

MINERALS, ROCKS, VOLCANOES AND EARTHQUAKES

UNIT OVERVIEW

Earth Science at its greatest. Students explore the fascinating world of geology, learning everything from the causes of earthquakes and volcanoes to how to make a fossil.

Part I of the unit uses notes photocopied onto overhead transparencies to give students most of the knowledge-based material in the unit. The activities and worksheets included follow closely with the material in the notes. Part II - "Optional Activities" adds flexibility to the unit and suggests assignments which can be coordinated with the main lesson topics, used as enrichment or used at the end of the unit as fun, culminating activities.

PART I - LESSON TOPICS AND STUDENT ASSIGNMENTS

1. **The Earth - From Core to Crust** (1 Class) - Students learn the composition of the earth including the core, mantle and crust then complete a "Geology Wordsearch".
2. **Plate Tectonics** (2 Classes) - Students develop an understanding of plate tectonics (continental drift), supporting evidence and do a worksheet, "The Break-up of Pangea".
3. **Earthquakes** (2 Classes) - Students understand the causes of earthquakes and write a "Newspaper Story" reporting a major earthquake.
4. **Volcanoes** (2-3 Classes) - Students learn about the causes and types of volcanoes. Students complete a map activity, "Locating Volcanoes and Earthquakes", and a colouring activity entitled "Three Types of Volcanoes".
5. **Mountain Building** (1 Class) - Students discover how plate tectonics relates to mountain building and complete a pictogram activity entitled "Between A Rock And A Hard Place".
6. **Minerals** (1 Class) - Students learn the definition of a mineral, some common types of minerals and study crystals in the activity, "Grow Your Own Crystals".
7. **Rocks** (2 Classes) - Students learn about the three main types of rocks and complete two activities - "Rock and Mineral Identification" and "Crossword Puzzle".
8. **Review and Exam** (2 Classes) - Students complete a "Review" worksheet and write an exam.

INTRODUCTION

- Before beginning the unit, photocopy the student notes onto overhead transparencies. These notes convey much of the knowledge-based content in the unit. (Teachers not wanting to use the overhead projector can simply write the notes on the board)
- Certain pages of the notes (especially pages with detailed drawings that are suitable for colouring) can simply be photocopied and given to students to paste into their notebooks.
- Words important to the unit are underlined throughout the notes.
- **A.I.F.S.** is a reminder for questions that require students to Answer In Full Sentences.

LESSON #1 - THE EARTH - FROM CORE TO CRUST (1 Class)

Student Objectives and Activities

- Students learn the composition of the earth including the core, mantle and crust then compare the earth to an apple.
- Students complete a “Geology Wordsearch” (if time permits) to become more familiar with new words in the unit.

Suggested Teaching Strategies

- Introduce the unit by cutting an apple in half and challenging students to guess what the earth and the apple have in common. (The answer is that both have a core, mantle and crust - skin)
- Next, students copy the overhead notes on “The Earth - From Core To Crust” into their science notebooks. (One strategy to help students understand the notes as they copy them down is to leave or block out words periodically throughout the notes)
- Use the apple analogy to teach about the core, mantle and crust, and to show the relative thicknesses of each part.
- After the notes have been copied and explained, finish the lesson with the activity “Geology Wordsearch”.
- This activity is mainly for fun although it does help familiarize students with vocabulary words used in the unit.

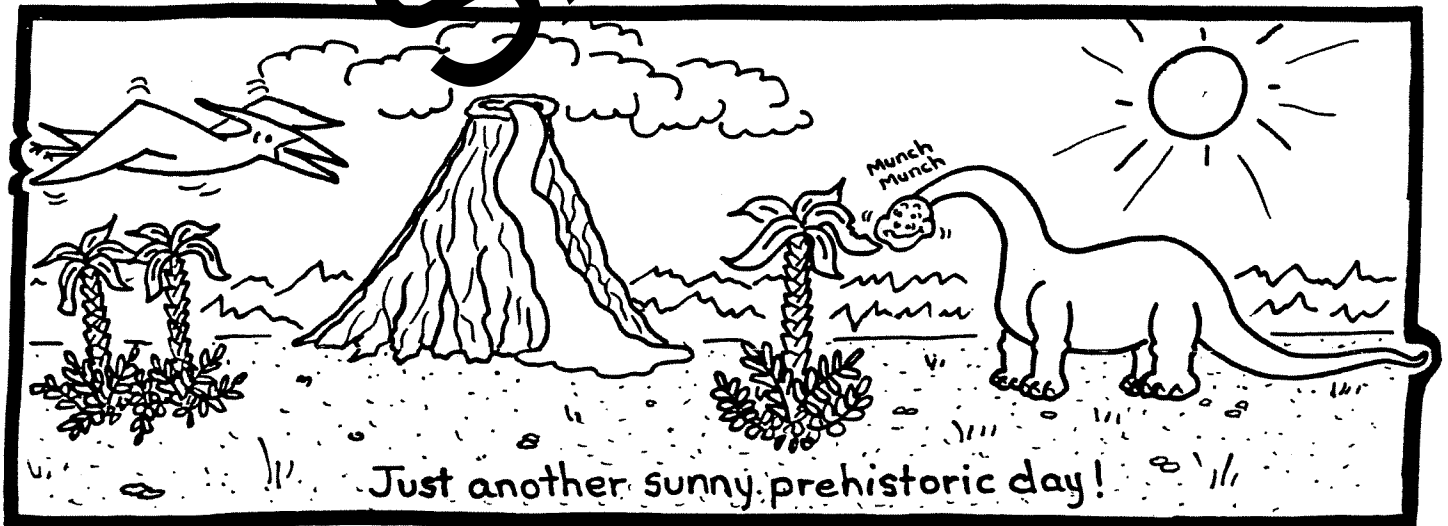
Mid Atlantic Ridge

The volcanoes at the center of the Atlantic Ocean are located along a “rift zone”. Here, the Atlantic plate is split in half with the two parts moving away from each other. Volcanic activity is caused when magma rises up to fill this rift between the two separating pieces. It is interesting that this volcanic activity takes place mostly underwater along the entire length of the Atlantic Ocean, except for on the island of Iceland which rises above the surface of the water.

- Students copy the notes on volcanoes. (This should probably take up one class)
- The pronunciations of the two types of lava in the notes are “pahoehoe” (pa-hoy-hoy) for ropy lava and “aa” (ah-ah) for sharp, pointy lava. The words are Hawaiian and “pahoehoe” means rope while “aa” is what you would say if you stepped on that type of lava. (not to be confused with Alcoholics Anonymous)
- For the second class, students finish with the colouring activity, “**Three Types of Volcanoes**”, which helps students learn about shield volcanoes, cinder cones and strato volcanoes (composite cones).
- As further enrichment, a film or video could also be shown at this time.

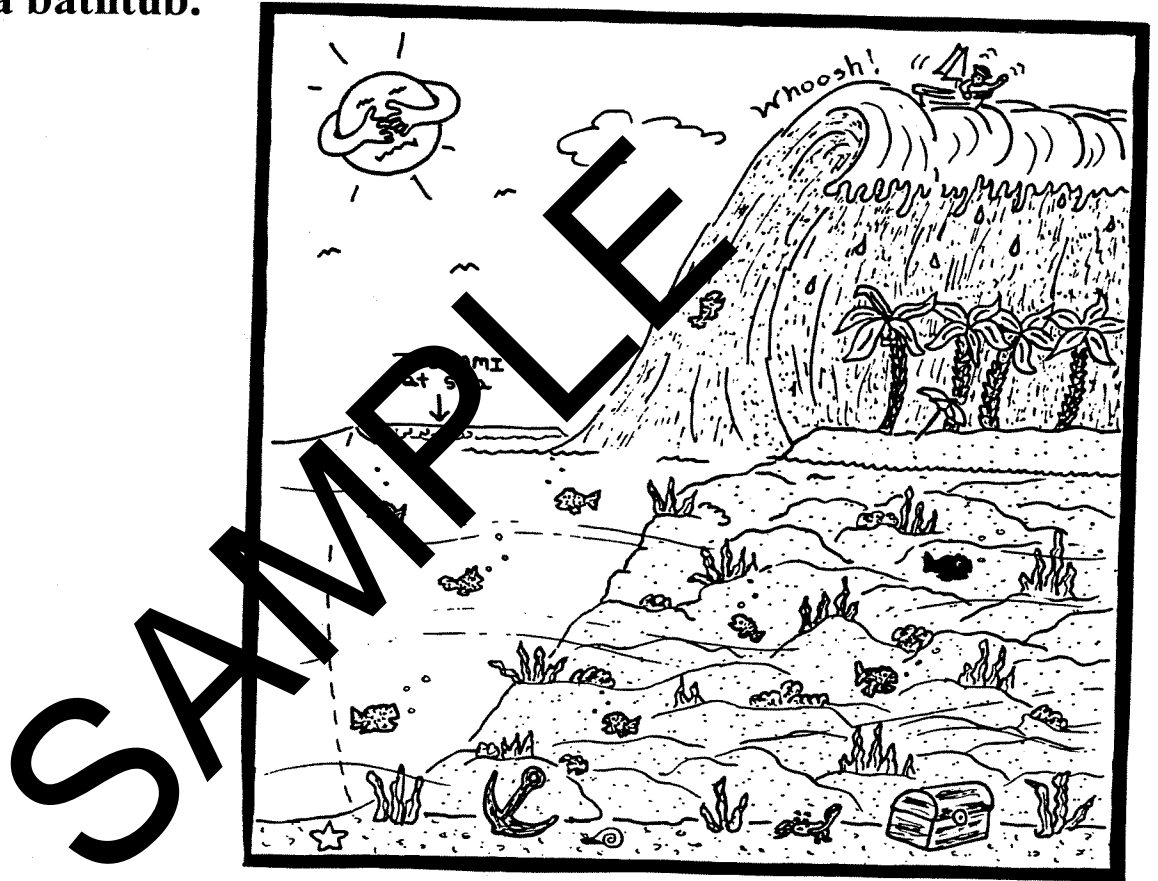
*** Note ***

The geologic “Ring of Fire” is totally unrelated to the other “Ring of Fire” that commonly occurs on Sunday morning and is caused by the overconsumption of beer that has outlived its shelf-life.



TSUNAMI

When an earthquake happens on the floor of the ocean, a tsunami is created. (Tsunamis are often wrongly called tidal waves) These waves can be up to 85 meters high and travel 300 kilometers per hour. Large ships can be washed ashore like toys in a bathtub.



Tsunamis occur when an underwater earthquake causes falling rocks to hit the ocean floor and create a powerful wave. This is similar to what happens when a person claps their hands together underwater in the bathtub or swimming pool. Usually, the tsunami is not very large in deeper water. (1 meter high) However, when the wave gets to shallow water by the land, it “piles up” because it has no place to go and makes a huge, deadly wave.