

SCIENCE CURRICULUM SUMMARY

The purpose of the Science Curriculum Summary is to present an overview of the Earth Systems curriculum. Parents are the intended audience of the Science Curriculum Summary.

Unifying Themes

- Apply concepts of systems and subsystems, feedback and control to solve technological problems.
- Apply concepts of models as a method to predict and understand science and technology.
- Assess patterns of science and technology to evaluate changes in natural and manmade systems.
- Analyze scale as a way of relating concepts and ideas to one another.

Inquiry and Design

- Evaluate nature of scientific and technological knowledge as it pertains to Earth systems.
- Acquire and evaluate experimental information for appropriateness and adherence to relevant science processes.
- Apply inquiry-based and problem based strategies to classroom experiences.
- Analyze and implement a scientific process to solve global problems and communicate those results to a global audience.

Twenty-First Century Skills

- Core subjects and 21st century themes (Global Awareness, Financial, Economic, Business and Entrepreneurial Literacy, Civic and Health Literacy)
- Learning and Innovation Skills (creativity and innovation, critical thinking and problem solving, communication and collaboration)
- Information, Media and Technology Skills (information literacy, media literacy, information, communications and technology literacy)
- Life and career skills (flexibility and adaptability, initiative and self-direction, social and cross-cultural skills, productivity and accountability, leadership and responsibility)

Lithosphere

- Discuss the concept of dating Earth's materials using technology and methods such as radioactive dating, core sampling and/or relative dating.
- Analyze the evolution of geology as a science.
- Create a Geologic Time Scale.
- Interpretation of Rock Cycle as a review of mineral and rock properties and Earth processes.
- Investigate and analyze factors affecting the availability, location, extraction, and use of natural resources and their local and global impacts.
- Explain landform formation in terms of Earth's processes.
- Compare the development and components of various soil types.
- Distinguish between geologic provinces.
- Apply geologic concepts to Pennsylvania landforms and features.

Cosmosphere

- Investigate the origins of Astronomy.
- Analyze and evaluate the impact of modern astronomical thought.
- Compare and discuss the tools of modern astronomy.
- Analyze star maps to hypothesize celestial motion.
- Compare the formation of celestial bodies.
- Apply concepts to develop a logical argument to determine the formation of the solar system.
- Calculate orbital velocities and periods for bodies in our solar system.
- Identify patterns on the HR Diagram and predict the relationship between stellar properties.
- Compare and analyze the various theories for the origin/fate of the universe.
- Classify the structure, composition, and behavior of bodies in the universe (i.e. black holes, quasars, galaxies).
- Evaluate the chance of finding life in the cosmos through the use of technology.
- Discuss the Drake equation and summarize the *assumptions of mediocrity*.

Atmosphere

- Review and reinforcement of meteorology fundamentals (Ex. Fronts, pressure systems, moisture).
- Analyze patterns in meteorological maps.
- Explain weather phenomena as presented in case studies.
- Formulate how topography impacts Pennsylvania weather.
- Connect natural forces and anthropogenic influences on climate change.
- Develop a logical argument for the effectiveness of environmental legislation.
- Investigate atmospheric chemistry (ex. Pollutants, ozone)

Hydrosphere

- Connect thermohaline circulation to climate.
- Investigate the biological productivity and discuss the implications of over-harvesting.
- Compare seawater chemistry at different zones and latitudes.
- Identify surface and deep ocean current patterns.
- Explain how glaciers and their movement influence topography and climate (I.e. Great Lakes)
- Assess the importance of fresh surface water.
- Make connections between anthropogenic actions and impacts on water supply (ex. Desalination, water treatment, water conservation).