Rachel Dillard
Carolyn DiProspero
Christina Millson

5th Graders Rock Discovery Circus: Lesson Plan

Day: Monday
Topic: Rocks
Date: November 8, 2010
NSES: Teaching Standards (B&D) & Content Standard (A &D-earth materials)
Grade level: 5th
SOL: VA SOL 5.7 c, d, e
Time Needed: 60 min

The student will investigate and understand how the Earth's surface is constantly changing. Key concepts include
c) the rock cycle including identification of rock types;
d) the rock cycle including identification of rock types;
e) human impact.

Subject: Rock Classification
Daily Question: What are some characteristics of rocks and how can rocks differ from one another?

Procedures for Learning Experience	Guiding Questions	Materials Needed	**E**valuation (Assessment)	Approximate Time Needed
Engagement: Ask the students if they have seen rocks around their homes and school. Ask them to try to remember the characteristics of these rocks. Discuss the different sizes, shapes, textures, and colors of the rocks.	Have you seen or picked up rocks around your home or school? What did these rocks look like? What color were they? How did they feel? What shape were they? What size were they?	Dry erase board and marker	Listen to student answers and observe students participation in discussion.	5 min
Exploration: Tell students that they will be divided into five groups to work on activities around the classroom. Have each group choose a principal investigator, timer, recorder, spokesperson, and safety officer. Explain jobs of each member of the group. Explain that students will have 6 minutes at	(Note: Guiding questions vary at each station and you and other teachers float around the room to ask questions and gauge group progress)	Rock samples (conglomerate, sandstone, gneiss, soapstone, marble), playdoh, activity	Observation of student participation in groups. Students follow directions, answer questions, use materials	40 min

each station and two minutes to gather their things and move to the next stations. The five stations are as follows: 1. Name that Rock: (metamorphic rock): compare gneiss and soapstone and marble 2. How Are Rocks Made?: Sedimentary Rock Formation 3. Comparing Two Rocks (sedimentary rocks): compare conglomerate and sandstone 4. Comparing Two Rocks (igneous rocks): compare fine granite and diabase 5. The Work of a Coal Miner: observe picture of coal miners and answer questions At each station students follow directions on the student card and complete activity sheets that correspond with the appropriate station.	Station 1: What do you think rocks are made up of? How do you think rocks are formed? How long do you think it takes to make rocks? Station 2: How do sedimentary rocks form? What are some examples of sedimentary rock that you can name? How does sedimentary rock differ from the other two rock types? Which do you think would erode faster (Sedimentary, metamorphic or igneous)? Station 3: Why do you think these rocks are similar in the ways they are similar? Why do you think they are different in the ways they are different? Why does one rock have smaller particles than the other? Stations 4: Have you known of or read of someone who worked in a mine? Are you aware of the 33	workbooks (one for each student), picture of coal miners, student cards, teacher cards	appropriately, cooperate with group members, perform duties of job, and transition smoothly between stations.	

	miners in Chile who were trapped in a gold mine? Do you think coal is important to our society? Why? Station 5: Why does one rock have smaller particles than the other? How do you think these rocks were formed? How would you classify each of these rocks? Are they igneous, metamorphosis, or sedentary?			
Explanation: Bring class together as a group to discuss answers to the questions on the activity sheets. Go over each activity, selecting questions to discuss as a group, and allow time for each group to share their answers. The spokesperson is in charge of relaying the information found at each station to the group. Discuss the circus as a whole, asking students about their favorite station and connections they saw between the stations.	What did you learn today? What was your favorite activity and why? How did the different stations fit together? What connections did you find between the different activities?		Observe participation in discussion of activities and questions at each activity center. Students contribute to discussion.	15 min
Extension: If time allows, discuss how the students have recently created thinking maps to compare and contrast in reading and writing. Ask students if they think the maps can be used in other subjects. Explain that these bubble maps and comparison webs can	What does it mean to compare and contrast? What have we used in reading and writing to help us compare and contrast? Do you think	Dry erase board and marker OR document camera and pencil	Observe participation in extension activity.	15 min

also be used in science. Discuss how a bubble map could be used to compare two different rocks, setting up the stage for the Comparison and Contrast learning cycle lesson to follow during the next science class.	these maps could be used in other subjects? How could we use them in our study of rocks?			
Evaluation: Students participate in all five stations, and extension activity. At each station they think about and write their answers to the questions asked in their activity booklets. Students present their answers as a large group and contribute ideas to class discussion.	Were students engaged in each activity? Did students participate in discussion and contribute effectively to groups?		See preceding Formative Assessments	N/A

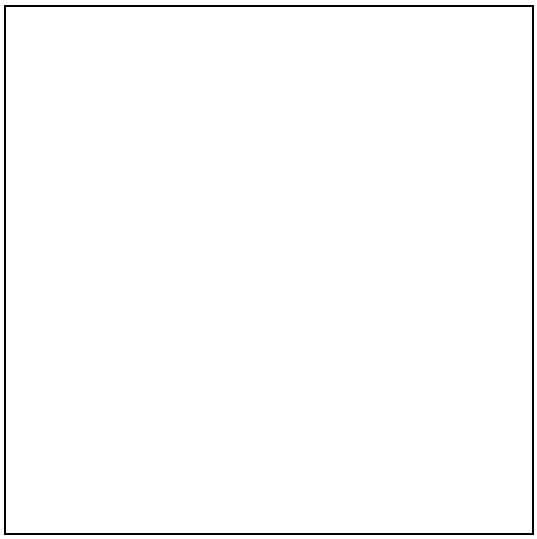
Notes: The lesson fits into a larger unit on rocks, which explore the rock cycle and classification of three types of rocks (metamorphic, igneous, and sedimentary).

Safety: Safety officer will help teacher monitor the use of materials. Rock samples must be handled carefully and appropriately.

Differentiation: Students who need additional help can be mixed with children who are more independent in order to create groups of varied ability. The lesson is great for ESL or visual learners because of the opportunity to view the rocks first hand. Students with learning disabilities will need extra assistance, especially during exploration phase of the lesson (reading instructions, paraphrasing of questions, etc).

5th Graders Rock Discovery Circus: Student Card
Activity #1

Title: Name that Rock



Directions:

1) Look at the rock sample on the piece of paper.
2) Use the magnifying glass to better examine what the rock is made of.

Think of your best answer to these questions:

1) What feature do you notice easily about this rock?
2) What are the colors of major particles (minerals) you see in this rock?
3) How do the particles in this rock reflect light? Is it glossy, shiny, dull, glassy, earthy, etc?
4) How would you classify this rock?

5th Graders Rock Discovery Circus, Teacher Information Card Activity #1

Title: Name That Rock
Topic: Identification of Rock Types
Grade Level: 5th grade
Standards: 5.7 The student will investigate and understand how the Earth's surface is constantly changing. Key concepts include
a) the rock cycle including identification of rock types;

Key Concepts: Students will examine a gneiss (metamorphic) rock sample available from the Luck Stone Rock Kit, which features rocks native to Virginia. They will then observe certain characteristics of the rock including color, sheen and makeup to determine what kind of rock it is. They will draw upon their previous knowledge of the three major rock classifications to make this inference.

Materials: Rock Sample from The Luck Stone Rock Kit

Source: Luck Stone Rock Corporation, The Luck Stone Rock Kit (2007).

Notes: This activity requires students to utilize their skills of observation and inquiry to analyze a given rock sample and predict whether it is sedimentary, metamorphic or igneous. We choose the gneiss rock from the rock kit because it will expose students to an example of metamorphic rock and force them to recognize the characteristics of this rock. Students will have been exposed to the rock types in a previous introductory lesson taught by their regular teacher but we will also review them during the introduction to the discovery circus. We could even define the terms and keep these definitions up on the document camera for student reference throughout the circus. This prediction will require students to take their previous knowledge of rock types and apply it to a real life situation. It is important for students to understand the Earth's composition and the fact that it is constantly changing. Rock formation is a key example of this constant evolution.

Discussion Questions:
What do you think rocks are made up of?
How do you think rocks are formed?
How long do you think it takes to make rocks?
Would you classify this rock as sedimentary, metamorphic or igneous?

5th Graders Rock Discovery Circus: Student Card
Activity #2

Title: How are rocks made?

Directions:

1) Line the bottom of the clear container with one color of modeling dough.
2) Make two more layers out of the other two colors of modeling dough and put one on top of the other.
3) Squeeze the dough together so the "sediments" are pressed together.
4) Once you have created your own "sedimentary rock" make sure that you take the Play-Doh out and separate the layers as best you can. Then clean up the workstation for the next group.

Think of your best answer to these questions:

1) In this demonstration, what do the layers of modeling clay represent?
2) What are some characteristics of sedimentary rocks?
3) How does this activity connect to the formation of sedimentary rock?
4) In what region of Virginia are sedimentary rocks most commonly found?

5th Graders Rock Discovery Circus, Teacher Information Card Activity #2

Title: How are rocks made?
Topic: Rock Formation
Grade Level: 5th grade
Standards: 5.7 The student will investigate and understand how the Earth's surface is constantly changing. Key concepts include
b) the rock cycle including identification of rock types;

Key Concept(s): Students will recognize that sedimentary rocks are made of layers of sediment that accumulate and are pressed together over hundreds of thousands of years.

Materials: Play-Doh in 3 different colors, a clear circular container, teacher-made worksheet for students to record their answers on

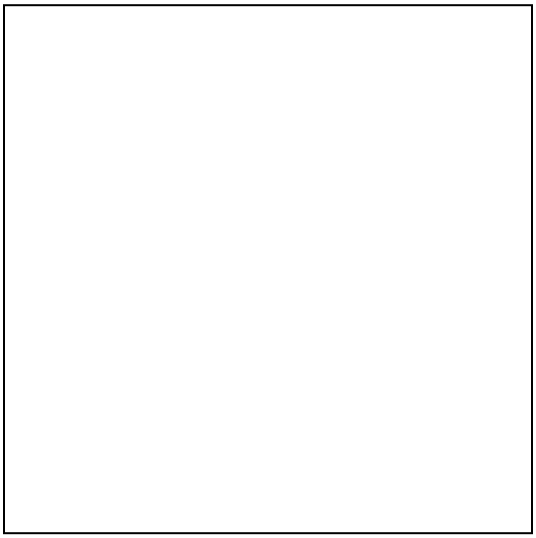
Source: Luck Stone Rock Corporation, The Luck Stone Rock Kit (2007).

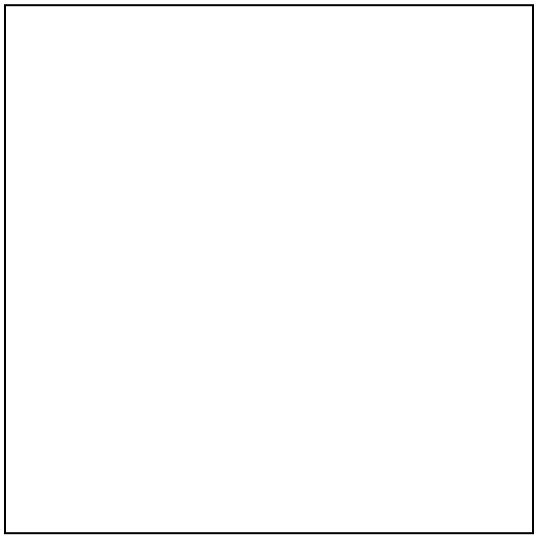
Notes: This is a very simplistic way to show that sedimentary rock is formed by layers of Earth's sediment. You could take this further by having students take the "sedimentary rocks" they form in the clear containers and compare them to three examples of sedimentary rock you provide (sandstone, shale, slate, etc).

Discussion Questions:
How do sedimentary rocks form?
What are some examples of sedimentary rock that you can name?
How does sedimentary rock differ from the other two rock types?
Which do you think would erode faster (Sedimentary, metamorphic or igneous)?
Which of the three rock types might contain fossils?
Which of the three rock types might be coal?

The Rock Cycle Discovery Circus: Student Card
Activity # 3

Title: Comparing Two Rocks





Directions:

1. Carefully analyze the two rock samples above.
2. While examining the rocks think about how they are similar and different.

Answer the following questions:

1. **How are the two rocks similar?**
2. **How are the two rocks different?**
3. **Which rock has smaller particles?**
4. **Do you think these rocks are the same type of rock (formed the same way) or different (formed differently)? Why?**
5. **What type would you classify each of the rocks as?**

5th Graders Rock Discovery Circus, Teacher Information Card Activity #3

Title: Comparing Two Rocks
Topic: Comparing and contrasting two rocks
Grade Level: 5th grade
Standards: 5.7

> The student will investigate and understand how the Earth's surface is constantly changing. Key concepts include
> c) the rock cycle including identification of rock types;

Key Concept(s): Students will analyze two rock samples, conglomorate and sandstone (both sedimentary). While analyzing the two rock samples, students will pay careful attention to similarities and differences between the two rocks.

Materials: Rock Samples from the Luck Stone Rock Kit.

Source: Luck Stone Rock Corporation, The Luck Stone Rock Kit (2007).

Notes: The activity requires students to utilize observation and inquiry skills to analyze a given rock sample of sedimentary rocks and describe how the two rock samples are both similar and different from one another. Using previous knowledge of the three major classifications of rocks, students must also make a prediction as to which category each rock falls under. It is critical that students understand the Earth's composition and how it continually changes, and rock formation is an important facet of the persistent changes the Earth undergoes.

Discussion Questions:
Why do you think these rocks are similar in the ways they are similar?
Why do you think they are different in the ways they are different?
Why does one rock have smaller particles than the other?
How do you think these rocks were formed?
How would you classify each of these rocks? Are they igneous, metamorphosis, or sedentary?

Virginia Rocks Discovery Circus
Student Card
Activity #4

Title: The Work of a Coal Miner

Directions:
Look at the picture of the Coal Miners on the table and read the following information:

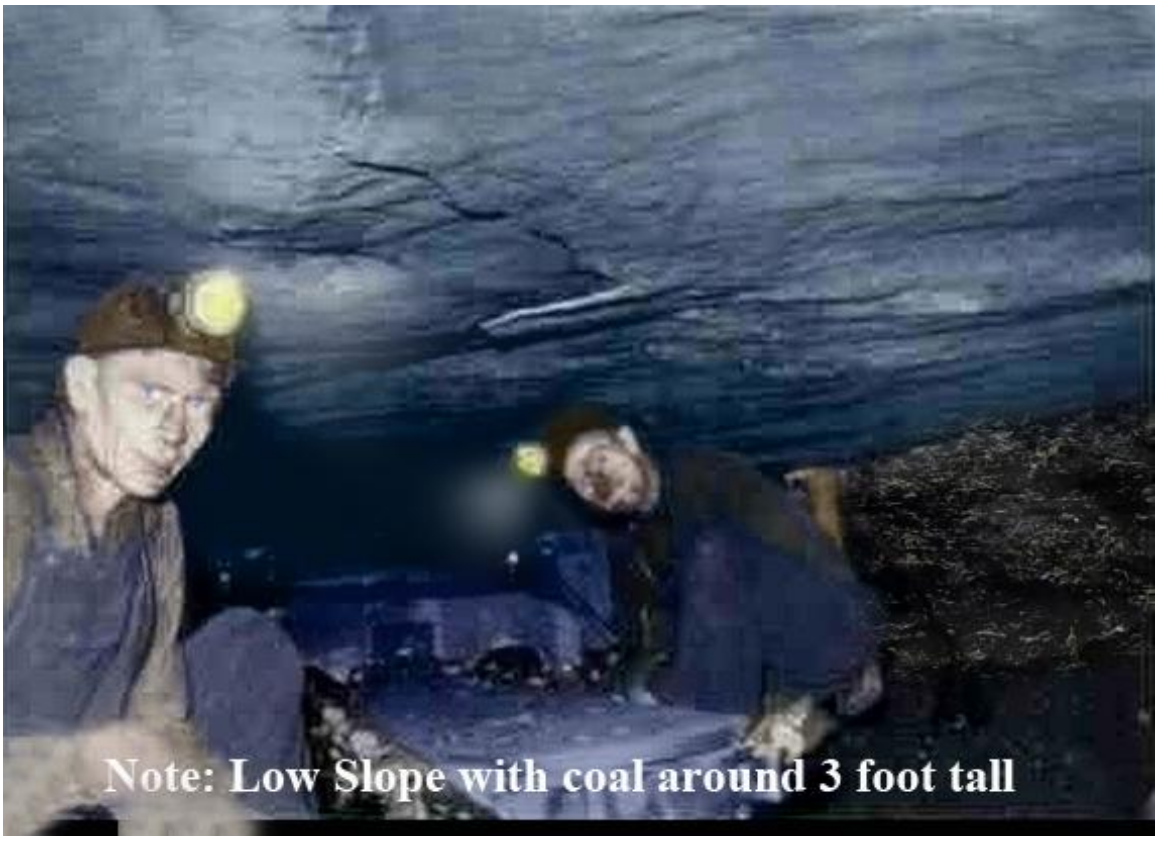
1. The United States produces about 35%, or 1 billion tons, of the world's coal supply—more than any other country produces
2. The average coal miner is 45 years old and has 20 years of experience.
3. Coal generates more than half of the electricity used in the United States.
4. Each person in the United States uses 3.8 tons of coal each year.
5. U.S. coal deposits contain more energy than that of all the world's oil reserves.
6. The United States has more than a 250-year supply of coal, if it continues using coal at the same rate at which it uses coal today.
7. When we surf the Internet, watch television, play a video game, charge a cell phone or turn on the air conditioner, we are using electricity.
8. Did you know that half of the electricity that heats our homes, lights our schools, and powers our businesses comes from coal?

Answer these questions:

1. How would you feel if you went to work underground?
2. What are the sacrifices or risks of working in a mine?
3. Is it worth the risk to send men and women into mines to harvest resources?
4. Why is coal such an important resource?
5. Are you aware of the 33 miners in Chile who were trapped in a gold mine?
6. Can you think of ways to harness electricity without burning coal?

5th Graders Rock Discovery Circus, Teacher Information Card Activity #4

The Work of a Coal Miner – Picture Sheet



5th Graders Rock Discovery Circus, Teacher Information Card Activity #4

Title: The Work of a Coal Miner

Topic: The lives of those who mine coal and why the coal industry supports our daily needs.

Grade Level: 5th

Standards:

VS 5.7 The student will investigate and understand how the Earth's surface is constantly changing. Key concepts include

d) the rock cycle including identification of rock types;
e) human impact.

Materials: Activity worksheet, coal.

Discussion Questions:

Have you known of or read of someone who worked in a mine?
Are you aware of the 33 miners in Chile who were trapped in a gold mine?
Do you think coal is important to our society? Why?
Can you think of ways to make electricity without drilling new mines?

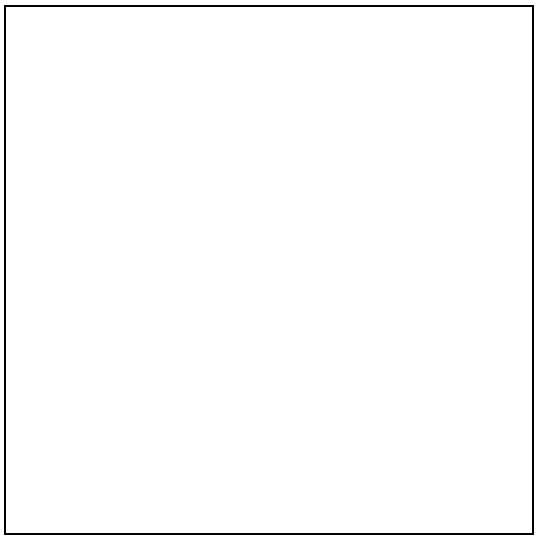
Source: http://www.coal-miners-in-kentucky.com/

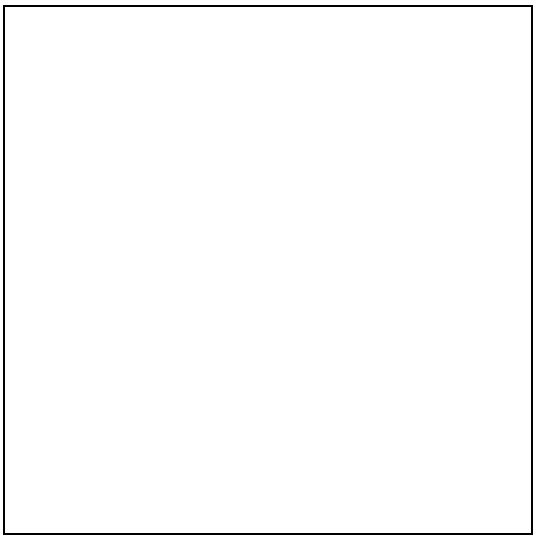
Notes:

1.The United States produces about 35%, or 1 billion tons, of the world's coal supply—more than any other country produces.
2.The average coal miner is 45 years old and has 20 years of experience.
3.Coal generates more than half of the electricity used in the United States.
4.Each person in the United States uses 3.8 tons of coal each year.
5.U.S. coal deposits contain more energy than that of all the world's oil reserves.
6.The United States has more than a 250-year supply of coal, if it continues using coal at the same rate at which it uses coal today.
7.When we surf the Internet, watch television, play a video game, charge a cell phone or turn on the air conditioner, we are using electricity.
8.Did you know that half of the electricity that heats our homes, lights our schools, and powers our businesses comes from coal?

The Rock Cycle Discovery Circus: Student Card
Activity # 5

Title: Comparing Two Rocks





Directions:

7. Carefully analyze the two rock samples above
8. While examining the rocks think about how they are similar and different.

Answer the following questions:

1. **How are the two rocks similar?**
2. **How are the two rocks different?**
3. **Which rock has smaller particles?**
4. **Do you think these rocks are the same type of rock (formed the same way) or different (formed differently)? Why?**
5. **What type would you classify each of the rocks as?**

5th Graders Rock Discovery Circus, Teacher Information Card Activity #5

Title: Comparing Two Rocks
Topic: Comparing and contrasting two rocks
Grade Level: 5th grade
Standards: 5.7

> The student will investigate and understand how the Earth's surface is constantly changing. Key concepts include
> f) the rock cycle including identification of rock types;

Key Concept(s): Students will analyze two rock samples, fine granite and diabase (both igneous). While analyzing the two rock samples, students will pay careful attention to similarities and differences between the two rocks.

Materials: Rock Samples from the Luck Stone Rock Kit.

Source: Luck Stone Rock Corporation, The Luck Stone Rock Kit (2007).

Notes: The activity requires students to utilize observation and inquiry skills to analyze a given rock sample and describe how the two rock samples are both similar and different from one another. Using previous knowledge of the three major classifications of rocks, students must also make a prediction as to which category each rock falls under. It is critical that students understand the Earth's composition and how it continually changes, and rock formation is an important facet of the persistent changes the Earth undergoes.

Discussion Questions:
Why do you think these rocks are similar in the ways they are similar?
Why do you think they are different in the ways they are different?
Why does one rock have smaller particles than the other?
How do you think these rocks were formed?
How would you classify each of these rocks? Are they igneous, metamorphosis, or sedentary?

5th Graders Rock

Discovery Circus

Student Activities Booklet

_____

(NAME)

_____

(#)

_____

(DATE)

Ms. Dillard
Ms. DiProspero
Ms. Millson

5th Graders Rock Discovery Circus

Student Activities Booklet

TABLE OF CONTENTS:

Page(s)

Name: _____ Date:_____

Activity 1 Worksheet: Name that Rock

5) What feature do you notice easily about this rock?

6) What are the colors of major particles (minerals) you see in this rock?

7) How do the particles in this rock reflect light? Is it glossy, shiny, dull, glassy, earthy, etc?

8) How would you classify this rock?

Name: _____ Date:_____

Activity 2: How Are Rocks Made?

5) In this demonstration, what do the layers of modeling clay represent?

6) What are some characteristics of sedimentary rocks?

7) How does this activity connect to the formation of sedimentary rock?

8) In what region of Virginia are sedimentary rocks most commonly found?

Name: _____ Date:_____

Activity 3: Comparing Two Rocks

6. How are the two rocks similar?

7. How are the two rocks different?

8. Which rock has smaller particles?

9. Do you think these rocks are the same type of rock (formed the same way) or different (formed differently)? Why?

10. What type would you classify each of the rocks as?

Name: _____ Date:_____

Activity #4: The Life of a Coal Miner

1. How would you feel if you went to work underground?

2. What are the sacrifices or risks of working in a mine?

3. Is it worth the risk to send men and women into mines to harvest resources?

4. Why is coal such an important resource?

5. Are you aware of the 33 miners in Chile who were trapped in a gold mine?

6. Can you think of ways to harness electricity without burning coal?

Name: _____ Date:_____

Activity 5: Comparing Two Rocks

1. How are the two rocks similar?

2. How are the two rocks different?

3. Which rock has smaller particles?

4. Do you think these rocks are the same type of rock (formed the same way) or different (formed differently)? Why?

5. What type would you classify each of the rocks as?