EARTH SCIENCE Lesson Plan

Quarter 3, Week 3, Day 1

Outcomes for Today

Standard Focus: Earth Sciences 3.e "*students know there are two kinds of volcanoes: one kind with violent eruptions producing steep slopes and the other kind with voluminous lava flows producing gentle slopes*".

PREPARE

1. Background knowledge necessary for today's reading.

Volcanic eruptions are caused by magma (a mixture of liquid rocks, crystals, and dissolved gas) expelled onto Earth's surface. The geothermal gradient is the rate at which temperature increases with depth. As pressure increases in the Earth, the melting temperatures change. Minerals melt at a single given temperature at any given pressure. Since rocks are a mixture of minerals, they melt over a range of temperatures.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

magma **lava**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 18.1, pp. 471-473

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- Temperature increases with depth below the Earth's surface.
- Even though temperatures are high enough, most rocks in the Earth's lower crust and upper mantle do not form magma due to the effect of pressure.
- The presence of water also affects the melting temperature of rocks and minerals.

7. Post information on the billboard. Add new information to ongoing projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Where are the Volcanoes?

Procedure: Students locate, identify general information about volcanoes

Discussion: Discuss what students perceive about volcanoes affect on people

Key question: Where do we find volcanoes throughout the world?

Source:
http://www.pbs.org/americanfieldguide/teachers/volcanoes/volcanoes.pdf

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world

EARTH SCIENCE Lesson Plan

Quarter 3, Week 3, Day 2

Outcomes for Today

Standard Focus: Earth Sciences 3.e

PREPARE

1. Background knowledge necessary for today's reading.

There are three major types of magma. All magmas contain gas dissolved in liquid. As magma rises towards the surface and pressure decreases the gas forms a separate vapor phase, much like a carbonated beverage bottled under pressure releases bubbles when opened. Gas gives magmas their explosive character.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

basaltic magma **andesitic magma** **rhyolitic magma**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall**.**

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 18.1, pp. 473-475

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- There are three major types of magma: basaltic, andesitic, and rhyolitic.
- The volcanoes in Hawaii are made of basalt.

7. Post information on the billboard. Add new information to ongoing projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Cake Batter Lava

Procedure: Students use cake batter to simulate lava flow

Discussion: Discuss the effects of viscosity and friction on flow patterns (water compared to thicker substances)

Key question: How did the two experimental flows compare?

Source: http://www.spacegrant.hawaii.edu/class_acts/CakeLavaTe.html

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world

EARTH SCIENCE Lesson Plan

Quarter 3, Week 3, Day 3

Outcomes for Today

Standard Focus: Earth Sciences 3.e

PREPARE

1. Background knowledge necessary for today's reading.

Viscosity is the resistance to flow, the opposite of fluidity. The viscosity of magma depends on its composition and temperature. Higher silica content magmas have higher viscosity than lower silica content magmas. Lower temperature magmas have higher viscosity than higher temperature magmas. Viscosity is an important property in determining the eruptive behaviors of magmas.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

viscosity **silica**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 18.1, p. 475

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- The temperature and composition of magma determines its viscosity.
- The amount of silica increases its viscosity.
- Basaltic magma has the lowest viscosity of the three major types.

7. Post information on the billboard. Add new information to ongoing projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Viscosity

Procedure: Students explore the viscosity of different solutions

Discussion: Discuss the difference between quantitative and qualitative data

Key question: Why is the viscosity of magma important?

Source: http://www.iit.edu/~smile/ph9108.html

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world

EARTH SCIENCE Lesson Plan

Quarter 3, Week 3, Day 4

Outcomes for Today

Standard Focus: Earth Sciences 3.b *"students know the principal structures that form at the three different kinds of plate boundaries*".

PREPARE

1. Background knowledge necessary for today's reading.

Since magma is less dense than the surrounding rocks it eventually comes in contact with the overlying crust. Magma that solidifies deep in the subsurface is called a pluton or an igneous intrusion. Batholiths are huge intrusions covering an area greater that 100 km. Laccoliths are blister-shaped intrusions that form the core of mountains such as the Black Hills of South Dakota, the Henry mountains of Utah, and others.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

plutons **batholiths** **laccoliths** **stocks**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 18.2, pp. 476-477

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- Intruding magma can affect the crust in several ways: it can enter fissures in rocks, blocks of rocks can break off and sink into the magma and eventually melt, and magma can melt the rock into which it intrudes.
- After cooling the magma form minerals that combine to form intrusive igneous rock bodies.
- These intrusive rock bodies can be exposed at the Earth's surface by uplift and erosion.

7. Post information on the billboard. Add new information to ongoing projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Section 2: Intrusive activity

Procedure: Students answer questions based on diagram of igneous intrusions

Discussion: Review types of intrusions depicted in the text

Source:
http://highered.mcgrawhill.com/sites/oo78664233/student_view0/unit5/chapter18/section...

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world

EARTH SCIENCE Lesson Plan

Quarter 3, Week 3, Day 5

Outcomes for Today

Standard Focus: Earth Sciences 3.b

PREPARE

1. Background knowledge necessary for today's reading.

Intrusions are remnants of past igneous activity and are exposed at the surface by erosion of the overlying rocks and sediments. Other types of intrusions form at shallower depths, such as stocks, sills and dikes.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

sill **dike**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 18.2, pp. 477-479

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- A sill forms parallel to layers of rock.
- A dike often forms when magma cuts across cracks in the surrounding rock.
- Plutons represent the majority of igneous activity on Earth.

7. Post information on the billboard. Add new information to ongoing projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Gelatin Volcanoes

Procedure: Students inject red food coloring and water into gelatin "volcanoes"

Discussion: Discuss types of plutons

Key question: How and why does magma move through volcanoes?

Source: http://www.spacegrant.hawaii.edu/class_acts/GelVolTe.html

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world