Impact on Student Learning Project

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Appalachian State University

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FOUNDATIONAL INFORMATION					
Student Number	Achievement/ development	504/IEP modifications	AYP Groups (50% of class is on free or reduced lunch)	Possible Environmental and cultural factors other than AYP	Strengths
1	770L 3 Reading EOG 4 Math EOG		Female White, Black, Hispanic	Brother in high school.	Expressive
2	1005L 4 Reading EOG 5 Math EOG	AIG math	Female White	Has younger brother.	Imaginative
3	770L 3 Reading EOG 5 Math EOG		Male White		Engaged
4	1075L 5 Reading EOG 5 Math EOG	AIG math Speech	Female White, Black		Contemplative
5	960L 4 Reading EOG 4 Math EOG		Female White		Perseverant
6	795L 4 Reading EOG 4 Math EOG		Female White	Two siblings, one on the way. Receives food book bag.	Observant
7	910L 4 Reading EOG 4 Math EOG		Male White	Lives with Grandparents. Medicated for unknown. Receives food book bag	Competitive
8	960L 4 Reading EOG 5 Math EOG		Male White		Amiable
9	1145L 5 Reading EOG 5 Math EOG	AIG Math	Male White	3rd school. Brother in high school.	Thoughtful
10	560L 2 Reading EOG 4 Math EOG	504 Reading-improving fluency and comprehension	Female White	Lives with Grandmother.	Dedicated
11	840L 4 Reading EOG 4 Math EOG		Female White	Lives with mother.	Visionary
~~12~~	~~655L~~ ~~2 Reading EOG~~ ~~2 Math EOG~~	SWITCHED PERIODS.	~~Male~~ ~~White~~		
13	1005L	AIG math	Male		Cordial

	4 Reading EOG 5 Math EOG		Hispanic, Black		
14	865L 4 Reading EOG 4 Math EOG		Male White	Lives with Grandparents.	Zealous
15	840L 4 Reading EOG 4 Math EOG		Female White		Poised
16	910L 4 Reading EOG 5 Math EOG	AIG math	Female White		Explicit
17	770L 3 Reading EOG 4 Math EOG		Male Hispanic	Lives with mother who is from Costa Rica	Clever
18	725L 3 Reading EOG 4 Math EOG	Speech	Male Asian		Mindful

PART 1: LEARNING GOALS & OBJECTIVES

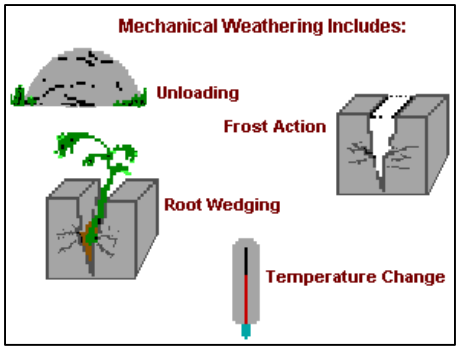
NC Curriculum Standards	4.P.2 Understand the composition and properties of matter before and after they undergo a change or interaction. 4.P.2.1 Compare the physical properties of samples of matter 4.P.2.3 Classify rocks as metamorphic, sedimentary or igneous based on their composition, how they are formed and the processes that create them.
Learning Targets	-Students will know how minerals are identified. -Students will classify rocks based on properties. -Students will compare metamorphic, sedimentary, and igneous rocks. - Students will demonstrate how the properties and process of rock formation can be used in science.
Horizontal Alignment	4.MD. 1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec.
Vertical Alignment	3.P.2 Understand the structure and properties of matter before and after they undergo a change. 5.P.2 Understand the interactions of matter and energy and the changes that occur. The fourth grade students should have previously learned that everything that has mass is matter and that a matter's state can change based on whether heat is applied or removed. This information will be applied to the processes by which rocks are formed and how it creates the many variety of rocks we have. The study of rocks is a visual example of changes in states of matter that will provide a concrete foundation for more complex changes such as the water cycle.

PART 2: ESSENTIAL CONTENT KNOWLEDGE

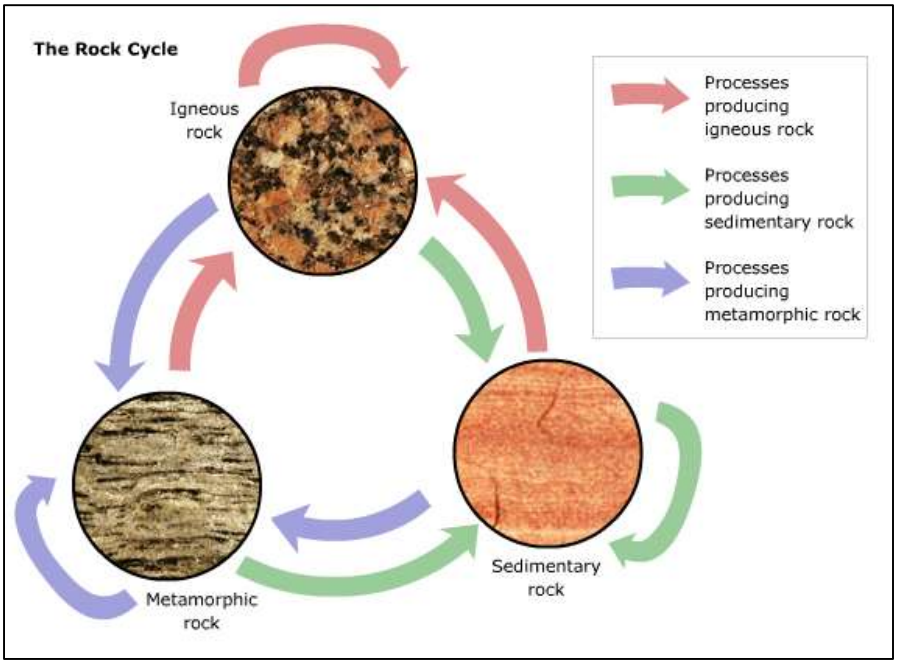
(Curriculum Standard: 4.P.2 Rocks and minerals)

Minerals are natural, nonliving, solid materials with particles in repeating patterns. Rocks are made up of one or more of those minerals. It is a common misconception that these substances are one in the same or separate, but the relationship is that minerals are the substances that make up rocks. Soil is also connected, as the material left over from rocks breaking down, combined with organic material forms soil. Though rocks seem unyielding they do not last forever eventually they will breakdown by some force, however, the material make up is never lost. In the same way that the three states of matter can undergo a cycle of change so also do these three types of rocks.

The rock cycle has seven processes that can occur in any order; heat, pressure, melting, weathering, erosion, compacting, and cementing. There are two types of weathering; chemical or mechanical. Mechanical weathering is natural forces such as heat, water, wind, and ice, whereas



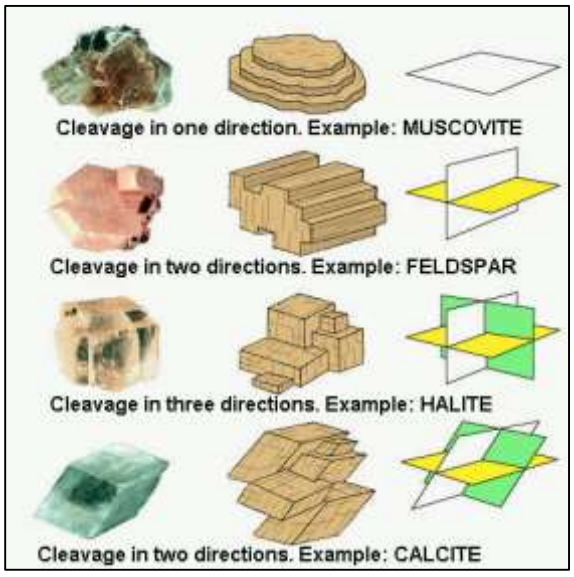
chemical weathering involves a chemical reaction. An example of mechanical weathering would be water particles freezing and wedging the rock apart as it expands. Crystallization is very similar to wedging, however it involves salt crystals instead of ice. When plant roots grow into a rock causing it to break is also another example of mechanical weathering. Erosion is a very common form of mechanical weathering, which is the process of water washing away pieces of the rock. Compaction is when sediment is squeezed together and cementation is when dissolved minerals wedge between sediment and act as a glue or cement.



There are three types of rock igneous, metamorphic, and sedimentary that classify rocks based on the process they undergo. Igneous, meaning fire, is a type of rock that includes pumice and granite. It is formed when hot, molten rock (lava) cools till hardened. Based on whether the rock cools quickly or slowly air pockets can be formed by gas bubbles. These after hardening these gas bubbles leave pockets in the rock making it dense and thus allowing it to float in water. An igneous rock can be subject to heat and pressure to form metamorphic rock. Or it can be weathered (broken down) and eroded (transported) to form sedimentary rock. Metamorphic, meaning change, is a type of rock that includes schist and gneiss. It can undergo two types of change; heat and pressure to form a new generation of metamorphic rock or it can be weathered (broken down) and eroded (transported) to form sedimentary rock. Sedimentary is type of rock that includes limestone and sandstone. It is formed from small pieces of rock pressed or cemented together forming layers. Sedimentary rock can be subject to weathering and erosion to form a new generation of sedimentary rock or, if heated enough, it can melt and harden into igneous rock.

Rocks can be further classified based on certain properties such as color and luster (how it reflects light). However, the color of a rock is unreliable because of the similarities in shades

and infinite color patterns. To test how tough or weak a rock is scientists perform a scratch test by using materials that the hardness level is already known to mark the rock being tested. Based on the result the rock is rated on a scale of 1-10 according to Mohs' hardness scale. Rocks are also classified using a process called streaking, upon being rubbed on a porcelain tile, called a streak plate, rocks leave behind a unique streak that can be used to classify it. After a rock is broken observing how many and the types of surfaces created, or the rocks cleavage, is also used to classify rocks. Some special rocks such as magnetite can easily be identified with a magnet as it has high levels of iron making it magnetic. Pumice as previously mentioned is dense and is the only rock that can float. There is another test to find a more complex measurement, density. Archimedes is attributed to the process of placing a substance in water and observing the amount of water that is displaced.



Why study rocks and minerals? They are valuable resources as they play a role in soil formation, which is vital for plant growth that humans depend on. We use rocks and minerals to make jewelry, coins, construction materials, beauty products, fuel, and metal (aluminum) products. Rocks form several of the famous landscapes around us such as the Grand Canyon and

the Appalachian Mountains. Worldwide rock wonders such as the beaches of the Mediterranean Sea and the Giant's Steps in Scotland.

There are several well-known rocks and minerals that are unique. Diamonds are the hardest of all minerals, while mica is a soft, layered mineral. Geodes are commonly seen in gift shops and are formed by mineral rich water making its way through the pores crust of a sedimentary or igneous rock. Coal is a type of rock that is burned for fuel. They can also hold secrets of the past in the form of fossils, which tell us how animals moved, their diet, characteristics, or how they died (Essential Standard 4.E.2).

Geologist are the professionals who study these Earth processes, landscapes, and rocks. They use this information to make inferences about the history of the area. Most geologists work for the state as land surveyors for building roads and drawing property lines. However, geologists are not limited to only Earth process as several work with NASA and analyze images that are sent back from Satellites and rovers to make inferences about life on other planets.

Vocabulary used in this unit:

- Luster- A property of all rocks based on how a rock reflects light.
- Cleavage- A property of all rocks based on observing how it breaks.
- Geologist- A person who studies Earth processes, landscapes, and rocks.
- Metamorphic- A type of rock that is created from a mixture of other rocks with heat and pressure underground.
- Sedimentary- A type of rock that is created from different rock materials layered on top of each other pressed together typically underwater.
- Igneous- A type of rock that is formed from molten rock cooling.

PART 3: ASSESSMENTS

4.P.2 Understand the composition and properties of matter before and after they undergo a change or interaction.

- 4.P.2.2 Explain how minerals are identified using tests for the physical properties of hardness, color, luster, cleavage and streak.
- 4.P.2.3 Classify rocks as metamorphic, sedimentary or igneous based on their composition, how they are formed and the processes that create them.

Knowledge			**Reasoning**					
Factual Information	Procedural	Conceptual	Inference	Analysis	Comparison	Classification	Evaluation	Synthesis
-Students will know how minerals are identified.					-Students will compare metamorphic, sedimentary, and igneous rocks.	-Students will classify rocks based on properties.		- Students will demonstrate how the properties and process of rock formation can be used in science.

PRE- ASSESSMENT

I have created 4 selected response questions for each of the learning targets. There are a total of 20 questions to gauge student's prior knowledge of content that will be taught about rocks and minerals. The chart below is for student scores and will help guide focus when planning lessons. Have students place a question mark on questions that they guessed to account for discrepancies.

1. Students will know how minerals are identified. (questions 1-5)
2. Students will classify rocks based on properties.(questions 6-10)
3. Students will compare metamorphic, sedimentary, and igneous rocks.(questions 11-15)
4. Students will demonstrate how the properties and process of rock formation can be used in science. (questions 16-20)

Student	Grade	Target 1	Target 2	Target 3	Target 4
		(Number correct out of 4 questions)			
1.					
2.					
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11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					

Answer Key

1)a 2)b 3)c 4)d 5)c 6)d 7)c 8)b 9)d 10)c 11)b 12)d 13)a
14) b 15)a 16)c 17)a 18)b 19)d 20)d

Rocks and Minerals Test

1. Luster, color, cleavage, pattern, weight, and texture are all _____.

a) properties of rocks b) clothes c) pet rocks

2. Rough, sharp, smooth, and grainy are examples of what property?

a) color b) texture c) pattern d) luster

3. Speckled, layered, and solid are examples of what property?

a) color b) texture c) pattern d) luster

4. The way mineral reflects light is called _____.

a) color b) texture c) pattern d) luster

5. What are minerals?

a) Sparkles b) rocks c) matter that makes up rock d) magma

6. Rocks are classified by the way they form. Which of the following are the three factors used to classify rocks?

a) earthquakes, volcanoes, tsunamis

b) melted rock cooling, tree roots breaking, rocks melting under pressure

c) ocean sediments falling, water pressure, and volcanoes

d) melted rock cooling, smaller rocks glued together, and re melting due to heat and pressure

7. A mineral's luster can be tested by _____.

a) breaking it a part b) shining a flashlight on it c) washing it off d) using a scale

8. Why is classifying a rock based on its color unreliable?

a) All rocks are grey.

b) Because of the similarities in shades and infinite color patterns that rocks can have.

c) You cannot tell what color it is.

9. What unit of measure do scientist use for weight?

a) Liters b) Pounds (lbs.) c) Gallons d) Grams

10. The process of minerals breaking into distinct shapes is called _____.

a) breakage b) fracture c) cleavage d) slippage

11. What type of rock has layered particles of weathered rocks and minerals?

a) Igneous b) Sedimentary c) Minerals d) Metamorphic

12. What type of solid rock has been changed as a result of pressure or heat?

a) Igneous b) Sedimentary c) Minerals d) Metamorphic

13. What type of rock is created from cooled magma?

a) Igneous b) Sedimentary c) Minerals d) Metamorphic

14. Rocks found around active volcano Sakurajima in Japan are most likely to be classified as what kind of rock?

a) Sedimentary b) Igneous c) Metamorphic d) Magma

15. Sid was hiking on a mountain trail and he found a rock which contained shells from the beach. What type of rock would contain shells?

a) Sedimentary b) Igneous c) Metamorphic d) Mineral Crystals

16. A person who studies rocks is called a what?

a) scientist b) rocker c) geologist

17. If a hard substance consisting of minerals and created by volcanic activity is found on another planet would it still be considered a rock?

a) Yes b) Maybe c) No

18. What kind of rocks would most likely be found on Mars?

a) Sedimentary b) Igneous c) Metamorphic d) Mineral Crystals

19. Why would NASA geologist want to study rocks on Mars?

a) They believe that they are aliens.

b) Time and relative dimension in space

c) Geologist think they are cooler than rocks on Earth.

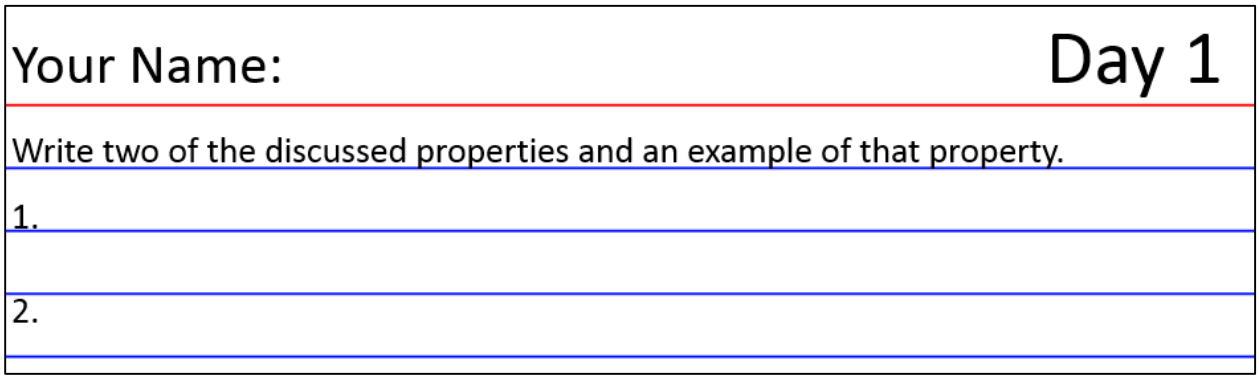
d) To prove the theory that there once was water on Mars.

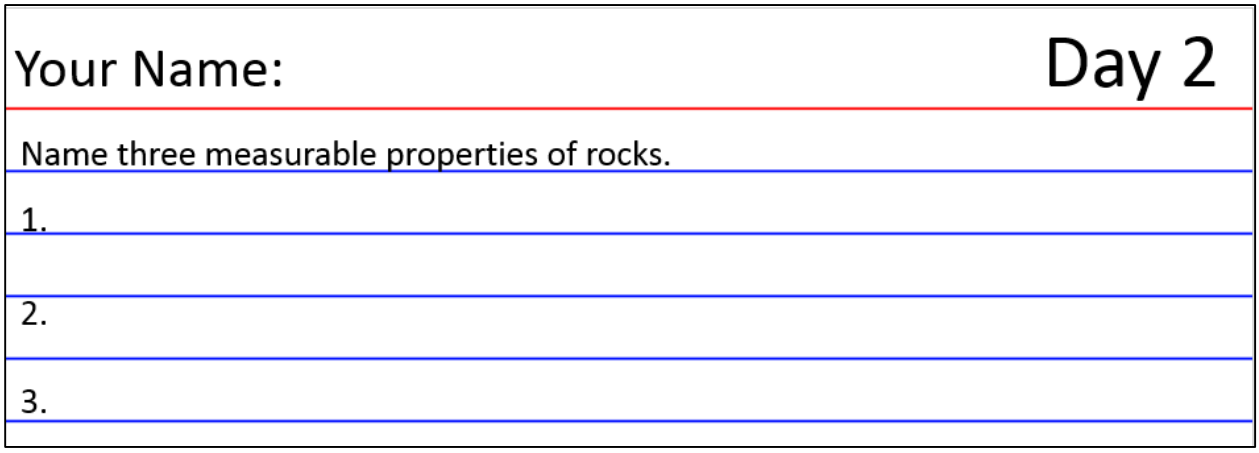
20. What other objects in outer space could be considered rocks?

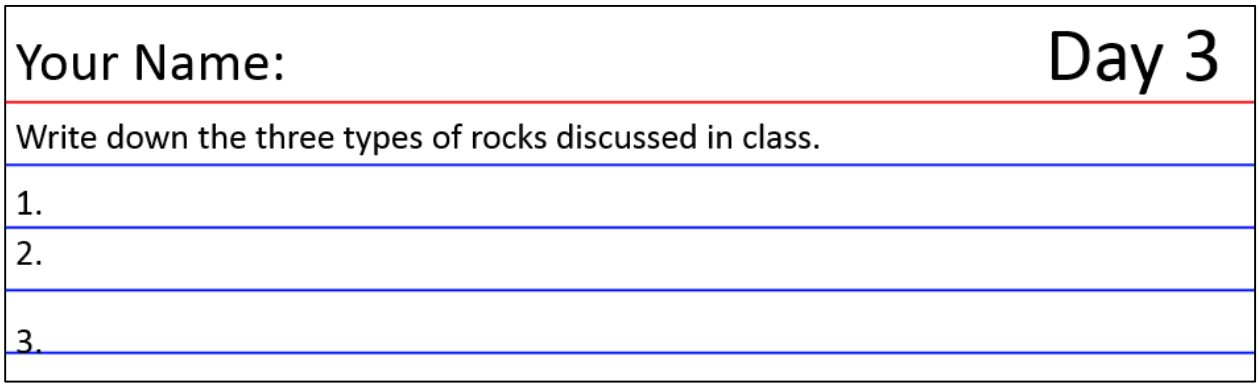
a) moon b)asteroids c) stars d) all the above.

FORMATIVE ASSESSMENT

For each of the 5 days of lessons the formative assessment will be a quick question that is to be answered on an index card and turned in as an exit ticket. Student's response will help gauge if students have learned key points, possible misconceptions, or wholes in student learning or instruction. There will be a power point with the questions on an index card background to show students the format that is to be used.







Your Name: Day 4

3 points to remember- 2 points you like - 1 question you still have.

Your Name: Day 5

Can rocks be used to prove that there was once water on Mars?

How?

SUMMATIVE ASSESSMENT

Students will retake the pre-assessment. Scores for both test will be recorded in the table below to show percentage of growth.

Student	Pre-Assessment	Post Assessment	Percentage of Growth
1.			
2.			
3.			
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13.			
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17.			
18.			

PART 4.1: INSTRUCTIONAL PROCEDURES

Subject: Science	Topic: Matter- Properties and Change	Estimated Time: 60 minutes
Standard	4.P.2 Understand the composition and properties of matter before and after they undergo a change or interaction. 4.P.2.1 Compare the physical properties of samples of matter	
Objective	Students will know the properties by which minerals and rocks are identified.	
Bloom's Taxonomy	Level 1 Remembering: List and label the properties of rocks.	
21st Century Skills	Students will need to communicate clearly while collaborating respectively in their groups as well as use analytical and critical thinking skills to title the properties posters.	

ENGAGE

Have samples of rocks. Ask students questions about its appearance.

EXPLORE

Have samples at each group for students to observe using a magnifying glass. Students are to describe their rock to the classmates in their group. Have a center set up where students can come up in groups to look through a microscope at a sample.

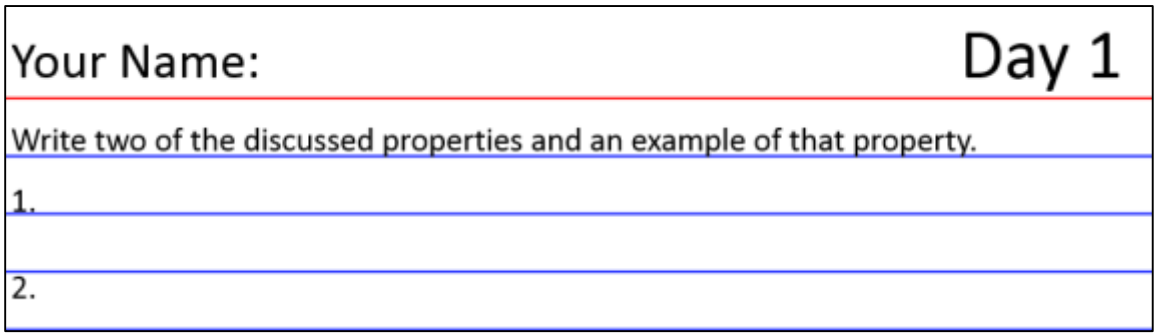
EXPLAIN

Hang six pieces of poster board. Each represents one of six properties of rocks (luster, color, cleavage, pattern, weight, texture), but students will not be told. Prompt students for words they used to describe the rocks at their groups and write them on the correct chart paper. After there are a good number of words on each chart, have students consider what all those words have in common. Lead them to the property title.

ELABORATE

Within their groups have students group the rocks based on certain properties.

EVALUATE



Subject: Science and math	Topic: Matter- Properties and Change	Estimated time: 60 minutes
Standard	4.P.2 Understand the composition and properties of matter before and after they undergo a change or interaction. 4.P.2.1 Compare the physical properties of samples of matter 4.MD. 1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec.	
Objective	Students will know the properties by which minerals and rocks are identified.	
Bloom's Taxonomy	Measuring: Level 4 Evaluating- Is your outcome accurate? Weight: Level 2 Understanding- Explain why scientist use grams. Properties: Level 3 Analyzing- Compare and contrast the properties of rocks. Magnet: Level 1 Remembering- Recall information from magnetism unit. Luster: Level 4 Evaluating- Based on activity evaluate and explain sparkle versus luster.	
21st Century Skills	Students will need to work collaboratively with their partners to use problem solving and information literacy skills in order to answer the Bloom's taxonomy question for each station.	

ENGAGE

Have samples of rocks have students review the 6 properties of rocks discussed the day before. Ask if there are any other possible properties that were not discussed such as weight and hardness.

EXPLORE

Stations:

MEARSURING

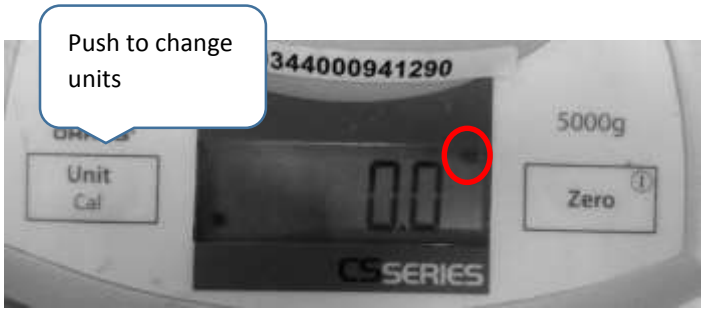
1. Each pair picks a rock and measuring tool.
2. Find the length in inches and then in centimeters. Record in notebook.
3. Find the width of the rock in inches and then in centimeters. Record in notebook.
4. Using the length and the width to find the area of your rock.
5. Answer the following question in your notebook:

   Do you think the area is truly the area of your rock? Why or Why not?

WEIGHT

Please leave the rocks in the measuring cups!

1. Place cup A on the scale.
2. Using the images to the right find the weight in grams. Record in your notebook.
3. Using the images to the right find the weight in ounces. Record in your notebook.
4. The cup weights 127g or 4.5 oz. What is the actual weight of the rock? Record in your notebook.
5. Repeat steps 1-4 for measuring cup B.
6. Answer the following question in your notebook:



Scientist use grams for weight measurement. Why do you think they do that?

PROPERTIES

Please leave the rocks inside specimen viewer!

1. Consider the 6 properties of rocks; luster, color, cleavage, pattern, weight, and texture.
2. With your partner discuss the properties of each rock and then record in your notebook.
3. Compare properties with the other group at this station.

MAGNET

Please leave the rocks in the box!

1. Predict which rocks you think will be magnetic. Record the number in your notebook and why you think it is magnetic.
2. Ask a teacher for the magnet.
3. TAKE TURNS holding the magnet over each rock.
4. If the magnet is attracted record the rock's number in your notebook. If it is not attracted you do not need to record it.
5. Answer the following question in your science notebook:

What does a magnetic rock contain? How do you know it contains this?

LUSTER

Luster is how a rock reflects light.

1. Use the flashlight to see how each rock reflects the light.

(Flashlight privileges can be lost if used for other purposes.)

2. Place the rocks in order from the most luster to the least luster.
3. Look at the numbers on the rocks to record the order in your science notebooks.
4. Answer the following question in your science notebook:

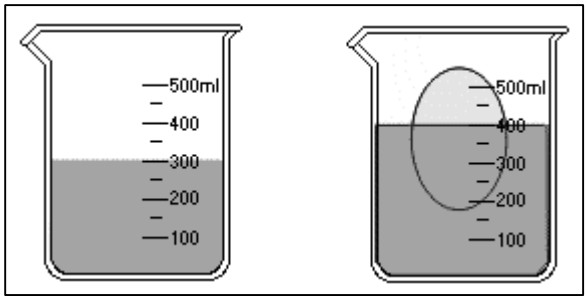
Can a rock without sparkles have more luster than a rock without sparkles? Why?

EXPLAIN

Discuss what unit of measure students used. The universal scientific unit of weight measurement used is grams and kilograms. Pumice is the only rock that floats due to the air pockets formed by gas bubbles while hardening. Review from previous unit that magnetic rocks, such as magnetite, contain iron.

ELABORATE

Rocks very so much in shape making it difficult to measure. A mathematician Archimedes' solution was to find the density by using the volume of water displaced when the object is placed in water. Demonstrate to students.



EVALUATION

Your Name: Day 2

Name three measurable properties of rocks.

1.

2.

3.

Subject: Science	Topic:Matter- Properties and Change	Estimated Time: 60 minutes
Standard	4.P.2 Understand the composition and properties of matter before and after they undergo a change or interaction. 4.P.2.3 Classify rocks as metamorphic, sedimentary or igneous based on their composition, how they are formed and the processes that create them.	
Objective	Students will compare metamorphic, sedimentary, and igneous rock.	
Bloom's Taxonomy	Engage- Level 3 Applying: Use previous knowledge to infer how rocks are made. Explore- Level 1: Recall key information from animations. Explain- Level 4 Analyzing: Compare and contrast the three types of rocks.	
21st Century Skills	Students will use information literacy skills to transfer information from an animation recording that information in a Venn diagram.	

ENGAGE

Have samples of rocks. Prompt students on how they think the rocks were formed? Is it different from how the others were formed?

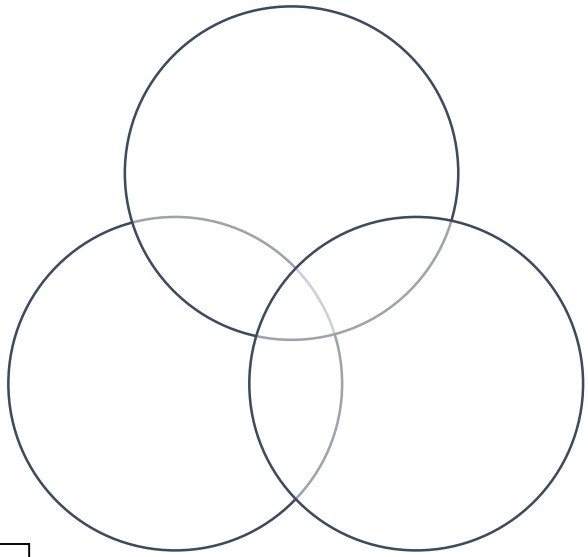
EXPLORE

Discovery education activity, ROCKS exploration, on the SMARTboard that allows students to see how the three rocks were formed.

EXPLAIN

On the SMARTboard use a triple Venn diagram to compare the similarities and differences between the three types of rocks.

IGNEOUS



METAMORPHIC

SEDIMENTARY

ELABORATE

Teach the following song by displaying lyrics on the SMARTboard.

We will we will rock you!
we will we will rock you!

Volcanos erupt with lava so hot
it cools and hardens and its igneous rock cuz
rocks can change...all over this place...
they weather, and melt, and get rearranged!

We will we will rock you!
we will we will rock you!

Rock gets weathered into tiny tiny rocks
layers and layers get piled on top
it gets compacted, its elementary
this rock will become sedimentary

we will we will rock you
we will we will rock you!

Any type of rock under heat and pressure
becomes metamorphic and thats for sure
cuz rocks can change, all over this place..
they weather, and melt and get rearranged

we will we will rock you
we will we will rock you!

EVALUATE

Your Name:	Day 3
Write down the three types of rocks discussed in class.	
1.	
2.	
3.	

Subject: Science	Topic: Matter- Properties and Change	Estimated Time: 60 minutes
Standard	4.P.2 Understand the composition and properties of matter before and after they undergo a change or interaction. 4.P.2.3 Classify rocks as metamorphic, sedimentary or igneous based on their composition, how they are formed and the processes that create them.	
Objective	Students will compare metamorphic, sedimentary, and igneous rock.	
Bloom's Taxonomy	Explore: Level 6 Creating- Students are to design a triorama to represent information about their type of rock. Elaborate: Level 3 Applying- Students will apply knowledge to infer which of the three types of rock significant rock formations are.	
21st Century Skills	Students are to collaborate and work creatively in groups of three to display information about rocks. Not only will students have to communicate within their groups, but be able to inform and explain their design to the class. During the elaborate part of the lesson students will become globally aware of environmental or cultural significant rock formations from around the world.	

ENGAGE

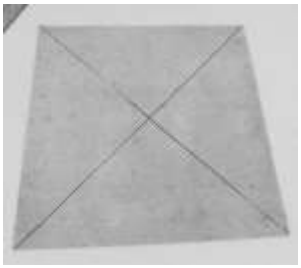
We Will Rock You Song

EXPLORE

Students will work in groups of three to create a triarama that displays the three types of rocks. (Each student will be doing one type of rock). The triarama will include the following; type of rock, what it looks like, what it is made of, and how it is formed.

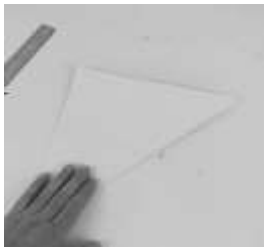
DIRECTIONS:

http://www.stormthecastle.com/diorama/make-a-triarama.html

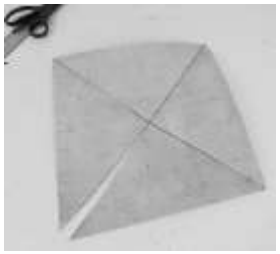


Start with a square of poster board or paper. The larger the square the larger your triarama will be.

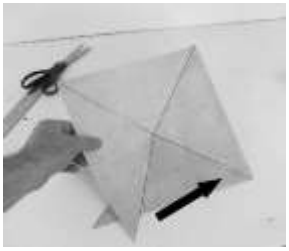
I have marked two lines on mine. You don't have to mark yours. Just fold along each of these lines then unfold.



Fold it diagonally one way then unfold. And then fold it diagonally the other way and unfold.



Cut it with a pair of scissors from one corner to the center. On one of the triangles not cut write your name on the back.



Now just grab one of those flaps and slide it all the way over the other flap. The triarama will fold right up into shape.

Now you can fill it with various things to make your scene.

EXPLAIN

Groups will have an opportunity to share their work with the class.

ELABORATE

Have a power point with environmental and/or culturally significant areas in the United States and worldwide. Students are to infer which of the three types of rocks it is. Examples from the United States include; Grand Canyon, Blowing Rock, and Via Ferrata. Worldwide examples include; Mediterranean shoreline, Giant's Causeway in Ireland, and Columnar rocks in Iceland.

EVALUATE

Your Name:		Day 4
3 points to remember-	2 points you like	- 1 question you still have.

Subject: Science	Matter: Properties and Change	Estimated Time: 60 minutes
Standard	4.P.2 Understand the composition and properties of matter before and after they undergo a change or interaction. 4.P.2.3 Classify rocks as metamorphic, sedimentary or igneous based on their composition, how they are formed and the processes that create them.	
Objective	Students will demonstrate how the properties and process of rock formation can be used in science.	
Bloom's Taxonomy	Engage: Level 3 Applying- Students will apply knowledge to infer and deduce information about a rock. Explore: Level 6 Creating- Students are to design a test that they can do to prove their theory.	
21st Century Skills	Students will be working creatively with a partner to come up with a solution on how they can prove their theory. As a class we analyze a video of NASA's geologists work as they prove that there was once water on Mars.	

ENGAGE

Use a picture of a rock from Mars to spark discussion (prezi will make for a more intriguing presentation). Have students identify it as metamorphic, sedimentary, or igneous. What does that tell you about the area it is found? Where do you think this rock came from? Tell students that people who study rocks are called geologists and today that's what they are.

EXPLORE

Have student's pair up to do the following in their science notebooks.
Essential question: Is it possible to use rocks to prove that there is water on Mars?
Theory: Yes or No
Procedure: Write how you would test the rocks to prove your theory.

EXPLAIN

Have students watch a discovery education video on how NASA's geologists used a rover that tested rocks and proved that there once was water on Mars. Use the worksheet on the following page to help keep students focused and ensure they get key information. Discuss what was presented in the clip.

American Museum of Natural History: Geologists on Mars (8:40)

Is it possible to use rocks to prove that there is water on Mars?

Water is a key ingredient for _____

(M.E.R.) Mars Exploration Rover was sent to Mars to look at _____which records the history or Mars.

Spirit Landing site was chosen because _____ , _____,

_____ , _____.

Scientist have concluded that _____.

Evidence 1._____

2. _____

3. _____

_____

Answers

Water is a key ingredient for __Life.

(M.E.R.) Mars Exploration Rover was sent to Mars to look at ___Rocks___which records the history or Mars.

Spirit Landing Site was chosen because_Flat , Canyon site_ , _Volcano_ , _Iron Oxide/ Red Hematite.

Scientist have concluded that __the rocks were once soaked in liquid water_____.

Evidence 1.___Spherical objects/ concretion formed by liquid__

2. ____holes that are molds of where crystals could have been___

3. ____mineral that has to have water_____

ELABORATE

Discuss what other astrological features could be made up of rock. Examples include; the moon, asteroids, and meteors

EVALUATE

Your Name:	Day 5
Can rocks be used to prove that there was once water on Mars?	
How?	

RESOURCES, MATERIALS & PREPERATION

DAY 1

<table>
<tr><td colspan="3">MATERIALS</td></tr>
<tr><td rowspan="2">Before Instruction</td><td colspan="2">During Instruction</td></tr>
<tr><td>Teacher</td><td>Student</td></tr>
<tr><td>• Check out from science lab.
-Rock collections (remove fossil samples)
-Large samples
-Magnifying glasses
• Poster board should be taped to the marker board 3 rows of 3. Decide where to hang them after? Labels for teacher.
• 20 index cards
• Power point with all evaluation questions. Have backup written up on paper.
• microscope and slide</td><td>• 3 large rock samples
• 6 1/4 pieces of poster board
• Markers
• Computer and projector
• evaluation power point</td><td>• 4 sets of rock collections, one for each desk group.
• 1 magnifying glass per student.
• one index card per student</td></tr>
<tr><td colspan="3">Having real samples of rocks is critical for any knowledge relating to rocks and minerals as it is a very hands on topic with a plethora of specimens and variety. The magnifying glass and microscope encourages students to look closely at the rocks and allows them to see the minerals that makeup the rock more closely. It also gives them practice with using these common science tools. The properties will be written on 1/4 pieces of poster board because some of the properties may not have as many examples. It is also due to space issues when hanging them up in the classroom afterwards. These are anchor charts that will help students organize and retain the information learned. For the informal evaluation I wanted to put instructions on a power point that looks like an index card to give a visual of expected organization and neatness. It will also prevent me from having to repeat the question several times.</td></tr>
</table>

DAY 2

<table>
<tr><td colspan="3">MATERIALS</td></tr>
<tr><td rowspan="2">Before Instruction</td><td colspan="2">During Instruction</td></tr>
<tr><td>Teacher</td><td>Student</td></tr>
<tr><td>• 30 rock samples
• Beaker or bucket with mL marked
• Station set- up
-4 Flashlights
-5 rocks per station
-2 scales
-2 rulers and 2 tape measures
-5 magnets
-directions and essential questions for each station printed
• 20 index cards</td><td>• 3 large rock samples
• Beaker with water
• small rock sample
• evaluation power point</td><td>• science notebooks
• pencil
• index card</td></tr>
<tr><td colspan="3">Science is all about proving theories through experimentation, but only those tests that can be done without causing damage to the rock collections will be used. Magnetism is the unit prior to these lessons and what better opportunity to review it. Using rulers, tape measures, scales, and the Archimedes' test gives students a life application for different units of measurement in math. Students will be recording their findings in an already established science notebook that they have been using for science investigations throughout the year. Directions for each station will be printed, glued onto rock photo paper, and laminated for future use. Once again the informal evaluation will be on a power point to give a visual of expected organization and neatness.</td></tr>
</table>

DAY 3

<table>
<tr><td colspan="3">MATERIALS</td></tr>
<tr><td rowspan="2">Before Instruction</td><td colspan="2">During Instruction</td></tr>
<tr><td>Teacher</td><td>Student</td></tr>
<tr><td>• Reserve leveled library for SMARTboard use
• 3 rocks (1 metamorphic, 1 sedimentary, and 1 igneous)
• SMARTboard lesson
-triple Venn diagram
-song lyrics
-evaluation</td><td>• 3 rocks (1 metamorphic, 1 sedimentary, and 1 igneous)
• SMARTboard
• Discovery Education login
- activity link: ROCKS exploration</td><td>• Science Notebooks
• Pencil
• index card</td></tr>
<tr><td colspan="3">The process by which the three rocks are formed is a rather complex idea for students to grasp and to demonstrate it in such a short amount of time is difficult. The Venn diagram meets the objective perfectly as it is used to compare things. With it being done on the SMARTboard and students copying it into their notebooks this requires more participation from the students. The discovery education activity gets students involved and their brains working as they have to figure out what materials and processes are needed to make each type of rock. When students have chosen the correct steps a short animated video demonstrates the process. This lesson has a lot of information that needs to be retained that will be achieved by writing in their notebooks and singing the rock song. The evaluation will be screenshot from the power point and placed in the SMARTboard lesson for previously stated reasons as well as to reduce transition time.</td></tr>
</table>

DAY 4

<table>
<tr><td colspan="3">MATERIALS</td></tr>
<tr><td rowspan="2">Before Instruction</td><td colspan="2">During Instruction</td></tr>
<tr><td>Teacher</td><td>Student</td></tr>
<tr><td>• Diorama example
• Find a place to display work.
• power point
-song
-criteria for diorama
-images of geographic regions
-evaluation
• 25 sheets of white square construction paper</td><td>• computer and projector</td><td>• square sheets of construction paper
• coloring utensils
• glue
• scissors
• index card
• tape</td></tr>
<tr><td colspan="3">As mentioned before the process by which the three rocks are made is complex, therefore students will sing the song again to review concepts from the previous lesson. Creating a diorama allows these artistic students to make something that will help them visualize what they have learned. It also allows for both group and independent work. There will be stated set criteria for the diorama to ensure students consider all aspects of the rock. The geographic regions demonstrates the bigger picture of rock formations on a more global scale. Once again the informal evaluation will be on a power point to give a visual of expected organization and neatness.</td></tr>
</table>

DAY 5

<table>
<tr><td colspan="3">MATERIALS</td></tr>
<tr><td rowspan="2">Before Instruction</td><td colspan="2">During Instruction</td></tr>
<tr><td>Teacher</td><td>Student</td></tr>
<tr><td>• prezi of Mars rock with questions surrounding
• Print 20 worksheets
• 20 index cards
• evaluation power point</td><td>• computer and screen
• Discovery Education login
-video: American Museum of Natural History: Geologists on Mars (8:40)
• Collect notebooks after lesson.</td><td>• science notebook
• pencil
• 1 worksheet per student
• glue
• 1 index card per student</td></tr>
<tr><td colspan="3">With a Mars' rock being unattainable using a picture will have to suffice, however, a Prezi can make it more visually intriguing with the image centralized and essential questions surrounding it. The Geologist on Mars video fits perfectly as it gives students an understanding of how geologist can use rocks and also carries over into the next unit of the solar system! Students will be recording the investigation in an already established science notebook that they have been using throughout the year. A worksheet was created to help keep students focused on key information from the video. Once again, the informal evaluation will be on a power point to give a visual of expected organization and neatness.</td></tr>
</table>

ADAPTATIONS & MODIFICATIONS

The majority of students are high achieving students, however, there is one student who has a 504 plan for reading comprehension. The student does not receive any special services in this math and science class. The most common issue that may arise with high achieving students is boredom. Keeping a fast pace by having short transitions and over planned lessons will help prevent boredom for these students as they can keep moving from one task to the next.

To adapt to these high thinkers I have created lessons focused on explorative and abstract learning with Bloom's taxonomy high order thinking questions. Examples of hands on lessons include the rock properties experiment lesson which not only requires students to perform the experiment, but to also convert measurements and apply previously learned concepts. The Geologists on Mars lesson is an example of Blooms highest order of thinking as students have to invent a way to use rocks to prove that there is water on Mars. Most of the lessons have an open discussion portion where students can express their thoughts and draw more connections with their class.

CLASSROOM MANAGEMENT

DAY 1

Wait till after the Engage portion of the lesson to place rock collections on students' desks. Even before that give rules and instructions.
Rules: Now, there are plenty of rocks for everyone so you may not observe a rock until your classmate has placed it back in the box. That means no asking if you can have it or claiming that you get it next. Think of these as guest pet rocks, so treat them as you would treat your own pet rock. AKA no smashing, throwing, tossing, or any other potentially damaging actions towards these rocks.
Instructions: 1) Pick a rock. 2) Examine using your magnifying glass. 3) Describe the rock to the classmates in your group and keep those words in the back of your mind. 4) When you are through observing the rock set back in the box 5) pick another.
During this time I will also be calling groups back to look through samples in the microscope.

Use established call and respond to get students attention and to freeze. Please place all rocks back in the box. Place a student in charge of the box at each desk group.

Have students raise their hand to give descriptive words as the teacher writes them on the correct poster. Then, have students raise their hands to tell what the words in each poster have in common.

Now that you have several properties of rocks see if you can as a team group the rocks based on certain properties?
Use established call and respond to get students attention and to freeze. Please place all rocks back in the box and have a teacher helper collect them. Have second teacher helper collect magnifying glasses.
Take down posters. Turn on the T.V. give instructions for ticket out:
1) Write your name and day 1 at the top.
2) Write two of the discussed properties and an example for each.

DAY 2

Let students pair up with a partner. There are several testing stations set-up. There may only be four people per station. You are to perform the experiment and then leave to write your results or answer the questions. There are directions at each station read them carefully. *Show students where each station is located and the name of it.*

Use established call and respond to get students attention and to freeze. Say, "This is the five minute mark please stop all testing and finish writing." When time it is time to switch periods say, "Please return to your seats."

The discussion during the Explain portion of the lesson have students raise their hands. No tolerating shout outs.

During the Elaborate portion let each desk group come up to observe the change in water level.

Turn on the T.V. give instructions for ticket out:
1) Write your name and day 2 at the top.
2) Name three measurable properties of rocks.

DAY 3

Have students get their science notebooks and a sharpened pencil (take extras in case some break). Line them up to go to the media library. Go in first and direct students to sit in straight lines three rows of 6 and separate any talkative groups. Have co-op teacher do the Engage, while I set-up the SMARTboard.

Tell students that there are three types of rocks; sedimentary, igneous, and metamorphic. They are to figure out how each rock is made by picking a material and a process. It is important that they remember the process. Call on students to pick a set. Continue until all are complete.

Start by reviewing what a Venn diagram is. Students are to raise hands to answer questions. Look at images of the different rocks to write similarities and differences in properties. Recall the discovery education activity to write similarities and differences in processes that create them.

Go over words in the song. Teacher says it then students. Have students stand up and start the beat for "We Will Rock You." Depending on time try to do 2x.

Evaluation on the SMARTboard
1) Write your name and day 3 at the top.
2) Write two of the three types of rocks
Then line up quietly.

DAY 4

Stand students up for song.

We are going to make what is called a triarama of the three types of rocks. Show students the example already made. To start, I need my helpers to pass out a piece of construction paper to everyone. Demonstrate the steps for students to do with you. Have students pick their own groups to give them more motivation to participate. Before letting students go give the following directions: In your groups you need to figure which rock each is going to do. Up on the screen are the things you have to include. Use your team mates to include as much as you can about each rock.

Have the person in your group with the shortest hair come get two pieces of tape and tape your work together. That person is then to place the completed work on the teacher table. The rest clean up your area and have a seat at your desk.

While students are cleaning up get power point up and begin talking. Students are to raise hand to answer questions.

Evaluation
1) Write your name and day 4 at the top.
2) 3 points to remember, 2 points you like, 1 question you still have

DAY 5

Students are to raise their hands during engage discussion.

After setting up their science notebooks have students discuss in their desk groups their theories and how they would test the rocks to prove your theory.

Use established call and respond to get students attention as you prepare to start the video.

Students are to raise their hands during elaborate discussion.

Have students leave their notebooks opened to the page of this investigation and call students by groups to stack them on the teacher table.

PART 5: RESULTS & ANALYSIS OF STUDENT LEARNING

Assessment Data

Student	Pretest	Day 1 * definition	Day 2 *property	Day 3	Day 4	Day 5	Posttest
		Formative Assessments					
1.	~~50~~ 47	2:4*	3:3	3:3	0:6	1:2	79
2.	~~50~~ 47	2:4	3:3	3:3	6:6	2:2	100
3.	~~50~~ 53	2:4*	2:3*	3:3	6:6	2:2	74
4.	~~50~~ 53	4:4	Absent	3:3	2:6	2:2	95
5.	~~35~~ 37	2:4*	2:3*	3:3	4:6	2:2	84
6.	~~65~~ 63		3:3	3:3	6:6	1:2	89
7.	~~55~~ 53	4:4	Absent	3:3	6:6	Testing	95
8.	~~35~~ 32	4:4	1:3	3:3	4:6	1:2	100
9.	~~45~~ 47	4:4	2:3	3:3	2:6	1:2	84
10.	~~30~~ 32	4:4	0:3	3:3	5:6	1:2	68
11.	~~55~~ 53	2:4	2:3*	3:3	3:6	1:2	79
~~12.~~			~~2:3*~~				
13.	~~35~~ 37	2:4*	3:3	3:3	5:6	2:2	84
14.	~~55~~ 53	4:4	2:3*	Absent	2:6	Absent	79
15.	~~45~~ 47	2:4	3:3	3:3	6:6	2:2	100
16.	~~50~~ 53	4:4	1:3	3:3	6:6	1:2	95
17.	~~45~~ 47	2:4*	3:3	3:3	1:6	1:2	89
18.	~~50~~ 47	4:4	1:3*	3:3	2:6	2:2	84

Areas of Growth

Least Growth Greatest Growth

Student	Pre	Post	Target 1 Out of 5	Target 2 Out of 5	Target 3 Out of 5	Target 4 Out of 4	Correct out of 19 Pre…post	Percentage of growth
			(Number correct out of 4 questions)					
1.	47	79	4…5	1… 3	1…3	3… 4	9… 15	32
2.	47	100	4…5	2… 4	0…5	3…4	9… 19	53
3.	53	74	4…4	2… 4	1… 2	3…4	10…14	21
4.	53	95	4…5	3…5	0…4	3…4	10…18	42
5.	37	84	2…4	2…4	1…4	2…4	7…16	47
6.	63	89	5…5	2…3	2…5	3…4	12…17	26
7.	53	95	2…5	3…5	2…4	3…4	10…18	42
8.	32	100	2…5	1… 5	0…5	3… 4	6… 19	68
9.	47	84	5…5	1…2	0…5	3… 4	9… 16	37
10.	32	68	3…4	2…2	1…5	0… 2	6… 13	37
11.	53	79	5…5	2…3	1…3	2…4	10… 15	26
12.								
13.	37	84	3…5	1…3	1…5	2…3	7… 16	47
14.	53	79	4…3	3… 5	2…5	1… 2	10…15	26
15.	47	100	3…5	3… 5	1…5	2… 5	9…19	53
16.	53	95	5…5	2… 4	1…5	2… 4	10… 18	42
17.	47	89	4… 5	2… 5	0… 3	3… 4	9… 17	42
18.	47	84	3…5	2…3	2…4	2…4	9…16	37

The formative assessments for day 1 and 2 seemed to be unreliable as many of the students did not seem to understand what they were to write. An example would be on the first day they were asked to write two of the discussed properties and an example of that property. The students with astricts by their score, wrote definitions of the properties instead of examples. Then, on day two they were asked to name three measurable properties of rocks. Students wrote that a measurable property of rocks are properties. This time probably occurred because of my hint that they should think about the stations they went to. I noticed my error before they turned in the cards and told them their answer should fit this sentence: A measurable property of rocks is blank.

Day three's assessment was very straight forward and all the students knew exactly what I was expecting of them. Every single student could name the three types of rocks, showing that my objective for that day had been met! Several of the students were even able to spell the rocks correctly which I did not expect at all. It was a great feeling to record the results of this assessment. The simulation from Discovery Education and the Venn diagram seems to have given the students enough repetition and exposure to the three types of rocks to where they remember them.

The objective for day four was for students to compare the three types of rocks. The content was review, but more in depth. I had chosen a three-two-one response assessment to see if they could give more detail than the three types of rocks. The ratio is based on how many of the six points did the student record. During the assessment I realized I should have left more than five minutes for students to complete since it did require more in depth thinking, which is evident in the scores for this assessment. For those who did complete the assessment, their

responses showed me misconceptions or confusions they had. Such as that igneous rock comes from under the sea, this student is confusing igneous and sedimentary. When writing things to remember a student wrote that sedimentary rocks can be found in rivers, ponds, lakes, oceans, and puddles. These are correct, except for the puddle part. Another response was that sedimentary is compacted without heat, which it needs both heat and pressure just like metamorphic rock. A student asked if all of the six properties of rock are present in all three types of rocks. This is a misconception for this students as in my lesson I stated that all rocks contain these six properties, but clearly this needs to be revisited. All of these can be easily corrected by giving students feedback and handing them back out. As well as doing a quick review before the next day's lesson that addresses those areas.

On day five students were asked to write whether or not it was possible to study rocks to prove that there was once water on Mars and how. The ratio is based on if students stated yes and stated at least one piece of evidence NASA got from the rocks that was mentioned in the video. I was very disappointed to read five students response that had put that rocks contain water or are made from water. Then, the other three students that got 1:2 seemed to have gotten distracted by the other information in the video. This assessments shows that only half the class understands how rocks can be used in science to prove theories.

Before scoring the post-test I knew that one of the questions for target 4 had not been discussed and would be eliminated. After grading the students test I debated removing another as many of the students missed the question. However, it was 1/3 of the class and the content was discussed throughout the unit. The cooperating teacher aided in helping me decide if I should just give students the points for question 20 or eliminate it from the score all together leaving 19 questions. Her advice was to eliminate it altogether. I followed her advice, however, I realized

that now there was a discrepancy between the pre and posttest because there was a different number of questions. To adjust this regraded the pretest, which I had kept filled, with the last question eliminated. This is why the first set of pretest scores in the Assessment Data chart are marked out.

Of the three students who made a 100 on the posttest number two is an AIG student, but she did show a large amount of growth at 54%. Student fifteen was not a surprise considering how much she participated in class and consider her formative assessment scores. Student eight was also very active in the discussions and asked questions. It is important to note that the student who scored the lowest, ten, was the student who has a 504 in reading. I had been told that this student does not receive any special services in math and science only in reading. However, considering her score I think it would be beneficial to this student to have someone read the test to her. As a teacher it is our responsibility to consider the whole child and do what is best for them whether there is an established plan or not, therefore, I feel I should have been more accommodating to this student.

Day one objective, knowing the properties by which minerals and rocks are identified, shows the least amount of growth as students seemed to have previous knowledge as noted by the pretest versus the post-test scores. Day three objective of comparing metamorphic, sedimentary, and igneous rock shows the most growth. Of the five days of lesson two was spent on this one object versus the one day the other objectives had. This allowed for a larger variety of teaching methods, such as, the SMARTboard, the rock song, and the triarama. Those activities require a lot of student interaction and application of knowledge that allowed students to score better on this standard.

The U.S. Department of Education expects 80% growth rates between pre and post-tests. My impact project is only a week long on a unit that usually takes a month, therefore, my personal goal was 50% growth rate. The average percentage of growth for my impact project was about 40%. This is probably due to time constraints forcing me to shorten lessons and not using my formative assessments to their fullest. The lowest percentage of growth was for a student who had missed two of the five lessons, which a plan should have been in place to help this student before the test. Overall, I think I could have reached my 50% goal had I used more focused formative assessments and immediately followed up with students to correct any misconceptions or gaps.

PART 6: REFLECTION ON TEACHING AND LEARNING

On the first day students did very well respecting the rocks and each other during the opening discussion. All of the students participated giving great descriptions as I walked around. I was pleased to hear that some of the students were already using some of the vocabulary words such as color, texture, and pattern. The students gave enough descriptive words that there were several examples for each property. Since students were already using most of the words, I focused on luster and cleavage having students write the words and definition in the glossary of their science notebook. The lesson would have gone even better if I had picked up the pace, while writing the student's descriptions because I could tell about half way through, several of students' eyes were roaming around the room in a bored manner.

On the second day, I do not think the subject objective was met. Students were pushed straight into the stations without me stating an object. Then, due to behavioral circumstances, I was unable to give the closure for the lesson. Several of the stations had directions that were confusing to the students.

I had replaced the sink and float activity with a properties activity because I was unable to find a pumice rock. It was a rather dull task of looking through a specimen viewer at different types of rocks and recording the six properties for each rock. Not only was it dull, but as previously mentioned my directions were worded badly and what I considered a simple task confused most of the students. If I had thought it through more carefully an activity called 'Guess My Rock' would have accomplished the same objective, but in a more fun and interactive way.

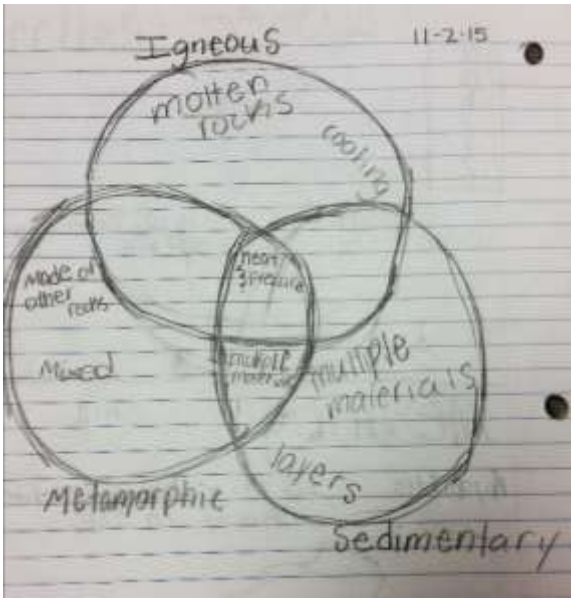
The weight and measuring stations had a lot of steps that required students to think very critically. My plan had been for me and the cooperating teacher to man those two stations, however, this did not happen. The luster station did not have specific instructions on how to test

the luster of the rocks and having someone there to demonstrate would make it more user friendly. For the objective of these stations to be met students need that teacher guidance at the weight, luster and measuring stations in order to do this parent volunteers would be crucial. If that cannot be done the stations need to be modified.

As I walked around the stations I got a lot of meaningful feedback: both good and bad. Through talking with students I was horrified that my teaching had led them to the misconception that having sparkles is what gave a rock luster. I tried to correct this by explaining luster to be similar to how a mirror reflects light. This seemed to clarify the misconception based on what I read in students' science journals afterwards. It was great to be able to hear the meaningful discussions students were having with their partners at each of the stations. Even more rewarding, was having a couple of students thank me for setting up the stations because they were having fun. That has never happened before and warmed my heart! Overall, the students were able to get time handling various types of rocks as well as make the connection between math and science.

When considering classroom management on that day it started off well. Before breaking into groups I asked students what would help them get through the stations. To my delight the students listed Steven Covey's 7 habits! However, a procedure for switching stations should have been in place. Perhaps setting a timer and creating a clockwise rotation would have prevented students having to wait for another station. Also, the stations should be timed to see how long it takes and modify them so that all the stations take approximately the same amount of time to complete. Lastly, I had to discipline a student for hitting another by writing them up and taking that student to the vice principal.

Day three went extremely well as I felt well prepared and was excited to be able to use a SMARTboard. Teacher enthusiasm for a lesson can truly make it or break it. The lesson was well over planned. My objective was clear and I made a point to use the vocabulary words, as well as, have students repeat them. I was pleased that students recalled the six properties of rocks and were able to describe the properties of the rock samples. I was worried about retention of the information over the weekend. They seemed to be enthralled by the Discovery Education interactive activity. However, when seating the students I should have created a path for myself in the room so that the computer was more accessible. During the lesson I had to appoint a student to be my techy because I could not get to the computer.



Getting the triple Venn diagram started was a bit rocky as I realize now how difficult it is to draw a triple Venn diagram. In the future a triple Venn diagram printout will keep transition time short and smooth so that students can be more focused on the content rather than having perfect circles. While filling in the Venn diagram I realized that through the discussion many of the students were already making connections to the rock cycle. This realization occurred, while students were trying to justify where to put heat and pressure. A student randomly blurted out, "An igneous rock can become sedimentary and a sedimentary can become metamorphic! Can a metamorphic rock become igneous?" Then another student, "Oh! It's a cycle!" This was more than I had hoped for! The rock cycle is also a fourth grade objective, but for this project wanted I

wanted to focus on the fundamentals. I think based on these responses the students have been provided with a pretty solid foundation.

The SMARTboard lesson helped engage students', however, actual interaction with the SMARTboard was limited and could have easily been done on a computer. To make the lesson more interactive I should have created a page that had a matching game where they had to match the picture with the name or the process the picture, ect. The class would then be split into two teams to compete with each person in the team taking turns flipping the virtual cards. Another idea would be to not do the SMARTboard at all and create a board on Discoveryeducation for students to do with partners using their chrome books.

Day four was a bit of a roller coaster as some students had a blast, while others seemed miserable. Most of the students really got into The Rock Song and were having a blast. One student sat reading a book instead, which I did not mind because not everyone likes singing. Well, a couple of the student's friends wanted him to participate and were trying to get his attention. It progressed to him holding his hands over his ears and bursting into tears. As soon as I saw it I told him to go to the bathroom and wash his face off. There was a substitute in that day who went to talk with him a few minutes later to find out what happened. The student said that he was scared because everyone was looking at him. I realize now that he was scapegoating by throwing a tantrum to get out of participating.

I should have used a different management strategy for grouping students. Students were too noisy to hear directions making it difficult to have control of the class and to finish assigning groups. I should have just stated the following, "Ones are igneous, twos are sedimentary, and threes are metamorphic. You must make a group of three that has one of each." There was also an issue with a student who would not tell me their number because they did not want to be

partners with the other student. I reacted badly to this situation as I raised my voice at the student saying, "I didn't ask if you wanted to be partners, I asked if you are a number 2 as well. It makes no sense to put to two's together I need you with a one and a three! Now, will you please tell me what your number is?"

My goals for the triarama activity had been for students to review what they had learned the previous day as a group and then to use their artistic ability to create this visual aid. Students kept on asking me for the answers and I had to repeatedly tell them to talk with their groups because that's why they have a group. I was disappointed in the outcome of the triaramas because I know this group has wonderful art skills, but most just wrote lists with no drawings, funky fonts, or even color. Perhaps, I should have put an expectation as it had to be creative or colorful. There were only five students who embraced the purpose of this project and here is three of those.

Day five was the shortest lesson of all as it occurred during a double planning time giving me less than thirty minutes. Students really enjoyed me calling them geologists and I think it got them more involved in the video. In my lesson plans I had created this short worksheet to help students focus on the video and key points that we would be discussing. However, it did the opposite as students were upset they could not answer all the questions and shut down. Right after the video ended I very enthusiastically said, "Now, geologists of NASA we recently have

received data from one of our rovers." A student very rudely yelled, "Well, I don't know what you're talking about because I didn't get to finish this stupid worksheet!" This caught me off guard as I had already told the student that it was alright because we were going to talk about it as a class and he could fill-in what he was missing. I responded by saying, "That was rude as I don't recall saying anything about the worksheet. So, let me try again." After I repeated the previous statement several of the students cheered, which was a godsend as it helped take the edge off after that interruption. The rest of the discussion flowed perfectly with students' enthusiasm and participation.

_____I also want to note that I had been notified that student 12 would be switching periods and would not be a part of the group that these lessons would be given. However, he was randomly present throughout the lessons. I feel that I should have prepared scaffolds just in case this occurred or if another student started to show signs of struggling.