

BILLINGS PUBLIC SCHOOLS
SCIENCE
GEOLOGY
Learner 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 the learner's ability to understand science and to appreciate its value as well as to develop the learner'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 engage in inquiry activities and scientific investigations in the study of the laws, concepts and forces of nature as they relate to formations in geologic environments.
2. Student will engage in inquiry activities and scientific investigations in the study of minerals, rocks and natural resources.
3. Student will engage in inquiry activities and scientific investigations in the study of constructive and deformational processes.
4. Student will engage in inquiry activities and scientific investigations in the study of data acquisition and visual interpretations.

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

None purposefully written for this standard for Geology

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 Geology

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

5. Student will relate the laws, concepts, and forces of nature to the processes and formations in geologic environments. These aspects may include superposition, original horizontality, uniformitarianism, differentiation, deformation processes, convection, isostasy, gravity, heat-temp-pressure, time density...
6. Student will explore the relationship between elements and compounds that compose minerals and rocks.
7. Student will summarize how mineral/rock formation is affected by temperature, pressure, composition, environmental conditions and geologic forces, and time.
8. Student will use skills to interpret the history of rock and mineral samples.
9. Student will describe patterns of rock types and formations common to Montana and our region.
10. Student will describe processes and outcomes of the weathering of minerals and how they develop soil particles.

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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.)

11. Student will describe erosional processes and outcomes related to landform development such as cliffs, valleys, arches, oxbows, horns, cirques, landslides, and soil creep. Erosional processes include the work of water, wind, ice, and gravity.
12. Student will relate examples of various deformation processes to existing regional landforms.
13. Student will describe processes and outcomes of mineral formation and how they develop rock types and landforms.
14. Student will describe constructive processes and outcomes related to Earth features such as mountains, basins, plateaus, volcanoes, depositional features.
15. Student will relate examples of various constructive processes to existing regional landforms.
16. Student will summarize the geologic aspects of various geologic phenomena found in our locality, state, or nation. Examples may include Yellowstone Valley geology, The Stillwater mining complex, state and national monuments and parks, mountain ranges, faulting systems, and volcanic areas.
17. Student will summarize the historical aspects related to the development of the plate tectonics theory.
18. Student will summarize Earth's internal forces which theoretically drive the movements of plate tectonics theory
19. Student will summarize Earth's internal forces which theoretically drive the movements of the crustal plates.
20. Student will relate different types of plate boundaries to various surface features such as mid-ocean ridges, rift zones, island arcs and orogenic mountain belts.

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

21. Student will identify various minerals and rocks that have economic value in our society.
22. Student will discuss the political, environmental, and economical relationships that impact decisions related to the exploration, extraction, and reclamation of geologic resources.
23. Student will discuss examples of various geologic resources found in our region and the environmental and societal impact of the pursuit and development of these resources.
24. Student will review geologic events and issues from media sources, and describe their causes and impacts on the land, economy and society. Examples may include volcanic eruptions, Earthquakes, floods, landslides, dinosaur beds, discoveries, mining, and groundwater issues.

VI. Students understand historical developments in science and technology

25. Student will cite examples of how the historical progression of geologic research has shaped what is known about the Earth.