

Curriculum - First Grade

High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 1.LS1.A.1

Learning Goal

Students 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

4: Student demonstrates advanced application and understanding of structure, function, and information processing.

3: Student demonstrates mastery with the learning goal as evidenced by:

- designing a device and describing the specific or required features in their designs and devices including:
 - the device provides a solution to the given human problem.
 - the device mimics plant and/or animal external parts, and/or information processing.

2: Student demonstrates he/she is nearing proficiency by:

- 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.

1: Student demonstrates limited understanding of structure, function, and information processing.

Learning Targets - Life Science Unit

Science and Engineering Practices

- Define a simple problem that can be solved through mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
- Design a solution to a given human problem by mimicking how plants and animals use their structures.
- Ask questions based on observations of how different plants and animals use their body parts in different ways to protect themselves.
- Develop a model to represent relationships in the natural world, such as animals' external parts and the animals' ability to move from place to place.
- Make observations (firsthand or from media) to construct an evidence-based account for how plant and animal structures (e.g., roots of plants, duck feet) help them survive and grow.

Disciplinary Core Ideas

- All organisms have external parts that they use to perform daily functions.

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- Different animals use their body parts in different ways (e.g., see; hear; grasp objects; protect themselves; move from place to place; seek, find, and take in food, water, and air).
- Plants have different parts (e.g., roots, stems, leaves, flowers, fruits) that help them survive and grow.
- Animals have body parts that capture and convey different kinds of information needed for growth and survival.
- Animals respond to inputs with behaviors that help them survive. Plants also respond to external inputs.

Cross Cutting Concept

- The shape and stability of structures of natural and designed objects are related to their function(s).
- Describe simple tests that can be designed to gather evidence to support or refute student ideas about how different plant and animal parts contribute to survival.

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High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 1.LS3.A.1

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

4: Student demonstrates advanced application and understanding of inheritance and variation of traits..

3: Student demonstrates mastery with the learning goal as evidenced by:

- connecting the evidence of observed patterns in features to support that:
 - 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.

2: Student demonstrates he/she is nearing proficiency by:

- describing evidence from observations that:
 - 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.

1: Student demonstrates limited understanding of inheritance and variation of traits.

Learning Targets - Life Science Unit

Science and Engineering Practices

- Make observations (firsthand or from media [e.g., books, videos]) to collect data that can be used to make comparisons of parent and baby plants and animals.
- Read grade-appropriate texts and/or use media to obtain scientific information to determine patterns in and/or evidence about similarities in young plants and animals and their parents.
- Make qualitative observations to compare and contrast parents and offspring.
- Observe the growth of a plant from seed to flowering plant.

Disciplinary Core Ideas

- Adult plants and animals can have young.

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- Animals and plants of the same kind have the same structures (e.g., wings, number of legs, fur, leaf shape, flower).
- Young organisms are very much, but not exactly, like their parents and also resemble other organisms of the same kind.

Cross Cutting Concept

- Observe the pattern that parents and their young are alike, but not exactly alike (i.e., animals and plants).
- Observe the pattern that animals and plants of the same kind have the same structures.

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High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 5.PS4.A.1

Learning Goal

Students can make observations to construct an evidence-based account that objects in darkness can be seen only when light is reflected off them or when they produce their own light.

Proficiency Scale

4: Student demonstrates advanced application and understanding of light waves.

3: Student demonstrates mastery with the learning goal as evidenced by:

- logically connecting the evidence to support and describe that:
 - 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.

2: Student demonstrates he/she is nearing proficiency by:

- making observations about:
 - 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.

1: Student demonstrates limited understanding of light waves.

Learning Targets - Light and Sound

Science and Engineering Practices

Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.

Disciplinary Core Ideas

Objects can be seen when light reflected from their surfaces enters our eyes.

Cross Cutting Concept

Simple tests can be designed to gather evidence to support or refute student ideas about causes.

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High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 1.PS4.C.1

Learning Goal

Students 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

4: Student demonstrates advanced application and understanding of light and sound waves.

3: Student demonstrates mastery with the learning goal as evidenced by:

- designing and building a device that is able to send or receive information over a given distance and uses light or sound to communicate.

2: Student demonstrates he/she is nearing proficiency by:

- 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.

1: Student demonstrates limited understanding of light and sound waves.

Learning Targets - Light and Sound

Science and Engineering Practices

- Define a simple problem that can be solved through the development of a new or improved object or tool.
- Make observations to construct an evidence-based account of devices that can help people communicate over long distances.
- Communicate design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas.
- With guidance, students use tools and materials to design and build a device that uses light or sound to solve the given problem.

Disciplinary Core Ideas

- Objects can only be seen if there is light to illuminate them or they give off their own light.
- Objects made of different materials allow light to pass through them in different ways.
- Materials can block light and create shadows.
- Materials (e.g., mirror, aluminum foil) can change the direction of the light.
- People use a variety of devices to communicate over long distances to send and/or receive information.

Cross Cutting Concept

Objects are related to their function(s).

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High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 1.PS4.A.1 and 2.PS4.A.1

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of light and sound waves.

3: Student demonstrates mastery with the learning goal as evidenced by:

- developing an investigation plan and describing the evidence that will result from the investigation including:
 - 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.

2: Student demonstrates he/she is nearing proficiency by:

- 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 material is vibrating.

1: Student demonstrates limited understanding of light and sound waves.

Learning Targets - Light and Sound

Science and Engineering Practices

- With guidance, predict, plan and conduct simple investigations to observe the vibrations of various materials producing sounds.
- Record information from observations that sound can make matter vibrate and vibrating matter can make sound.
- With guidance, use qualitative data to compare two alternative solutions to a problem (e.g., sound makes matter vibrate / vibrations make sound).

Disciplinary Core Ideas

- Observe that sound can make materials (matter) vibrate.
- Observe that vibrating materials (matter) can make sound.

Cross Cutting Concept

- Vibrations make sound, and sounds make vibrations.
- Events have causes that generate observable patterns in creating sound.

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- Simple tests can be designed to gather evidence to support or refute student ideas about the cause and effect relationship of vibrations and sound.

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High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 1.ESS1.A.2

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of patterns and cycles in space.

3: Student demonstrates mastery with the learning goal as evidenced by:

- identifying and describing patterns in the organized data, including:
 - 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.

2: Student demonstrates he/she is nearing proficiency by:

- using graphical displays to organize data from given observations with guidance and support including:
 - 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.

1: Student demonstrates limited understanding of patterns and cycles in space.

Curriculum - First Grade

Learning Targets - Space Systems

Science and Engineering Practices

- Make observations and collect data that can be used to make comparisons and predict patterns of the sun and moon during the day.
- Ask questions based on observations to find more information about the patterns of the sun, moon, and stars.
- Make predictions based on observations of the sun, moon, and stars.
- Use observations to describe patterns and/or relationships of the sun, moon, and stars to answer scientific questions.

Disciplinary Core Ideas

- Patterns of movement of the sun, moon, and stars as seen from Earth can be observed, described, and predicted.
- The sun is observed at different positions in the sky at different times of the day (e.g., rises in the morning, sets in the evening, high in the sky at midday, moves east to west).
- The moon is observed at different positions in the sky at different times during the day and/or night.

Cross Cutting Concept

- Make predictions using patterns (e.g., day/night, movement and position of sun and moon, observable during day and/or night).
- Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.

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High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal K.ESS1.B.1

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

4: Student demonstrates advanced application and understanding of patterns and cycles in space.

3: Student demonstrates mastery with the learning goal as evidenced by:

- 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.

2: Student demonstrates he/she is nearing proficiency by:

- describing the data with guidance and support including observations of relative length of the day throughout the year.

1: Student demonstrates limited understanding of patterns and cycles in space.

Learning Targets - Space Systems Unit

Science and Engineering Practices

- Collect and analyze observations (data points).
- Interpret data to make generalizations about seasons and amount of daylight in Missouri.

Disciplinary Core Ideas

Recall that different seasons result in longer or shorter amounts of daylight, depending on the time of year (“Have you noticed that you can play outside longer in the summer than in the winter?”) and describe those amounts in relative terms (e.g., more, few, less).

Cross Cutting Concept

Describe the observable pattern that can be seen between the seasons and the amount of daylight.

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High Priority Standards (Missouri Learning Standards, National, CREDE, etc.)

Missouri Learning Goal 1.ESS1.A.1

Learning Goal

Students can describe the presence of the sun, moon, and stars in the sky over time.

Proficiency Scale

4: Student demonstrates advanced application and understanding of the universe and its stars.

3: Student demonstrates mastery with the learning goal as evidenced by:

- using pictures, models, and/or drawings to describe objects visible in the sky during the day and during the night

2: Student demonstrates he/she is nearing proficiency by:

- understands that the sun and moon move to different positions in the sky.

1: Student demonstrates limited understanding of the universe and its stars.

Learning Targets - Space Systems Unit

Science and Engineering Practices

- Make observations of the sun and moon during the day.
- Communicate information with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about the presence of the sun, moon, and stars in the sky over time.

Disciplinary Core Ideas

- The sun is observed at different positions in the sky at different times of the day (e.g., rises in the morning, sets in the evening, high in the sky at midday, moves from east to west).
- The moon is observed at different positions in the sky at different times during the day or night.
- Stars (other than the sun) are not observable in the sky during the day but are observed during the night.
- The moon can be observed during the day and during the night, but the sun can only be observed during the day.

Cross Cutting Concept

- Describe patterns in the presence of objects in the sky (e.g., sun, moon, stars) over time.
- Events have causes that generate observable patterns (e.g., the sun is visible only during the day, the moon is visible during day and night, stars are visible during the night).
- Some things stay the same while other things change (e.g., the sun during the day, the moon during the day or night).