NAME: _____ **PERIOD:** _____ **DATE:** _____

LAB PARTNERS: _____ **LAB #8**

ROCK IDENTIFICATION

****NOTE TO TEACHERS: THIS LAB CAN BE DONE AS ONE BIG LAB OR DIVIDED INTO THREE SEPARATE LABS (9A, 9B, AND 9C)****

PHENOMENON: Amazing ways rocks are made https://youtu.be/Vp_S3BDiR-I

INTRODUCTION

The three main types of rocks found on the Earth are Sedimentary, Igneous, and Metamorphic. Rocks remember their formation by recording it in the physical and chemical characteristics found in each sample. By looking very closely at these characteristics, you can unravel the history of rocks. Rocks from all over the world have certain things in common. This will allow you to identify rocks and compare them to others.

SEP's: Throughout this lab, the following SEP's (Science Engineering Practices) will be touched upon: MS-ESS2-1. Develop a model to describe the cycling of Stability and Change Earth's materials and the flow of energy that drives this process

MATERIALS

Rock Samples and Earth Science Regents Reference Tables

TIME 2 – 3 Periods

PROCEDURES

1. For each unknown rock, identify the key physical characteristics. Using your Earth Science Reference Tables, determine the name of the rock based on the observed characteristics.

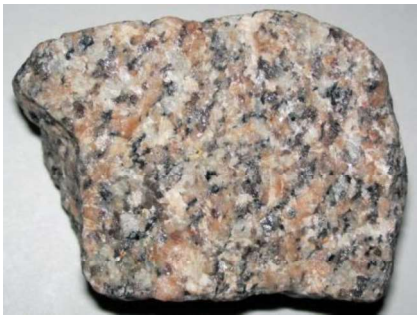
IGNEOUS ROCKS PART 1 or LAB 9A

STATION/SAMPLE #1

Color	□ Light Colored	□ Dark Colored	□ In Between
Composition	□ Felsic	□ Mafic	□ In Between

Grain Size	□ 10 mm or larger	□ 1mm to 10mm	□ less than 1mm	□ Non-crystalline
Texture	□ Very Coarse	□ Coarse Grained	□ Fine Grained	□ Glassy Texture

Yes	No	Key Identifying Feature
□	□	Are there visible interlocking crystals?
□	□	Vesicular (gas pockets)?



In complete sentences state why this rock would be classified as an igneous rock. Include whether it is intrusive or extrusive and explain why.

_____

_____

What is the name of this igneous rock? _____

STATION/SAMPLE #2

Color	□ Light Colored	□ Dark Colored	□ In Between
Composition	□ Felsic	□ Mafic	□ In Between

Grain Size	□ 10 mm or larger	□ 1mm to 10mm	□ less than 1mm	□ Non-crystalline
Texture	□ Very Coarse	□ Coarse Grained	□ Fine Grained	□ Glassy Texture

Yes	No	Key Identifying Feature
□	□	Are there visible interlocking crystals?
□	□	Vesicular (gas pockets)?

In complete sentences state why this rock would be classified as an igneous rock. Include whether it is intrusive or extrusive and explain why.

_____

_____

What is the name of this igneous rock? _____

STATION/SAMPLE #3

Color	□ Light Colored	□ Dark Colored	□ In Between
Composition	□ Felsic	□ Mafic	□ In Between

Grain Size	□ 10 mm or larger	□ 1mm to 10mm	□ less than 1mm	□ Non-crystalline
Texture	□ Very Coarse	□ Coarse Grained	□ Fine Grained	□ Glassy Texture

Yes	No	Key Identifying Feature
□	□	Are there visible interlocking crystals?
□	□	Vesicular (gas pockets)?

In complete sentences state why this rock would be classified as an igneous rock. Include whether it is intrusive or extrusive and explain why.

_____

_____

What is the name of this igneous rock? _____

STATION/SAMPLE #4

	Color	□ Light Colored	□ Dark Colored	□ In Between
	Composition	□ Felsic	□ Mafic	□ In Between
Grain Size	□ 10 mm or larger	□ 1mm to 10mm	□ less than 1mm	□ Non-crystalline
Texture	□ Very Coarse	□ Coarse Grained	□ Fine Grained	□ Glassy Texture

Yes	No	Key Identifying Feature
□	□	Are there visible interlocking crystals?
□	□	Vesicular (gas pockets)?

In complete sentences state why this rock would be classified as an igneous rock. Include whether it is intrusive or extrusive and explain why.

_____

_____

What is the name of this igneous rock?

STATION/SAMPLE #5

	Color	□ Light Colored	□ Dark Colored	□ In Between
	Composition	□ Felsic	□ Mafic	□ In Between
Grain Size	□ 10 mm or larger	□ 1mm to 10mm	□ less than 1mm	□ Non-crystalline
Texture	□ Very Coarse	□ Coarse Grained	□ Fine Grained	□ Glassy Texture

Yes	No	Key Identifying Feature
□	□	Are there visible interlocking crystals?
□	□	Vesicular (gas pockets)?

In complete sentences state why this rock would be classified as an igneous rock. Include whether it is intrusive or extrusive and explain why.

_____

_____

What is the name of this igneous rock?

STATION/SAMPLE #6

Color	□ Light Colored	□ Dark Colored	□ In Between
Composition	□ Felsic	□ Mafic	□ In Between

Grain Size	□ 10 mm or larger	□ 1mm to 10mm	□ less than 1mm	□ Non-crystalline
Texture	□ Very Coarse	□ Coarse Grained	□ Fine Grained	□ Glassy Texture

Yes	No	Key Identifying Feature
□	□	Are there visible interlocking crystals?
□	□	Vesicular (gas pockets)?

In complete sentences state why this rock would be classified as an igneous rock. Include whether it is intrusive or extrusive and explain why.

_____

_____

What is the name of this igneous rock?

STATION/SAMPLE #7

Color	□ Light Colored	□ Dark Colored	□ In Between
Composition	□ Felsic	□ Mafic	□ In Between

Grain Size	□ 10 mm or larger	□ 1mm to 10mm	□ less than 1mm	□ Non-crystalline
Texture	□ Very Coarse	□ Coarse Grained	□ Fine Grained	□ Glassy Texture

Yes	No	Key Identifying Feature
□	□	Are there visible interlocking crystals?
□	□	Vesicular (gas pockets)?

In complete sentences state why this rock would be classified as an igneous rock. Include whether it is intrusive or extrusive and explain why.

_____

_____

What is the name of this igneous rock?

STATION/SAMPLE #8

	Color	□ Light Colored	□ Dark Colored	□ In Between
	Composition	□ Felsic	□ Mafic	□ In Between
Grain Size	□ 10 mm or larger	□ 1mm to 10mm	□ less than 1mm	□ Non-crystalline
Texture	□ Very Coarse	□ Coarse Grained	□ Fine Grained	□ Glassy Texture

Yes	No	Key Identifying Feature
□	□	Are there visible interlocking crystals?
□	□	Vesicular (gas pockets)?

In complete sentences state why this rock would be classified as an igneous rock. Include whether it is intrusive or extrusive and explain why.

_____

_____

What is the name of this igneous rock? _____

LABORATORY QUESTIONS FOR PART 1 or 9A

1. Describe how the rate at which molten rock material cools effects the size of the crystals formed in an igneous rock.

   _____

   _____

2. How can you tell if an igneous rock has had an *intrusive or extrusive* origin? Explain fully.

   _____

   _____

3. List the mineral that make a light colored, low density, felsic rock:

   _____

   _____

4. Describe the difference between lava and magma.

   _____

5. What are the two environments of formation for igneous rocks (where do igneous rocks form, use your ESRT)?

_____

_____

6. List all the minerals that can be found in basalt.

_____

_____

7. Where are pumice and obsidian formed?

_____

_____

8. What does a vesicular texture mean?

_____

_____

9. Igneous rocks with a felsic composition contain which elements?

_____

_____

10. Igneous rocks with a mafic composition contain which elements?

_____

_____

11. Which of the following rocks has the highest content of iron: granite, obsidian, basalt, or pumice?

_____

_____

Sample 9

Sample 10

Sample 11

Sample 12

Sample 13

Sample 14

SEDIMENTARY ROCKS PART 2 or LAB 9B

STATION/SAMPLE #9

Yes	No	Key Identifying Feature	Questions
☐	☐	**Clastic (pieces of rock)**	**If you checked yes, are the clasts angular or rounded?** ☐ **Angular** ☐ **Rounded**
☐	☐	**Bioclastic**	**Can you see pieces of shells cemented together? Is it dark in color and made of compacted plant remains?**
☐	☐	**Fossils**	**Can you see fossils in this sample?**
☐	☐	**Crystalline**	**Can you see a crystalline structure in this sample?**

In COMPLETE SENTENCES state why this rock would be classified as a sedimentary rock.

_____

_____

What is the name of this sedimentary rock? _____

STATION/SAMPLE #10

Yes	No	Key Identifying Feature	Questions
☐	☐	**Clastic (pieces of rock)**	**If you checked yes, are the clasts angular or rounded?** ☐ **Angular** ☐ **Rounded**
☐	☐	**Bioclastic**	**Can you see pieces of shells cemented together? Is it dark in color and made of compacted plant remains?**
☐	☐	**Fossils**	**Can you see fossils in this sample?**
☐	☐	**Crystalline**	**Can you see a crystalline structure in this sample?**

In COMPLETE SENTENCES state why this rock would be classified as a sedimentary rock.

_____

_____

What is the name of this sedimentary rock? | |

STATION/SAMPLE #11

Yes	No	Key Identifying Feature	Questions
☐	☐	**Clastic (pieces of rock)**	**If you checked yes, are the clasts angular or rounded?** ☐ **Angular** ☐ **Rounded**
☐	☐	**Bioclastic**	**Can you see pieces of shells cemented together? Is it dark in color and made of compacted plant remains?**
☐	☐	**Fossils**	**Can you see fossils in this sample?**
☐	☐	**Crystalline**	**Can you see a crystalline structure in this sample?**

In COMPLETE SENTENCES state why this rock would be classified as a sedimentary rock.

_____

_____

What is the name of this sedimentary rock? | |

STATION/SAMPLE #12

Yes	No	Key Identifying Feature	Questions
☐	☐	**Clastic (pieces of rock)**	**If you checked yes, are the clasts angular or rounded?** ☐ **Angular** ☐ **Rounded**
☐	☐	**Bioclastic**	**Can you see pieces of shells cemented together? Is it dark in color and made of compacted plant remains?**
☐	☐	**Fossils**	**Can you see fossils in this sample?**
☐	☐	**Crystalline**	**Can you see a crystalline structure in this sample?**

In COMPLETE SENTENCES state why this rock would be classified as a sedimentary rock.

_____

_____

What is the name of this sedimentary rock? | |

STATION/SAMPLE #13

Yes	No	Key Identifying Feature	Questions
☐	☐	**Clastic (pieces of rock)**	**If you checked yes, are the clasts angular or rounded?** ☐ **Angular** ☐ **Rounded**
☐	☐	**Bioclastic**	**Can you see pieces of shells cemented together? Is it dark in color and made of compacted plant remains?**
☐	☐	**Fossils**	**Can you see fossils in this sample?**
☐	☐	**Crystalline**	**Can you see a crystalline structure in this sample?**

In COMPLETE SENTENCES state why this rock would be classified as a sedimentary rock.

_____

_____

What is the name of this sedimentary rock? | |

STATION/SAMPLE #14

Yes	No	Key Identifying Feature	Questions
☐	☐	**Clastic (pieces of rock)**	**If you checked yes, are the clasts angular or rounded?** ☐ **Angular** ☐ **Rounded**
☐	☐	**Bioclastic**	**Can you see pieces of shells cemented together? Is it dark in color and made of compacted plant remains?**
☐	☐	**Fossils**	**Can you see fossils in this sample?**
☐	☐	**Crystalline**	**Can you see a crystalline structure in this sample?**

In COMPLETE SENTENCES state why this rock would be classified as a sedimentary rock.

_____

_____

What is the name of this sedimentary rock? | |

LABORATORY QUESTIONS FOR PART 2 or LAB 9B

1. Draw a picture (an actual oval shape) of a pebble of **maximum** size.

2. What are the maximum and minimum dimensions (size range) for the following particles:

    a. sand:

    b. pebble:

    c. cobble:

3. Explain how a clastic sedimentary rock such as sandstone formed differently than a chemically formed sedimentary rock such as gypsum.

    _____

    _____

4. How would the particles that make up a conglomerate differ from the particles in a sandstone or shale?

5. Sandstone is made of what mineral(s)?

6. In what way is the overall appearance of a breccia different from that of conglomerate?

7. What chemical test could be used to identify limestone? Explain.

Sample 15

Sample 16

Sample 17

Sample 18

Sample 19

Sample 20

METAMORPHIC ROCKS PART 3 or LAB 9C

STATION/SAMPLE #15

Yes	No	Key Identifying Feature	Questions
☐	☐	**Foliated**	**Do you notice any mineral alignment and/or banding?** **If you checked yes and it is banded:** *If yes then it's gneiss*
☐	☐	**Microscopic Mica Crystals**	**Does the rock appear *slightly* shiny with slight mineral alignment?** *If yes then it's phylitte*
☐	☐	**Platy Mica Crystals**	**Do you notice larger shiny mica crystals with some mineral alignment?** *If yes then it's schist*
☐	☐	**Nonfoliated**	**If you checked no for all of the above, then your rock is nonfoliated. Please use the ESRT comments and rock map symbols to help identify**

What was the parent rock? The type of rock it was before it was changed due to heat and pressure? Use ESRT!

In COMPLETE SENTENCES state why this rock would be classified as a metamorphic rock.

_____

_____

What is the name of this metamorphic rock?

STATION/SAMPLE #16

Yes	No	Key Identifying Feature	Questions
☐	☐	**Foliated**	**Do you notice any mineral alignment and/or banding?** **If you checked yes and it is banded:** *If yes then it's gneiss*
☐	☐	**Microscopic Mica Crystals**	**Does the rock appear *slightly* shiny with slight mineral alignment?** *If yes then it's phylitte*
☐	☐	**Platy Mica Crystals**	**Do you notice larger shiny mica crystals with some mineral alignment?** *If yes then it's schist*
☐	☐	**Nonfoliated**	**If you checked no for all of the above, then your rock is nonfoliated. Please use the ESRT comments and rock map symbols to help identify**

What was the parent rock? The type of rock it was before it was changed due to heat and pressure? Use ESRT!

In COMPLETE SENTENCES state why this rock would be classified as a metamorphic rock.

_____

_____

What is the name of this metamorphic rock? ☐

STATION/SAMPLE #17

Yes	No	Key Identifying Feature	Questions
☐	☐	**Foliated**	**Do you notice any mineral alignment and/or banding?** **If you checked yes and it is banded:** *If yes then it's gneiss*
☐	☐	**Microscopic Mica Crystals**	**Does the rock appear *slightly* shiny with slight mineral alignment?** *If yes then it's phylitte*
☐	☐	**Platy Mica Crystals**	**Do you notice larger shiny mica crystals with some mineral alignment?** *If yes then it's schist*
☐	☐	**Nonfoliated**	**If you checked no for all of the above, then your rock is nonfoliated. Please use the ESRT comments and rock map symbols to help identify**

What was the parent rock? The type of rock it was before it was changed due to heat and pressure? Use ESRT!

In COMPLETE SENTENCES state why this rock would be classified as a metamorphic rock.

_____

_____

What is the name of this metamorphic rock? ☐

STATION/SAMPLE #18

Yes	No	Key Identifying Feature	Questions
☐	☐	**Foliated**	**Do you notice any mineral alignment and/or banding?** **If you checked yes and it is banded:** *If yes then it's gneiss*
☐	☐	**Microscopic Mica Crystals**	**Does the rock appear *slightly* shiny with slight mineral alignment?** *If yes then it's phylitte*
☐	☐	**Platy Mica Crystals**	**Do you notice larger shiny mica crystals with some mineral alignment?** *If yes then it's schist*
☐	☐	**Nonfoliated**	**If you checked no for all of the above, then your rock is nonfoliated. Please use the ESRT comments and rock map symbols to help identify**

What was the parent rock? The type of rock it was before it was changed due to heat and pressure? Use ESRT!

In COMPLETE SENTENCES state why this rock would be classified as a metamorphic rock.

_____

_____

What is the name of this metamorphic rock?

STATION/SAMPLE #19

Yes	No	Key Identifying Feature	Questions
☐	☐	**Foliated**	**Do you notice any mineral alignment and/or banding?** **If you checked yes and it is banded:** *If yes then it's gneiss*
☐	☐	**Microscopic Mica Crystals**	**Does the rock appear *slightly* shiny with slight mineral alignment?** *If yes then it's phylitte*
☐	☐	**Platy Mica Crystals**	**Do you notice larger shiny mica crystals with some mineral alignment?** *If yes then it's schist*
☐	☐	**Nonfoliated**	**If you checked no for all of the above, then your rock is nonfoliated. Please use the ESRT comments and rock map symbols to help identify**

What was the parent rock? The type of rock it was before it was changed due to heat and pressure? Use ESRT!

In COMPLETE SENTENCES state why this rock would be classified as a metamorphic rock.

_____

_____

What is the name of this metamorphic rock?

STATION/SAMPLE #20

Yes	No	Key Identifying Feature	Questions
☐	☐	**Foliated**	**Do you notice any mineral alignment and/or banding?** **If you checked yes and it is banded:** *If yes then it's gneiss*
☐	☐	**Microscopic Mica Crystals**	**Does the rock appear *slightly* shiny with slight mineral alignment?** *If yes then it's phylitte*
☐	☐	**Platy Mica Crystals**	**Do you notice larger shiny mica crystals with some mineral alignment?** *If yes then it's schist*
☐	☐	**Nonfoliated**	**If you checked no for all of the above, then your rock is nonfoliated. Please use the ESRT comments and rock map symbols to help identify**

What was the parent rock? The type of rock it was before it was changed due to heat and pressure? Use ESRT!

In COMPLETE SENTENCES state why this rock would be classified as a metamorphic rock.

_____

What is the name of this metamorphic rock?

LABORATORY QUESTIONS FOR PART 3 or 9C

1. What happens to the grain size in a rock as it goes from low to high grade metamorphism?

_____

2. How could hydrochloric acid be used to tell quartzite from marble?

_____

3. Why are fossils not usually found in metamorphic rocks?

_____

4. Explain how foliation occurs in metamorphic rocks.

_____

5. On what basis can metamorphic rocks be identified?

_____

6. Gneiss can form into granite. How is gneiss different in appearance from granite?

_____

7. What sedimentary rock does slate most closely resemble?

_____