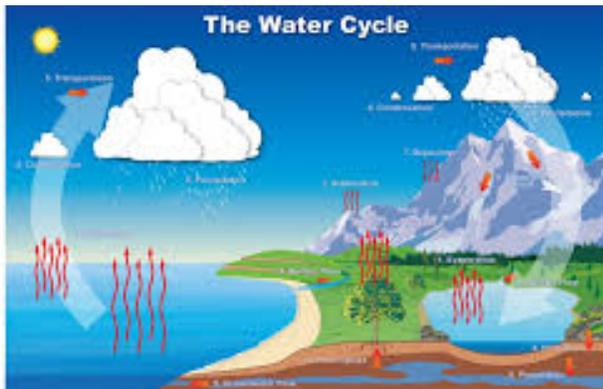


Curriculum Guide for 2nd Grade SDP Science Teachers



Please note: Pennsylvania & Next Generation Science Standards as well as Instructional Resources are found on the SDP Curriculum Engine

2nd Grade Science Curriculum Term 1 (9/5-11/13/17)

Topic: Earth Materials



Duration: 9-10 Weeks

Performance Objectives

SWBAT:

- use their five senses **IOT** observe and describe different rocks and soils.
- identify the properties of soil and rocks **IOT** compare the similarities and differences
- analyze soil **IOT** identify the living and nonliving components of soil.
- analyze soil **IOT** describe the layers of soil.
- observe weather **IOT** describe the effects of soil and rock erosion
- observe wind and water **IOT** hypothesize the effects of deposition
- identify real life examples of living and nonliving components **IOT** explore and identify living and nonliving matter
- identify multiple solutions designed to slow or prevent wind or water from changing the shape of the land **IOT** compare and contrast their design.
- make observations from multiple sources **IOT** provide evidence that Earth's events can occur quickly or slowly.

Key Terms and Definitions

Matter: Anything that has mass and takes up space

weight: The amount that something weighs

solid: A state of matter that keeps its size and shape

liquid: A state of matter that takes the shape of its container

gas: A state of matter that has no fixed shape or mass

classify: To arrange things into a group based on ways that they are alike

describe: To tell or write what is observed about something

soil: The portion of the earth's crust consisting of rock and humus

rocks: A hard mineral from the earth

minerals: A non-living solid that is part of the earth and makes up rock and soil

patterns: Things that are arranged following a rule, a repeated form or design

properties: Used to characterize physical objects

erosion: The process by which the surface of the earth is worn away by the action of water, glaciers, winds, waves, etc.

living components: An object that breathes, grows, and reproduces

nonliving components: An object that does not breathe, grow, or reproduce

deposition: The process by which rocks, sand and sediment from erosion are deposited or dropped in a different location such as a river or ocean.

luster: Shininess

texture: Smooth, rough, hard, soft, slippery, slimy, etc.

weathering: The process by which the surface of the earth is worn away or broken down by the actions of water, ice, glaciers, wind, waves, etc.

landform: Any natural rock or dirt found on earth

geology: The study of the history of the earth

Essential Questions

What are the characteristics of living and nonliving objects?

What are examples of living things?

What are examples of nonliving things?

What are some words we can use to describe different object?

What causes rock and soil to change?

What causes erosion? How can you tell?

What are similarities and differences of rock and soil?

How can you sort these rocks based on the physical properties?

How and why is the Earth constantly changing?

What causes weathering? How can you tell?

What is some evidence that Earth's events can occur quickly or slowly?

How can events on Earth change its landscape?

Starting Points

In prior grades, students will have learned how to investigate by using their five senses, asking questions, and formulating hypotheses. Students will have a foundation of the concept of the three states of matter, which are solid, liquid, and gas. In the first quarter of second grade, students will be taking a deeper look into the structure and properties of matter. Students will be able to observe and describe the basic properties and components of soil such as living components and nonliving components. Students will investigate different types of soil according to: color, texture, materials, and capacity to retain water. Students will be introduced and explore the concept of how erosion and deposition are the result of interactions between air, wind, water, and land. Using their five senses, students will observe and describe the physical properties of rocks by their size, shape, color, and presence of fossils. Compare and sort rocks by size, color, luster, texture, patterns, hardness/softness.

2nd Grade Science Curriculum Term 2 (11/18-1/29/18)

Topic: Air and Weather



Duration: 4-5 Weeks

Performance Objectives

SWBAT:

- observe interactions of air with objects **IOT** identify properties of air.
- conduct experiments **IOT** recognize that air takes up space and can move things.
- monitor and observe local weather conditions **IOT** identify patterns.

- identify and use common tools (thermometer, wind vane, anemometer, rain gauge) **IOT** describe the weather in measurable quantities (temperature, wind direction, wind speed, precipitation).
- create charts and graphs **IOT** display changes in weather conditions over time.
- discuss and determine how energy from the sun warms the land, air, and water **IOT** explain earth's dependence on the sun.
- understand how the Sun's energy warms the land, air, and water **IOT** identify and explain the stages of the water cycle.
- identify different types of clouds **IOT** classify them into three groups; cirrus, cumulus, and stratus.
- identify the difference between weather and climate **IOT** describe the three major climate zones of the Earth.

Key Terms and Definitions

Weather: Describes conditions in the air outside

Meteorologist: A person who studies the weather

Temperature: How hot or cold the air is

Thermometer: A tool used to measure the temperature of air

Wind: Moving air

Speed: How fast something moves

Direction: Which way something is going

rain gauge: A tool used to measure the amount of rainfall or snowfall

climate: The average pattern of weather for a particular region

precipitation: The rain, snow, hail, sleet or other form of water that falls from clouds

clouds: Made of liquid water drops that fall to earth as precipitation

cirrus cloud: Thin, wispy clouds high in the sky

cumulus cloud: Fluffy white clouds that could bring rain if they are dark and gray

stratus cloud: Low clouds that stretch over a large portion of the sky

wind vane: Points in the direction that the wind is coming from

anemometer: Measures the speed of wind

erosion: The wearing away of earth materials by wind, water, and rain

water cycle: The natural process water goes through to be recycled on earth

groundwater: Water found beneath the earth's surface

vapor/gas: Water found in the clouds

solid/ice: Water found as snow, sleet, freezing rain, or hail

liquid: Water found as rain

accumulation: The amount of precipitation gathered or acquired over time

polar zone: The cold, icy climate zone at the north and south poles

temperate zone: The climate zone in which we live, can be warm or cool

tropical zone: The hot climate zone around the equator

Essential Questions

What is wind?

What is weather?

What are the stages of the water cycle?

What tools can you use to measure and track the weather?

What are the properties of air? How can the properties affect earth structures?

What is climate? How does it help predict future weather?

What is the difference between climate and weather?

What is the water cycle? Why is the water cycle important?

In what forms can water be found in nature?

How are various landforms and bodies of water similar and different from each other?

How do wind and weather influence erosion?

What are the different climate zones?

What is the climate like where you live?

What does a thermometer tell us about the weather?

How does energy from the sun warm the land, air, and water?

What is the weather like in different parts of the world?

How and why is the Earth constantly changing?

Compare and contrast two climate zones.

Why do you think the tropic zones receive a lot of rain if they are so hot and also have the world's largest deserts? Use what you know about weather and the water cycle to support your answer.

Which climate zone would be the best location to open a ski shop? Explain your answer.

What are the polar climates like? Why? Use what you know about the sun to explain your answer.

What is the climate like near the equator? Why? Explain what you know about the sun to explain your answer.

Starting Points

In prior grades, students will have learned how to investigate by using their five senses, asking questions, and formulating hypotheses. Students will have learned how to gather data, record information, track patterns, and make predictions. Students will have an understanding of basic weather concepts, matter, and information about earth materials. They will use this background knowledge to dig deeper into learning about air and weather and how it affects living and nonliving things on the earth. Students will learn that air and weather are inseparable and that air is a gas that is invisible and fills the space it's in. Students will understand that weather is the condition of the atmosphere at a particular location at a specific time. They will make connections from Quarter 1 that earth's atmosphere is an earth material. As meteorologists, they will explore this idea more deeply as they make meaningful observations of the weather in their neighborhoods and learn fundamental facts about the behavior of air. The knowledge gained in this unit will help prepare them for the next unit about earth's ecosystems. Students will continue to build upon prior knowledge as they progress through second grade as scientists.

Topic: Habitats (Ecosystems)

Duration: 4-5 Weeks

Performance Objectives

SWBAT:

- use a Venn diagram **IOT** compare and contrast different habitats.
- identify and describe characteristics of each habitats **IOT** match habitats to their description.
- research habitats **IOT** create a picture/ collage which includes distinct characteristics of each given habitat.
- practice their world map skills **IOT** identify the 5 habitats and where they are located.
- use graphic organizers **IOT** help classify and categorize different examples of each habitat.
- observe the environment around them **IOT** identify the habitat in which they live.
- identify and define the characteristics of the water habitat **IOT** classify oceans, streams, lakes and rivers as part of the water habitat.
- define the characteristics of a forest **IOT** classify rainforests and temperate forests as a type of forest habitat.
- examine different landforms **IOT** label each picture of a landform with the correct name.

Key Terms and Definitions

ecosystem: Plants and animals that are found in a particular location.

habitat: A place where plants and animals can meet their needs

forest: A habitat that gets rain and sunlight for trees to grow well. Types of forests are rainforest, temperate forest, and taiga.

desert: A habitat that gets very little rain.

grassland: A habitat that is a big open space of grass

tundra: Habitat which is located near the north pole. This habitat is frozen much of the year.

aquatic: A habitat that is made of water (freshwater or saltwater)

freshwater: Some lakes, ponds, rivers, streams, springs, and wetlands, which do not contain salt

saltwater: Water that contains a high percentage of dissolved salt such as oceans, seas, and some lakes.

precipitation: Rain, hail, sleet, and snow that falls to the ground

characteristic: A special quality or trait that makes a person, thing, or group different from others

landform: A natural feature on the earth's surface Example: mountain, plateau, lake etc.

argument: Statement for or against something

evidence: Something which shows that something else exists or is true

design: To plan and make decisions about (something that is being built or created)

construct: To build or make something physical (such as a road, bridge, or building)

engineer: A person who designs and builds complex products, machines, systems, or structures

Starting Points

Prior to quarter 2, students refreshed their skills of thinking like a scientist by using their five senses in order to observe and investigate different types of soil, physical properties of rocks, and

the effects of erosion and deposition on land. In this part of quarter 2, students will focus on the different habitats/ ecosystems found around the world. Students will be introduced to the five main habitats: forest, desert, water, grassland, and tundra and will be able to identify specific types of each habitat, such as, the concept of forest includes rainforests, temperate forests, etc. Furthermore, another example is that the habitat of water includes the ocean, rivers, streams, lakes, etc. Students will be able to describe each habitat with varying characteristics by observing and collecting data on weather conditions such as average temperature and precipitation and types of precipitation. Students will also be able to identify landforms and water systems that are common to each habitat. Using maps, students will be able to identify and label habitats around the world. It is important that by the end of Quarter 2, students are able to describe each habitat because in quarter 3, students will begin investigating independent and dependent relationships in each habitat/ ecosystem.

2nd Grade Science Curriculum Term 3 (1/30-4/9/18)

Topic: Interdependent Relationships in Ecosystems

Duration: 9-10 Weeks

Performance Objectives



SWBAT:

- observe the relationship between landforms and climate **IOT** identify different habitats and ecosystems.
- define the terms abiotic and biotic **IOT** classify factors in an ecosystem as living or nonliving.
- complete a Venn Diagram **IOT** compare and contrast abiotic and biotic factors.
- observe and explore the relationship between abiotic and biotic **factors IOT** understand how biotic/ living things like plants and animals rely on abiotic factors/ nonliving things such as the sun and rain.
- plan and conduct an investigation **IOT** determine if plants need sunlight and water to grow.
- develop a simple model of a plant or animal **IOT** mimic the function of an animal in dispersing seeds or pollinating plants.
- observe, record, and compare the physical characteristics of plants **IOT** understand how plants meet their basic needs in an ecosystem. (e.g., stems carry water throughout the plant)
- observe, record, and compare the physical characteristics and behaviors of animals **IOT** understand how animals meet their basic needs in an ecosystem. (e.g., fins help fish move and balance in the water)
- compare and give examples of the ways living organisms depend on each other and on their environments **IOT** create food chains.
- identify factors in the environment, including temperature and precipitation that affect growth and behavior **IOT** explore such things as migration and hibernation of living things.
- describe everyday human activities that use the natural environment (e.g., driving, washing, eating, manufacturing, farming) **IOT** identify the dependence humans have on the environment.

- describe the human dependence on the natural environment **IOT** identify ways that it can be protected and sustained.
- identify causes of pollution in an environment **IOT** describe the effects it has on the community.

Key Terms and Definitions

ecosystem: Plants and animals that are found in a particular location.

Habitat: A place where plants and animals can meet their needs

Abiotic: nonliving things such as sun, soil, and weather.

Biotic: living things such as plants and animals.

Independent: Something that does not need to rely on something else to live

Dependent: Something that relies on something else to live

External: Outside

Sustainability: Not being harmful to the environment

life cycle: Different stages of life of a living organism (Example: baby, child, adult)

nutrients: Something that plants, animals, and humans need to live and grow (Example for humans: oxygen, water, and food)

shelter: A place that gives protection from bad weather and/or danger

pollinating: How insects help plants to make seeds

Essential Questions

How do biotic and abiotic factors affect a habitat?

What are the different types of habitats/ ecosystems?

What habitat does _____ live/grow? (give animal/animal) What does it need in this habitat to survive and why would it not thrive elsewhere?

What are some similarities and differences between two given habitats?

How do animals use features of their habitat to survive/thrive?

How do the external parts of a plant/animal help it to survive in their given habitat?

What is the life cycle of a plant/animal? (Choose specific plants/animals)

Starting Points

At the end of quarter 2, students were introduced to the different habitats/ ecosystems that exist in our world. Students learned the five main habitats of forest, water, desert, grassland, and tundra and should be able to describe, identify, and give various examples of each. Students investigated the climate and landforms of each habitat. With having this background knowledge, students will now go deeper into the ecosystem and begin investigating independent and dependent relationships in each habitat/ ecosystem. In order to understand what makes each ecosystem unique, we need to look at the biotic and abiotic factors within them. Biotic factors are all of the living organisms within an ecosystem. These may be plants, animals, and any other living things. Abiotic factors are all of the non-living things in an ecosystem, such as the sun, soil, rain, and temperature. Both biotic and abiotic factors are related to each other in an ecosystem, and, if one factor is changed or removed, it can affect the entire ecosystem. Abiotic factors are especially important because they directly affect how living things/organisms grow and survive. Students will take a closer look at how the abiotic factors are crucial in the life

cycles of the living organisms in the ecosystem. In addition, students will be able to identify the basic external structures of different plants and animals. In this quarter, students will also be researching the effects that humans have on the ecosystem and what we can do in order to protect and sustain it.

2nd Grade Science Curriculum Term 4 (4/10-6/15/18)

Topic: Force and Motion and Simple Machines



Duration: 9-10 Weeks

Performance Objectives

SWBAT:

- observe the movement of objects **IOT** describe how different forces affect an object's motion.
- analyze data **IOT** determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.
- observe motion of different objects **IOT** describe the type of motion they see. (e.g., straight line, back and forth, merry-go-round)
- define friction and gravity **IOT** demonstrate how friction and gravity affect the motion of an object.
- identify the parts of a simple machine **IOT** explain the work done by that machine.
- identify six simple machines **IOT** to sort them into groups based on their structure.
- compare and contrast simple machines **IOT** identify which one would be best to do work in a given situation.
- construct a simple machine **IOT** perform a task such as lift or move a heavy object a given height or distance.
- identify simple machine **IOT** give examples of common simple machines in their classroom, at home, etc. (*levers*: door handles, the "claws" of a hammer, crowbars, light switches, bottle openers, scissors, hinges, *wheel-and-axle*: an electric fan, a motor, a revolving door, a merry-go-round, wheels on bikes, cars, and skateboards, *inclined plane*: wheelchair ramps, slides, *wedges*: a shovel, an axe, scissors, an ice pick, a doorstop, *pulley*: window blinds, cranes, elevators, *screw*: jar lid, a drill, a bolt, a light bulb, faucets, bottle caps,)

Key Terms and Definitions

motion: An object's change in position

energy: The ability to do work, how things change and move

machine: Something that makes work easier, faster, or better

work: When a force moves an object

force: A push or pull

plane: Any flat surface

inclined plane: A plane that has one end higher than the other

wedge: An object with at least one slanting side ending in a sharp edge, which cuts material apart (ex: the tip of a nail hammers easily into wood compared to a flat top bolt)

screw: An inclined plane wrapped around a pole which holds things together or lifts materials

lever: A stiff bar that rests on a support called a fulcrum which lifts or moves loads

wheel-and-axle: A wheel with a rod, called an axle, through its center that lifts or moves loads

pulley: A wheel with a groove for a rope that is used for lifting

friction: A force that slows down objects when they move against each other

gravity: A force of attraction between two objects

Starting Points

When second grade students enter into the fourth quarter, they will have ample knowledge and understanding of living things, what they need to survive, where they live, and how they use their parts and their environment to live and grow. During the last quarter, these students will shift their thinking and focus on the physical sciences, specifically forces and motion and simple machines. They will learn about forces and motion as well as engineering by asking questions, manipulating materials, working as a member of a team, making observations, and designing and conducting experiments. Students will begin by observing the movement of nonliving objects and determining how different types of forces affect their motion. They will then learn about common simple machines including inclined planes, wedges, screws, levers, wheels and axles, and pulleys and how these machines transfer energy to help do work and move objects. Students will search for simple machines in their homes, school, and community and sort them into groups based on the “work” that they do. Providing students with the opportunity to observe, describe, sort, and analyze different shapes and materials used to build simple machines will prepare students for their third grade energy unit. Students will develop a bank of vocabulary and have experience problem solving.