

Curriculum - Fifth Grade

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

Missouri Learning Goal 5.PS1.B.1

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of properties of matter.

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

- 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.

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

- identifying and describing the materials to be used to separate the components of a mixture/solution.
- identifying physical properties of different components.

1: Student demonstrates limited understanding of properties of matter.

Learning Targets - Matter Unit

Science and Engineering Practices

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using a fair test in which variables are controlled and the number of trials are considered.
- Describe ways to separate the components of a mixture/solution by their properties (i.e., sorting, filtration, magnets, screening).

Disciplinary Core Ideas

Matter exists as different substances that have observable different properties. Components of mixtures and solutions can be separated using a variety of methods, depending on the properties of the individual components.

Cross Cutting Concept

Cause and Effect relationships are routinely identified and used to explain change.

Curriculum - Fifth Grade

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

Missouri Learning Goal 5.PS1.A.1

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of matter.

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

- 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.

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

- using a model to identify the relevant components of bulk matter and particles of matter that are too small to be seen.

1: Student demonstrates limited understanding of matter.

Learning Targets - Matter Unit

Science and Engineering Practices

Using models to describe phenomena

Disciplinary Core Ideas

Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.

Cross Cutting Concept

Natural objects exist from the very small to the immensely large.

Curriculum - Fifth Grade

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

Missouri Learning Goal 5.PS1.A.2

Learning Goal

Students 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

- 4: Student demonstrates advanced application and understanding of the conservation of matter.
- 3: Student demonstrates mastery with the learning goal as evidenced by:
- 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.
- 2: Student demonstrates he/she is nearing proficiency by:
- 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.
- 1: Student demonstrates limited understanding of the conservation of matter.

Learning Targets - Matter Unit

Science and Engineering Practices

Measure and graph quantities such as weight to address scientific and engineering questions and problems.

Disciplinary Core Ideas

- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.
- No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.)

Cross Cutting Concept

Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

Curriculum - Fifth Grade

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

Missouri Learning Goal 5.PS1.B.2

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of matter.

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

- describing the evidence from data that will be collected including:
 - 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 rested substances results in one or more new substances.

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

- collaboratively collecting and recording data, including data about the substances before and after mixing.

1: Student demonstrates limited understanding of matter.

Learning Targets - Matter Unit

Science and Engineering Practices

Conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials is considered.

Disciplinary Core Ideas

When two or more different substances are mixed, a new substance with different properties may be formed.

Cross Cutting Concept

Cause and effect relationships are routinely identified and used to explain change.

Curriculum - Fifth Grade

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

Missouri Learning Goals K.PS1.A.1 and 2.PS1.A.1

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of structure and properties of matter.

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

- describing how data will be collected through:
 - 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.

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

- 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).

1: Student demonstrates limited understanding of structure and properties of matter.

Learning Targets - Matter Unit

Science and Engineering Practices

Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.

Disciplinary Core Ideas

Measurements of a variety of properties can be used to identify materials.

Cross Cutting Concept

Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

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

Missouri Learning Goal 5.LS1.C.1

Learning Goal

Students 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

4: Student demonstrates advanced application and understanding of energy flow in organisms.

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

- using reasoning to connect the evidence to support the claim with argumentation that:
 - 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

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

- 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.

1: Student demonstrates limited understanding of energy flow in organisms.

Learning Targets - Ecosystems

Science and Engineering Practices

Support an argument with evidence, data, or a model.

Disciplinary Core Ideas

Plants acquire their material for growth chiefly from air and water.

Cross Cutting Concept

Matter is transported into, out of, and within systems.

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

Missouri Learning Goal 5.LS2.B.1

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of the movement of matter in an ecosystem.

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

- developing a model describing the movement of matter within an ecosystem and identifying all of the relevant components, including:
 - matter
 - plants
 - animals
 - decomposers, such as fungi and bacteria
 - environment
- using the model to describe:
 - 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.

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

- developing a model describing the movement of matter within an ecosystem and identifying some, but not all of the relevant components, including:
 - matter
 - plants
 - animals
 - decomposers, such as fungi and bacteria
 - environment
- Using the model to show:
 - animals that consume other animals.
 - animals that consume other plants.

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- o organisms that consume dead plants and animals.

1: Student demonstrates limited understanding of the movement of matter in an ecosystem.

Learning Targets - Ecosystems

Science and Engineering Practices

Develop a model to describe phenomena.

Disciplinary Core Ideas

- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as decomposers. Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.
- Matter cycles between the air and soil and between plants, animals, and microbes as these organisms live and die. Organisms obtain gases and water from the environment and release waste matter (gas, liquid, or solid) back into the environment.

Cross Cutting Concept

A system can be described in terms of its components and their interactions. 2

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

Missouri Learning Goal 5.PS3.D.1

Learning Goal

Students 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

4: Student demonstrates advanced application and understanding of food chains and food webs.

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

- using models to identify and describe the relationships between all of the following:
 - 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.

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

- using models to identify and describe the relationships between some, but not all of the following:
 - 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.

1: Student demonstrates limited understanding of food chains and food webs.

Learning Targets - Ecosystems

Science and Engineering Practices

Use models to describe phenomena.

Disciplinary Core Ideas

- The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).
- Food provides animals with the materials they need for body repair and growth, the energy they need to maintain body warmth, and for motion.

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Cross Cutting Concept

Energy can be transferred in various ways and between objects.

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

Missouri Learning Goal 5.ESS2.A.1

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of Earth's systems and interactions between them.

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

- 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 the Earth system and contribute to the functioning of the other relevant Earth system.

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

- developing a model of 2 of Earth's systems.
- identifying the relationships between the 2 Earth systems.

1: Student demonstrates limited understanding of Earth's systems and the interactions between them.

Learning Targets - Earth Unit

Science and Engineering Practices

Develop a model using an example to describe a scientific principle.

Disciplinary Core Ideas

Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.

Cross Cutting Concept

A system can be described in terms of its components and their interactions

Curriculum - Fifth Grade

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

Missouri Learning Goal 5.ESS2.C.1

Learning Goal

Students 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

4: Student demonstrates advanced application, understanding, and in-depth inferences with water distribution on Earth.

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

- graphing the given data about the amount and percentage of saltwater and freshwater in each of the following reservoirs, as well as in all the reservoirs combined:
 - oceans
 - lakes
 - rivers
 - glaciers
 - ground water
 - polar ice caps
- using the graphs to describe all of the following:
 - the majority of water on Earth is found in the oceans.
 - most of the Earth's freshwater is stored in glaciers or underground.
 - a small percentage of freshwater is found in lakes, rivers, wetlands, and the atmosphere.

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

- graphing the given data about the amount and percentage of saltwater and freshwater in some, but not all, of the following reservoirs, as well as in all the reservoirs combined:
 - oceans
 - lakes
 - rivers
 - glaciers
 - ground water
 - polar ice caps
- using the graphs to describe some, but not all of the following:

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- the majority of water on Earth is found in the oceans.
- most of the Earth's freshwater is stored in glaciers or underground.
- a small percentage of freshwater is found in lakes, rivers, wetlands, and the atmosphere.

1: Student demonstrates limited understanding of the water distribution on Earth.

Learning Targets - Earth Unit

Science and Engineering Practices

Describe and graph quantities such as area and volume to address scientific questions.

Disciplinary Core Ideas

Nearly all of Earth's available water is in the oceans. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.

Cross Cutting Concept

Standard units are used to measure and describe physical quantities such as weight and volume.

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

Missouri Learning Goal 5.ESS3.C.1

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of Earth and human activity.

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

- 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.

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

- 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.

1: Student demonstrates limited understanding of Earth and human activity.

Learning Targets - Earth Unit

Science and Engineering Practices

Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.

Disciplinary Core Ideas

Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.

Cross Cutting Concept

A system can be described in terms of its components and their interactions.

Curriculum - Fifth Grade

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

Missouri Learning Goal 5.PS2.B.1

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of gravitational forces.

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

- defending the conclusion that gravitational force draws towards the Earth's center based on the location of its surface using evidence, data, or a model.

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

- 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.

1: Student demonstrates limited understanding of gravitational forces.

Learning Targets - Space Unit

Science and Engineering Practices

Support an argument with evidence, data, or a model.

Disciplinary Core Ideas

The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.

Cross Cutting Concept

Cause and effect relationships are routinely identified and used to explain change.

Curriculum - Fifth Grade

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

Missouri Learning Goal 5.ESS1.A.1

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of Earth's place in the universe.

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

- supporting an argument that the apparent brightness of the sun compared to other stars are due to their relative distances from the Earth.

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

- 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.

1: Student demonstrates limited understanding of Earth's place in the universe.

Learning Targets - Space Unit

Science and Engineering Practices

Support an argument with evidence, data, or a model.

Disciplinary Core Ideas

The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.

Cross Cutting Concept

Natural objects exist, from the very small to the immensely large.

Curriculum - Fifth Grade

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

Missouri Learning Goal 5.ESS1.B.2

Learning Goal

Students 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

4: Student demonstrates advanced application and understanding of Earth's place in the universe.

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

- using data in graphical displays to connect observable patterns and their causes. These include all of the following:
 - 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.

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

- using data in graphical displays to connect observable patterns and their causes. These include 1-2 of the following:
 - 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.

1: Student demonstrates limited understanding of Earth's place in the universe.

Learning Targets - Space Unit

Science and Engineering Practices

Represent data in graphical displays (e.g. bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.

Disciplinary Core Ideas

The orbits of Earth around the sun and the moon around Earth, together with the rotation of Earth about an axis between its North and South Poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year.

Cross Cutting Concept

Similarities and differences in patterns can be used to sort, classify, communicate, and analyze simple rates of change for natural phenomena.

Curriculum - Fifth Grade

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

Missouri Learning Goal 5.ESS1.B.1

Learning Goal

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

Proficiency Scale

4: Student demonstrates advanced application and understanding of Earth's place in the universe.

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

- identifying and describing the relationship between the amount of daylight and the time of year.

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

- making and recording observations about the relative length of the day in different seasons.

1: Student demonstrates limited understanding of Earth's place in the universe.

Learning Targets - Space Unit

Science and Engineering Practices

- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
- Represent data in tables and/or various graphical displays, bar graphs, pictographs, and/or pie charts to reveal patterns that indicate relationships.
- Organize simple data sets to reveal patterns that suggest relationships.

Disciplinary Core Ideas

Patterns of seasons can be observed, described, and predicted.

Cross Cutting Concept

- Patterns of change can be used to make predictions.
- Events that occur together with regularity might or might not be a cause and effect relationship.
- Natural objects and/or observable phenomena exist, from the very small to the immensely large or from very short to very long time periods.