

**BILLINGS PUBLIC SCHOOLS**  
**SCIENCE**  
**EARTH SCIENCE**  
**Learning Objectives**

**MISSION STATEMENT**

Science is a subject that deals with concepts, principles, processes, and applications that can be integrated into all life skills. In our highly-developed technologically and environmentally-minded society, a broad science education that emphasizes problem solving is necessary. The science program in the Billings Public Schools provides all grade levels, (K-12) with experiences that allow each student to become knowledgeable in science content, process, and skills necessary to function a global society. To accomplish this, technological advances must be integrated into every level of science education.

**PHILOSOPHY**

Through the application of science processes and concepts, and emphasis of critical thinking skills, the Science curriculum seeks to develop Student's ability to understand science and to appreciate its value as well as to develop Student's ability to respond to technological and societal changes. Therefore, as an educational system we believe we can teach all children and all children can learn. We believe accessing knowledge, reasoning, questioning, and problem solving are the foundations for learning in an ever-changing world. We believe education enables students to recognize and strive for higher standards. Consequently, we will commit our efforts to help students acquire knowledge and attitudes considered valuable in order to develop their potential and their career and lifetime aspirations.

**STATE CONTENT STANDARDS**

- I. Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.**
- II. Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.**
- III. Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process of diversity of life, and how living organisms interact with each other and their environment.**
- IV. Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.**
- V. Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures, and societies.**
- VI. Students understand historical developments in science and technology.**

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**I. Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.**

1. Student will use or make systematic observations, accurate measurements, and control variables to formulate and conduct investigations, and to draw conclusions based on specific scientific data.
2. Student will communicate scientific data and results, with an emphasis placed on data analysis, graphing, and metric measurements.
3. Student will select and use appropriate tools including technology to make measurements, gather, process, and analyze data from scientific investigations.
4. Student will demonstrate safe procedures during scientific investigations.

**II. Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.**

5. Student will discuss the interrelationship of chemistry and earth science by examining basic geochemical processes as related to geology, hydrology, meteorology, astronomy and oceanography.
6. Student will describe and discuss the processes involved how energy is stored, transferred and transformed within Earth and space.
7. Student will describe how energy and matter interact in a cause and effect relationship.

**III. Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process of diversity of life, and how living organisms interact with each other and their environment.**

*None purposefully written for this standard for Earth Science*

**IV. Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.**

8. Student will model and explain the internal structure of Earth.
9. Student will understand the theory of plate tectonics and how it explains the interrelationships between earthquakes, volcanoes, sea-floor spreading, and mountain building processes.
10. Student will describe the formation and composition of Earth in terms of minerals, rocks and the rock cycle.
11. Student will identify and classify rocks and minerals based on physical and chemical properties.
12. Student will demonstrate an understanding of the utilization of rocks, minerals and other natural resources by humans.
13. Student will describe continuous changes that occur on Earth's surface as a result of the processes of weathering, erosion and deposition.
14. Student will describe various conditions and processes that lead to the formation of fossils.

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**IV. Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space. (cont.)**

15. Student will discuss the role fossils and rocks have in the development of the geologic timeline.
16. Student will use dating processes to explain how rocks and fossils provide evidence to make inferences about biologic, climatic and geologic changes that have occurred over time.
17. Student will describe distribution and recycling of water on Earth.
18. Student will discuss the significance of the composition and structure of Earth's atmosphere.
19. Student will examine atmospheric changes over time and how they influence the environment.
20. Student will analyze how unequal distribution of solar energy affects air pressure, winds and moisture.
21. Student will interpret weather information and maps to make forecasts utilizing current technology.
22. Student will determine how latitude, elevation and ocean currents affect climate.
23. Student will describe the nature of and energy involved in severe weather.
24. Student will describe and model the processes of rotation and revolution to the occurrences of day and night and the seasons.
25. Student will examine the Sun-Earth-Moon relationships and interactions.
26. Student will summarize the key features of the objects found in our solar system.
27. Student will examine how inertia and gravity determine the motion of objects within the solar system.
28. Student will describe the location, distribution and evolution of stars.
29. Student will explore scientific theories about the origin of the solar system and the universe.
30. Student will describe the past, present and future of space exploration and how space technology impacts our world.

**V. Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures, and societies.**

31. Student will survey current applications of geotechnology and their social implications.

**VI. Students understand historical developments in science and technology**

31. Student will investigate the historical impact of earth science and technology on society.