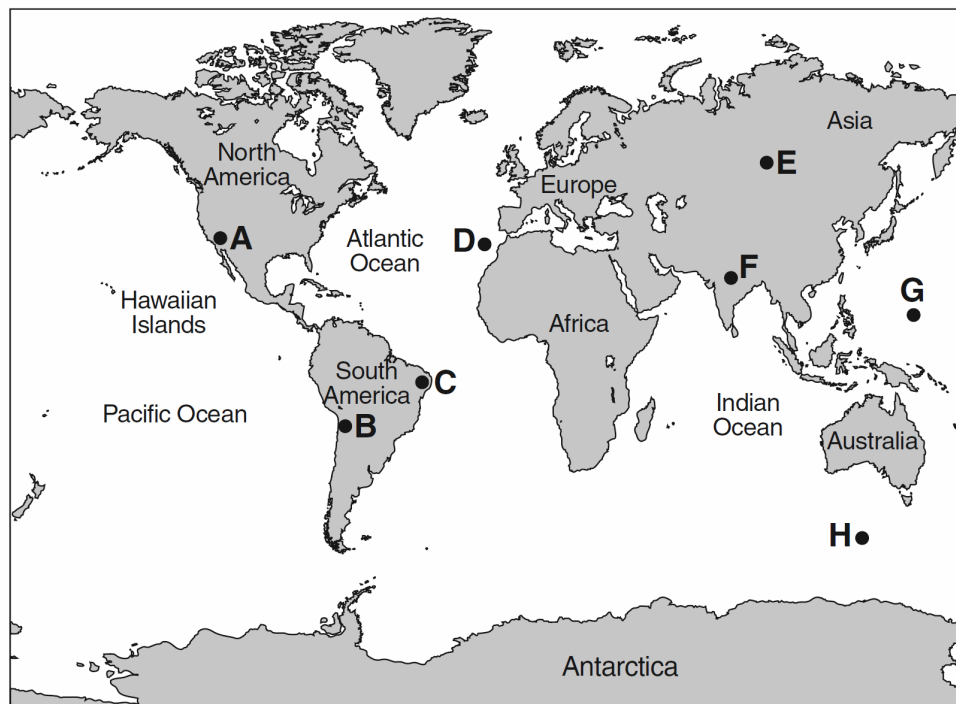


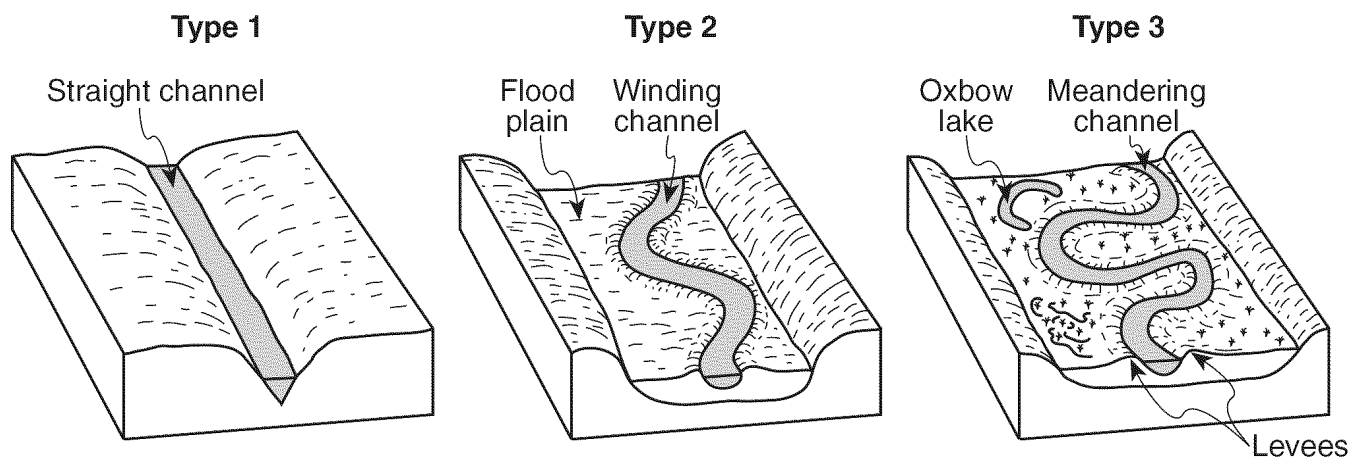
Constructed Response

Base your answers to questions 1 and 2 on the world map below. Points *A* through *H* represent locations on Earth's surface.



1. Identify the tectonic feature responsible for the formation of the Hawaiian Islands.
2. Identify the *two* lettered locations from the map that are *least* likely to experience volcanic activity or earthquakes.

Base your answers to questions 3 through 5 on the block diagrams below, which show three types of streams with equal volumes.



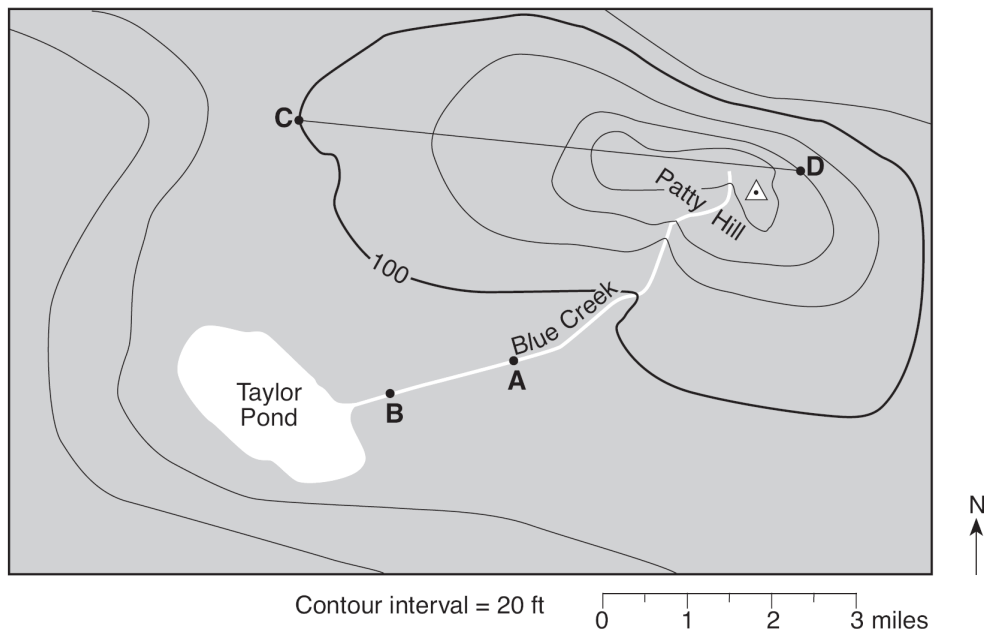
3. Explain how the cobbles and pebbles that were transported by these streams became smooth and rounded in shape.
4. Explain why the outside of the curve of a meandering channel experiences more erosion than the inside of the curve.

Midterm Review

5. Explain how the differences between the type 1 and type 3 stream channels indicate that the average velocities of the streams are different.

Base your answers to questions 6 through 10 on

the topographic map shown below. Letters *A*, *B*, *C*, and *D* represent locations on Earth's surface. The symbol (▲) marks the highest elevation on Patty Hill. Elevations are shown in feet.



6. On the grid below, construct a profile of the land surface along line *CD*. Plot the elevation of *each* contour line that crosses line *CD*. Connect the plots with a line to complete the profile.

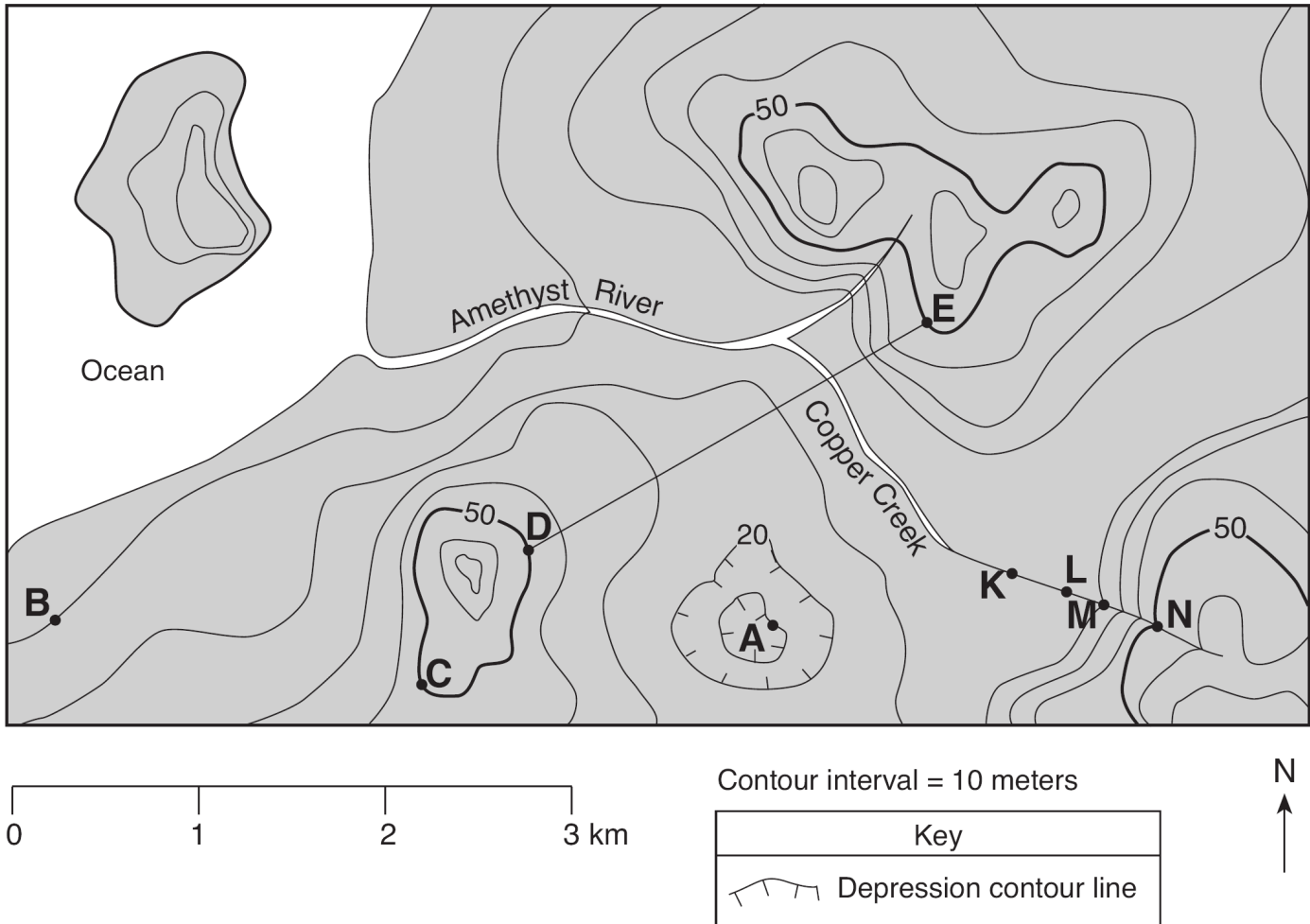


7. A student placed a floating wooden block in Blue Creek at location *A*. Fifteen minutes later, the floating block arrived at location *B*. What was the creek's rate of flow from *A* to *B*? Express your answer to the *nearest tenth*.
8. Explain how the shape of the contour lines crossing Blue Creek shows the direction that the creek is flowing.
9. Indicate, using a compass direction, the steepest side of Patty Hill.

Midterm Review

10. What is a possible elevation at the symbol Δ at the top of Patty Hill?

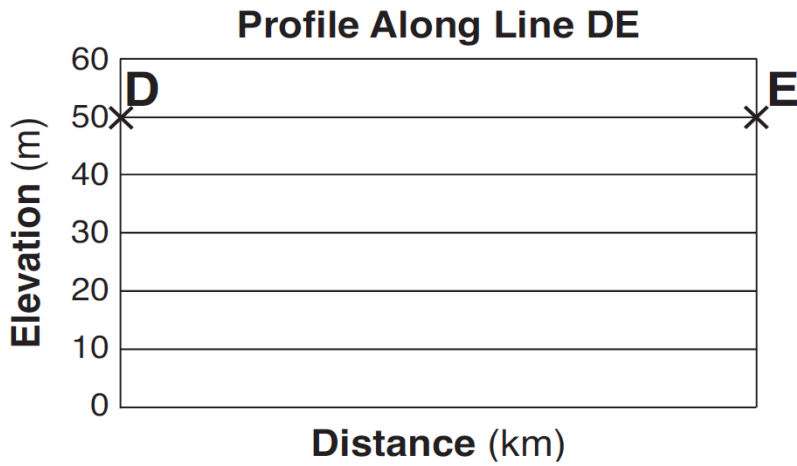
Base your answers to questions **11** through **14** on the topographic map shown below. Letters *A*, *B*, *C*, *D*, and *E* represent locations on Earth's surface. Letters *K*, *L*, *M*, and *N* are locations along Copper Creek. Elevations are measured in meters.



11. Explain how the map indicates that Copper Creek flows faster between points *N* and *M* than between points *L* and *K*.

Midterm Review

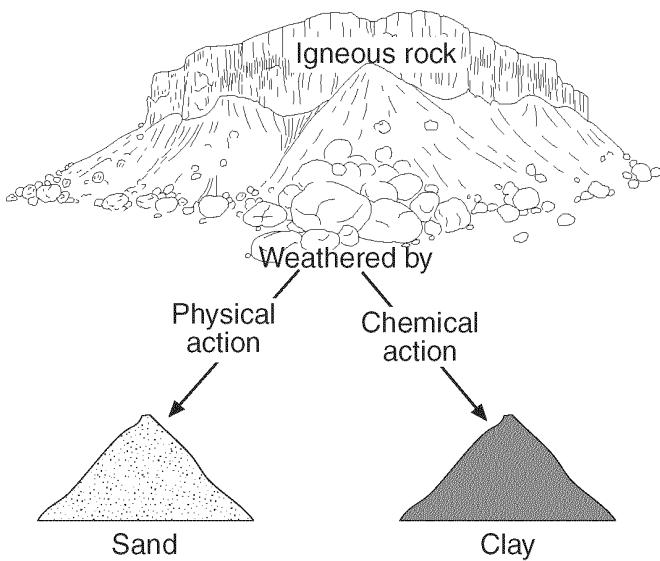
12. On the grid below, construct a topographic profile along line *DE* by plotting an **X** for the elevation of each contour line that crosses line *DE*. Connect the **X**s with a smooth, curved line to complete the profile.



13. Calculate the gradient between points *B* and *C* and label your answer with the correct units.

14. What is the elevation of location *A*?

Base your answers to questions **15** and **16** on the diagram below, which shows igneous rock that has undergone mainly physical weathering into sand and mainly chemical weathering into clay.



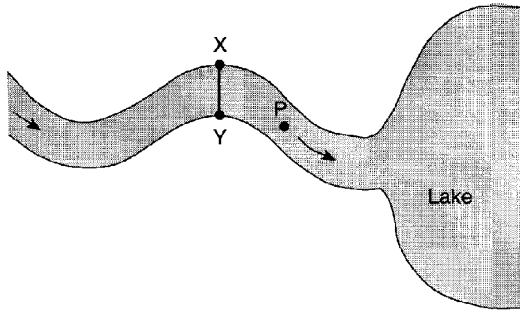
15. If the igneous rock is a layer of vesicular andesite, identify *three* types of mineral grains that could be found in the sand.

16. Describe the change in temperature and moisture conditions that would cause an increase in the rate of chemical weathering into clay.

Midterm Review

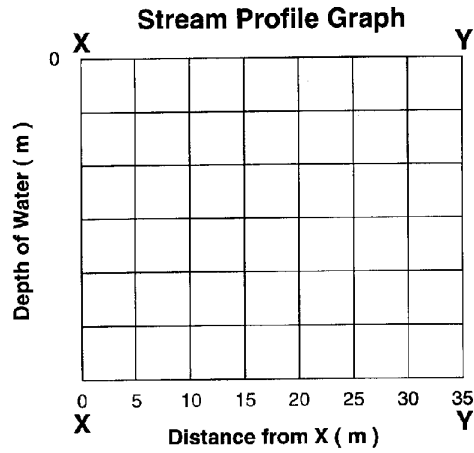
17. Base your answer to the following question on the diagram and the stream data table below.

The diagram represents a stream flowing into a lake. Arrows show the direction of flow. Point *P* is a location in the stream. Line *XY* is a reference line across the stream. Points *X* and *Y* are locations on the banks. The data table gives the depth of water in the stream along line *XY*.



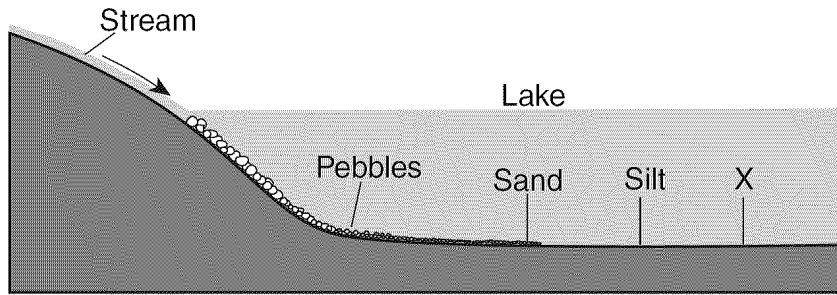
Stream Data Table

	Location X							Location Y	
Distance from X (meters)	0	5	10	15	20	25	30	35	
Depth of Water (meters)	0	5.0	5.5	4.5	3.5	2.0	0.5	0	



State why the depth of water near the bank at point *X* is different from the depth of water near the bank at point *Y*.

18. Base your answer to the following question on The cross section below illustrates the normal pattern of sediments deposited where a stream enters a lake. Letter *X* represents a particular type of sediment.



(Not drawn to scale)

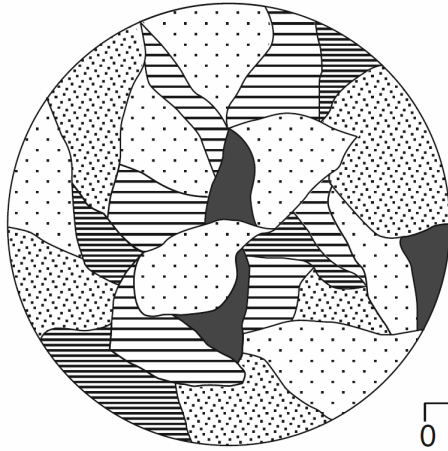
a Briefly explain why deposition of sediment usually occurs where a stream enters a lake.

b Name the type of sediment most likely represented by letter *X*.

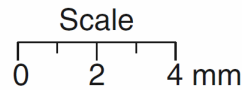
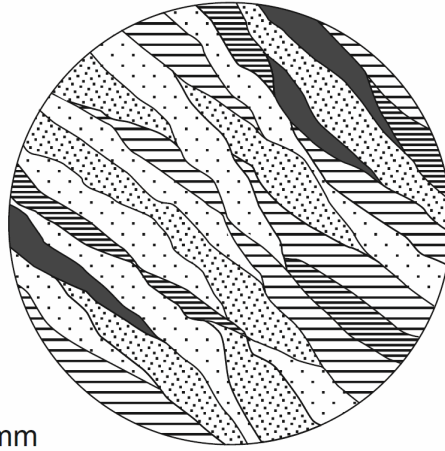
Midterm Review






Base your answers to questions **19** through **21** on the magnified views shown below of the minerals found in an igneous rock and in a metamorphic rock. The millimeter scale indicates the size of the crystals shown in the magnified views.

Igneous Rock



Metamorphic Rock

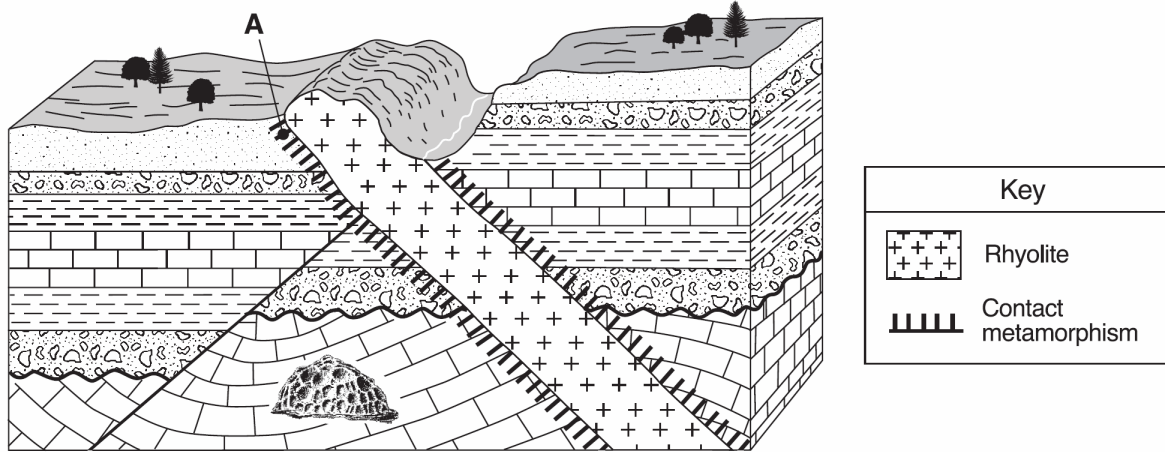


Key					
	Amphibole		Plagioclase feldspar		Quartz
	Biotite		Potassium feldspar		

- Describe the texture shown by this metamorphic rock that indicates it could be schist.
- Based on the minerals present, identify the relative color and density of this igneous rock compared to mafic igneous rocks with the same crystal size.
- Identify the environment of formation of this igneous rock based on the size of its intergrown crystals.

Midterm Review

Base your answers to questions 22 through 24 on the block diagram below, which shows rock units that have not been overturned. Point *A* is located in the zone of contact metamorphism. A New York State index fossil is shown in one of the rock units.



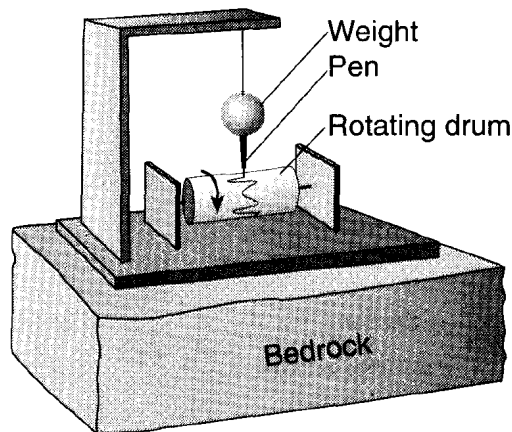
(Not drawn to scale)

22. Describe *one* piece of evidence that would indicate that the valley shown on the surface of the block diagram had been eroded and deepened by a glacier.
23. Identify the metamorphic rock that most likely formed at point *A*.
24. Identify the crystal size of the minerals in rhyolite and explain what this size indicates about the rate of cooling of the magma from which it formed.

Crystal size: _____

Explanation: _____

Base your answers to questions 25 through 27 on the diagram below, which shows a seismograph that recorded seismic waves from an earthquake located 4000 kilometers from this seismic station.

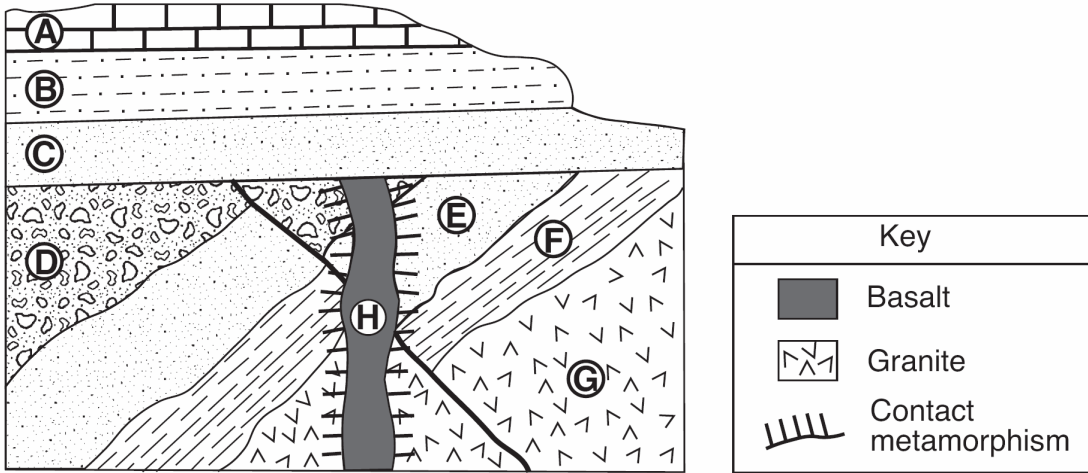


25. State *one* possible cause of the earthquake that resulted in the movement of the bedrock detected by this seismograph.

Midterm Review

26. Which type of seismic wave was recorded first on the rotating drum?
27. How long does the first S-wave take to travel from the earthquake epicenter to this seismograph?
-

28. Base your answer to the following question on the cross section below. Letters *A* through *H* represent rock units in which overturning has not occurred.

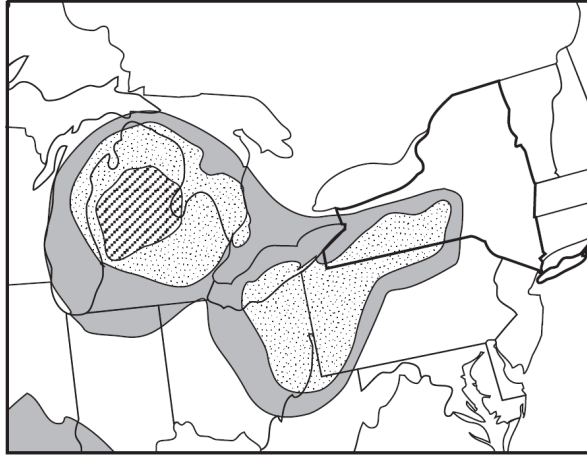





Identify *one* metamorphic rock that could have formed at the boundary between rock unit *E* and rock unit *H*.

Midterm Review

Base your answers to questions **29** and **30** on the map below. The map shows the approximate area in a portion of North America where some sedimentary rock layers composed of gypsum, halite, and potassium salt minerals are found in Earth's crust.

Mineral Deposits

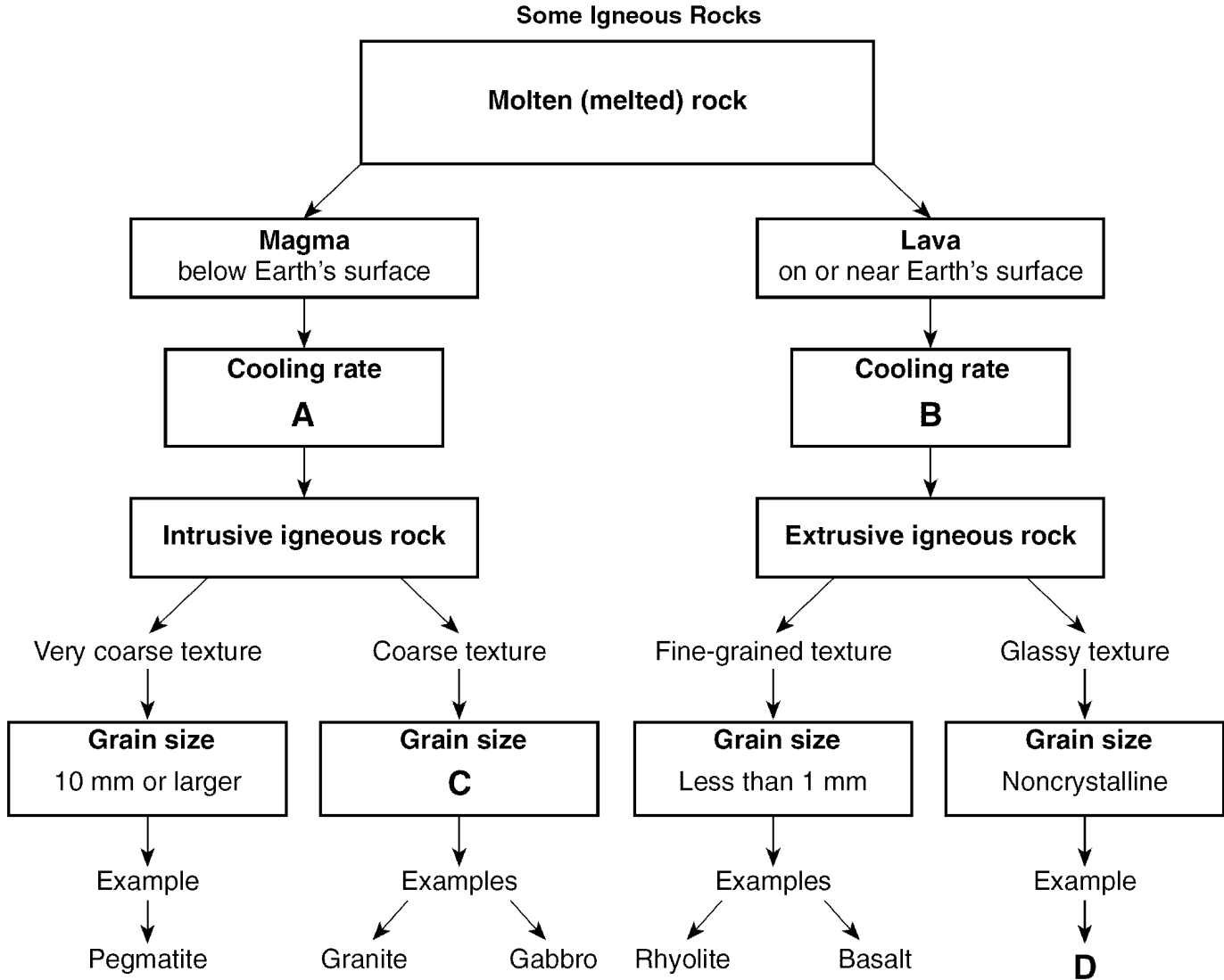


Key	
	Gypsum
	Gypsum and halite
	Gypsum, halite, and potassium salts

29. Identify the sedimentary rock composed of halite and explain how this rock is usually formed.
30. Identify *one* New York State landscape region in which deposits of gypsum and halite are commonly found.

Midterm Review

Base your answers to questions **31** through **33** on the flowchart below and on your knowledge of Earth science. The flowchart shows the formation of some igneous rocks. The bold letters **A**, **B**, **C**, and **D** indicate parts of the flowchart that have not been labeled.



31. State *one* igneous rock that could be placed in the flowchart at **D**.

32. Contrast the rate of cooling at **A** that forms intrusive igneous rock with a rate of cooling at **B** that forms extrusive igneous rock.

33. Give the numerical grain-size range that should be placed in the flowchart at **C**. Units must be included in your answer.

Midterm Review

Base your answers to questions **34** through **38** on the passage and map below. The map shows the volcanic island, Krakatau, before and after the 1883 eruption.

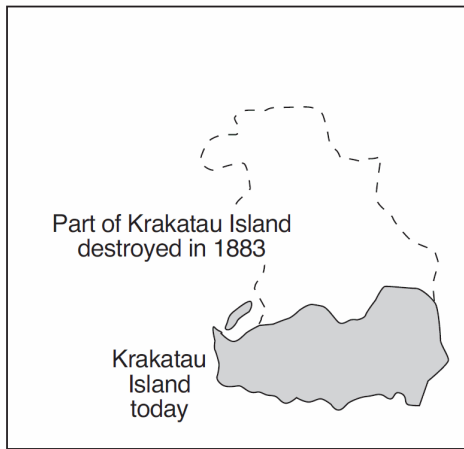
Krakatau

On August 27, 1883, one of the largest volcanic eruptions ever recorded in history occurred. Krakatau, a volcanic island nearly 800 meters in height, located at 6° S 105.5° E, exploded. Two-thirds of the island was destroyed by the blast. Blocks of pumice produced by the eruption were found floating in the ocean for months afterward.

Tsunamis produced by the eruption reached heights of 40 meters as they came ashore on nearby islands. These destructive waves traveled 6360 kilometers in just 12 hours. Over 36,000 people died and 165 coastal villages were destroyed.

Volcanic ash was blasted into the atmosphere to heights between 36 and 48 kilometers. Global temperatures cooled as the ash traveled on air currents around the world.

Volcanic Island of Krakatau



34. Describe the texture and density of pumice that allowed the blocks of pumice to float on the ocean.

Texture: _____

Density: _____

35. Explain how the volcanic ash from the Krakatau eruption caused global temperatures to decrease.

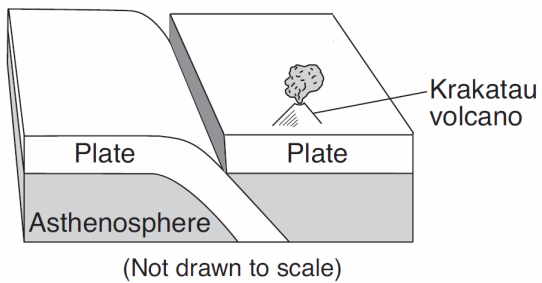
36. Identify the layer of the atmosphere into which the highest volcanic ash was blasted from the Krakatau eruption.

37. Determine the rate the tsunamis traveled across the ocean. Label your answer with the correct units.

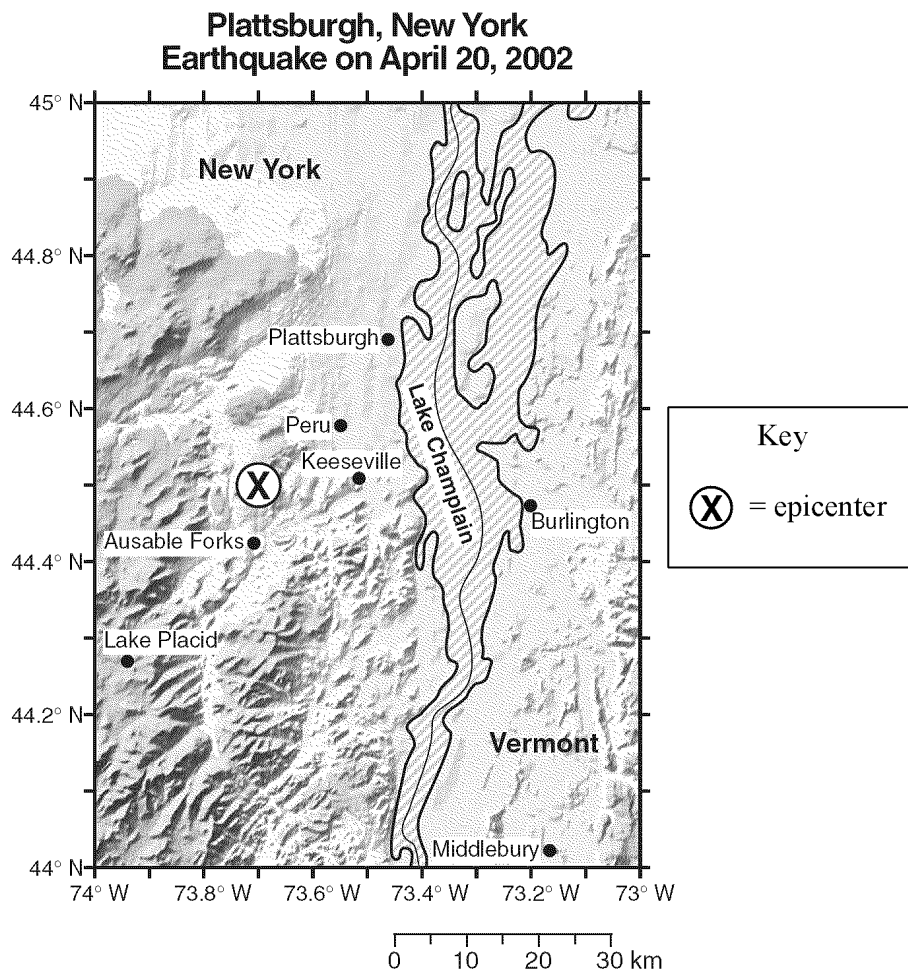
Rate = _____

Midterm Review

38. The diagram shows where Krakatau formed, then exploded. Draw *one* arrow on *each* lithospheric plate to show the relative direction that both plates are moving to produce this type of volcano.



- Base your answers to questions 39 through 42 on the map below which shows the location of the epicenter of an earthquake that occurred on April 20, 2002, about 29 kilometers southwest of Plattsburgh, New York.



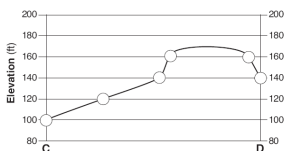
39. State the latitude and longitude of this earthquake epicenter. Express your answers to the *nearest tenth of a degree* and include the compass directions.

40. What is the *minimum* number of seismographic stations needed to locate the epicenter of an earthquake?

Answer Key

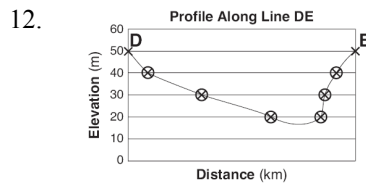
Midterm Review

1. – Hawaii Hot Spot – mantle hot spot – volcano – a rising magma plume
2. *C* and *E*
3. Responses include, but are not limited to: These tumbling cobbles and pebbles were abraded against other transported rocks and the stream channel; Abrasion occurred as the rocks bounced and rolled along the bottom of the streambed; Sharp corners and edges were knocked off, scraped, and/or worn down; Grinding against other sediment and rocks
4. Responses include, but are not limited to: Stream velocity is greater on the outside of the meandering channel; Stream flow is slower on the inside of the meandering channel; Water is moving faster on the outside of a meander curve
5. Responses include, but are not limited to: The type 3 stream meanders more; The type 3 stream occupies a wider floodplain; The type 1 stream has a straighter course.



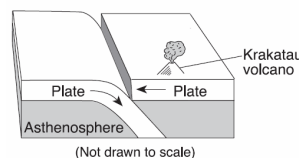
7. 0.1 mi/min.

8. — Contour lines that cross the stream bend in the opposite direction of stream flow. — Contour lines form V-shapes that indicate the uphill or upstream direction. — Contour lines bend upstream.
9. — north side — north northeast — NE side
10. any value greater than 160 ft and less than 180 ft
11. *Examples:* — Contour lines between *N* and *M* are closer together. — There is a steeper slope between *N* and *M*. — Where contour lines are far apart, there is a gentle slope and the stream velocity is less.



12. 18.9 to 21.1 Correct units: — m/km —meters/km —m/kilometer
14. 10 m
15. plagioclase feldspar – biotite – amphibole – quartz *or* pyroxene
16. – Moisture and temperature should both increase.
17. Stream water moves faster on the outside of the curve. Deposition is greatest on the inside of the curve.

18. *a:* – The stream velocity decreases. – The still water of the lake slows the stream current.
b: – Silt – Clay
19. – foliated – mineral alignment – flattened crystals
20. Color: – lighter – whiter –pinker
Density: – lower – less dense
21. – intrusive – plutonic – underground
22. — The valley is U-shaped. — The valley has grooved, scratched, and polished bedrock.
23. – quartzite *or* hornfels
24. Crystal size: — fine grained — less than 1-mm crystal size
Explanation: — The magma cooled rapidly. — It cooled over a short period of time.
25. *Examples:* –tectonic plate movement, –movement along a fault, –volcanic eruption.
26. *Examples:* –P-wave, –primary wave, –compressional wave.
27. Any response from 12 min 30 sec to 12 min 50 sec
28. quartzite *or* hornfels
29. *a:* – The stream velocity decreases. – The still water of the lake slows the stream current.
b: – Silt – Clay



(Not drawn to scale)

29. *Examples:* — crystals of halite settling in an evaporating sea — precipitation from seawater — chemical deposition
30. *Examples:* — Allegheny Plateau — Erie-Ontario Lowlands — Appalachian Plateau
31. Responses include, but are not limited to: obsidian; basaltic glass; pumice; vesicular basalt glass.
32. Responses include, but are not limited to: *A* is slower cooling than *B*; *B* is faster cooling than *A*; Intrusive rock forms from molten rock that cools slowly; Extrusive rock forms from molten rock that cools rapidly.
33. 1mm to 10 mm
34. Texture: — vesicular — filled with gas pockets Density: — low density — density less than 1 g/cm³ — less dense than water
35. — The ash particles blocked out the Sun's rays. — Dust particles reflect the Sun's rays. — Less insolation reached Earth's surface.
36. – stratosphere
37. – 530 kilometers/hour (km/h)

Answer Key
Midterm Review

- 39. 44.5°N (latitude) and 73.7°W (longitude).
 - 40. Three
 - 41. Peru is closer to the epicenter
 - 42. 3 min 0 sec (± 20 sec)
-