NTTI Media-Rich Lesson

NAME

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Going Around in Circles: A Study of the Rock Cycle

LESSON TITLE

Third Grade

GRADE LEVEL

Three thirty to forty-five minute class periods

TIME ALLOTMENT

OVERVIEW

This is an introductory study of the rock cycle, utilizing the NSRC/STC ***Rocks and Minerals*** kit, the video "**Junior Geologist:** Rocks and Minerals", and the **Rock Hound** website to learn how to classify rock. Students will also try to solve a geo-mystery about rocks, take an online assessment and write an imaginary story about a trip through the rock cycle.

SUBJECT MATTER

Science

LEARNING OBJECTIVES

The students will:

1) Explain how igneous, metamorphic, and sedimentary rocks are formed.
2) Classify rocks as igneous, metamorphic, or sedimentary.
3) Utilize technology to gather information.

STANDARDS

NSES Earth Science Content Standard C

Earth materials are solid rocks and soils, water, and the gases of the atmosphere. The varied materials have different physical and chemical properties, which make them useful in different ways, for example, as building materials, as sources of fuel, or for

growing the plants we use as food. Earth materials provide many of the resources that humans use.
Georgia Quality Core Curriculum:
Classifies rocks according to the manner in which they are formed.
Knows the primary groups of rocks and knows that characteristics of rock types are a direct result of how they are formed. QCC 3.21

MEDIA COMPONENTS

Peach Star Video Streaming
http://peachstar.unitedstreaming.com/login_peachstar.cfm
Junior Geologist: "Rocks and Minerals" - In this video, students are introduced to the three types of rocks and the rock cycle. During the discussion of sedimentary rocks, students are shown pictures of fossils and a brief description of how they are formed.

Geo-Mysteries
http://www.childrensmuseum.org/geomysteries/floatingrock/a1.html This is found on the website for the Children's Museum of Indianapolis. Students are invited to solve three mysteries about rocks and minerals.

Rock Hounds
http://www.ft.edu/fellows/payton/rocks/create/index.html This is an excellent website to help students to understand how rocks are formed and view samples of each type of rock.

The Rock Cycle Song
http://www.whps.org/schools/IT/profdevelopment/instructional%20resources/rock_cycle_song.htm This song, to the tune of "Row, Row, Row Your Boat", is found on this school's website.

MATERIALS
Per Class
Rocks & Minerals kit
Chart paper for a KWHL chart
Marker

Per Group of Students
Rocks #1-12 (granite, gneiss, conglomerate, limestone, shale, sandstone, obsidian, basalt, pumice, slate, marble, schist)
Cardboard tray
Basin
Bowl of water for Activity 4

Per Student
Hand lens
Handouts

PREP FOR TEACHERS
Before beginning the lesson, on each computer bookmark all of the websites and make sure that Shockwave has been loaded. Download and save to the hard drive of the main computer from video streaming the video ***Junior Geologist:*** "Rock and the Rock Cycle" at http://peachstar.unitedstreaming.com/login_peachstar.cfm . If you do not have a username and password, you may enter "atlanta 1057" as user and "761" as the password. Complete a search for the rock cycle and click on the video, ***Junior Geologist:*** "Rock and the Rock Cycle". Prepare and duplicate all student hand-outs. Set up the group materials in basins for easy access.

INTRODUCTORY ACTIVITY: SETTING THE STAGE (Engage)
1. Organize the class into groups of three or four and distribute the basins with the twelve rocks, a hand lens for each student, and a cardboard tray (used to lay out the rocks for easy viewing).
2. To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** by saying, ***"Today we are going to begin a study of rocks and minerals. At the beginning of the video, you will see different types of rocks in different places. Some will even look like some of the rocks you have in your basin. Pay close attention and you will hear the two ways scientists can tell the difference between one rock and another."***
3. **START** the video at the beginning of the tape. There will be scenes with no sound for the first 40 seconds. While this part of the video is running, provide students with a specific task to complete, **FOCUS ON MEDIA INTERACTION** by saying, "***Notice the colors and shapes of the rocks and minerals."*** **PAUSE** the video at 1:04 with the words "With a little information of how rocks are formed and what they are made of, we can begin to identify them and understand why they are so important."
4. **CHECK FOR STUDENT COMPREHENSION** by saying, ***"What are the two ways scientists use to tell the difference between one rock and another?"*** Students should be able to respond "how they are formed and what they are made of." Allow the students to examine the rocks and discuss how they look and feel.

LEARNING ACTIVITIES
Activity 1: What are rocks made of?
1. To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** by saying, ***"Each group has been given a set of twelve rocks, numbered 1 through 12. Look at rock #1. How would you describe it?"***
Allow for responses from several students. "The descriptions you have given represent **physical properties** of the rock. ***You now have twelve rocks to sort into three***

different groups. As the video plays, listen carefully to the first way geologists, group rocks. Then as a group, decide on what properties you will use to group these rocks."

2. Resume the video by clicking on **PLAY** and then **PAUSE** at 2:42 with the words "*By now we can begin to see that if geologists know what ingredients are inside a rock, they are well on their way to properly identifying it."* **CHECK FOR STUDENT COMPREHENSION** by asking, "***What are rocks made from?*** (Allow students to answer "minerals".) Then say, "***How are they different?"*** (Allow time for the students to discuss the differences in the minerals, especially the colors and shapes.) Pass out Handout #1 and say, "***As a group, try to divide your rocks into three groups, place each group in a circle, then write the numbers of the rocks you have grouped together in the same circle."***

3. Allow the students to divide the rocks into the three groups and then share their results with the class.

Activity 2: The Rock Cycle
1. Before the lesson begins, cue the video at 2:42 and the words, "What else must we know to identify rocks?"

2. Review yesterday's lesson, emphasizing the fact that one reason rocks vary in color and shape is because of what minerals they are made of. To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** by saying, "***At a later date we will spend time learning more about minerals, but for today's lesson, we are more concerned with the second way that is used to classify rocks. As the video plays, listen carefully to find what three ways rocks are formed and what do geologists use to help them explain how rocks are formed."***

3. Press **PLAY** at 2:42 and then **PAUSE** at 3:30 as the screen displays "The Rock Cycle", right after the words, "Geologists use what is called the rock cycle to help explain the three basic ways in which a rock can form." Distribute copies of handout #2 to each student. To provide students with a specific task to complete while viewing say, "***As you listen to the description, take notes on the chart. There are vocabulary words at the bottom of the page to help you. I will pause after each rock is introduced.*** **PAUSE** at 3:36, after the first sentence is read, "The first type of rock is called igneous – which means fire formed." **CHECK FOR STUDENT UNDERSTANDING** by asking students ***"What is the first kind of rock? What does igneous mean?*** RESUME the video and then **PAUSE** at 3:58 after the sentence, "When the hot lava from a volcano cools and hardens, the result is an igneous rock." **CHECK FOR STUDENT UNDERSTANDING** by allowing students the opportunity to complete the information about igneous rocks and then discussing what they have written.

6. To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** by saying, ***"Now let's listen for the second type of rock.*** Press **PLAY** for the sentence "The second type of rock is called metamorphic." **CHECK FOR STUDENT UNDERSTANDING** by asking, "***What word do you think is meant by 'metamorphic'?*** Students may recognize the similarity between "metamorphic" and "metamorphosis" which means "change", if they have already studied insects. To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** by saying, ***"Let's now listen and see if you are right and what we can learn about metamorphic rocks. Include in your notes the two conditions that are needed for the rocks to change."*** Press **PLAY** to learn about the next group of rocks and then **PAUSE** at 4:26 with the words "This metamorphic rock called schist was once an igneous rock called granite". **CHECK FOR STUDENT UNDERSTANDING** by asking, ***"What was the metamorphic rock that changed that was changed to this igneous rock called granite? Be sure to add this information to your chart."*** Allow time for the students to answer the question and add to their chart. To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** by saying, ***"Let's continue to listen and learn about metamorphic rocks."*** Press **PLAY** so that the students may hear, "And this metamorphic rock called slate was formed from this rock called shale." PAUSE at 4:34. **CHECK FOR STUDENT UNDERSTANDING** by reminding the students to enter this information about metamorphic rocks and discuss with them what they have written.

7. To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** by saying, "***Now we will discover the third kind of rock in the rock cycle. You should now be able to listen carefully to learn about these rocks.*** Press **PLAY** for the one sentence, "Shale is part of our third rock type that we call sedimentary." **PAUSE** at 4:40. **CHECK FOR STUDENT UNDERSTANDING** by allowing students to write this name and rock example in their chart. To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** by saying***, "Let's continue to learn about sedimentary rocks."*** Press **PLAY** at this point so that the students may find out about sedimentary rocks. **PAUSE** at 5:50 after hearing the question, "Can you tell where the oldest rocks would be?" **CHECK FOR STUDENT UNDERSTANDING** by asking, "***Where do you think the oldest rocks would be? Be sure to support your answer with a good explanation."*** To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** by saying, ***"Now we'll see if you're right and what other details we can find out about sedimentary rocks."*** Press **PLAY** to finish listening to the study of sedimentary rocks. **STOP** at 6:50 with the words "From studying the fossil remains, geologists can make intelligent guesses about what these animals might have looked like when they were alive." **CHECK FOR STUDENT UNDERSTANDING** by discussing the information about sedimentary

rocks. Then say, "***Now that you have had an opportunity to learn more about the rock cycle, see if you need to change your original rock groups."*** After they have spent about five minutes classifying their rocks into the three groups, pass out Handout #3 and have them to enter what group of rocks they think each of their twelve rocks belong.

Activity 3: Checking Student Classifications

1. Before beginning the activity, set each computer at the Rock Hound website at *http://sln.fi.edu/fellows/payton/rocks/create/index.html* . To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** saying, "***Today we're going to see how closely your group's results are like those of geologists. What are the three types of rocks? Where and how is each type formed?*** (Allow students to share their hypotheses.) ***"You are going to become rock hounds for today. I have given you the names of each of your rocks that you classified yesterday. Now you will have the opportunity to find out the official group for each of your rocks. Your computers have been set at the Rock Hound website and you'll click on each type of rock. After you click on each rock type, check which ones were classified properly. For instance, if you said that rock #1(granite) is an igneous rock, you would be right!"*** After students click on the Rock Hound website, they should click on "Sedimentary Rock" and continue to check their answers. **CHECK FOR STUDENT UNDERSTANDING** by discussing the students' answers on their completed charts (Handout #3)

2. To bring closure and provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION,** for the end of the activity say, ***We're going to sing a song that summarizes what we have learned about the Rock Cycle. After we have sung the song a couple of times, I'm going to give you the opportunity to write your own Rock Cycle song."*** Click on "The Rock Cycle Song" at *http://www.whps.org/schools/IT/profdevelopment/instructional%20resources/rock_cycle_song.htm* and join students in singing the song.

CULMINATING ACTIVITY

Solving a Geo-Mystery

1) Before beginning the activity, place in the student basins limestone (rock #4), schist (rock #12) and pumice (rock #9) and a bowl of water. Set each computer at the Children's Museum website at http://www.childrensmuseum.org/geomysteries/floatingrock/a1.html . To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** *say, "**Today we're going to solve a Geo-Mystery. Does anyone have an idea about what is meant by a Geo-mystery?*** (Allow time for discussion.) ***A geo-mystery is a problem involving something that we are learning about geology, in this case, we will determine what kind of rock can float."*** *Project on the screen the floating rock mystery at*

http://www.childrensmuseum.org/geomysteries/floatingrock/a1.html After the mystery is presented, click on “Cemented together from pebbles”. Discuss with the students what kind of rocks are cemented together from pebbles (sedimentary rocks) and what happened to the rock when placed in the water. Students should then place their sedimentary rock in water to see if it will float. It will not float. NEXT click on “Heated deep in the earth”. Discuss with the students what kind of rocks are changed by heat or pressure (metamorphic). Allow the students to place the schist in the bowl of water and see if it floats. NEXT click on “Tossed from a volcano”. After discussing what is shown on the screen, allow students to place the pumice in the bowl of water and watch it float.

2) **CHECK FOR STUDENT UNDERSTANDING** by allowing students to write up their observations and review the three types of rock and the rock cycle.
3) Bring closure to the lessons by inviting the students to go on a class field trip to a nature center or the schoolyard and experience a new dig. Depending on the location, students might find fossilized remains of various plants and animals.

EVALUATION

1. Set the computers to the Rock Hounds website at http://sln.fi.edu/fellows/payton/rocks/quiz/index.html .
2. To provide students with a specific task to complete while viewing, **FOCUS ON MEDIA INTERACTION** by saying, ***Now that you have become expert rock hounds, you’re ready for a test. Just click on http://sln.fi.edu/fellows/payton/rocks/quiz/index.html and begin.***
3. Use Handout # 5 as a performance-based assessment.

CROSS-CURRICULAR EXTENSIONS

Language Arts

Students will pretend they are a rock and write an imaginary trip through the rock cycle. They will read a book about rocks or volcanoes, or a book of fiction such as ***Stone Soup*** or ***Sylvester and the Magic Pebble*** and report on it to the class.

Mathematics

Students will spend a week collecting various kinds of rocks, sort them, and make a bar graph about the amount of different kinds of rocks they were able to find.

Art and Language Arts

Students will bring in a rock to decorate as a pet rock. They will then write a story about their pet rock.

Social Studies and Mathematics

Students will research famous volcanoes throughout the world and identify them on a map. They may then make a bar graph showing the number of famous volcanoes on each continent.

Music

Students learn and sing “The Rock Cycle Song” at http://www.whps.org/schools/IT/profdevelopment/instructional%20resources/rock_cycle_song.htm to the tune of “Row, Row, Row Your Boat”.

COMMUNITY CONNECTIONS

Students may use the internet to *Ask a Geologist* at http://walrus.wf.usgs.gov/ask-a-geologist/ to help them with any questions they may have about the rock cycle.
A visit to the local museum or a visit from a geologist at a local college would yield a first hand look at a rock collection.

Handout #3

Classifying Rocks

1. After listening to and viewing the video, identify each type of rock under “Student’s Guess”.
2. Click on the Rock Hound website, http://sln.fi.edu/fellows/payton/rocks/create/index.html , to check your answers.

Number	Rock	Student’s Guess	Actual Type of Rock
1	Granite		
2	Gneiss		
3	Conglomerate		
4	Limestone		
5	Shale		
6	Sandstone		
7	Obsidian		
8	Basalt		
9	Pumice		
10	Slate		
11	Marble		
12	Schist		

Key

Number	Rock	Student's Guess	Actual Type of Rock
1	Granite		Igneous
2	Gneiss		Metamorphic
3	Conglomerate		Sedimentary
4	Limestone		Sedimentary
5	Shale		Sedimentary
6	Sandstone		Sedimentary
7	Obsidian		Igneous
8	Basalt		Igneous
9	Pumice		Igneous
10	Slate		Metamorphic
11	Marble		Metamorphic
12	Schist		Metamorphic

The Rock Cycle

Name _____

Fill in the chart as you watch and learn about the three kinds of rocks.

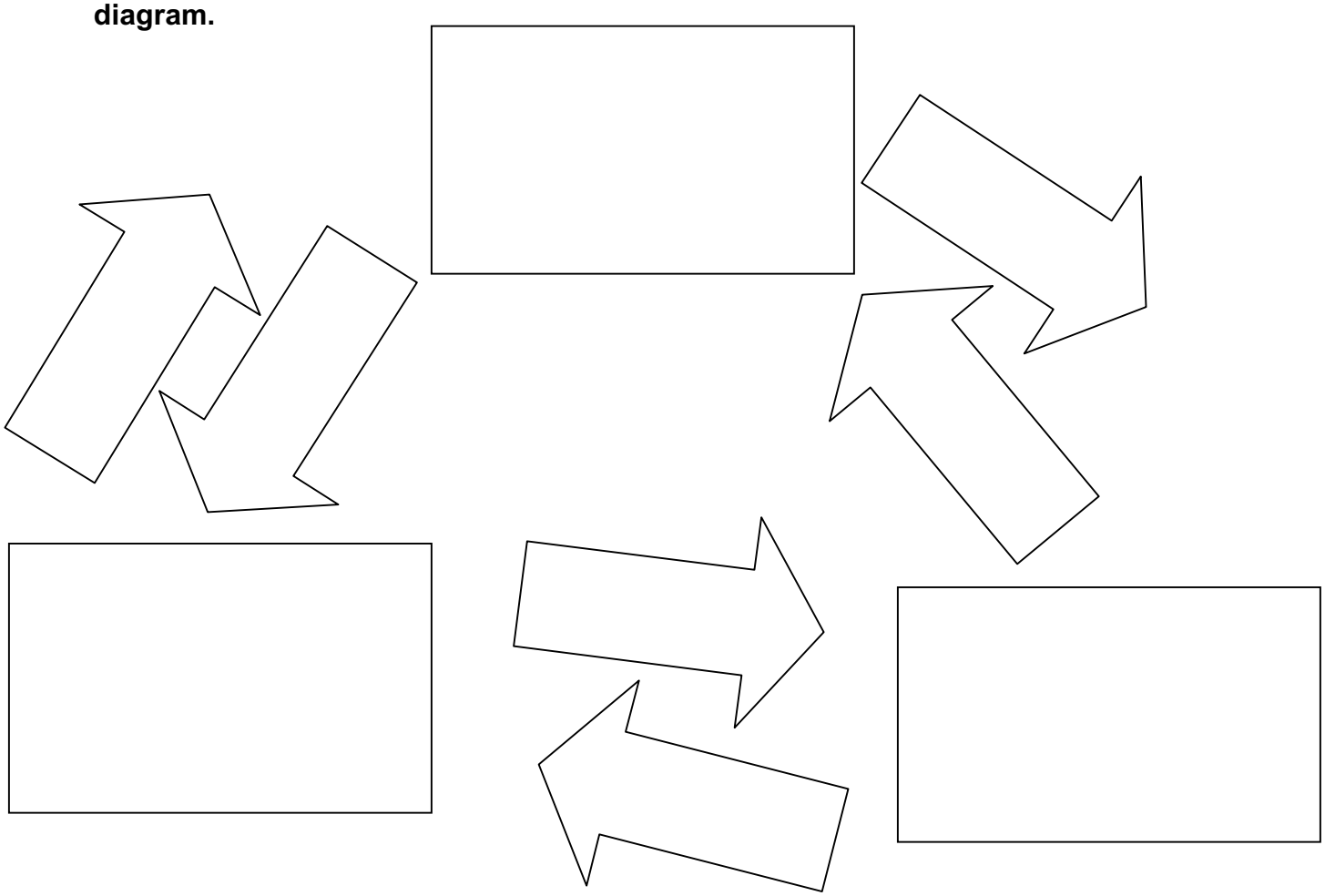
Type of Rock	How and Where Formed	Examples

Vocabulary

magma	volcano	fire formed
igneous	metamorphic	sedimentary
change	pressure	heat
fragments	weathering	erosion

The Rock Cycle

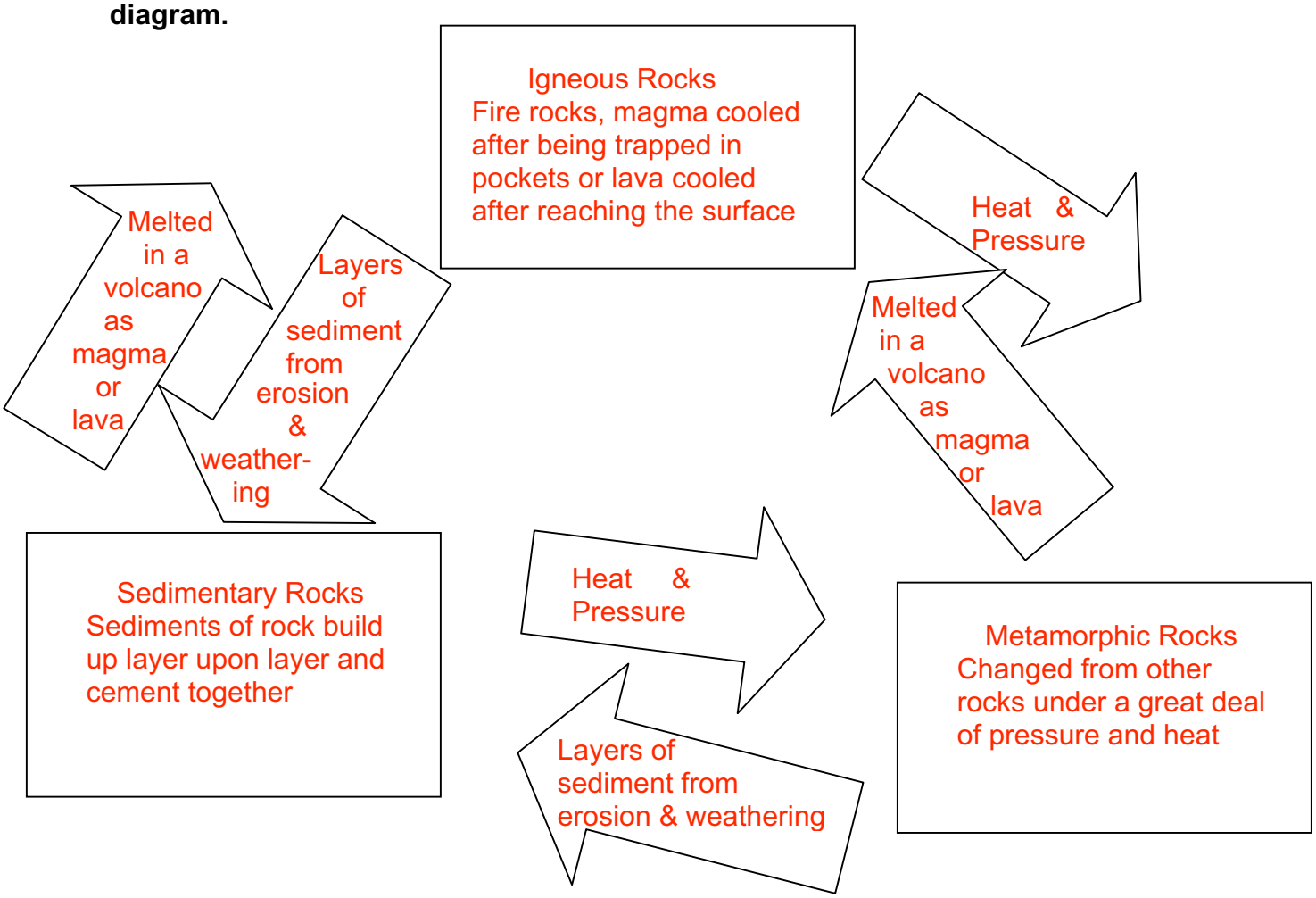
Now that you know the three types of rock, use this information to fill in the diagram.



Write the name of a type of rock in each rectangle. Use the arrows to describe how rocks go from one type to another.
If you need help, refer to your chart (Handout #1) and the information found on the Rock Hound website at http://sln.fi.edu/fellows/payton/rocks/create/index.html .

The Rock Cycle

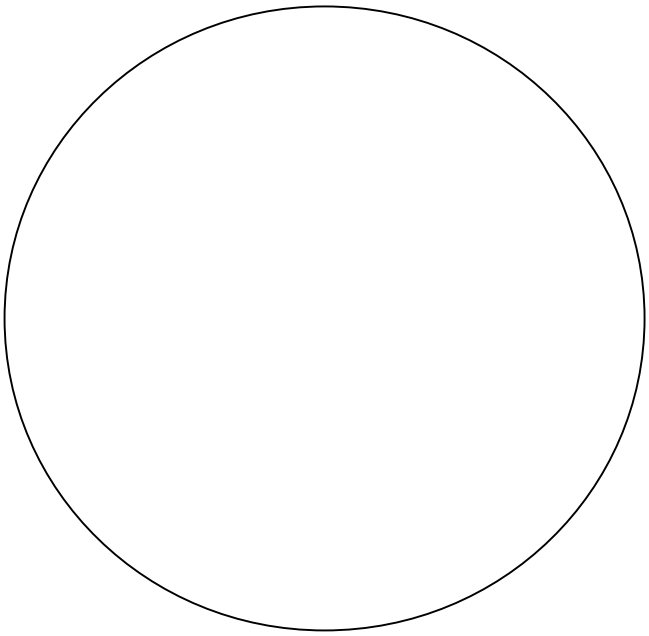
Now that you know the three types of rock, use this information to fill in the diagram.

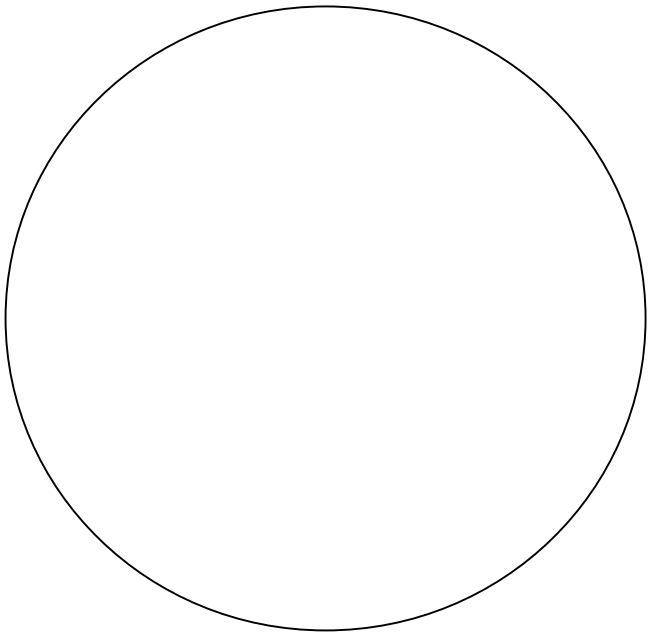


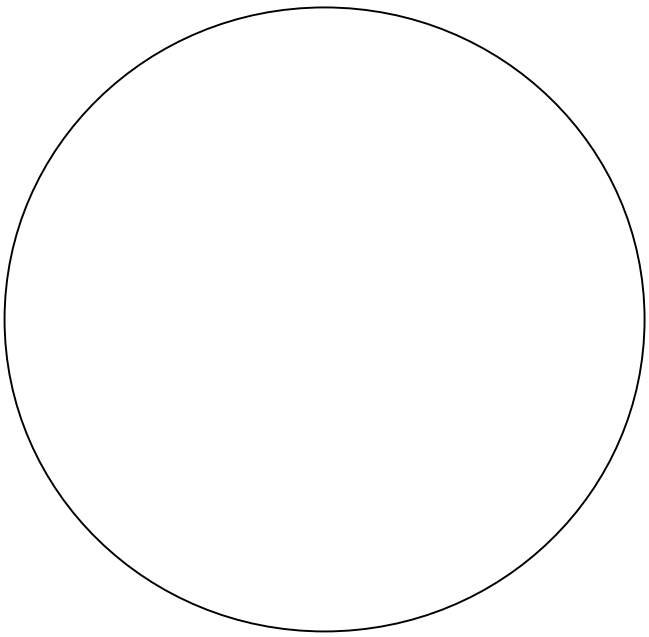
Write the name of a type of rock in each rectangle. Use the arrows to describe how rocks go from one type to another.
If you need help, refer to your chart (Handout #1) and the information found on the Rock Hound website at http://sln.fi.edu/fellows/payton/rocks/create/index.html

Classifying Rocks

1. Place the twelve rocks from the basin on the cardboard tray.
2. Each member of the group should closely examine each rock, listen to what rocks are made of, and then discuss how to divide the rocks into three groups.
3. In the circles below, write the number of the rocks that your group has decided belong together.





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Cisco Systems
Foundation
thirteen
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Be A Rock Hound

While playing in the backyard, you find a new rock. How can you determine what kind of rock you have found? Design a plan to identify this rock. What steps will you take to find out about your rock?