

**WEBSTER GROVES SCHOOL DISTRICT
BOARD OF EDUCATION ITEM OF CONSIDERATION**

DATE: May 8, 2017

TOPIC/PROPOSAL:

Modification of the K-5th Grade Science Curriculum Learning Goals and Proficiency Scales

BACKGROUND INFORMATION:

At the beginning of the 2016-2017 school year, district staff starting implementing the new science curriculum and learning goals for grades K-8. Through the course of implementing the new curriculum, it was found that the learning goals and proficiency scales previously set for K-5th grade should be rewritten with more detail in order to meet the needs of the Webster Groves curriculum, the Missouri Learning Standards, and the Next Generation Science Standards. Engineering learning goals and proficiency scales were also added for all grades. The new learning goals will be added to the district K-5 Progress Report.

INSTRUCTIONAL IMPACT/RATIONALE:

The revised K-5th grade Science Curriculum learning goals will be more efficiently aligned to the Missouri Learning Standards and Next Generation Science Standards. This revision also adds engineering learning goals and proficiency scales to the science curriculum for the first time.

CSIP/DISTRICT GOAL ADDRESSED:

* WGSD will personalize learning for all students to increase engagement and rigor resulting in improved student achievement.

*WGSD will make a positive impact on the world by being a model for teaching, learning and practicing sustainability.

FISCAL NOTE:

None

ADMINISTRATIVE RECOMMENDATION:

- Action Requested: X
- Information:
- Proposed Motion for Approval (if applicable):

PREPARED BY: Kristin Denbow

Motion: _____ **Second:** _____

Board Vote: (yes) (no) (abstain) (Consent Agenda)

Learning goals and Proficiency Scales for Kindergarten

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PUSHES AND PULLS UNIT

LEARNING GOAL

Students who demonstrate understanding can plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of forces and interactions.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing a plan to investigate the relationship between the strength and direction of pushes and pulls and the motion of an object.• describing the cause and effect relationship between pushes and pulls and object motion to be determined.• comparing the effects of the motion of the objects caused by changes in the strength or direction of the pushes and pulls and recording their data.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• predicting the effect of the push or pull on the motion of the object.• describing the relative strengths of the push or pull that will be applied to the object to start or stop its motion or change its speed OR describing the relative directions of the push or pull that will be applied to the object.
Beginning	Student demonstrates limited understanding of forces and interactions.

PUSHES AND PULLS UNIT

LEARNING GOAL

Students who demonstrate understanding can analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of forces and interactions.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• organizing data using graphical or visual displays.• describing relative changes in the speed or direction of the object caused by pushes or pulls from the design solution.• describing, from the observed data, whether the push or pull from the design solution causes the intended change in speed or direction of motion of the object.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• organizing data with guidance.• describe how the pushes or pull from the design solution causes the change in the object's motion.
Beginning	Student demonstrates limited understanding of forces and interactions.

WEATHER AND CLIMATE UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations to determine the effect of sunlight on Earth's surface.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of weather and climate.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• describing observations of the relative warmth of materials in the presence and absence of sunlight.• identifying patterns of relative warmth or materials in sunlight and in shade.
Approaching	Students demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing that sunlight warms the earth.• comparing the warmth of earth materials placed in sunlight and the same earth materials placed in shade.
Beginning	Student demonstrates limited understanding of weather and climate.

WEATHER AND CLIMATE UNIT

LEARNING GOAL

Students who demonstrate understanding can use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of weather and climate.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• designing and building a structure that reduces warming caused by the sun.• describing whether the structure meets the expectations in terms of cause (structure blocks sunlight) and effect (less warming of the surface).
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• designing and building a structure with guidance and support.• describing that the structure is expected to reduce warming for a designed area by providing shade.
Beginning	Student demonstrates limited understanding of weather and climate.

WEATHER AND CLIMATE UNIT

LEARNING GOAL

Students who demonstrate understanding can use and share observations of local weather conditions to describe patterns over time.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of weather and climate.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• organizing data from given observations (firsthand or from media) about local weather conditions using graphical displays (pictures, charts, etc.).• describing patterns and sharing that:<ul style="list-style-type: none">○ certain months have more days of some kinds of weather than do other months.○ the differences in relative temperature over the course of a day are directly related to the time of day.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• organizing data with guidance and support.• identifying in the data:<ul style="list-style-type: none">○ the change in the relative temperature over the course of a day.○ the relative number of days of different types of weather conditions in a month.
Beginning	Student demonstrates limited understanding of weather and climate.

WEATHER AND CLIMATE UNIT

LEARNING GOAL

Students who demonstrate understanding can ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of weather and climate.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• formulating questions about local severe weather to clarify how weather forecasting can help people avoid the most serious impacts of severe weather events.• collecting information to provide evidence that:<ul style="list-style-type: none">○ there are patterns related to local severe weather that can be observed.○ weather patterns help scientists predict severe weather before it happens.○ severe weather warnings are used to communicate predictions about severe weather○ weather forecasting can help people plan for, and respond to, specific types of local weather.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• collecting information to provide some evidence that:<ul style="list-style-type: none">○ there are patterns related to local severe weather that can be observed.○ weather patterns help scientists predict severe weather before it happens.○ severe weather warnings are used to communicate predictions about severe weather○ weather forecasting can help people plan for, and respond to, specific types of local weather.
Beginning	Student demonstrates limited understanding of weather and climate.

PLANTS AND ANIMALS UNIT

LEARNING GOAL

Students who demonstrate understanding can use observations to describe patterns of what plants and animals (including humans) need to survive.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of plants and animals.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• organizing data from given observations (firsthand or from media) using graphical displays (pictures, charts, etc.).• describing the patterns identified in the data provided to show evidence that:<ul style="list-style-type: none">○ plants and animals need light and water to live and grow.○ animals get their food from plants, other animals, or both.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• organizing data with guidance and support.• identifying patterns in the data including:<ul style="list-style-type: none">○ all animals eat food.○ all animals drink water.○ plants cannot live or grow if there is not water or light.
Beginning	Student demonstrates limited understanding of plants and animals.

PLANTS AND ANIMALS UNIT

LEARNING GOAL

Students who demonstrate understanding can construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of plants and animals.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• making a claim to be supported by evidence that plants and animals (including humans) can change the environment to meet their needs.• supporting the claim and presenting an argument connecting various needs of plants and animals to show evidence about how plants/animals change their environments to meet their needs.• The argument includes:<ul style="list-style-type: none">○ examples of how plants affect other parts of their system by changing their environments to meet their needs.○ examples of how animals affect other parts of their systems by changing their environments to meet their needs.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• making and supporting a claim with guidance and support.• identifying and describing:<ul style="list-style-type: none">○ examples of plants changing their environments.○ examples of animals (including humans) changing their environments.○ examples of plant and animal needs.
Beginning	Student demonstrates limited understanding of plants and animals.

PLANTS AND ANIMALS UNIT

LEARNING GOAL

Students who demonstrate understanding can use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of plants and animals.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using a given model to represent and describe relationships between the components including:<ul style="list-style-type: none">○ the relationships between the different plants and animals and the materials they need to survive.○ the relationship between places where different plants and animals live and the resources those places provide.○ the relationships between specific plants and animals and where they live.• using a given model to describe that plants and animals, the places in which they live, and the resources found in those places are each part of a system, and that these parts of systems work together and allow living things to meet their needs.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying and describing the components in a given model representing:<ul style="list-style-type: none">○ different plants and animals (including humans).○ the places where the different plants and animals live.○ the things that plants and animals need.• describing the relationship between the components with guidance and support
Beginning	Student demonstrates limited understanding of plants and animals.

PLANTS AND ANIMALS UNIT

LEARNING GOAL

Students who demonstrate understanding can communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of plants and animals.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• communicating information clearly about solutions in oral and/or written form.• communicating information about solutions that reduce the negative effects of humans on the local environment, including:<ul style="list-style-type: none">○ examples of things that people do to live comfortable and how those things can cause changes to the land, water, air, and/or living things in the local environment.○ examples of choices that people can make to reduce negative impacts and the effects those choices have on the local environment.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• communicating information, with guidance and support, about solutions in oral and/or written form• describing information about:<ul style="list-style-type: none">○ how people affect the land, water, air, and/or living things in the local environment in positive and negative ways.○ solutions that reduce the negative effects of humans on the local environment.
Beginning	Student demonstrates limited understanding of plants and animals.

Learning goals and Proficiency Scales for First Grade

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LIFE SCIENCE

LEARNING GOAL

Students who demonstrate understanding can use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of structure, function, and information processing.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• designing a device and describing the specific or required features in their designs and devices including:<ul style="list-style-type: none">○ the device provides a solution to the given human problem.○ the device mimics plant and/or animal external parts, and/or information processing.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing the given human problem to be solved by the design.• explaining how external structures are used to help the plant and/or animal grow and/or survive.
Beginning	Student demonstrates limited understanding of structure, function, and information processing.

LIFE SCIENCE UNIT

LEARNING GOAL

Students who demonstrate understanding can read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of growth and development of organisms.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• evaluating the information to determine and describing the patterns of what animals parents and offspring do to help offspring survive.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• using books or media to obtain information about:<ul style="list-style-type: none">○ the idea that both plants and animals can have offspring.○ behaviors of animal parents that help offspring survive.○ behaviors of animal offspring that help the offspring survive.
Beginning	Student demonstrates limited understanding of growth and development of organisms.

LIFE SCIENCE UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of inheritance and variation of traits.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• connecting the evidence of observed patterns in features to support that:<ul style="list-style-type: none">○ young plants and animals are very similar to their parents.○ young plants and animals are not exactly the same as their parents.○ similarities and differences in features are evidence that although individuals of the same type of animal or plant are recognizable as similar, they can also vary in many ways.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing evidence from observations that:<ul style="list-style-type: none">○ there are key differences between different types of plants and animals.○ young plants and animals of the same type have similar, but not identical features.○ adult plants and animals of the same type have similar, but not identical features.
Beginning	Student demonstrates limited understanding of inheritance and variation of traits.

LIGHT AND SOUND UNIT

LEARNING GOAL

Students who demonstrate understanding can plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of light and sound waves.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing an investigation plan and describing the evidence that will result from the investigation including:<ul style="list-style-type: none">○ observations that sounds can cause materials to vibrate.○ observations that vibrating materials can cause sounds.○ how the data will support evidence to support or refute ideas about the relationship between vibrating materials and sound.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing how materials can be made to vibrate to make sound.• describing what sounds can be used to make materials vibrate.• describing how to determine that a materials is vibrating.
Beginning	Student demonstrates limited understanding of light and sound waves.

LIGHT AND SOUND UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of light waves.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• logically connecting the evidence to support and describe that:<ul style="list-style-type: none">○ the presence of light in a space causes objects to be able to be seen in that space.○ objects cannot be seen if there is no light to illuminate them, but the same object in the same space can be seen if a light source is introduced.○ the ability of an object to give off its own light causes the object to be seen in a space where there is no other light.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• making observations about:<ul style="list-style-type: none">○ the appearance of objects in a space with no light.○ the appearance of objects in a space with light.○ the appearance of objects that give off light in a space with no other light.
Beginning	Student demonstrates limited understanding of light waves.

LIGHT AND SOUND UNIT

LEARNING GOAL

Students who demonstrate understanding can plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of light waves.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• designing and conducting an investigation to gather evidence about the effect of placing objects made of different materials in a beam of light.• collecting and recording observations about what happens when objects made of materials that allow light to pass through them in different ways are placed in the path of a beam of light.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing materials that allow all light to pass through, some light to pass through, blocks all of the light, and changes the direction of the light.• describing a light source that can be used to produce a beam of light.
Beginning	Student demonstrates limited understanding of light waves.

LIGHT AND SOUND UNIT

LEARNING GOAL

Students who demonstrate understanding can use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of light and sound waves.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• designing and building a device that is able to send or receive information over a given distance and uses light or sound to communicate.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing a given problem involving people communicating over long distances.• designing and building, with guidance, a device that uses light or sound to solve the given problem.
Beginning	Student demonstrates limited understanding of light and sound waves.

SPACE SYSTEMS

LEARNING GOAL

Students who demonstrate understanding can use observations of the sun, moon, and stars to describe patterns that can be predicted.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of patterns and cycles in space.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• identifying and describing patterns in the organized data, including:<ul style="list-style-type: none">○ stars are not seen in the sky during the day, but they are seen in the sky during the night.○ the sun is at different positions in the sky at different times of the day, appearing to rise in one part of the sky in the morning and appearing to set in another part of the sky in the evening.○ the moon can be seen during the day and at night, but the sun can only be seen during the day○ the moon is at a different position in the sky at different times of the day or night, appearing to rise in one part of the sky and appearing to set in another part of the sky.• using the identified patterns of the motions and appearance of objects in the sky to provide evidence that future appearances of those objects can be predicted.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• using graphical displays to organize data from given observations with guidance and support including:<ul style="list-style-type: none">○ objects visible in the sky during the day.○ objects visible in the sky during the night.○ the position of the sun in the sky at various times during the day.○ the position of the moon in the sky at various times during the day or night.
Beginning	Student demonstrates limited understanding of patterns and cycles in space.

SPACE SYSTEMS UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations at different times of year to relate the amount of daylight to the time of year.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of patterns and cycles in space.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• making and recording observations about the relative length of the day in different seasons to reveal the pattern between the amount of daylight at different times of the year.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing the data with guidance and support including observations of relative length of the day throughout the year.
Beginning	Student demonstrates limited understanding of patterns and cycles in space.

Learning goals and Proficiency Scales for Second Grade

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HOW SEEDS TRAVEL UNIT

LEARNING GOAL

Students who demonstrate understanding can develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of interdependent relationships in ecosystems.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none"> • developing a simple model that includes: <ul style="list-style-type: none"> ○ relevant structures of the animal. ○ relevant structures of the plant. ○ pollen or seeds from plants. • describing the relationships between components, including evidence that the developed model mimics how plant and animal structures interact to move pollen or disperse seeds.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none"> • developing a simple model with guidance and support that includes: <ul style="list-style-type: none"> ○ relevant structures of the animal. ○ relevant structures of the plant. ○ pollen or seeds from plants. • identifying the relevant components of their model, including those components that mimic the natural structure of an animal that helps it disperse seeds or mimic the natural structure of an animal that helps it pollinate plants.
Beginning	Student demonstrates limited understanding of interdependent relationships in ecosystems.

HOW SEEDS TRAVEL UNIT

LEARNING GOAL

Students who demonstrate understanding can plan and conduct an investigation to determine if plants need sunlight and water to grow.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of interdependent relationships in ecosystems.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing an investigation plan that includes:<ul style="list-style-type: none">○ the plants to be used.○ the source of light.○ how plants will be kept with/without light in both the light/dark test and the water/no water test.○ the amount of water plants will be given in both the light/dark test and the water/no water test.○ how plant growth will be determined.• describing how the plan will allow them to answer the question about whether plants need sunlight and water to grow.• collecting and recording accurate data on the effects of plant growth.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing the evidence to be collected during the investigation, including:<ul style="list-style-type: none">○ plant growth with both light and water.○ plant growth without light but with water.○ plant growth without water but with light.○ plant growth without water and without light.• collecting and recording data with guidance and support on the effects of plant growth.
Beginning	Student demonstrates limited understanding of interdependent relationships in ecosystems.

HOW SEEDS TRAVEL UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations of plants and animals to compare the diversity of life in different habitats.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of interdependent relationships in ecosystems.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• collecting, recording, and organizing data on different types of plants and animals in land and water habitats.• providing evidence for patterns of plants and animal diversity across habitats.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing observations of land and water habitats.• describing observations of different types of living things in each habitat.• comparing different types of living things that can be found in different habitats.
Beginning	Student demonstrates limited understanding of interdependent relationships in ecosystems.

FORCE AND MOTION UNIT

LEARNING GOAL

Students who demonstrate understanding can plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of forces and interactions.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing an investigation which produces sufficient data to serve as the basis for evidence for how balanced and unbalanced forces determine an object's motion.• describing the change in motion of an object at rest after different strengths and directions of balanced and unbalanced forces are applied to the object.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing an object at rest and identifying the forces acting on it.• describing an object in motion and identifying the forces acting on it.
Beginning	Student demonstrates limited understanding of forces and interactions.

FORCE AND MOTION UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of forces and interactions.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• identifying and describing the data to be collected through observations and/or measurement, including data on the motion of the object as it repeats a pattern over time.• identifying a pattern that can be used to predict future motion.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• observing and identifying the motion of an object.• predicting the future motion of an object.
Beginning	Student demonstrates limited understanding of forces and interactions.

FORCE AND MOTION UNIT

LEARNING GOAL

Students who demonstrate understanding can ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of forces and interactions.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• asking questions from observations of two objects not in contact with each other interacting through electric or magnetic forces.• identifying the cause-and-effect relationships between:<ul style="list-style-type: none">○ the sizes of the forces on two interacting objects due to the distance between the two objects.○ the presence of a magnet and the force the magnet exerts on other objects.○ static electrically charged objects and a static electric force.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• asking questions with guidance and support from observations of two objects not in contact with each other interacting through static electric or magnetic forces.• determining the relationship between the relative orientation of two magnets and whether the force between the magnets is attractive or repulsive.
Beginning	Student demonstrates limited understanding of forces and interactions.

FORCE AND MOTION UNIT

LEARNING GOAL

Students who demonstrate understanding can plan and conduct a fair test to compare and contrast the forces (measured by a spring scale in Newtons) required to overcome friction when an object moves over different surfaces (i.e., rough/smooth)

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of forces and interactions.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing a testing plan that includes:<ul style="list-style-type: none">○ the surfaces to be tested.○ the object that will move across each surface.○ using a spring scale to measure Newtons.• conducting a fair test that includes an accurate way to collect and record data.• using the data collected, comparing and contrasting the forces needed to overcome friction when the object moved over different surfaces.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• measuring the force required to overcome friction when an object moves over different surfaces using a spring scale in Newtons.• conducting a fair test and recording data, with guidance and support, to show the forces needed to overcome friction.
Beginning	Student demonstrates limited understanding of forces and interactions.

OBSERVING WEATHER PATTERNS

LEARNING GOAL

Students who demonstrate understanding can represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of weather and climate.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• organizing and representing given data by season using tables, pictographs, and/or bar graphs including weather condition data from the same area across multiple seasons and weather conditions data from different areas.• using patterns of weather conditions in different seasons and different areas to predict the typical weather condition expected during a particular season in different areas.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• organizing and representing given data with guidance and support by season using tables, pictographs, and/or bar graphs.• identifying and describing weather conditions across different seasons and in different areas.
Beginning	Student demonstrates limited understanding of weather and climate.

OBSERVING WEATHER PATTERNS UNIT

LEARNING GOAL

Students who demonstrate understanding can obtain and combine information to describe climates in different regions of the world.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of weather and climate.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• combining obtained information to provide evidence about the climate patterns in a region that can be used to make predictions about typical weather conditions in that region.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing the difference between weather and climate.• collecting information about the climate of a region of the world.
Beginning	Student demonstrates limited understanding of weather and climate.

OBSERVING WEATHER PATTERNS UNIT

LEARNING GOAL

Students who demonstrate understanding can make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of weather and climate.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• evaluating the evidence to determine how the proposed solution addresses the problem, including the impact of the weather-related hazard after the design solution have been implemented.• evaluating the merits of a given solution in reducing the impact of a weather-related hazard.• evaluating the benefits and risks a given solution poses when responding to the societal demand to reduce the impact of the hazard.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying weather related hazards.• identifying problems caused by weather related hazards.• describing with guidance and support how a proposed solution addresses the problem.
Beginning	Student demonstrates limited understanding of weather and climate.

OBSERVING WEATHER PATTERNS UNIT

LEARNING GOAL

Students who demonstrate understanding can identify patterns indicating relationships between observed weather data and weather phenomena (e.g., temperature and types of precipitation, clouds and amounts of precipitation)

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of weather and climate.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• identifying patterns showing the relationship between observed weather data and weather phenomena.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying the signs that different weather is going to happen.• describing typical attributes of weather.
Beginning	Student demonstrates limited understanding of weather and climate.

Learning goals and Proficiency Scales for Third Grade

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SHAPING THE EARTH

LEARNING GOAL

Students who demonstrate understanding can develop a model to represent the shapes and kinds of land and bodies of water in an area.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth’s systems and processes that shape the Earth.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing a model that represents both land and bodies of water in an area.• identifying and describing relationships between the specific shapes and kinds of land and specific bodies of water.• describing patterns of water and land in a given area.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• developing a model with guidance and support that represents both land and bodies of water in an area.• describing the land and water in an area.
Beginning	Student demonstrates limited understanding of Earth’s systems and processes that shape the Earth.

SHAPING THE EARTH UNIT

LEARNING GOAL

Students who demonstrate understanding can use information from several sources to provide evidence that Earth events can occur quickly or slowly.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth's systems and processes that shape the Earth.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• making observations using at least 3 or more sources.• connecting the evidence and describing their reasoning that in some cases, Earth events and the resulting changes can be directly observed; therefore, those events must occur rapidly.• connecting the evidence and describing their reasoning that in other cases, the resulting changes of Earth events can be observed only after a long period of time; therefore, these Earth events occur slowly, and changes happen over a time period that is much longer than one can observe.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• making observations using 1-2 sources.• describing evidence from observations that:<ul style="list-style-type: none">○ some Earth events occur quickly.○ some Earth events occur slowly.○ some results of Earth events that occur quickly and some slowly.
Beginning	Student demonstrates limited understanding of Earth's systems and processes that shape the Earth.

SHAPING THE EARTH UNIT

LEARNING GOAL

Students who demonstrate understanding can compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth's systems and processes that shape the Earth.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• describing two or more solutions in terms of how they slow or prevent wind or water from changing the shape of the land.• evaluating features in the solution that would slow or prevent wind or water from washing away sand or soil.• using their evaluation and comparing the given solution to each other.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing one solution in terms of how it slows or prevents wind or water from changing the shape of the land.• describing features in the solution that would slow or prevent wind or water from washing away sand or soil.• describing features in the solution that would address problems created by slow and rapid changes in the environment.
Beginning	Student demonstrates limited understanding of Earth's systems and processes that shape the Earth.

SHAPING THE EARTH UNIT

LEARNING GOAL

Students who demonstrate understanding can obtain information to identify where water is found on Earth and that it can be solid or liquid.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth's systems and processes that shape the Earth.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using books and other reliable media to identify patterns of where water is found, and what form it is in.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• using books and other reliable media to identify where water is found on Earth, including oceans, rivers, lakes, ponds, and glaciers.• using books and other reliable media to describe that water can be found on Earth as liquid water or solid ice.
Beginning	Student demonstrates limited understanding of Earth's systems and processes that shape the Earth.

MATTER UNIT

LEARNING GOAL

Students who demonstrate understanding can plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of structure and properties of matter.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing an investigation plan and describing the properties of matter of the materials that would allow for classification and the temperature at which those properties are observed.• describing how the properties will be classified by their observable similarities (pattern of the properties) and the method for classifying them.• collecting and recording data on the properties of the materials.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing which materials will be classified.• describing which materials will be observed at different temperatures, and how those temperatures will be determined.• collecting and recording data with guidance and support on the properties of the materials.
Beginning	Student demonstrates limited understanding of structure and properties of matter.

MATTER UNIT

LEARNING GOAL

Students who demonstrate understanding can analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of structure and properties of matter.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• describing relationships between properties of materials and some potential uses.• using organized data to support or refute their ideas about which properties of materials allow the object or tool to be best suited for the given intended purpose relative to the other given objects/tools.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• using the given data from tests of different materials to organize those materials by their properties.• describing relationships between materials and their properties.
Beginning	Student demonstrates limited understanding of structure and properties of matter.

MATTER UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of structure and properties of matter.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using reasoning to connect the evidence to support that many different objects can be built from the same set of pieces and that they can have different characteristics, even though they were made of the same set of pieces.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing the characteristics of the original object.• identifying that the original object was disassembled into pieces and then reassembled into a new object or objects.• describing the characteristics of the new object or objects.
Beginning	Student demonstrates limited understanding of structure and properties of matter.

MATTER UNIT

LEARNING GOAL

Students who demonstrate understanding can construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of structure and properties of matter.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• evaluating whether changes in a material after heating or cooling are reversible or non-reversible.• providing evidence to support their claim about reversible and non-reversible changes.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing the characteristics of the material before and after heating or cooling.• describing the difference between a reversible and non-reversible change.
Beginning	Student demonstrates limited understanding of structure and properties of matter.

LIFE AND ENVIRONMENT UNIT

ENVIRONMENT - ECOSYSTEMS

LEARNING GOAL

Students who demonstrate understanding can construct an argument that some animals form groups that help members survive.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of environmental impacts on ecosystems.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• constructing an argument connecting the evidence and describing that being part of a group can have the effect of animals being more successful in obtaining food, defending themselves, and coping with change, therefore being a member of a group helps animals survive.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying types of animals that form or live in groups.• finding examples of animals obtaining more food for each individual animal compared to the same type of animals looking for food individually.• finding examples of animals displaying more success in defending themselves than those same animals acting alone.• finding examples of animals making faster or better adjustments to harmful changes in their ecosystem than would those same animals acting alone.
Beginning	Student demonstrates limited understanding of environmental impacts on ecosystems.

LIFE AND ENVIRONMENT UNIT

LEARNING GOAL

Students who demonstrate understanding can analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of environmental impacts on ecosystems.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• interpreting data to describe that features of fossils provide evidence of organisms that lived long ago and of what types of environments those organisms must have lived in.• describing that by comparing data about where fossils are found and what those environments are like, fossilized plants and animals can be used to provide evidence that some environments look very different now than they did a long time ago.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying fossils of plants and animals.• organizing the given data about fossils of animals and plants.• describing the relationship between the fossils of organisms and the environments in which they lived.• describing the relationship between fossils or organisms that lived long ago and their modern counterparts.
Beginning	Student demonstrates limited understanding of environmental impacts on ecosystems.

LIFE AND ENVIRONMENT UNIT

LEARNING GOAL

Students who demonstrate understanding can construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of environmental impacts on ecosystems.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• evaluating evidence to determine the similarities and differences in needs among at least 3 types of organisms.• evaluating evidence to determine how and what features of the habitat meet and do not meet the needs of each of the organisms.• constructing an argument with evidence that suggests a cause-and-effect relationship within the system between the characteristics of a habitat and the survival of organisms within it.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing the characteristics of a given particular environment.• describing the characteristics and needs of a particular organism.
Beginning	Student demonstrates limited understanding of environmental impacts on ecosystems.

LIFE AND ENVIRONMENT UNIT

LEARNING GOAL

Students who demonstrate understanding can make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of environmental impacts on ecosystems.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• evaluating the solution to the problem and describing how well the proposed solution reduces the impact of the problem created by the environmental change in the system.• describing how the solution makes changes to one part of the system, affecting the other parts of the system and how the solution affects plants and animals.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing a system of plants, animals, and a given environment within which they live before the given environmental change occurs.• describing a given change in the environment.• describing how the change in the given environment causes a problem for existing plants and animals living within that area.
Beginning	Student demonstrates limited understanding of environmental impacts on ecosystems.

LIFE AND ENVIRONMENT UNIT

LIFE – LIFE CYCLES

LEARNING GOAL

Students who demonstrate understanding can develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of life cycles and traits.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing models and identifying the following:<ul style="list-style-type: none">○ organisms (both plant and animal)○ birth○ growth○ reproduction○ death• describing the causal direction of the cycle.• describing that although organisms can display life cycles that look different, they all follow the same pattern.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• developing models and identifying some but not all of the following:<ul style="list-style-type: none">○ organisms (both plant and animal)○ birth○ growth○ reproduction○ death• describing that organisms are born, grow and die in a pattern known as a life cycle.
Beginning	Student demonstrates limited understanding of life cycles and traits.

LIFE AND ENVIRONMENT UNIT

LEARNING GOAL

Students who demonstrate understanding can analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of life cycles and traits.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• identifying and describing patterns in the data to show similarities in the traits of a parent and the traits of an offspring or among siblings.• identifying and describing patterns in the differences in traits in a group of similar organisms.• identifying and describing patterns in the differences in traits of parents and offspring or among siblings.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying the traits of plant and animal parents.• identifying the traits of plant and animal offspring or siblings.• identifying the variations in similar traits in a grouping of similar organisms.
Beginning	Student demonstrates limited understanding of life cycles and traits.

LIFE AND ENVIRONMENT UNIT

LEARNING GOAL

Students who demonstrate understanding can use evidence to support the explanation that traits can be influenced by the environment.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of life cycles and traits.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using reasoning to connect the evidence to describe a cause-and-effect relationship between a specific causal environmental factor and its effect of a given variation in a trait.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying observable inherited traits or organisms in varied environmental conditions.• describing environmental factors that may influence organisms' traits.
Beginning	Student demonstrates limited understanding of life cycles and traits.

LIFE AND ENVIRONMENT UNIT

LEARNING GOAL

Students who demonstrate understanding can use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of life cycles and traits.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using reasoning to logically connect the evidence to describe that certain variations in characteristics make it harder or easier for an animal to survive, find mates, and reproduce.• using reasoning to logically connect the evidence to describe that characteristics that make it easier for some organisms to survive, find mates, and reproduce give those organisms an advantage over other organisms of the same species that don't have those traits.• using reasoning to logically connect the evidence to describe that there can be a cause-and-effect relationship between a specific variation in a characteristic and its effect on the ability of the individual organism to survive and reproduce.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing a given characteristic of a species.• describing the patterns of variation of a given characteristic among individuals in a species.• describing the potential benefits of a given variation of the characteristic.
Beginning	Student demonstrates limited understanding of life cycles and traits.

Learning goals and Proficiency Scales for Fourth Grade

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WAVES AND ENERGY UNIT

WAVES

LEARNING GOAL

Students who demonstrate understanding can generate and compare multiple solutions that use patterns to transfer information.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of waves.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none"> • generating two or more design solutions that use patterns to transmit a given piece of information through energy using models like pendulums, Slinkys, Morse Code, and grids. • describing how the design solution is based on knowledge of digitized information transfer and ways that high-tech devices convert and transmit information for communication. • identifying similarities and differences in the types of patterns used in the solution to determine whether some ways of transmitting information are more effective than others at addressing the problem.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none"> • generating one design solution that use patterns to transmit a given piece of information. • describing the given constraints and criteria for the design solution.
Beginning	Student demonstrates limited understanding of waves.

WAVES AND ENERGY UNIT

LEARNING GOAL

Students who demonstrate understanding can develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of waves.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing a model of waves and identifying the following:<ul style="list-style-type: none">○ waves○ wave amplitude○ wavelength○ motion of objects• identifying and describing that waves can be described in terms of patterns of repeating amplitude and wavelength.• using the model to describe the similarities and differences in patterns underlying waves and uses these patterns to describe simple relationships involving wave amplitude, wavelength, and the motion of an object.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• developing a model of waves and identifying some but not all of the following:<ul style="list-style-type: none">○ waves○ wave amplitude○ wavelength○ motion of objects• identifying and describing that waves can cause an object to move.• using the model to describe how waves may be initiated.
Beginning	Student demonstrates limited understanding of waves.

WAVES AND ENERGY UNIT

ENERGY

LEARNING GOAL

Students who demonstrate understanding can use evidence to construct an explanation relating the speed of an object to the energy of that object.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of energy.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using evidence to describe that motion can indicate the energy of an object.• creating models that demonstrate how energy is transferred from a moving object interacting with its surroundings and transferring between objects.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying and describing the relative speed of the object.• identifying and describing the qualitative indicators of the amount of energy of the object, as determined by a transfer of energy from that object.
Beginning	Student demonstrates limited understanding of energy.

WAVES AND ENERGY UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of energy.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• making and recording observations to provide evidence that energy is present whenever there are moving objects, sound, light, or heat.• making and recording observation to provide evidence that energy has been transferred from place to place.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing the motion and collision of objects before and after an interaction.• describing the relative present of sound, light, or heat before and after an interaction.• describing the presence of electric currents flowing through wires causally linking one form of energy output to another form of energy output.• describing that energy can be transferred from place to place by:<ul style="list-style-type: none">○ moving objects○ sound○ light○ heat○ electric currents
Beginning	Student demonstrates limited understanding of energy.

WAVES AND ENERGY UNIT

LEARNING GOAL

Students who demonstrate understanding can ask questions and predict outcomes about the changes in energy that occur when objects collide.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of energy.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• asking questions about the changes in energy that occur when objects collide.• predicting reasonable outcomes about the changes in energy that occur after objects collide, based on patterns linking object collision and energy transfer between objects and the surrounding air.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• asking questions about the changes in energy that occur when objects collide in which answers would clarify a qualitative measure of energy of the object before the collision.• asking questions about the changes in energy that occur when objects collide in which answers would clarify the mechanism of energy transfer during the collision.
Beginning	Student demonstrates limited understanding of energy.

WAVES AND ENERGY UNIT

LEARNING GOAL

Students who demonstrate understanding can apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of energy.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• designing a solution to a given problem that converts energy from one form to another.• testing the device and using the results of the test to address problem in the design or improve its functioning.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• designing a solution to a given problem with guidance and support that converts energy from one form to another.• describing the initial and final forms of energy.• identifying the device by which the energy will be transformed.
Beginning	Student demonstrates limited understanding of energy.

WAVES AND ENERGY UNIT

LEARNING GOAL

Students who demonstrate understanding can obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of energy.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using information they obtained to describe the causal relationships between energy resources and the environmental effects of using that energy source.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• gathering information about energy resources and fossil fuels including how they are derived from natural sources, how they address human needs, and the positive and negative environmental effects of using each energy resource.
Beginning	Student demonstrates limited understanding of energy.

WAVES AND ENERGY UNIT

LEARNING GOAL

Students who demonstrate understanding can use models to explain that simple machines change the amount of effort and/or direction of force.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of energy.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using 3 or more models to explain how the amount of effort and/or direction of forces is changed with a simple machine.• describing the relationship between the amount of effort and the direction of force when using a simple machine.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• using 1-2 models to explain how the amount of effort and/or direction of forces is changed with a simple machine.• describing the effort, force, and movement of simple machines.
Beginning	Student demonstrates limited understanding of energy.

OUR DYNAMIC EARTH

LEARNING GOAL

Students who demonstrate understanding can identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth's systems and processes that shape the Earth.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using reasoning to connect the evidence to support the explanation that specific rock layers in the same location show specific fossil patterns.• using reasoning to connect the evidence to support the explanation that since lower layers were formed first then covered up by upper layers, this pattern indicates that the landscape of the area was transformed onto the landscape indicated by the upper layer.• using reasoning to connect the evidence to support the explanation that irregularities in the patterns of rock layers indicate disruptions due to Earth forces.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying different rock layers found in an area.• identifying the order of rock layers.• identifying the presence of particular fossils.• identifying the occurrence of events due to Earth forces.• describing how rock layers are formed.
Beginning	Student demonstrates limited understanding of Earth's systems and processes that shape the Earth.

OUR DYNAMIC EARTH UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, wind, or vegetation.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth's systems and processes that shape the Earth.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• making and recording observations to provide evidence on how weathering breaks rocks, soil, and sediments into smaller pieces and moves them around.• identifying the cause and effect relationships between weathering or erosion, and Earth materials.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing the kind of weathering or erosion to which the Earth material is exposed.• identifying a variety of forces that break down rocks, soil and sediments.• defining weathering and erosion and describing the similarities and differences between them.
Beginning	Student demonstrates limited understanding of Earth's systems and processes that shape the Earth.

OUR DYNAMIC EARTH UNIT

LEARNING GOAL

Students who demonstrate understanding can analyze and interpret data from maps to describe patterns of Earth's features.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth's systems and processes that shape the Earth.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using maps to identify areas of the Earth where it can be predicted that features such as mountain chains, deep ocean trenches, volcanoes, and earthquake regions can occur.• describing that Earth features occur in patterns that reflect information about how they are formed or occur.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• recognizing that there are areas of the earth that have common patterns such as mountain chains, deep ocean trenches, volcanoes, and earthquake regions.• identify the location of Earth features, including the locations of mountain ranges, deep ocean trenches, earthquakes, and volcanoes.
Beginning	Student demonstrates limited understanding of Earth's systems and processes that shape the Earth.

OUR DYNAMIC EARTH UNIT

LEARNING GOAL

Students who demonstrate understanding can generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth's systems and processes that shape the Earth.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• designing at least two solutions that reduce the impacts of natural Earth processes on humans.• describing and using cause and effect relationships between the Earth's processes and its observed effect.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• designing one solution that reduces the impacts of natural Earth processes on humans.• identifying natural hazards that result from the Earth's processes.
Beginning	Student demonstrates limited understanding of Earth's systems and processes that shape the Earth.

SURVIVAL, SENSES, AND ADAPTATIONS UNIT

LEARNING GOAL

Students who demonstrate understanding can develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of structure, function, and information processing
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing a model and identifying the relevant components including:<ul style="list-style-type: none">○ light (including light source)○ objects○ the path that light follows○ the eye• identifying and describing causal relationships between the components including:<ul style="list-style-type: none">○ light entering the eye, allowing objects to be seen.○ light reflects off of objects, and then can travel and enter the eye.○ objects can be seen only if light follows a path between a light source, the object, and the eye.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• developing a model and identifying some but not all of the relevant components including:<ul style="list-style-type: none">○ light (including light source)○ objects○ the path that light follows○ the eye• describing the effects of removing, blocking, or changing the light source, closing the eye, and changing the path of the light.
Beginning	Student demonstrates limited understanding of structure, function, and information processing.

SURVIVAL, SENSES AND ADAPTATIONS UNIT

LEARNING GOAL

Students who demonstrate understanding can construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of structure, function, and information processing
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using reasoning to connect the relevant and appropriate evidence and construct an argument that:<ul style="list-style-type: none">○ internal and external structures serve specific functions within plants and animals.○ the functions of internal and external structures can support survival, growth, behavior, and/or reproduction in plants and animals.○ different structures work together as part of a system to support survival, growth, behavior and/or reproduction.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying the internal and external structures of selected plants and animals.• describing the primary functions of those structures.
Beginning	Student demonstrates limited understanding of structure, function, and information processing.

SURVIVAL, SENSES AND ADAPTATIONS UNIT

LEARNING GOAL

Students who demonstrate understanding can use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of structure, function, and information processing.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using a model to describe that different types of sensory information are relayed to the brain via different sensory receptors allowing experiences to be perceived, stored as memories, and influence behavior.• using a model to describe interactions between the following:<ul style="list-style-type: none">○ information in the environment.○ different types of sense receptors.○ perception and memory of sensory information.○ animal behavior.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying and describing from a given model:<ul style="list-style-type: none">○ different types of information about the surroundings.○ sense receptors able to detect different types of information from the environment.○ animals' actions.
Beginning	Student demonstrates limited understanding of structure, function, and information processing.

SURVIVAL, SENSES AND ADAPTATIONS UNIT

LEARNING GOAL

Students who demonstrate understanding can compare and contrast the major organs/organ systems (e.g. support, reproductive, digestive, transport/circulatory, excretory, response) that perform similar functions for animals belonging to different vertebrate classes.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of structure, function, and information processing.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• comparing and contrasting major organs/organ systems that perform similar function in at least two different vertebrate classes (ex. fish, amphibians, reptiles, birds, mammals).
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying major organs/organ systems in animals.• identifying the functions of major organs/organ systems in animals.
Beginning	Student demonstrates limited understanding of structure, function, and information processing.

Learning goals and Proficiency Scales for Fifth Grade

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EARTH AND SPACE UNIT

EARTH

LEARNING GOAL

Students who demonstrate understanding can develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth’s systems and interactions between them.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none"> • developing a model to show the interactions between 2 of Earth’s systems. • describing the interactions of how parts of an individual Earth system work together to affect the functioning of that Earth system and contribute to the functioning of the other relevant Earth system.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none"> • developing a model of 2 of Earth’s systems. • identifying the relationships between the 2 Earth systems.
Beginning	Student demonstrates limited understanding of Earth’s systems and the interactions between them.

EARTH AND SPACE UNIT

LEARNING GOAL

Students who demonstrate understanding can describe and graph the amounts and percentages of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application, understanding, and in-depth inferences with water distribution on Earth.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">graphing the given data about the amount and percentage of salt water and fresh water in each of the following reservoirs, as well as in all the reservoirs combined:<ul style="list-style-type: none">oceanslakesriversglaciersground waterpolar ice capsusing the graphs to describe all of the following:<ul style="list-style-type: none">the majority of water on Earth is found in the oceans.most of the Earth's fresh water is stored in glaciers or underground.a small percentage of fresh water is found in lakes, rivers, wetlands, and the atmosphere.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">graphing the given data about the amount and percentage of salt water and fresh water in some, but not all, of the following reservoirs, as well as in all the reservoirs combined:<ul style="list-style-type: none">oceanslakesriversglaciersground waterpolar ice capsusing the graphs to describe some, but not all of the following:<ul style="list-style-type: none">the majority of water on Earth is found in the oceans.most of the Earth's fresh water is stored in glaciers or underground.a small percentage of fresh water is found in lakes, rivers, wetlands, and the atmosphere.
Beginning	Student demonstrates limited understanding of the water distribution on Earth.

EARTH AND SPACE UNIT

LEARNING GOAL

Students who demonstrate understanding can obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth and human activity.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• obtaining and combining information from two or more sources to provide and describe evidence about the positive and negative effects on the environment as a result of human activities.• describing evidence about how individual communities can use scientific ideas and a scientific understanding of interactions between components of environmental systems to protect a natural resource and the environment in which the resource is found.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• obtaining information from books and other reliable media about how a given human activity affects the Earth's resources and environments.• describing evidence about how a given community uses scientific ideas to protect a given natural resource and the environment in which the resource is found.
Beginning	Student demonstrates limited understanding of Earth and human activity.

EARTH AND SPACE UNIT

SPACE

LEARNING GOAL

Students who demonstrate understanding can support an argument that the gravitational force exerted by Earth on objects is directed towards the planet's center.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of gravitational forces.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">defending the conclusion that gravitational force draws towards the Earth's center based on location of its surface using evidence, data, or a model.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">describing how gravitational forces are present on Earth and that this force is equal on different objects.identifying that the gravitational force exerted by Earth on objects is directed down in any location.
Beginning	Student demonstrates limited understanding of gravitational forces.

EARTH AND SPACE UNIT

LEARNING GOAL

Students who demonstrate understanding can support an argument that relative distances from Earth affects the apparent brightness of the sun compared to other stars.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth's place in the universe.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• supporting an argument that the apparent brightness of the sun compared to other stars are due to their relative distances from the Earth.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• understanding that differences in the sun's brightness and star brightness is caused by their relative distances from Earth.• understanding the brightness of a light source is affected by its distance from the location being measured from.
Beginning	Student demonstrates limited understanding of Earth's place in the universe.

EARTH AND SPACE UNIT

LEARNING GOAL

Students who demonstrate understanding can represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearances of some stars in the night sky.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth's place in the universe.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using data in graphical displays to connect observable patterns and their causes. These include all of the following:<ul style="list-style-type: none">○ daily patterns in length and direction of shadows.○ daily patterns of day and night.○ patterns of seasonal appearances of some stars in the night sky.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• using data in graphical displays to connect observable patterns and their causes. These include 1-2 of the following:<ul style="list-style-type: none">○ daily patterns in length and direction of shadows.○ daily patterns of day and night.○ patterns of seasonal appearances of some stars in the night sky.
Beginning	Student demonstrates limited understanding of Earth's place in the universe.

EARTH AND SPACE UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations during different seasons to relate the amount of daylight to the time of year.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of Earth's place in the universe.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• identifying and describing the relationship between the amount of daylight and the time of year.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• making and recording observations about the relative length of the day in different seasons.
Beginning	Student demonstrates limited understanding of Earth's place in the universe.

STRUCTURE AND PROPERTIES OF MATTER UNIT

LEARNING GOAL

Students who demonstrate understanding can plan and conduct investigations to separate the components of a mixture/solution by their physical properties (ie. sorting, filtration, magnets, screening).

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of properties of matter.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing a plan to separate the components of a mixture/solution by its physical properties.• collecting and recording observations about different components and their physical properties.• describing the relationship between the physical properties of different components and the best method used to separate it from the mixture/solution.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying and describing the materials to be used to separate the components of a mixture/solution.• identifying physical properties of different components.
Beginning	Student demonstrates limited understanding of properties of matter.

STRUCTURE AND PROPERTIES OF MATTER UNIT

LEARNING GOAL

Students who demonstrate understanding can develop a model to describe that matter is made of particles too small to be seen.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of matter.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing a model that includes the idea that matter is made of particles too small to be seen.• identifying the relevant components in the model of bulk matter and particles of matter that are too small to be seen.• describing the relevant relationships between bulk matter and tiny particles that cannot be seen.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• using a model to identify the relevant components of bulk matter and particles of matter that are too small to be seen.
Beginning	Student demonstrates limited understanding of matter.

STRUCTURE AND PROPERTIES OF MATTER UNIT

LEARNING GOAL

Students who demonstrate understanding can measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of the conservation of matter.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• measuring and/or calculating the difference between the total weight of the substances before and after they are heated, cooled, and/or mixed.• describing the changes in properties they observe during and/or after heating, cooling, or mixing substances.• using their measurements and calculations to describe that the total weight of the substances did not change, regardless of the reaction or changes in properties that were observed.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• measuring and graphing the weight of substances before they are heated, cooled, or mixed.• measuring and graphing the weight of substances, including any new substances produced by a reaction, after they are heated, cooled, or mixed.
Beginning	Student demonstrates limited understanding of the conservation of matter.

STRUCTURE AND PROPERTIES OF MATTER UNIT

LEARNING GOAL

Students who demonstrate understanding can make observations and measurements to identify materials based on their properties.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of structure and properties of matter.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• describing how data will be collected through:<ul style="list-style-type: none">○ quantitative measures of properties in standard units (e.g. grams, liters).○ observations of properties such as color, conductivity, and reflectivity.○ determination of conductors vs. nonconductors and magnetic vs. nonmagnetic materials.• describing how the observations and measurements they make will allow them to identify materials based on their properties.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• collecting and recording data on the properties of materials that can be used to identify those materials (e.g. color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility).
Beginning	Student demonstrates limited understanding of structure and properties of matter.

STRUCTURE AND PROPERTIES OF MATTER UNIT

LEARNING GOAL

Students who demonstrate understanding can conduct an investigation to determine whether the mixing of two or more substances results in new substances.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of matter.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• describing the evidence from data that will be collected including:<ul style="list-style-type: none">○ quantitative (e.g. weight) and qualitative (e.g. state of matter, color, texture, odor) properties of the substances to be mixed).○ quantitative and qualitative properties of the resulting substances.• describing how the collected data can serve as evidence for whether the mixing of the two or more tested substances results in one or more new substances.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• collaboratively collecting and recording data, including data about the substances before and after mixing.
Beginning	Student demonstrates limited understanding of matter.

ECOSYSTEMS

LEARNING GOAL

Students who demonstrate understanding can use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of food chains and food webs.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using models to identify and describe the relationships between all of the following:<ul style="list-style-type: none">○ plants and the energy they get from the sunlight to produce food.○ food and the energy and materials that animals require for bodily functions (body repair, growth, motion, body warmth maintenance).○ animals and the food they eat, which is either other animals or plants (or both), to obtain energy for bodily functions and materials for growth and repair.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• using models to identify and describe the relationships between some, but not all of the following:<ul style="list-style-type: none">○ plants and the energy they get from the sunlight to produce food.○ food and the energy and materials that animals require for bodily functions (body repair, growth, motion, body warmth maintenance).○ animals and the food they eat, which is either other animals or plants (or both), to obtain energy for bodily functions and materials for growth and repair.
Beginning	Student demonstrates limited understanding of food chains and food webs.

ECOSYSTEMS UNIT

LEARNING GOAL

Students who demonstrate understanding can support an argument that plants get the materials (i.e. carbon dioxide, water, sunlight) they need for growth chiefly from air and water.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of energy flow in organisms.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using reasoning to connect the evidence to support the claim with argumentation that:<ul style="list-style-type: none">○ plants do not acquire most of the material for growth from soil, because some plants don't need soil to grow.○ a plant cannot grow without water or air.○ plant growth must come chiefly from water and air
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing the given evidence, data, and/or models that support the claim.• showing evidence of plant growth over time and a plant's inability to grow without water or air.
Beginning	Student demonstrates limited understanding of energy flow in organisms.

ECOSYSTEMS UNIT

LEARNING GOAL

Students who demonstrate understanding can develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of the movement of matter in an ecosystem.
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing a model describing the movement of matter within an ecosystem and identifying all of the relevant components, including:<ul style="list-style-type: none">○ matter○ plants○ animals○ decomposers, such as fungi and bacteria○ environment• using the model to describe:<ul style="list-style-type: none">○ the cycling of matter in the system between plants, animals, decomposers, and the environment.○ how interactions in the system of plants, animals, decomposers, and the environment allow multiple species to meet their needs.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• developing a model describing the movement of matter within an ecosystem and identifying some, but not all of the relevant components, including:<ul style="list-style-type: none">○ matter○ plants○ animals○ decomposers, such as fungi and bacteria○ environment• Using the model to show:<ul style="list-style-type: none">○ animals that consume other animals.○ animals that consume other plants.○ organisms that consume dead plants and animals.
Beginning	Student demonstrates limited understanding of the movement of matter in an ecosystem.

Engineering Learning Goals and Proficiency Scales Grades K-2

LEARNING GOAL

Students who demonstrate understanding can ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of engineering design
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using information gathered, including the answers to their questions, observations they have made, and scientific information, to describe the situation people want to change in terms of a simple problem that can be solved with the development of a new or improved object or tool.• describing the desired features of the tool or object that would solve the problem, based on scientific information, materials available, and potential related benefits to people and other living things.
Approaching	Students demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• describing a given situation that people wish to change.• describing why people want the situation to change.• describing the desired outcome of changing the situation.
Beginning	Student demonstrates limited understanding of engineering design.

ENGINEERING

LEARNING GOAL

Students who demonstrate understanding can develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of engineering design
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• developing a representation (simple sketch, drawings, or physical model) of an object needed to solve a given problem.• using their representation to communicate the connections between the shape(s) of an object, and how the object could solve the problem.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• developing a representation (simple sketch, drawings, or physical model) of an object with guidance and support needed to solve a given problem.• identify the relevant shape(s) of the object.• identify the function of the object.
Beginning	Student demonstrates limited understanding of engineering design.

ENGINEERING

LEARNING GOAL

Students who demonstrate understanding can analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of engineering design
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• using graphical displays (tables, pictographs, line plots, etc.) to organize given data from tests of two objects.• finding patterns and using the patterns to describe:<ul style="list-style-type: none">○ the way (physical process, qualities of the solution) each object will solve the problem.○ the strengths and weaknesses of each design.○ which object is better suited to the desired function, if both solve the problem.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• using graphical displays (tables, pictographs, line plots, etc.) with guidance and support to organize given data from tests of two objects.• identifying the intended performance of the two objects.• comparing and contrasting the performances of the two objects.
Beginning	Student demonstrates limited understanding of engineering design

Engineering Learning Goals and Proficiency Scales Grades 3-5

LEARNING GOAL

Students who demonstrate understanding can define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of engineering and design
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">• defining the limits or constraints within which the problem will be addressed, which includes addressing something people want and need at the current time.• specify criteria (required features) of a successful solution.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">• identifying that the problem chosen is one that can be solved with the development of a new or improved object, tool, process, or system.• describing the cost, materials, and time needed for the design.
Beginning	Student demonstrates limited understanding of engineering and design.

ENGINEERING

LEARNING GOAL

Students who demonstrate understanding can generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of engineering and design
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">● generating at least two possible solutions to the problem based on scientific information and understanding of the problem.● testing each solution under a range of likely conditions and gather data to determine how well the solutions meet the criteria and constraints of the problem.● using the collected data to compare solutions based on how well each solution meets the criteria and constraints of the problem.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">● generating one possible solution to the problem based on scientific information and understanding of the problem.● specifying how the design solution solves the problem.● describing the criteria (required features) and constraints (limits) for the solutions.
Beginning	Student demonstrates limited understanding of engineering and design.

ENGINEERING

LEARNING GOAL

Students who demonstrate understanding can plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

PROFICIENCY SCALE

Innovating	Student demonstrates advanced application and understanding of engineering and design
Meeting	Student demonstrates mastery with the learning goal as evidenced by: <ul style="list-style-type: none">● creating a plan for the investigation that describes different tests for each aspect of the criteria and constraints including:<ul style="list-style-type: none">○ the specific criterion or constraint to be used.○ what is to be changed in each trial (the independent variable).○ the outcome (dependent variable) that will be measured to determine success.○ what tools and methods are to be used for collecting data.○ what is to be kept the same from trial to trial to ensure a fair test.
Approaching	Student demonstrates he/she is nearing proficiency by: <ul style="list-style-type: none">● describing how well the model/prototype performs against the given criteria and constraints.● describing specific aspects of the prototype or model that do not meet one or more of the criteria or constraints (i.e., failure points or difficulties).● describing aspects of the model/prototype that can be improved to better meet the criteria and constraints.
Beginning	Student demonstrates limited understanding of engineering and design.