Colquitt County 7th Grade Science Pacing Guide

Grading Timeline	1st -9 Weeks	2nd- 9 Weeks	3rd-9 Weeks	4th- 9 Weeks
Progress Report Window Open	Due on	Due on	Due on	TBA
Progress Reports Home				TBA
Report Card Window Open	Due on	Due on	Due on	TBA
Report Card Home				TBA

Aug (21)	Sept(21)	Oct (19)	Nov (17)	Dec (12)	Jan(19)	Feb	March	April	May

Fall Semester

First 9 Weeks (8/3-10/5)

1) Characteristics of Science (8/3-8/16: 10 days)
- Lab Safety (2 Days)
- Scientific Method/Experimental Design (3-5 Days)
- Microscopes (2-3 Days)
- **August 16: Quiz**
- **MAP Testing: August 17th-19th**
- Percent, Ratio, Decimals, Part to Whole, Fraction, Mean, Median, Mode, Data Charts, Frequency Tables, Metric System

2) Cells - S7L2 (8/22-9/16:20 Days)
- Cell Types, Organelles, and Structure (5 Days)
- Cell Processes: Diffusion, Osmosis, Photosynthesis, Respiration, Mitosis, Meiosis (10 Days)
- Test and Remediation(3 Days)
- **August 26: Cell Organelle FCA**
- **August 31:Cell Organelles Illuminate Test**
- **September 16th: Processes FCA**
- Ratio, Circumference, Surface Area, Cross Sections, Scale Factor, Percent, Measurement

Second 9 Weeks (10/6-12/16)

3) Introduction to Body System S7L2 (9/19-10/19: 23 days)
- Body Systems and Organs (20 Days)
- Test and Remediation (3 Days)
- **September 30: Half FCA**
- **October 14: Other Half FCA**
- **October 19: Body Systems Test**
- Part to Whole, Fractions, Percent

4) Genetics S7L3 (10/24-11/18: 20 days)
- Mendel/Inherited Traits (5-6 Days)
- Asexual/Sexual Reproduction (5-6 Days)
- Selective Breeding (5-6 Days)
- Test and Remediation (3 Days)
- **October 28: Mendel/Traits FCA**
- **November 11: Reproduction/SB FCA**
- **November 18: Unit Test**
- Percent, Ratio, Decimals, Part to Whole, Fraction, Probability, Distributive Property (TTxTt)

MAP Testing: December 5th-7th

November 28-December 16th Culminating Projects/Activities

Spring Semester

Third 9 Weeks (1/4-3/9)

5) Classification of Organisms S7L1 (1/4-2/3: 23 days)
- Intro to Classification (3-4 Days)
- Compare Models (6 Days)
- 6 Kingdom Model (10 Days)
- Test and Remediation (3 Days)
- **January 11: Intro FCA**
- **January 20: Model FCA**
- **January 31: Kingdom FCA**
- **February 3: Unit Test**

6) Ecology S7L4 (2/6-3/16: 33 Days)
- Abiotic/Biotic Factors (3 Days)
- Flow of Energy (Food Chains/Food Webs/Energy Pyramid) (15 Days)
- Environmental Factors (3 Days)
- Biomes (9 Days)
- Test and Remediation (3 Days)
- **February 9: Factors FCA**
- **March 3: Energy FCA**
- **March 14: Biomes/EF FCA**
- **March 16: Unit Test**
- Percent, Ratio, Decimals, Part to Whole, Fraction, Mean, Median, Mode, Data Charts

Fourth 9 Weeks (3/10-5/19)

7) Evolution S7L5 (3/20-3/31: 10 Days)
- Natural Selection/Survival of Fittest (5 Days)
- Fossil Records (2 Days)
- Test and Remediation (3 Days)
- **March 24th: Natural Selection FCA**
- **March 31: Unit Test**

MAP Testing: April 18th-20th

April 10th-May 19th: Culminating Projects/Intro to Physical Science

Standards	Standards	Standards	Standards
S7L2. Obtain, evaluate, and communicate information to describe how cell structures, cells, tissues, organs, and organ systems interact to maintain the basic needs of organisms. **a. Develop a model and construct an explanation** of how cell structures (specifically the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, and mitochondria) contribute to the function of the cell as a system in obtaining nutrients in order to grow, reproduce, make needed materials, and process waste. (Clarification statement: The intent is for students to demonstrate how the component structures of the cell interact and work together to allow the cell as a whole to carry out various processes. Additional structures, beyond those listed, will be addressed in high school Biology.) **b. Develop and use a conceptual model** of how cells are organized into tissues, tissues into organs, organs into systems, and systems into organisms. **c. Construct an argument** that systems of the body (Cardiovascular, Excretory, Digestive, Respiratory, Muscular, Nervous, and Immune) interact with one another to carry out life processes. (Clarification statement: The emphasis is not on learning individual structures and functions associated with each system, but on how systems interact to support life processes.)	**S7L2. Obtain, evaluate, and communicate** information to describe how cell structures, cells, tissues, organs, and organ systems interact to maintain the basic needs of organisms. **a. Develop a model and construct an explanation** of how cell structures (specifically the nucleus, cytoplasm, cell membrane, cell wall, chloroplasts, lysosome, and mitochondria) contribute to the function of the cell as a system in obtaining nutrients in order to grow, reproduce, make needed materials, and process waste. 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Develop and defend a model** that categorizes organisms based on common characteristics. **b. Evaluate historical models** of how organisms were classified based on physical characteristics and how that led to the six kingdom system (currently archaea, bacteria, protists, fungi, plants, and animals). (Clarification statement: This includes common examples and characteristics such as, but not limited to, prokaryotic, eukaryotic, unicellular, multicellular, asexual reproduction, sexual reproduction, autotroph, heterotroph, and unique cell structures. Modern classification will be addressed in high school.) **S7L5. Obtain, evaluate, and communicate** information from multiple sources to explain the theory of evolution of living organisms through inherited characteristics. **a. Use mathematical representations to evaluate explanations** of how natural selection leads to changes in specific traits of populations over successive generations. (Clarification statement: Referencing data should be obtained from multiple sources including, but not limited to, existing research and simulations. Students should be able to calculate means, represent this data in a table or graph, and reference it when explaining the principles of natural	**S7L4. Obtain, evaluate, and communicate** information to examine the interdependence of organisms with one another and their environments. **a. Construct an explanation** for the patterns of interactions observed in different ecosystems in terms of the relationships among and between organisms and abiotic components of the ecosystem. (Clarification statement: The interactions include, but are not limited to, predator-prey relationships, competition, mutualism, parasitism, and commensalism.) **b. Develop a model** to describe the cycling of matter and the flow of energy among biotic and abiotic components of an ecosystem. (Clarification statement: Emphasis is on tracing movement of matter and flow of energy, not the biochemical mechanisms of photosynthesis and cellular respiration.) **c. Analyze and interpret data** to provide evidence for how resource availability, disease, climate, and human activity affect individual organisms, populations, communities, and ecosystems. **d. Ask questions to gather and synthesize information** from multiple sources to differentiate between Earth's major terrestrial biomes (i.e., tropical rainforest, savanna, temperate forest, desert, grassland, taiga, and tundra) and aquatic ecosystems (i.e., freshwater, estuaries, and marine). (Clarification statement:

	S7L3. Obtain, evaluate, and communicate information to explain how organisms reproduce either sexually or asexually and transfer genetic information to determine the traits of their offspring. **a. Construct an explanation supported with scientific evidence** of the role of genes and chromosomes in the process of inheriting a specific trait. **b. Develop and use a model to describe** how asexual reproduction can result in offspring with identical genetic information while sexual reproduction results in genetic variation. (Clarification statement: Models could include, but are not limited to, the use of monohybrid Punnett squares to demonstrate the heritability of genes and the resulting genetic variation, identification of heterozygous and homozygous, and comparison of genotype vs. phenotype.) **c. Ask questions to gather and synthesize information** about the ways humans influence the inheritance of desired traits in organisms through selective breeding. (Clarification statement: The element specifically addresses artificial selection and the ways in which it is fundamentally different from natural selection.)	selection.) **b. Construct an explanation based on evidence** that describes how genetic variation and environmental factors influence the probability of survival and reproduction of a species. **c. Analyze and interpret data for patterns** in the fossil record that document the existence, diversity, and extinction of organisms and their relationships to modern organisms. (Clarification statement: Evidence of evolution found in comparisons of current/modern organisms such as homologous structures, DNA, and fetal development will be addressed in high school.)	Emphasis is on the factors that influence patterns across biomes such as the climate, availability of food and water, and location.)

Resources: GYSTC Resource Guide Units 2,3,4 **State Standards** https://www.georgiastandards.org/Georgia-Standards/Documents/Science-Seventh-Grade-Georgia-Standards.pdf **State Curriculum Map** https://www.georgiastandards.org/Georgia-Standards/Documents/Science-7th-Grade-Curriculum-Map.pdf **SLDS-TRL Tab** **State Units, Lessons, and Resources** https://lor2.gadoe.org/gadoe/file/4ab70d95-80b0-4ec2-b666-5dad2fb103fb/1/Seventh%20Grade%20Science%20Instructional%20Segment%20Two%20Pacing%20Guide%20Structure%20and%20Function%20in%20Living%20Systems.pdf https://lor2.gadoe.org/gadoe/file/c7da3e77-679c-43ed-b426-a77f69dba9c0/1/Seventh-Grade-Science-Instructional-Segment-2-Part-1-of-2-Structure-and-Function-with-supports.pdf https://lor2.gadoe.org/gadoe/file/dff5aef6-58bd-43fe-84f4-f80aa80670d2/1/Seventh-Grade-Science-Instructional-Segment-2-Part-2-of-2-Structure-and-Function-with-supports.pdf https://www.gpb.org/education/learn	**Resources:** GYSTC Resource Guide Units 2,3,4 **State Standards** https://www.georgiastandards.org/Georgia-Standards/Documents/Science-Seventh-Grade-Georgia-Standards.pdf **State Curriculum Map** https://www.georgiastandards.org/Georgia-Standards/Documents/Science-7th-Grade-Curriculum-Map.pdf **SLDS-TRL Tab** **State Units, Lessons, and Resources** https://lor2.gadoe.org/gadoe/file/4ab70d95-80b0-4ec2-b666-5dad2fb103fb/1/Seventh%20Grade%20Science%20Instructional%20Segment%20Two%20Pacing%20Guide%20Structure%20and%20Function%20in%20Living%20Systems.pdf https://lor2.gadoe.org/gadoe/file/c7da3e77-679c-43ed-b426-a77f69dba9c0/1/Seventh-Grade-Science-Instructional-Segment-2-Part-1-of-2-Structure-and-Function-with-supports.pdf https://lor2.gadoe.org/gadoe/file/dff5aef6-58bd-43fe-84f4-f80aa80670d2/1/Seventh-Grade-Science-Instructional-Segment-2-Part-2-of-2-Structure-and-Function-with-supports.pdf https://lor2.gadoe.org/gadoe/file/7750f9e3-f716-4d85-9874-e9115a0a89d6/1/Seventh%20Grade%20Insructional%20Segment%20One%20Paci	**Resources:** GYSTC Resource Guide Units 1, 5 and 6 **State Standards** https://www.georgiastandards.org/Georgia-Standards/Documents/Science-Seventh-Grade-Georgia-Standards.pdf **State Curriculum Map** https://www.georgiastandards.org/Georgia-Standards/Documents/Science-7th-Grade-Curriculum-Map.pdf **SLDS-TRL Tab** **State Units, Lessons, and Resources** https://lor2.gadoe.org/gadoe/file/8810b8f1-d6c9-42c3-9cd7-3b16f8a71877/1/Seventh%20Grade%20Science%20Instructional%20Segment%20Three%20Patterns%20in%20Living%20Systems%20Pacing%20Guide.pdf https://lor2.gadoe.org/gadoe/file/529f2246-693d-44af-afa6-a94a2b847fb0/1/Seventh-Grade-Science-Instructional-Segment-3-Patterns-in-Living-Systems-with-supports.pdf https://www.gpb.org/education/learn **WJW Staff Resources** **Reading Activities** Evolution Reading Activities Natural Selection Reading Assignment When fish first walked	**Resources:** GYSTC Resource Guide Units 1, 5 and 6 **State Standards** https://www.georgiastandards.org/Georgia-Standards/Documents/Science-Seventh-Grade-Georgia-Standards.pdf **State Curriculum Map** https://www.georgiastandards.org/Georgia-Standards/Documents/Science-7th-Grade-Curriculum-Map.pdf **SLDS-TRL Tab** **State Units, Lessons, and Resources** https://lor2.gadoe.org/gadoe/file/8810b8f1-d6c9-42c3-9cd7-3b16f8a71877/1/Seventh%20Grade%20Science%20Instructional%20Segment%20Three%20Patterns%20in%20Living%20Systems%20Pacing%20Guide.pdf https://lor2.gadoe.org/gadoe/file/529f2246-693d-44af-afa6-a94a2b847fb0/1/Seventh-Grade-Science-Instructional-Segment-3-Patterns-in-Living-Systems-with-supports.pdf https://www.gpb.org/education/learn

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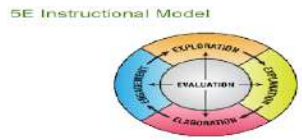
What is STEM

STEM education is an interdisciplinary approach to learning which removes the traditional instructional setting of teaching isolated subjects and integrates science, technology, engineering and math into real world learning experiences for students.

5 E Instructional Model



The 5E instructional model is built on the idea that learners build on and construct new ideas on top of their old ones. Advantages of the 5E model include: Enhancing mastery of subject matter,Developing scientific reasoning, Understanding the complexity and ambiguity of empirical work, Developing practical skills, Understanding the nature of science, Cultivating interest in science and interest in learning science,Developing teamwork abilities.

Engagement	Exploration	Explanation	Extend/Elaboration	Evaluation
Teacher generates interest, assess prior knowledge, connects prior knowledge, sets instructional focus on the concept,	Students experience key concepts, learn new skills, asking question,reflect on their thinking and develop relationships and understanding of concepts	Connecting prior knowledge to new content/discoveries, use of academic language, teacher and students work together	Apply learning to similar situations, explain new situation with formal academic language,	Should be ongoing throughout the learning phase, shows evidence of accomplishment,Teacher, peer and self assessments
Teacher actions: Motivates, creates interest, raises questions, taps into prior knowledge	**Teacher actions:** Moves into a facilitator role, observes students, asks guiding questions, encourages teamwork, provides materials and resources, provide adequate time for students to engage with the materials	**Teacher actions:** Encourages students to explain understandings in their own words, provides explanations of definitions, laws, theories, ask clarifying questions, builds onto students understanding, provide a variety of instructional strategies, develop academic language, formative assessments to gauge understanding	**Teacher actions:** Provide an opportunity for students to apply their new gained information to enhance additional learning, remind students to look for alternative ways to solve the problem,providing guidance on perseverance	**Teacher actions:** Observes students, asks open-ended questions,assess students, encourages students to self assess
Student actions: Ask questions, attentive to teacher/classmates, makes connections to prior learning, self reflects on what they already know, what do they want to know	**Student actions:** Conducts experiments, activities, work with groups to make meaning of the problem, record observations, use journals, listen to others ideas,	**Student actions:** Explain solutions, critiques or ask further questions of others solutions,refers back to notes and journals to communicate findings and understanding, self assesses their own learning	**Student actions:** Generates interest in new learning, explore related content, records observations and interacts with peers to broaden one's o	**Student actions:** Self evaluates, uses academic language, demonstrates understanding of concept, solves problems
Example: Topic : Observe and describe the process of erosion, transportation, and deposition	**Example:** Construct a model to investigate how these changes may have occurred. Provide materials so	**Example:** Tell me what some of your predictions were before it rained on your landscape. (	**Example:** Using the same paint roller tray as the base for their landscape, have the groups of students	**Example:** Have photographs representing each process and have students identify and explain why they

of the earth's land surface using natural phenomena and models Materials : paint tray (the kind used for a paint roller), pieces of sod (enough for each group), potting soil, heavy clay like soil, Rainmaker (paper cup with about ten tiny holes poked in the bottom) , Water. Activity 1.bottom of slide under swing 2.end of splash guard by rain spout at entrance to door 3. path leading to the playground at the bottom of hill/slope Do you notice anything different about these areas? (They are just dirt; no grass is growing here.) What do you think caused these changes? (Students walking over them; water running through it)	the students can construct their own model of a landscape. It should include a piece of sod, fine potting soil, and a heavy clay like soil. Have them use a paint roller tray as the base of the landscape. Do not put any landscape materials in the bottom well; it should remain empty. Once students have constructed their models, have them diagram and label their models and make a prediction as to what will happen if it "rains" on their landscape. One student pours a cup of water all at once into the rainmaker. Hold the rainmaker about 4 inches above the upper end of the landscape and slowly move it back and forth so the water "rains" down on the model landscape. Observe what happens to the landscape. When it is finished raining the students observe the final effects of the rain on their landscape. Have students go back to their predictions and record what actually happened.	Record on board.) What actually happened to your landscape when it rained on it? (record so you can make comparisons.) How is your landscape different after the rain than before it rained on it? What happened to the soil? Where did it go? Why did this happen? As students share their ideas and understandings, record key phrases on the board. Some phases that may be valuable to your later discussion may include:dirt and soil washed away,the soil collected at the bottom of the slope,the water hollowed out the soil, the rain carried the soil down the hill,when the water washed away the soil it formed a hole Relate their observations to the processes scientists observe over an extended period of time. Use student models to identify and label erosion and deposition. Have students work to create definitions for these terms. When you are sure students have a real understanding of the terms, formulate a final definition and post on board or chart in the classroom for future reference. Demonstrate the process of transportation and lead students to understand that it is the movement of soil particles from one place to another. Refer to the list generated during the engagement and have students make connections; they should use the new terms to discuss and explain what they saw. Help them to understand that they just used water to simulate	plan a method to decrease or eliminate erosion. Students should draw a diagram of the model planned and label the materials used in their landscape. They should write a short explanation explaining why they think this will work to curb erosion. (Tell students that you will provide the same materials that they used today and they are responsible for supplying the rest of the materials to build their new landscape tomorrow.) Have students use a variety of resources and references to research various landmarks that are the result of these processes.	identified it as such. Have students take a walk in their own neighborhood tonight to find examples of each process. They should draw and write one sentence telling what they observed. Have students write their own definition and list an example for each process in their science journals.

		erosion, transportation, and deposition, but it can also be caused by wind, people, animals, etc.		

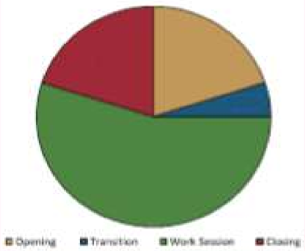
Science and Engineering Practices	
Asking questions and defining problems	Developing and using models
A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world(s) works and which can be empirically tested. Engineering questions clarify problems to determine criteria for successful solutions and identify constraints to solve problems about the designed world. Both scientists and engineers also ask questions to clarify ideas.	A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations. Modeling tools are used to develop questions, predictions and explanations; analyze and identify flaws in systems; and communicate ideas. Models are used to build and revise scientific explanations and proposed engineered systems. Measurements and observations are used to revise models and designs.
Planning and carrying out investigations	Using mathematics and computational thinking
Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters. Engineering investigations identify the effectiveness, efficiency, and durability of designs under different conditions	In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; solving equations exactly or approximately; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions.
Analyzing and interpreting data	Constructing explanations and designing solutions
Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis. Engineering investigations include analysis of data collected in the tests of designs. This allows comparison of different solutions and determines how well each meets specific design criteria— that is, which design best solves the problem within given constraints. Like scientists, engineers require a range of tools to identify patterns within data and interpret the results. Advances in science make analysis of proposed solutions more efficient and	The end-products of science are explanations and the end-products of engineering are solutions. The goal of science is the construction of theories that provide explanatory accounts of the world. A theory becomes accepted when it has multiple lines of empirical evidence and greater explanatory power of phenomena than previous theories. The goal of engineering design is to find a systematic solution to problems that is based on scientific knowledge and models of the material world. Each proposed solution results from a process of balancing competing criteria of desired functions, technical feasibility, cost, safety, aesthetics, and compliance with legal requirements. The optimal choice depends on how well the proposed solutions meet criteria and constraints.

effective.	
Engaging in argument from evidence	Obtaining, evaluating, and communicating information
Argumentation is the process by which evidence-based conclusions and solutions are reached. In science and engineering, reasoning and argument based on evidence are essential to identifying the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation to listen to, compare, and evaluate competing ideas and methods based on merits. Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to evaluate claims	Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations as well as orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to obtain information that is used to evaluate the merit and validity of claims, methods, and designs

The Science Standards-Based Classroom Instructional Framework provides a common language of instruction in order to successfully implement high quality practices. The tool can be used to develop lesson plans as well as a guide for teachers to reference during instruction. It is imperative that an opening, transition, work and closing is addressed with each lesson.

SCIENCE
STANDARDS-BASED CLASSROOM
INSTRUCTIONAL FRAMEWORK

Instructional Framework



Time will vary based on instructional focus

PERVASIVE LESSON PRACTICES

Teacher will embed pervasive practices throughout lesson based on instructional focus

Literacy Across the Content:
- Disciplinary literacy
- Content literacy
- Close reading
- Disciplinary research/ reading to learn

Writing Across the Content
- Content writing
- Writing process
- Writing to learn

Vocabulary Development:
- Academic vocabulary
- Content vocabulary
- Discipline vocabulary
- Engages in three-dimensional learning

Formative Assessment:
- Formal assessments
- Informal assessments
- Standards-based feedback

Classroom Culture:
- Models practices and procedures
- Encourages risk-taking and collaboration
- Demonstrates high expectations in classroom discourse
- Emphasizes safety practices

OPENING

Teacher:
- Introduces phenomena to engage students in investigations
- Engages students/accesses prior knowledge and makes connections by encouraging them to ask questions
- Provides explicit instruction aligned to standard(s), including skill development and conceptual understanding
- Models science and engineering practices and questioning based on crosscutting concepts

Student:
- Accesses prior knowledge
- Asks thought-provoking and clarifying questions.
- Participates in classroom discussions; engages in investigations and analyzes thinking

TRANSITION TO WORK SESSION

Teacher:
- Provides guidance to engage in exploration of phenomena
- Helps students in identifying routines to engage in collaboration
- Introduces organizing tools
- Reviews success criteria and expectations for work

Student:
- Engages in exploration of phenomena
- Participates in discussion
- Prepares organizing tools
- Asks questions or define problems

WORK SESSION

Teacher:
- Facilitates independent and small group work; scaffolds learning tasks
- Engages students in the 3-dimensions of science instruction
- Monitors, assesses and documents student progress and provides standards-based feedback
- Provides small group instruction
- Allows students to engage in productive struggle, make mistakes, and engage in error analysis
- Conferences formally and informally with students

Student:
- Engages in independent or collaborative learning
- Demonstrates proficiency of science and engineering practices, crosscutting concepts and core disciplinary ideas
- Completes conceptually rich performance tasks, research or guided practice
- Conferences with teacher and receives standards-based feedback

CLOSING

Teacher:
- Formally or informally assesses student understanding
- Asks questions targeting students' explanations and claims to provide feedback
- Provides phenomena that challenges students' explanations
- Engages students in summarizing learning and celebrates progress toward mastery of standard(s)
- Identifies next steps for instruction based on data analysis

Student:
- Shares, assesses, and justifies work using language of the standards
- Provides peer feedback and asks clarifying questions using language of the standards
- Reflects and summarizes progress toward mastery of learning target/standard based on success criteria