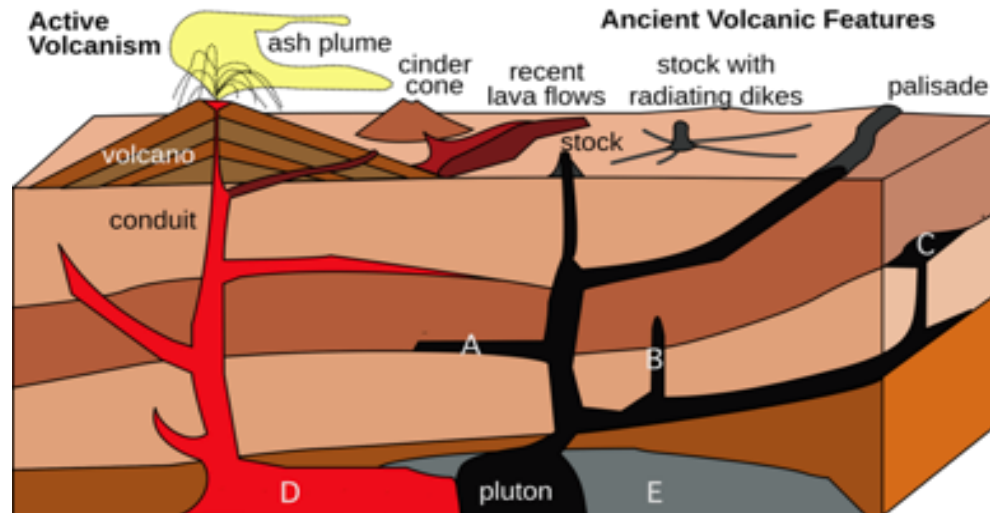


Part 1 - Vocabulary - Match the following terms.

1. _____ molten rock under Earth's surface ash
2. _____ molten rock on or near earth's surface extrusive
3. _____ texture of igneous rock with crystals > 1 cm felsic
4. _____ term for any rock that formed from cooling magma or lava igneous
5. _____ fine felsic pyroclastic material shot into the air intrusive
6. _____ igneous rocks with light-colored high-silica minerals lava
7. _____ igneous rocks with dark-colored low-silica minerals mafic
8. _____ any piece of igneous rock ejected from an eruption, means "fire formed rock" pyroclast
9. _____ igneous rock formed on or near Earth's surface resulting in small or no crystals magma
10. _____ igneous rock formed deep under Earth's surface resulting in larger visible crystals pegmatitic

Part 2 - Match the letter in the diagram below to the term.

- ___ batholith
- ___ dike
- ___ laccolith
- ___ magma chamber
- ___ sill



correct

Igneous Rock Textures



A

B

C



D



E



F

Part 3 - Match the letter in the image to the left with the term below.

___ aphanitic

___ fragmental

___ glassy

___ phaneritic

___ porphyritic

___ vesicular

___ ___ ___ ___ Which 4 rocks formed on or near Earth's surface?

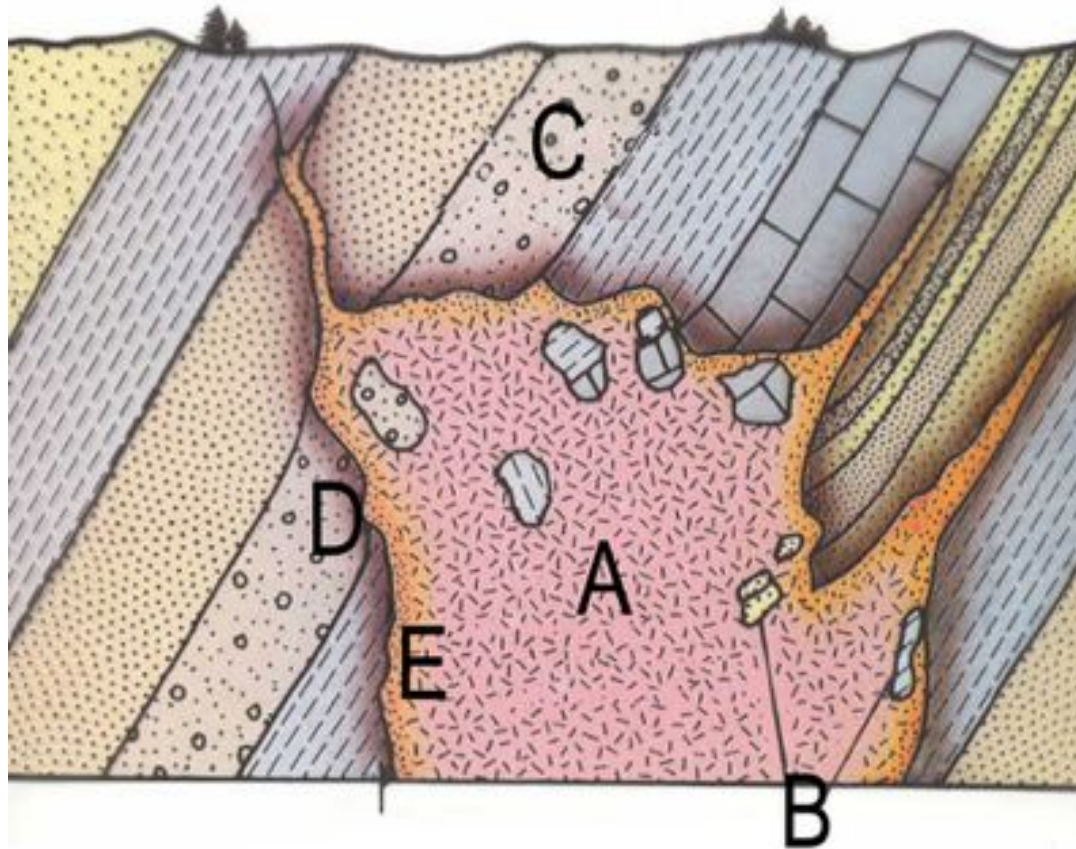
___ Which rock formed in two stages?

___ Which rock also is know as "Apache tears"?

Part 4 - Assimilation: Match the terms with the letter in the drawing below.

When a pluton rises into the already existing “country” rock, some parts of the [country rock](#) may fall into the molten pluton and be incorporated. These inclusions are called [xenoliths](#). If you find a xenolith, often in granite, look closely as it may be partially melted around the edges. The edge of the pluton loses heat to the country rock and cools more quickly, resulting in finer crystals, an area called the “[chill margin](#)”. At the same time, the edge of the country rock may be heated and recrystallized by the heat of the molten pluton, a region known as the “[baked zone](#)”. Yes, geology has some cool terms. :)

____ baked zone ____ chill zone ____ country rock ____ pluton ____ xenolith



Part 5 - Observations of Each Igneous Rock Under the Stereoscope

Using your stereomicroscope or loupe, take notes about each igneous rock: appearance, striations, apparent crystal structure, etc. Try low -> high power.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

10 _____

11 _____

12 _____

Extra Credit for Early Birds - On a separate sheet of paper, sketch each rock as it appears under the scope. Label the power used. Attach to this lab.

Part 6 - Characterizing and Identifying the Igneous Rocks

TEXTURE*	EXTRU/INTRU/BOTH	MINERALS YOU RECOGNIZE	CHEMISTRY	IGNEOUS ROCK NAME
1 _____	_____	_____	_____	_____
2 _____	_____	_____	_____	_____
3 _____	_____	_____	_____	_____
4 _____	_____	_____	_____	_____
5 _____	_____	_____	_____	_____
6 _____	_____	_____	_____	_____
7 _____	_____	_____	_____	_____
8 _____	_____	_____	_____	_____
9 _____	_____	_____	_____	_____
10 _____	_____	_____	_____	_____
11 _____	_____	_____	_____	_____
12 _____	_____	_____	_____	_____

TEXTURES: GLASSY-VESICULAR-PORPHYRITIC-APHANITIC-PHANERITIC-PEGMATITIC-FRAGMENTAL

EXTRUSIVE / INTRUSIVE / PORPHYRITIC

CHEMISTRY:

FELSIC=LIGHT
Up to 80% Silica

INTERMEDIATE=MEDIUM
Some Silica

MAFIC=DARK
Less Silica (45%)

ULTRAMAFIC=GREEN
<45% Silica

Choose from these rocks.

ANDESITE PORPHYRY BASALT DIABASE DIORITE GABBRO GRANITE
OBSIDIAN PEGMATITE PUMICE RHYOLITE SCORIA TUFF

Part 7 - Reflecting Upon Your Results

- A. Three rocks that are obviously *intrusive* include _____
- B. Four rocks that are obviously *extrusive* include _____
- C. Five high-silica rocks include _____
- D. Three low-silica rocks include _____
- E. The rock _____ is glued ash
- F. Rocks _____ & _____ are vesicular.
- G. The _____ rock formed in 2 different cooling stages.

Part 8 - Using Google maps to examine various igneous formations and the rocks tuff, granite, scoria, and diabase which is like coarse basalt.

- In [LOCATION 1](#), we are above the _____ River in the state of _____ at the _____ Park
- Using Control-Click (Mac) or Right Click (PC) + Measure Distance, the length of this park from north to south is _____ miles.
 - Switch to satellite view by clicking the satellite picture in the bottom left of the map.
 - Switch to 3-D view by clicking 3D in the bottom right.
 - Use the Control-Left Click-Mouse to look at the WEST bank of the river below the Palisades Interstate Park Commission building. Zoom in. Zoom out. Look around.
- Describe what you see.

4. This is MAFIC / FELSIC (Choose one.) How do you know?

5. [This is the rock](#) found here. Is this extrusive, near-extrusive, or deeply intrusive and how do you know?

6. Hypothesize how these cliffs were made geologically.

7. [LOCATION 2](#) is in _____ Park in the state of _____.

8. Look around. Tell 3 ways this rock is different from the rock in location 1.

A _____

B _____

C _____

9. These rocks are MAFIC / FELSIC (Circle 1.) How do you know?

10. Where must [this rock type](#) at LOCATION 2 have formed originally & how do you know?

11. Describe in at least three steps what must have happened for us to be able to see this rock at the surface now.

STEP 1 _____

STEP 2 _____

STEP 3 _____

STEP 4 _____

12. [LOCATION 3](#) is in the state of _____ near the town of _____

13. Switch to satellite then 3D view. Look around. Really. Zoom out. Look around. Describe geologically what is here.

14. [This rock](#) is found widely at LOCATION 3. How did this rock form? Why does it have all those holes? Is it EXTRUSIVE or INTRUSIVE?

15. Why is this rock different from the rocks at LOCATION 1 and LOCATION 2?

16. [LOCATION 4](#) is in the State of _____ near the town of _____

17. [This rock](#) makes up those cliffs. Is this rock vesicular, fragmental, aphanitic, porphyritic, or phaneritic? Explain.

18. How does this rock form?

D. Look around. From which direction did all this material to form this rock originate? Change to 2D satellite view. Look around.

19. The most probable source for all this ash is

20. Hypothesize what you think happened here a few million years ago.

21. This is the [Wikipedia link](#) to LOCATION 1. Explain how the Palisades formed. Was your answer close? Explain.

22. This is the [Wikipedia link](#) to LOCATION 2. Explain how the Half Dome formed. Was your answer close? Explain.

23. This is the [Wikipedia link](#) to LOCATION 3. Explain how the these hills formed. Was your answer close? Explain.

24. This is the [Wikipedia link](#) to LOCATION 4. Explain how the these mesas formed. Was your answer close? Explain.

