

Geology: The Earth and Its Changes

Fourth Grade

Thinking Frame Work Key: K=Knowledge, P=Patterns, M=Modeling, C= Creativity

Vocabulary: geology, plates, fault, intensity, seismography, Richter Scale, Tsunamis, active, dormant, extinct, geyser, theory, formation, metamorphic, sediment, physical, chemical, weathering, erosion, & soil

I. Core Knowledge Content Guidelines

A. The Earth's Layers

1. Students will be able to identify the crust, mantle, inner core, and outer core. (K,P)
2. Students will be able to explain the movement of crustal plates. (K,P,M)
3. Students will be able to explain what causes earthquakes (K,P,M)
4. Students will be able explain what a fault is and how one is caused. (K,P,M)
5. Students will be able to identify the San Andreas fault. (K)
6. Students will be able to explain that an earthquake's intensity is measured by a seismograph and the Richter Scale. (K,P)
7. Students will be able to explain the cause of a tsunami. (K,P)
8. Students will be able to explain the difference between magma and lava. (K)
9. Students will be able to explain the difference between active, dormant and extinct volcanoes. (K,P)

10. Students will be able to identify famous volcanoes such as Vesuvius, Krakatoa, and Mount St. Helens. (K,M)
11. Students will be able to explain the cause of a hot spring and a geyser and identify Old Faithful in Yellowstone National Park. (K,M)
12. Students will be able to explain theories of how the continents and oceans were formed; specifically Pangea and continental drift. (K,P,M)

B. How Mountains are Formed

1. Students will be able to explain the difference between volcanic, folded, fault-block, and dome-shaped mountains. (K,P,M)
2. Students will be able to explain how undersea mountain peaks and trenches are formed. (K,P,M)

C. Rocks

1. Students will be able to explain the formation and characteristics of metamorphic, igneous, and sedimentary rock. (K,P,M,C)

D. Weathering and Erosion

1. Students will be able to explain the difference between physical and chemical weathering. (K,P,M,C)
2. Students will be able to explain water, wind and glacial erosion. (K,P)
3. Students will be able to explain the difference between weathering and erosion. (K,P)
4. Students will be able to explain the formation of soil, identifying topsoil, subsoil, and bedrock. (K,P,M)

II. Procedures and Assessments

- A. Discussion of information packet
- B. Notes
- C. Videos
- D. PowerPoint presentation
- E. Rock lab
- F. Mountain formation lab

III. Character Education

A. Responsibility

1. using Playdo in a carpeted room for mountain formation lab
2. taking care of the rock kits for the rock lab

B. Cooperation

1. working together patiently during lab time

C. Self Control

1. maintaining self control during lab time

D. Citizenship

1. taking care of the rock kits so others can use them

IV. Colorado State Standards

Standard 1: Scientific Investigation

Students understand the processes of scientific investigation and design as well as conduct, communicate about, and evaluate such investigations.

1.1 Scientific investigations

Understand and practice the process of scientific investigation.

With teacher facilitation and in small groups the student will learn and follow the steps in the Scientific

Method:

- identify the problem.
- form a hypothesis (make a prediction).
- identify a procedure (list materials, steps, plan or strategy).
- test (experimentation).
- make observations (use tables, pictures and charts to explain in written form).
- collect data.
- interpret and draw conclusions.

Continue to develop appropriate questions and identify likely resources (For example: encyclopedia, atlases, nonfiction books and electronic media).

Standard 2: Physical Science

Students know and understand common properties, forms, and changes in matter and energy.

2.1 Characteristics of matter

Know that matter has characteristic properties which related to its composition and structure.

Examine, describe, classify and compare tangible objects in terms of common physical properties (For example: state of matter, size, shape, texture, flexibility and color).

Standard 3: Life Science

Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment.

3.1 Characteristics of living things

Know and understand the characteristics of living things, the diversity of life and how living things interact with each other and their environment.

3.2 Matter and energy of living systems

Know and understand interrelationships of matter and energy in living systems.

Standard 4: Earth and Space Science

Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space.

4.1 Earth

Know and understand the composition of Earth, its history and the natural processes that shape it.

Describe different types and uses of Earth materials (For example: rocks, soil and minerals).

Identify the three types of rocks: sedimentary, igneous and metamorphic).

Recognize that fossils are evidence of past life.

Identify major features of Earth's surface (For example: mountains, rivers, plains, hills, oceans and plateaus).

4.2 Atmosphere and Weather

Know and understand the general characteristics of the atmosphere and fundamental processes of weather

4.3 Water

Know major sources of water, its uses, importance and cyclic patterns of movement through the environment.

Standard 5: Science, Technology and Human Activity

Students know and understand interrelationships among science, technology, and human activity and how they can affect the world.

5.1 Science, technology and human activity

Understand the connections between science, technology, human activity and their impact on the world.

Recognize the diversity of resources provided by the Earth and sun (For example: minerals).

Identify careers that use science and technology.

Describe the effects of pollution of the environment and suggest activities designed to conserve natural resources.

Standard 6: Scientific Connections

Students understand that science involves a particular way of knowing and understanding common connection among scientific disciplines.

6.1 Scientific connections

Understand that science is a changing body knowledge driven by a process of observation and investigation.

Identify observable patterns and changes in their lives and predict future events based on the patterns.

Compare a model with what it represents.

V. Science Habits of Mind

SCIENCE HABITS OF MIND

THIRD THROUGH FIFTH GRADE

I. VALUES AND ATTITUDES

By the end of fifth grade, students should:

- A. Keep records of their investigations and observations and not change the records later.
- B. Offer reasons for their findings and consider reasons suggested by others.

II. CRITICAL-RESPONSE SKILLS

By the end of fifth grade, students should:

- A. Buttress their statements with facts found in books, articles, and databases, and identify the sources used and expect others to do the same.
- B. Recognize when comparisons might not be fair because some conditions are not kept the same.
- C. Seek better reasons for believing something than "Everybody knows that..." or "I just know" and discount such reasons when given by others.