



Sparta Area School District

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Course Outcome Summary

Course Information: (SPHEA) Earth/Space Science

Description: The Science curriculum rotates every year between Physical Science, Earth/Space Science, Life Science, and Health. This year, the curriculum will be covered in the area Earth/Space Science. Students will complete hands on labs or activities after every unit. At the end of the course students will complete a comprehensive final.

Instruction Level: Differentiated

Total Credits: 2

Prerequisites: Grade 4-6 skill level

Textbooks: Earth and Space Science, Kristine Lindsay, PCI Education, ISBN 1-58804-578-1

Course Standards:

Common Career and Technical Core:

<https://www.act.org/content/dam/act/unsecured/documents/CCRS-ScienceStandards.pdf>

Units

1. Layers of Earth
2. Minerals & Rocks
3. Weathering, Erosion, & Soil
4. Atmosphere
5. Water
6. Ecosystems
7. Pollution & Destruction
8. The Solar System
9. Earth & Its Moon

Unit Outlines

1. Layers of Earth

- Core, Mantle, & Crust
- Plate Movement
- Plate Tectonics
- Forces that Make & Change Landforms

Standard(s):

- IOD 302. Understand basic scientific terminology
- SIN 201. Find basic information in text that describes a simple experiment
- SIN 202. Understand the tools and functions of tools used in a simple experiment
- SIN 401. Understand a simple experimental design
- SIN 402. Understand the methods used in a complex experiment
- SIN 403. Identify a control in an experiment
- SIN 404. Identify similarities and differences between experiments

Essential Question

Students will be able to answer the following question(s):

- Why should we recognize patterns that exist in our world?
- How does planet Earth function within the solar system?
- How does Earth change?
- How are Earth's systems connected?
- How is life on Earth affected by the solar system?
- Why is it important to understand Earth's systems?
- What makes our planet unique?
- What do we know about how Earth's features are formed?
- How do the processes that shape Earth affect our lives?

Essential Knowledge

- Knowledge of various vocabulary terms: atmosphere, biosphere, geosphere, hydrosphere, system, core, crust, inner core, magma, mantle, outer core, tectonic plate, seafloor spreading
- Earth's surface, atmosphere, and life are constantly changing due to internal and external forces.
- Systems interact and influence each other.
- Earth is part of a system of planets that orbit the sun.
- Earth is a system of systems.
- Earth's surface, atmosphere, and life are constantly changing due to internal and external forces.
- Processes that shape Earth can be helpful, harmful, or both.
- Humans depend on and modify Earth's resources and systems.

2. Minerals & Rocks

- Minerals
- The Rock Cycle
- Igneous Rocks
- Sedimentary Rocks
- Metamorphic Rocks
- Geologic Time

Standard(s):

- IOD 302. Understand basic scientific terminology
- SIN 401. Understand a simple experimental design
- SIN 201. Find basic information in text that describes a simple experiment
- SIN 202. Understand the tools and functions of tools used in a simple experiment
- SIN 402. Understand the methods used in a complex experiment
- SIN 403. Identify a control in an experiment
- SIN 404. Identify similarities and differences between experiments

Essential Question:

Students will be able to answer the following question(s):

- The natural world is composed of interdependent systems.
- Earth's materials undergo change over varying lengths of time.
- Earth's materials have physical and chemical characteristics.
- Scientists classify and organize living and nonliving things in categories to better understand them and their relationships.
- Rocks and minerals have characteristics that make them useful to people.
- Earth's resources are limited.

Essential Knowledge:

- Knowledge of various vocabulary terms: compound, crystal, density, element, fracture, mineral, solid, streak, luster, hardness, cement, compact, rock, rock cycle, uplift, fossil
- How does Earth's surface change?
- What is Earth made of ?
- How can people tell what has happened to Earth?
- How do materials cycle through systems?
- Where do rocks and minerals come from?
- Why do rocks look different from each other?
- Are the rocks we see the same ones that dinosaurs saw? Why or why not?
- What story of Earth's history can rocks and minerals tell us?
- Why are some rocks and minerals valuable to people while others are not?
- How are scientists able to sort and identify rocks?
- Why should we be concerned with studying rocks?
- How does the use of Earth's resources affect our environment?

3. Weather, Erosion, & Soil

- Weathering
- Erosion
- Soil

Standard(s):

- IOD 201. Select one piece of data from a simple data presentation (e.g., a simple food web diagram)
- IOD 202. Identify basic features of a table, graph, or diagram (e.g., units of measurement)
- IOD 203. Find basic information in text that describes a simple data presentation
- IOD 302. Understand basic scientific terminology
- IOD 403. Translate information into a table, graph, or diagram
- SIN 401. Understand a simple experimental design
- SIN 201. Find basic information in text that describes a simple experiment
- SIN 202. Understand the tools and functions of tools used in a simple experiment
- SIN 402. Understand the methods used in a complex experiment
- SIN 403. Identify a control in an experiment
- SIN 404. Identify similarities and differences between experiments

Essential Question

Students will be able to answer the following question(s):

- How do changes in one part of Earth's systems affect other parts?
- Why is weather a system?
- How does geography play a role in natural events?
- How is weather related to water?
- How do we determine weather patterns?
- How can we use weather patterns to help explain our world?
- How can weather be described?
- How do tools help us collect data?
- How are living things affected by weather?
- Why are weather predictions not always right?
- How do humans impact weather systems on Earth?

Essential Knowledge

- Knowledge of various vocabulary terms: weathering, oxidation, gravity, deposited, erosion, glacier, soil, subsoil, topsoil, desertification, nutrient deletion
- Systems have cycles and patterns.
- Patterns can be studied and used to make predictions.
- Tools help us collect data.
- Weather is a powerful force of nature.
- Weather affects all life on Earth.
- Changes in weather affect our daily lives.

4. Atmosphere

- The Atmosphere & Its Gases
- The Greenhouse Effect
- Clouds
- Precipitation
- Humidity
- Weather Conditions
- Severe Weather
- Climates

Standard(s):

- IOD 201. Select one piece of data from a simple data presentation (e.g., a simple food web diagram)
- IOD 202. Identify basic features of a table, graph, or diagram (e.g., units of measurement)
- IOD 203. Find basic information in text that describes a simple data presentation
- IOD 302. Understand basic scientific terminology
- IOD 403. Translate information into a table, graph, or diagram
- SIN 401. Understand a simple experimental design
- SIN 201. Find basic information in text that describes a simple experiment
- SIN 402. Understand the methods used in a complex experiment
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- SIN 404. Identify similarities and differences between experiments

Essential Question:

Students will be able to answer the following question(s):

- What role does Earth's atmosphere play in supporting life on Earth?
- What influence do humans have on Earth's atmosphere?
- What key functions does the atmosphere serve that enable life to exist on the planet?
- How does the atmosphere shape Earth's climate and weather?
- What can cause the dynamic balance in the atmosphere to change and what influence do humans have?
- What is the Greenhouse effect?
- What are some of the consequences of global warming?

Essential Knowledge

- Knowledge of various vocabulary terms: carbon dioxide, decomposition, exhale, inhale, nitrogen, oxygen, photosynthesis, global warming, ozone, water vapor, greenhouse effect, altitude, condensation, condense
- The atmosphere is one of Earth's critical systems that makes life possible on our planet.
- The atmosphere is dynamic because of the number of factors that affect the gaseous envelope, such as pressure and temperature, which change with altitude and latitude due to Earth's rotation.
- Atmospheric CO₂ levels are controlled by the dynamic balance among living and inorganic processes that make up the carbon cycle.

- Positive and negative feedback interactions between variables, such as temperature, vegetation, and precipitation, drive atmospheric changes.
- Severe weather is the result of interactions among atmospheric variables concentrated in a specific geographic region.

5. Water

- The Water Cycle
- Freshwater Sources
- Oceans
- Ocean Currents

Standard(s):

- IOD 201. Select one piece of data from a simple data presentation (e.g., a simple food web diagram)
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- IOD 302. Understand basic scientific terminology
- IOD 403. Translate information into a table, graph, or diagram
- SIN 401. Understand a simple experimental design
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Essential Question

Students will be able to answer the following question(s):

- Why is water essential for sustaining life on Earth?
- How do we get the water we use every day?
- What are ways that water moves and changes?
- How does the water cycle impact the environment?
- How does water shape our planet?
- How does people's' use of water affect the environment?
- Why is the water cycle important?
- What is our role in the water cycle?
- Why does the quality of water in rivers and streams matter?
- How can a local action have a global effect?
- Why is it important to learn about water?
- How would life be different if there were no water cycle?

Essential Knowledge

- Knowledge of various vocabulary terms: evaporate, water cycle, freshwater, geyser, groundwater, heat capacity, reservoir, spring, surface tension, salinity, surface level
- Water is essential for life on Earth
- Cycles produce constant change on Earth.
- Some events in nature have a repeating pattern.
- Water plays a major role in shaping Earth's surface.

- Natural resources can be affected by human interaction.
- Local actions can have global effects.

6. Ecosystems

- Land Ecosystem
- Marine Ecosystem
- Freshwater Ecosystem

Standard(s):

- IOD 302. Understand basic scientific terminology
- SIN 401. Understand a simple experimental design
- SIN 201. Find basic information in text that describes a simple experiment
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Essential Question

Students will be able to answer the following question(s):

- How are living things connected?
- Why would a scientist say, “There’s no place like home”?
- Why do living things exist in different types of environments or habitats?
- How does our habitat affect the way we live?
- How are all habitats alike and different?
- What can threaten a habitat?
- How does an animal’s habitat affect its survival?
- What causes conflict between human and animal habitats?
- What is the relationship between habitats and adaptations?
- How do we describe habitats?
- Why should we care about habitats?
- What do you know about habitats in your state?
- How are wetlands threatened?

Essential Knowledge

- Knowledge of various vocabulary terms: desert, ecosystem, permafrost, savanna, coral reef, estuary, marsh, swamp, wetland
- Change can have good and bad effects.
- All living things exist in environments called habitats.
- Habitats provide basic needs for organisms.
- Living things depend on one another and on their environments.
- Environments influence the survival of living things.
- Human activity can affect environments.
- To recognize the value of wetland ecosystems

7. Pollution & Destruction

- Land Pollution & Destruction
- Air Pollution
- Water Pollution
- Reduce, Reuse, Recycle

Standard(s):

- IOD 302. Understand basic scientific terminology
- SIN 401. Understand a simple experimental design
- SIN 201. Find basic information in text that describes a simple experiment
- SIN 202. Understand the tools and functions of tools used in a simple experiment
- SIN 402. Understand the methods used in a complex experiment
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Essential Question

Students will be able to answer the following question(s):

- How does pollution lead to global warming?
- It is heat stored underneath a layer of gases and CO₂
- Where does pollution come from? (Besides obvious sources like cars, factories, etc.)
- What are some ways to lower pollution?
- What are some ways to lower pollution besides "extreme" action, such as removing all the cars?
- What are things that an average person, such as us, can lower pollution, global warming, and help save the environment?
- What actions has our country taken to fight global warming?
- What actions may we take in the foreseeable future?
- What actions should we take that our government(or others) should take to reduce it?
- What are the benefits of renewable energy?
- What are some of the downsides of renewable energy?

Essential Knowledge

- Knowledge of various vocabulary terms: agriculture, development, mining, nonrenewable resource, renewable resource, air pollution, emission, pollutant, smog, recycle, reduce, reuse
- Effects of pollution and destruction to the environment and how it affects us.
- Understand agriculture, development, and mining.
- Understand how we can help restore and protect the environment.
- Understand the different forms of water pollution and what can be done to prevent water pollution.
- How to reduce, reuse, and recycle materials/resources.
- Causes of air pollution.
- How to prevent air pollution.

8. The Solar System

- How the Solar System Works
- The Sun
- Planets
- Asteroids, Meteors, & Comets

Standard(s):

- IOD 302. Understand basic scientific terminology
- SIN 401. Understand a simple experimental design
- SIN 201. Find basic information in text that describes a simple experiment
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- SIN 402. Understand the methods used in a complex experiment
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Essential Question

Students will be able to answer the following question(s):

- Why is our solar system a system?
- How is our solar system organized?
- How does the sun affect the other planets?
- What is the role of gravity in the solar system?
- How do the sun and the moon cause changes in the Earth and how do living things adapt to those changes?

Essential Knowledge

- Knowledge of various vocabulary terms: Alignment, Asteroid, Axis, Comet, Constellation, Eclipse, Galaxy, Gravity, Lunar, Meteorite, Orbit, Phases, Planet, Rotation, Satellite
- Systems have cycles and patterns that allow us to make predictions.
- There are observable, predictable patterns of movement in the solar system.
- The sun is a star that drives Earth's systems and is essential for life.
- Stars form and change over time.
- Physical characteristics of planets depend on their size and distance from the sun.

9. Earth & Its Moon

- Days, Years, & Seasons
- The Moon
- Space Exploration

Standard(s):

- IOD 201. Select one piece of data from a simple data presentation (e.g., a simple food web diagram)
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- IOD 203. Find basic information in text that describes a simple data presentation
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- SIN 404. Identify similarities and differences between experiments

Essential Question

Students will be able to answer the following question(s):

- What accounts for day and night, seasons, months, and tides?
- Why do humans explore the solar system?
- Why was landing on the moon a great achievement?
- How does planet Earth function within the solar system?
- How are Earth's systems connected?
- How is life on Earth affected by the solar system?
- Why is it important to understand Earth's systems?
- What makes our planet unique?

Essential Knowledge

- Knowledge of various vocabulary terms: axis, equinox, solstice, eclipse, high tide, lunar eclipse, ocean tide, phase, solar eclipse
- Humans study and explore the sun, moon, and planets to learn about their past, present, and future history.
- Systems interact and influence each other.
- Earth is part of a system of planets that orbit the sun.
- Earth is a system of systems.
- Earth's surface, atmosphere, and life are constantly changing due to internal and external forces.