, academic language, and concepts that assist students in developing and explaining the use of a model in an extended discourse format.<br><br>***SENSORY/MEDIA***<br>● Have students create multimedia presentations or posters that explain different types of models, including the model implemented in the investigation they carried out. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 2: Developing and Using Models

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

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| **With prompting and supports, multilingual learners will…**<br>Key Language Use - Explain<br>● develop reasoning to illustrate and/ or predict the relationships between variables in a system or between components of a system using connectors to link clauses and combine ideas into logical relationships (as a result, therefore) in order to 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 write a prediction about something that might happen in the future that could be explained by the model with the aid of simple sentence frames, word banks/anchor charts, visuals, drawings, and/or L1 support. | **With appropriate supports, multilingual learners will…**<br>Key Language Use - Explain<br>● develop reasoning to illustrate and/ or predict the relationships between variables in a system or between components of a system using connectors to link clauses and combine ideas into logical relationships (as a result, therefore) in order to 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 write a prediction about something that might happen in the future that could be explained by the model with with the aid of compound and complex sentence starters, frames, and/or visual supports. | **With appropriate supports, multilingual learners will…**<br>Key Language Use - Explain<br>● develop reasoning to illustrate and/ or predict the relationships between variables in a system or between components of a system using connectors to link clauses and combine ideas into logical relationships (as a result, therefore) in order to 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 write a prediction about something that might happen in the future that could be explained by the model with the aid of complex language frames and other supports as needed. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 3: Planning and Carrying out Investigations

**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) |
|---|---|---|
| ***INSTRUCTIONAL***<br>● Explicitly model and provide exemplars with L1 support for the documentation of planning and carrying out of investigative processes.<br>● Embed guided practice with feedback.<br>● Conduct hands-on demonstrations of investigative procedures before students attempt them.<br>● Allow students to observe and practice each step multiple times with guidance.<br><br>***LANGUAGE***<br>● Provide language frames to:<br>➢ 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.<br>❖ Ex 1 (describe): This investigation will give evidence for how (variable 2) affect(s) (variable 1).<br>➢ e.g. This investigation will give evidence for how chemical properties of water affect composition of Earth.<br>❖ Ex 2 (justify): This investigation shows that | ***INSTRUCTIONAL***<br>● Explicitly model and provide exemplars for the documentation of planning and carrying out of investigative processes.<br>● Provide guided practice with specific feedback.<br>● Engage students in guided inquiry activities where the teacher models how to plan and carry out investigations.<br>● Ask open-ended questions to encourage critical thinking and deeper understanding.<br><br>***LANGUAGE***<br>● Provide language frames to:<br>➢ 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.<br>❖ Ex 1 (describe): This investigation will explain with evidence how (variable 2) affect(s) (variable 1).<br>➢ e.g. This investigation will explain with evidence how the chemical properties of water affect the composition of Earth materials. | ***INSTRUCTIONAL***<br>● Explicitly model and provide exemplars for the documentation of planning and carrying out of investigative processes.<br>● Provide guided practice with specific feedback.<br>● Encourage students to design and carry out their own investigations based on open-ended questions.<br>● Support independent research and exploration of complex scientific problems.<br>● Guide students in preparing presentations and posters to communicate their findings to authentic audiences.<br><br>***LANGUAGE***<br>● Provide language frames to:<br>➢ 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.<br>❖ Ex 1 (describe): This investigation will provide evidence to explain how the change in (variable 1) is affected by (variable 2).<br>➢ e.g. This investigation will provide evidence to explain how the change in the composition of Earth materials is affected |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| (conclusion) because in the data/evidence we see: (list of evidence/data).<br>➢ e.g. This investigation shows that electric current affects the magnetic field because in the evidence we see _____.<br><br>***INTERACTIVE***<br>● Utilize partner/triad collaboration.<br>● Implement small group cooperative learning structures with L1 support for students to plan and carry out investigations.<br><br>***GRAPHIC***<br>● Provide graphic organizers with L1 (primary language) translation and non- linguistic representation to guide students in their planning of an investigation and the collection and interpretation of data.<br>● Provide step-by-step visual aids, such as diagrams and flowcharts to demonstrate procedures.<br>● Offer templates for recording observations, data, and steps of the investigation.<br>● Use graphic organizers to help students plan and organize their investigations.<br><br>***SENSORY/MEDIA***<br>● Provide and model realia.<br>● Provide step-by-step videos to demonstrate procedures.<br>● Use labeled pictures and illustrations to explain materials and equipment. | ❖ Ex 2 (justify): This investigation shows that (conclusion) because in the data/evidence we can see how (connect evidence/data to conclusion).<br>➢ 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.<br><br>***INTERACTIVE***<br>● Implement small group cooperative learning structures with for students to plan and carry out investigations.<br><br>***GRAPHIC***<br>● Provide illustrated and/or annotated graphic organizers to aid in planning the structure of an investigation and the collection and interpretation of data.<br>● Provide detailed lab guides with clear instructions and checklists for each step of the investigation.<br>● Use flowcharts and timelines to help students plan and manage their investigative processes.<br><br>***SENSORY/MEDIA***<br>● Provide and model realia.<br>● Incorporate interactive tools and digital simulations to engage students in virtual investigations.<br>● Use apps and software that allow students to manipulate variables and visualize outcomes. | by the chemical properties of water.<br>❖ Ex 2 (Justify): This investigation indicates/ proves that (conclusion) because the data/ evidence shows that/how (connect evidence/ data to conclusion).<br>➢ 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.<br><br>***INTERACTIVE***<br>● Implement small group cooperative learning structures for students to plan and carry out investigations.<br>● Pair students with mentors, such as scientists or engineers, to guide their investigations.<br>● Promote collaboration with peers on complex projects that require teamwork and advanced problem-solving.<br><br>***GRAPHIC***<br>● Provide illustrated and/or annotated graphic organizers to aid in planning the structure of an investigation and the collection and interpretation of data.<br><br>***SENSORY/MEDIA***<br>● Provide visuals and multimedia to teach content concepts and scaffold the comprehension of complex text.<br>● Encourage students to use scientific journals, articles, and online databases for research.<br>● Integrate advanced technology tools, such as data analysis software, sensors, and probes, into investigations.<br>● Encourage students to use programming and coding for data collection and analysis. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 3: Planning and Carrying out Investigations

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

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| **With prompting and supports, multilingual learners will…**<br>Key Language Use - Inform<br>● plan and carry out investigations by reporting on explicit and inferred characteristics, patterns, or behavior using abstract nouns to introduce concepts, ideas, and technical terms (effects, impairment, perception, antioxidants) in order to conduct the investigation and collect data to serve as evidence to answer the scientific question with the aid of peer support, word banks, simple sentence frames, visuals and/or L1 support. | **With appropriate supports, multilingual learners will…**<br>Key Language Use - Inform<br>● plan and carry out investigations by reporting on explicit and inferred characteristics, patterns, or behavior using abstract nouns to introduce concepts, ideas, and technical terms (effects, impairment, perception, antioxidants) in order to conduct the investigation and collect data to serve as evidence to answer the scientific question with the aid of peer support, compound and complex sentence starters, frames, and/or visual supports. | **With appropriate supports, multilingual learners will…**<br>Key Language Use - Inform<br>● plan and carry out investigations by reporting on explicit and inferred characteristics, patterns, or behavior using abstract nouns to introduce concepts, ideas, and technical terms (effects, impairment, perception, antioxidants) in order to conduct the investigation and collect data to serve as evidence to answer the scientific question with the aid of complex language frames and other supports as needed. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 4: Analyzing and Interpreting Data

**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) |
|---|---|---|
| ***INSTRUCTIONAL***<br>● Explicitly model and provide exemplars of data collection and its analysis with L1 support, frequent checks for understanding, and opportunity for students to process new information with peers.<br>● Provide guided practice with feedback.<br>● Conduct hands-on activities where students can collect and visually represent data.<br><br>***LANGUAGE***<br>● Utilize L1 resources (spoken, written, and viewed) to build schema.<br>● Provide language frames to:<br>➢ describe how the organization of data helps them to analyze the data using simple sentences.<br>➢ describe patterns or relationships inferred from data using simple sentences with comparatives.<br>❖ Ex 1 (describe organization): We used (variable 1 noun) to organize the data. This shows the effect of (variable 1) on (variable 2).<br>➢ e.g. We used force to organize the data. This shows the effect of force on acceleration.<br>❖ Ex 2 (describe patterns**):** More/less (variable 1) results in more/less (variable 2 noun).<br>➢ e.g. More variation in parent | ***INSTRUCTIONAL***<br>● Explicitly model and provide exemplars of data collection and its analysis with frequent checks for understanding and opportunity for students to process new information with peers.<br>● Provide guided practice with specific feedback.<br><br>***LANGUAGE***<br>● Provide language frames to:<br>➢ describe how the organization of data helps them to analyze the data using extended sentences with prepositions<br>➢ describe patterns or relationships inferred from data using comparative sentences.<br>❖ Ex 1 (describe organization): We used (variable 1 noun) to organize the data. This shows the effect of (variable 1) on (variable 2).<br>➢ e.g. We used force to organize the data. This shows the effect of force on acceleration.<br>❖ Ex 2 (describe patterns): More/less (variable 1 noun, possibly + adjective) results in more/less (variable 2 noun, possibly + adjective).<br>➢ e.g. More variation in parent genes results in more variation in offspring | ***INSTRUCTIONAL***<br>● Explicitly model and provide exemplars of data collection and its analysis.<br>● Provide complex, real-world data sets for analysis.<br><br>***LANGUAGE***<br>● Provide language frames to:<br>➢ describe how the organization of data helps them to analyze the data using extended sentences and elaboration of content<br>➢ describe patterns or relationships inferred from data using comparative sentences and elaboration of content<br>❖ Ex 1 (describe organization): This data is organized by (variable 1 noun/noun phrase) in order to show (effect on variable 2).<br>➢ e.g. This data is organized by the amount of force applied to a constant mass in order to show how acceleration changes.<br>❖ Ex 2 (describe patterns): The more/less/-er (variable 1 noun/noun phrase) the more/less/-er (variable 2 noun/noun phrase).<br>➢ e.g. The higher genetic variation in a parent population the higher genetic variation in the offspring population. |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| genes results in more variation in offspring (babies).<br><br>***INTERACTIVE***<br>● Utilize partners/triads for collaboration.<br>● Provide anchor charts and language frames using simple sentences and discourse starters for students to practice and produce language around data analysis in small groups or with partners with L1 support.<br><br>***GRAPHIC***<br>● Use graphic organizers with L1 and visual supports to provide academic language, concepts, and structure that assist students in designing a data collection and analysis approach to an investigable question.<br>● Provide templates for students to record and analyze data<br><br>***SENSORY/MEDIA***<br>● Use physical objects or manipulatives to help students understand data concepts. | (babies).<br><br>***INTERACTIVE***<br>● Provide anchor charts and language frames using complex sentences and discourse starters for students to share data analysis and respond to questions in small groups or with partners.<br><br>***GRAPHIC***<br>● Provide illustrated and/or annotated graphic organizers to aid in the interpreting and analysis of data, including its organization, representation, categorization, comparison/contrast, and examination.<br><br>***SENSORY/MEDIA***<br>● Use physical objects or manipulatives to help students understand data concepts.<br>● Use interactive tools and software for data analysis (e.g., spreadsheets, graphing tools).<br>● Incorporate digital simulations that allow students to manipulate data. | ❖ Ex 3 (describe patterns): As (variable 1) increases/decreases, the (variable 2) increases/decreases.<br>➢ e.g. As genetic variation of a parent population decreases, the genetic variation of the offspring population decreases.<br><br>***INTERACTIVE***<br>● Provide learning tasks for students to share data analysis and respond to questions with a partner or small group.<br><br>***GRAPHIC***<br>● Provide graphic organizers to aid in the interpreting and analysis of data, including its organization, representation, categorization, comparison/contrast, and examination.<br><br>***SENSORY/MEDIA***<br>● Provide graphic organizers to aid in the interpreting and analysis of data, including its organization, representation, categorization, comparison/contrast, and examination.<br>● Use Video Observation Guides.<br>● Encourage the use of coding and programming for data analysis tasks. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 4: Analyzing and Interpreting Data

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

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| **With prompting and supports, multilingual learners will…**<br>Key Language Use – Explain<br>● analyze and interpret data to describe reliable and valid evidence from multiple sources about a phenomenon using relating verb groups to state relationships or attributes (have, be, belong to) in order to 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 with the aid of simple sentence frames, word banks/anchor charts, visuals, drawings, and/or L1 support. | **With appropriate supports, multilingual learners will…**<br>Key Language Use – Explain<br>● analyze and interpret data to describe reliable and valid evidence from multiple sources about a phenomenon using relating verb groups to state relationships or attributes (have, be, belong to) in order to 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 with the aid of compound and complex sentence starters, frames, and/or visual supports. | **With appropriate supports, multilingual learners will…**<br>Key Language Use – Explain<br>● analyze and interpret data to describe reliable and valid evidence from multiple sources about a phenomenon using relating verb groups to state relationships or attributes (have, be, belong to) in order to 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 with the aid of complex language frames and other supports as needed. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 5: Using Mathematics and Computational Thinking

**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) |
|---|---|---|
| ***INSTRUCTIONAL***<br>● Explicitly model mathematical problem-solving processes and computational thinking step-by-step with L1 support, frequent checks for understanding, and opportunity for students to process new information with peers.<br>● Provide guided practice with feedback.<br><br>***LANGUAGE***<br>● Utilize L1 resources (spoken, written, and viewed) to build schema.<br>● Provide keys or glossaries for putting mathematical symbols into words, e.g.:<br>➢ ρ = momentum<br>➢ m = mass<br>➢ v = velocity<br>➢ Provide language frames for using mathematical representations to describe scientific phenomena in simple sentences.<br>❖ Ex 1**:** The equation (equation) means (mathematical symbols written with words). For example, if we (mathematical function), then we have to (mathematical function).<br>➢ e.g. The equation momentum = mass x velocity means that momentum is equal to mass times velocity. | ***INSTRUCTIONAL***<br>● Explicitly model and provide exemplars of mathematical problem-solving processes and computational thinking step-by-step with frequent checks for understanding and opportunity for students to process new information with peers.<br>● Provide guided practice with specific feedback.<br><br>***LANGUAGE***<br>● Provide keys or glossaries for putting mathematical symbols into words, e.g.:<br>➢ ρ = momentum<br>➢ m = mass<br>➢ v = velocity<br>● Provide language frames to use mathematical representations to describe scientific phenomena with increasingly complex sentences and vocabulary.<br>❖ 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).<br>➢ e.g. The equation ρ = m*v means momentum of an object is equal to the mass of the object times the velocity. | ***INSTRUCTIONAL***<br>● Assign complex, real-world problems that require advanced mathematical and computational thinking.<br><br>***LANGUAGE***<br>● Provide language frames to use mathematical representations to describe scientific phenomena using extended sentences and elaboration of content<br>❖ 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.<br>❖ 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).<br>➢ 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. |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| ***INTERACTIVE***<br>● Utilize partners/triads to collaborate.<br>● Provide anchor charts and language frames using simple sentences and discourse starters for students to practice and produce language on topic in small groups or with partners.<br><br>***GRAPHIC***<br>● Use graphic organizers with L1 and visual supports to provide academic language, concepts, and structure that assist students in applying mathematical and computational thinking to the scientific process.<br><br>***SENSORY/MEDIA***<br>● Provide kinesthetic experiences, including activating the senses, real-life examples, hands-on approaches, and trial and error.<br>● Provide visuals with L1 support including pictures, gestures, graphs, symbols, highlighting in different colors. | 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.<br><br>***INTERACTIVE***<br>● Utilize partners/triads to collaborate.<br>● Provide anchor charts and language frames using simple and complex sentences and discourse starters for students to practice and produce academic language on topic in small groups or with partners.<br><br>***GRAPHIC***<br>● Provide illustrated and/or annotated graphic organizers to aid in the interpreting and analysis of data, including its organization, representation, categorization, comparison/contrast, and examination.<br><br>***SENSORY/MEDIA***<br>● Provide kinesthetic experiences, including activating the senses, real-life examples, hands-on approaches, and trial and error.<br>● Integrate interactive tools and educational software for practicing mathematical concepts and computational thinking. | ➢ 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.<br><br>***INTERACTIVE***<br>● Provide learning tasks for students to share data analysis and respond to questions with a partner or small group.<br>● Guide students in creating presentations to communicate their findings to an audience.<br><br>***GRAPHIC***<br>● Provide illustrated and/or annotated graphic organizers to aid in the interpreting and analysis of data, including its organization, representation, categorization, comparison/contrast, and examination.<br>● 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.<br><br>***SENSORY/MEDIA***<br>● Provide kinesthetic experiences, including activating the senses, real-life examples, hands-on approaches and trial and error.<br>● Provide visual supports including multimedia, graphs, symbols, infographics.<br>● Encourage the use of coding and programming for solving complex problems and creating simulations. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 5: Using Mathematics and Computational Thinking

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

| Entering/Emerging<br>(Levels 1-2) | Developing/Expanding<br>(Levels 3-4) | Bridging/Reaching<br>(Levels 5-6) |
|---|---|---|
| **With prompting and supports, multilingual learners will…**<br>Key Language Use – Explain<br>● employ mathematics and computational thinking using visual data displays (tables, tree diagrams, simulations, data charts, manipulatives) in order to write a prediction about the future state of a scientific phenomenon based on the provided data and equation with the aid of anchor charts, word banks, simple sentence frames and L1 support. | **With prompting and supports, multilingual learners will…**<br>Key Language Use -Explain<br>● employ mathematics and computational thinking using visual data displays (tables, tree diagrams, simulations, data charts, manipulatives) in order to write a prediction about the future state of a scientific phenomenon based on the provided data and equation with the aid of anchor charts, word banks, paragraph frames and L1 support as needed. | **With prompting and supports, multilingual learners will…**<br>Key Language Use -Explain<br>● employ mathematics and computational thinking using visual data displays (tables, tree diagrams, simulations, data charts, manipulatives) in order to write a prediction about the future state of a scientific phenomenon based on the provided data and equation with the aid of anchor charts and discourse frames as needed. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 6: Constructing Explanations and Designing Solutions

**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) |
|---|---|---|
| ***INSTRUCTIONAL***<br>● Provide scaffolded tasks for students to draw a picture of their solution and to label it.<br>● Explicitly model and provide exemplars of data collection and its analysis with L1 support, frequent checks for understanding, and opportunity for students to process new information with peers.<br>● Provide guided practice with feedback.<br><br>***LANGUAGE***<br>● Provide language frames to:<br>➢ respond to Why/How questions with explanations using simple sentences and content vocabulary; and<br>➢ propose and evaluate engineering design solutions using complex questions, paragraph responses, and elaboration of content.<br>❖ Ex 1 (explanation): (factual statement) (cause/ result transition signal) (factual statement).<br>➢ e.g. Vinegar is acetic acid (HCH3COO) and baking soda (NaHCO)is a base, so they create an acid-base reaction.<br>❖ 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). | ***INSTRUCTIONAL***<br>● Explicitly model learning tasks in which students can use charts, diagrams, tables or numbers to explain their understanding and solution.<br>● Provide guided practice with feedback.<br><br>***LANGUAGE***<br>● Provide language frames to:<br>➢ respond to Why/How questions with explanations using extended sentences, simple paragraphs, content vocabulary, and content details; and<br>➢ propose and evaluate engineering design solutions using extended sentences, simple paragraphs, content vocabulary, and content details.<br>❖ Ex 1 (explanation): (factual statement) (cause/ result transition signal) (factual statement).<br>➢ e.g. Baking soda and vinegar create an acid-base reaction because vinegar is acetic acid (HCH3COO) and baking soda (NaHCO), is a base.<br>❖ Ex 2 (explanation): (Cause/ result transition signal) (factual statement), (factual statement).<br>➢ e.g. Because vinegar is an acid and baking soda is a base, they will create | ***INSTRUCTIONAL***<br>● Assign learning tasks in which students can use charts, diagrams, tables or numbers to explain their understanding and solution.<br>● Assign complex, real-world problems that require constructing detailed explanations and designing innovative solutions.<br><br>***LANGUAGE***<br>● Provide language frames to:<br>➢ respond to Why/How questions with explanations using complex sentences, paragraph responses, content vocabulary, and elaboration of content; and<br>➢ propose and evaluate engineering design solutions using complex questions, paragraph responses, and elaboration of content.<br>❖ Ex 1 (explanation**):** (factual statement) (cause/ result transition signal) (factual statement).<br>➢ e.g. Baking soda reacts with vinegar in an acid-base reaction because vinegar is acetic acid (HCH3COO) and baking soda is bicarbonate (NaHCO), which is a base.<br>❖ Ex 2 (explanation): (Cause/ result transition signal) (factual statement), (factual statement). |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| ➢ e.g. We can optimize our design by combining the one-bin recycling and education programs.<br><br>***INTERACTIVE***<br>● Utilize partners/triads for collaboration.<br>● Provide anchor charts and language frames using simple sentences for students to practice and produce language on topic in small groups or with partners.<br><br>***GRAPHIC***<br>● Provide graphic organizers (cause-and-effect charts, T-charts, and Venn diagrams) with visuals and L1 support to provide academic language, concepts, and structure that assist students in identifying and organizing cause/effect relationships and sequencing in the engineering design process.<br>● Provide templates to guide students in designing solutions.<br><br>***SENSORY/MEDIA***<br>● Provide kinesthetic experiences, including manipulatives, activating the senses, real-life examples, hands-on approaches, and trial and error to assist students in identifying and organizing cause/effect relationships and sequencing the engineering design process.<br>● Provide visuals with L1 support including, pictures, gestures, graphs, symbols, highlighting in different colors. | an acid-base reaction.<br>❖ 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).<br>➢ e.g. As a result, we propose to optimize our design by using both the one bin recycling program and the educational outreach program.<br><br>***INTERACTIVE***<br>● Utilize partners/triads for collaboration.<br>● Provide anchor charts and language frames using simple and complex sentences for students to practice and produce language on topic in small groups or with partners.<br><br>***GRAPHIC***<br>● Use graphic organizers to provide visuals associated with academic vocabulary, details pertinent to the topic, and necessary language structures that help students to identify and describe text-based information.<br>● Provide graphic organizers to aid in identifying and organizing cause/effect relationships and sequencing in the engineering design process.<br>● Provide structured writing tasks with outlines or templates to help students organize their explanations.<br><br>***SENSORY/MEDIA***<br>● Provide kinesthetic experiences, including manipulatives, activating the senses, real-life examples, hands-on approaches, and trial and error to assist students in identifying and | ➢ e.g. Because vinegar is acetic acid (HCH3COO) and baking soda is a bicarbonate (NaHCO), which is a base, they will react in an acid-base reaction.<br>❖ 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).<br>➢ e.g. Because the one-bin recycling program of solution A was successful and the educational outreach program of solution B was successful, we propose to optimize our design by expanding both the one bin recycling program and the educational outreach program.<br><br>***INTERACTIVE***<br>● Encourage students to present to authentic audiences, such as science fairs or community events.<br><br>***GRAPHIC***<br>● Provide graphic organizers to aid in identifying and organizing cause/effect relationships and sequencing in the engineering design process.<br><br>***SENSORY/MEDIA***<br>● Encourage the use of online scientific journals, articles, and databases for research. |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| | organizing cause/effect relationships and sequencing the engineering design process.<br>● Provide visual supports, including pictures, multimedia, graphs, symbols, highlighting in different colors.<br>● Incorporate interactive tools and software that allow students to experiment with and visualize their solutions. | |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 6: Constructing Explanations and Designing Solutions

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

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| **With prompting and supports, multilingual learners will…**<br>Key Language Use – Explain<br>● construct explanations and design solutions by summarizing patterns in evidence, making trade-offs, revising, and retesting using conditional clauses (*if/then*) to generalize a phenomenon to additional contexts in order to explain the relationship between variables from a failed design scenario and draw a possible improvement with the aid of simplified, labeled descriptions, selection from visuals or a list of simply-stated options, word banks, auditory, observation, and L1 supports. | **With appropriate supports, multilingual learners will…**<br>Key Language Use – Explain<br>● construct explanations and design solutions by summarizing patterns in evidence, making trade-offs, revising, and retesting using conditional clauses (*if/then*) to generalize a phenomenon to additional contexts in order to explain the relationship between variables from a failed design scenario and draw a possible improvement with the aid of simplified descriptions, word/phrase banks, selection from a list of simply-stated options, paragraph frames, auditory, and observation supports. | **With appropriate supports, multilingual learners will…**<br>Key Language Use – Explain<br>● construct explanations and design solutions by summarizing patterns in evidence, making trade-offs, revising, and retesting using conditional clauses (*if/then*) to generalize a phenomenon to additional contexts in order to explain the relationship between variables from a failed design scenario and draw a possible improvement with supports as needed. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 7: Engaging in Argument from Evidence

**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) |
|---|---|---|
| ***INSTRUCTIONAL***<br>● Model how to construct arguments step-by-step, using simplified language and clear examples.<br>● Teach key vocabulary words explicitly, including scientific terms related to evidence and argumentation.<br><br>***LANGUAGE***<br>● Utilize L1 resources (spoken, written, and viewed) to build schema.<br>● Provide simple sentence frames and word banks with L1 support to:<br>➢ Compare and critique arguments<br>➢ Use scientific reasoning to explain why or how evidence supports a claim.<br>❖ Ex 1 According to the data/graph/evidence…<br>➢ e.g. According to the evidence, some bird species are increasing and some bird species are decreasing.<br>❖ Ex 2 This shows that..."<br>➢ e.g. This shows that global warming affects species population.<br>❖ Ex 3 Because of [evidence], we can conclude that..."<br>➢ e.g. Because of evidence, we can conclude that change in temperature affects diversity of species. | ***INSTRUCTIONAL***<br>● Model/provide exemplars of valid arguments from evidence and appropriate ways to critique the reasoning of others.<br>● Facilitate structured discussions and debates where ELs can practice presenting and defending arguments.<br>● Provide scaffolding by gradually reducing the amount of support as students become more proficient in constructing arguments independently.<br>● Provide constructive feedback on students' arguments, focusing on both language use and the logical coherence of their claims and evidence.<br><br>***LANGUAGE***<br>➢ Provide increasingly complex and compound sentence language frames and word banks with visuals to:<br>➢ Compare and critique arguments by citing evidence and posing questions.<br>➢ Use scientific reasoning to explain why or how evidence supports a claim.<br>❖ 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.) | ***INSTRUCTIONAL***<br>● Provide access to authentic scientific texts where students can analyze arguments made by scientists and researchers.<br>● Assign independent or group research projects where students can formulate their own arguments based on their findings and data analysis.<br><br>***LANGUAGE***<br>● Provide language frames to:<br>➢ Compare and critique arguments by citing evidence and posing questions using extended sentences and elaboration of content.<br>➢ Use scientific reasoning and extended sentences and elaboration of content to explain why or how evidence supports a claim.<br>❖ 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.)<br>❖ Ex 2 (contrast/critique): The argument for claim 1 emphasizes (type of evidence), while the argument for claim 2 emphasizes |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| ***INTERACTIVE***<br>● Use partners/triads to collaborate.<br>● Provide language frames for students to practice and produce language to engage in argument from evidence in small groups or with partners using simple sentences and L1 support.<br><br>***GRAPHIC***<br>● Use graphic organizers with L1 and visual supports to provide academic language, concepts, and structure that assist students in understanding the structure of arguments and the relationship between evidence and claims.<br><br>***SENSORY/MEDIA***<br>● Provide visuals with L1 support that illustrate the scientific concepts and relationships. | ❖ 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.)<br>Ex 3 (critique/response)**:** The evidence for (claim) is data from (source). (e.g., The evidence for the appearance of new species over time is data from a 22-year study produced by the Environmental Protection Agency.)<br>❖ 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?)<br>❖ Ex 5: (Claim) (Evidence) (Reasoning): Provide language banks based on the specific topic.<br>❖ Sample Language Bank: nouns/adjectives/ verbs<br>• biological/changing/effect<br>• organisms/decreasing/decrease<br>• number (of)/environmental<br>• conditions/increasing/decrease<br>• population/extinct/increase, show<br>• diversity, species, environment<br>• type (of), the EPA, unity<br>• global warming, humans<br>❖ Sample Response: e.g., (Claim) Changing | (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.)<br>❖ 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.)<br>❖ 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?)<br>❖ 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.~~)~~<br>● Continue to develop students' academic language proficiency by introducing more complex vocabulary and sentence structures relevant to scientific argumentation. |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| | 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.<br><br>***INTERACTIVE***<br>● Use partners/triads to collaborate.<br>● Provide language frames for students to practice and produce language to engage in argument from evidence in small groups or with partners using simple and complex sentences and discourse frames.<br><br>***GRAPHIC***<br>● Use graphic organizers to provide necessary content and language structures that help students to engage in argument from evidence, including the process of making claims, providing evidence, and responding to counter arguments.<br><br>***SENSORY/MEDIA***<br>● Use multimodal texts (text combined with visuals, audio, or interactive elements) to engage students and support comprehension of complex scientific concepts. | ***INTERACTIVE***<br>● Use partners/triads to collaborate.<br>● Promote peer review sessions where ELs can provide feedback to each other on their arguments, focusing on clarity, coherence, and persuasiveness.<br><br>***GRAPHIC***<br>● Use graphic organizers (e.g., Venn diagram. T-chart) to foster critical thinking skills by challenging students to evaluate different perspectives and interpretations of scientific evidence.<br><br>***SENSORY/MEDIA***<br>● Use multimodal texts (text combined with visuals, audio, or interactive elements) to engage students and support comprehension of complex scientific concepts. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 7: Engaging in Argument from Evidence

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

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| **With prompting and supports, multilingual learners will…**<br>Key Language Use – Argue<br>● signal logical relationships among reasoning, relevant evidence, data, and/or a model when making a claim using connectors to signal time (*next, at the same time*), causality (*therefore, consequently, as a result, because*), clarification (*for example, this shows how*) in order to state a claim about a phenomenon and identify evidence and the scientific principle for the claim with the support of amplified text, illustrations with labels, sentence frames, anchor charts, and L1 support. | **With appropriate supports, multilingual learners will…**<br>Key Language Use- Argue<br>● signal logical relationships among reasoning, relevant evidence, data, and/or a model when making a claim using connectors to signal time (*next, at the same time*), causality (*therefore, consequently, as a result, because*), clarification (*for example, this shows how*) in order to state a claim about a phenomenon and identify evidence and the scientific principle for the claim with the support of graphic organizers, paragraph frames, anchor charts, and glossaries/dictionaries. | **With appropriate supports, multilingual learners will…**<br>Key Language Use - Argue<br>● signal logical relationships among reasoning, relevant evidence, data, and/or a model when making a claim using connectors to signal time (*next, at the same time*), causality (*therefore, consequently, as a result, because*), clarification (*for example, this shows how*) in order to state a claim about a phenomenon and identify evidence and the scientific principle for the claim with supports as needed. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 8: Obtaining, Evaluating, and Communicating Information

**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) |
|---|---|---|
| ***INSTRUCTIONAL***<br>● Provide a list of relevant questions for analyzing and evaluating information.<br>● Provide guided practice with specific feedback.<br><br>***LANGUAGE***<br>● Provide opportunities to categorize details obtained from oral, written, or multimedia L1 texts to build schema.<br>● Provide simple sentence and discourse frames to scaffold communicating scientific and/or technical information.<br>❖ EX 1: The author stated_____.<br>➢ e.g. The author stated that global warming is affecting the type and number of species on Earth.<br>❖ EX 2: The evidence suggests _____.<br>➢ e.g. The evidence suggests that when the environment changes then number of some species increase and some decrease.<br><br>***INTERACTIVE***<br>● Provide opportunities for students to produce and practice language to communicate scientific information in small groups or with partners using simple | ***INSTRUCTIONAL***<br>● Provide a list of relevant questions for analyzing and evaluating information.<br>● Provide guided practice with specific feedback.<br>● Scaffold the critical reading of scientific texts by:<br>➢ ordering or sorting central ideas, events, and conclusions<br>➢ matching details, evidence, causes, etc. to central ideas or conclusions<br>➢ highlighting text evidence<br>➢ categorizing details obtained from oral, written, or multimedia sources.<br>● Scaffold the gathering, classification, and oral presentation of information.<br>Ex**:** Students use word banks and partially completed graphic organizers to record information from multiple adapted/annotated 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 formatted note cards containing key points.<br>● Teach students how to formulate research questions and locate relevant information.<br>● Guide students in evaluating sources for credibility and reliability. | ***INSTRUCTIONAL***<br>● Model and provide opportunity for learners to generate their own list of relevant questions for analyzing and evaluating information.<br>● Introduce students to scientific journals, articles, and peer-reviewed sources.<br>● Guide students in writing academic papers and reports using scientific conventions.<br><br>***LANGUAGE***<br>● Provide complex sentence and discourse frames to scaffold communicating scientific and/or technical information.<br>❖ EX 1: Data from _____ supports the claim that _____. Therefore, we can conclude _____.<br>➢ e.g. 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. Therefore, we can conclude that the changing environment affects the unity and diversity of species.<br><br>***INTERACTIVE***<br>● Provide opportunities for working with a |

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| sentences, discourse starters, and L1 support.<br><br>***GRAPHIC***<br>● Provide partially completed graphic organizers for gathering, classifying, synthesizing, and assessing information with L1 support.<br><br>***SENSORY/MEDIA***<br>● Provide visuals and multimedia with L1 support to teach content concepts and scaffold the comprehension, classification, and presentation of information. | ***LANGUAGE***<br>● Provide sentence and discourse frames to scaffold communicating scientific and/or technical information.<br>❖ EX 1: The evidence suggests_____. Therefore, _____.<br>➢ e.g. The evidence suggests changes in the species correspond to changing environmental condition. Therefore, the conclusion is the changing environment affects the unity and diversity of the species.<br><br>***INTERACTIVE***<br>● Provide opportunities for working with a partner to sort a list of sources according to credibility.<br>● Provide opportunities for students to produce and practice language to communicate scientific information in small groups or with partners using simple and complex sentences, word banks/anchor charts, and discourse frames.<br><br>***GRAPHIC***<br>● Provide graphic organizers for gathering, classifying, synthesizing and assessing information with the support of word banks and anchor charts.<br><br>***SENSORY/MEDIA***<br>● Provide visuals and multimedia to teach content concepts and build schema to scaffold the comprehension, classification, and presentation of information.<br>● Incorporate interactive tools and digital resources for researching and gathering information. | partner to analyze a list of sources according to credibility.<br>● Provide opportunities for students to produce and practice language to communicate scientific information in small groups or with partners using word banks/anchor charts, and complex sentence and discourse frames.<br>● Provide opportunities for students to present their work to peers or external audiences.<br>● Pair students with mentors, such as scientists or professionals, for guidance and feedback on research projects.<br><br>***GRAPHIC***<br>● Provide graphic organizers for gathering, classifying, synthesizing and assessing information.<br><br>***SENSORY/MEDIA***<br>● Teach effective multimedia presentation skills for communicating research findings. |

## 3B. Teacher Moves: Example Instructional Supports and Example Success Criteria for Science and Engineering Disciplinary Practices (continued)

### Practice 8: Obtaining, Evaluating, and Communicating Information

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

| Entering/Emerging (Levels 1-2) | Developing/Expanding (Levels 3-4) | Bridging/Reaching (Levels 5-6) |
|---|---|---|
| **With prompting and supports, multilingual learners will…**<br>Key Language Use – Inform<br>● obtain, evaluate, and communicate information by sorting, clarifying, and summarizing relationships using nominalizations to represent abstract concepts, ideas, and technical terms (*effects, predator-prey relationships, magnetic forces*) in order to synthesize information from across a set of resources and construct a visual, oral, or written explanation of a scientific phenomenon with the support of a graphic organizer, sentence frames, word banks/anchor charts, L1, and multimedia. | **With appropriate supports, multilingual learners will…**<br>Key Language Use - Inform<br>● obtain, evaluate, and communicate information by sorting, clarifying, and summarizing relationships using nominalizations to represent abstract concepts, ideas, and technical terms (*effects, predator-prey relationships, magnetic forces*) in order to synthesize information from across a set of resources and construct a visual, oral, or written explanation of a scientific phenomenon with the support of a graphic organizer, sentence frames, word banks/anchor charts, and multimedia. | **With appropriate supports, multilingual learners will…**<br>Key Language Use - Inform<br>● obtain, evaluate, and communicate information by sorting, clarifying, and summarizing relationships using nominalizations to represent abstract concepts, ideas, and technical terms (*effects, predator-prey relationships, magnetic forces*) in order to synthesize information from across a set of resources and construct a visual, oral, or written explanation of a scientific phenomenon with supports as needed. |