

# EARTH AND SPACE SCIENCE

## Key Features

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### Focus Areas

- the life cycle of a star, including nuclear processes,
- the composition and motion of orbiting objects in the universe,
- the history of the planet Earth, including plate tectonics,
- biogeochemical cycling and earth systems, and
- natural resource management and biodiversity, including human interactions.

### By the end of Earth and Space Science studies, students can

- Describe and explain the life cycle of stars, including the production of elements through nuclear processes and how the universe is changing over time.
- Predict the motion of orbiting objects in the universe due to gravity.
- Use evidence (for example: lunar rocks, asteroids, meteorites, and other planetary surfaces, ages of crustal rocks) to reconstruct the early history of Earth.
- Explain how crustal plates move across Earth's surface, carrying the continents, creating and destroying ocean basins, producing earthquakes and volcanoes, and forming mountain ranges and plateaus. Connect this process to the cycling of matter through convection processes in Earth's interior.
- The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space.
- Illustrate the relationships among Earth systems and how those relationships are being modified due to human activity, including managing Earth's resources and natural disasters.
- Describe the cycling of carbon and other materials through the hydrosphere, atmosphere, geosphere, and biosphere.

- Evaluate or refine a solution that reduces impacts of human activities on natural systems, including developing, managing, and using Earth's energy and mineral resources.

## Home to School Connections

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### Questions you can ask your learner could include:

- How do we know how old Earth is?
- How are the elements of stars identified?
- In what shape do the planets orbit the sun?
- How is the new seafloor created at the mid-Atlantic Ridge?
- What are some of the impacts human activity has on Earth?

### Questions you can ask your learner's teacher could include:

- Can you provide examples of natural resources we use in everyday items?
- What kind of post-secondary educational and career opportunities could this course inspire my learner to explore?

### Activities and learning you can do outside of the classroom to support your learner could include:

- View stars and find the Milky Way in the night sky. Discuss how the sun is just one of more than 200 billion stars in the Milky Way galaxy, and the Milky Way is just one of hundreds of billions of galaxies in the universe.
- Track the movement of planets in the night sky by drawing their position over the course of a week.
- Observe the pattern of earthquakes by using the United States Geological Survey earthquakes map online.
- Fill a clear, tall container with cold water. Fill a smaller container with warm water and a few drops of red food coloring. Carefully place the small container into the larger container and observe what happens.
- Obtain data from the South Carolina Department of Natural Resources showing the change in precipitation

and temperature year-to-year. Identify patterns and trends shown in the data and discuss possible impacts on the local environment.

- Draw a basic scene of your local community. Show how carbon moves through plants and animals via photosynthesis and respiration. Also include changes to the atmosphere caused by human activities that increase carbon dioxide.
- Identify the key natural resources in your region. This could include access to fresh water, regions of fertile soils, and high concentrations of minerals and fossil fuels.
- Discuss natural hazards that are of local concern and how they impact human activity: volcanic eruptions, earthquakes, tsunamis, soil erosion, hurricanes, floods and droughts.
- Discuss ways your family can reduce usage of resources including recycling and reuse of materials.

## Resources

- Bozeman Science (<https://www.bozemanscience.com/>)
- CK-12 Foundation (<https://www.ck12.org/student/>)
- Discus (<https://www.scdiscus.org/>)
- Exploratorium (<https://www.exploratorium.edu/>)
- Khan Academy (<https://www.khanacademy.org/>)
- NASA Education (<https://www.nasa.gov/learning-resources/for-educators/>)
- PBS LearningMedia (<https://scetv.pbslearningmedia.org/>)
- Smithsonian Museum of Natural History – Earth Science (<https://naturalhistory.si.edu/education/teaching-resources/earth-science>)