1. Consider the map below.
   a. On the map, place at least five more X marks to indicate places you are most likely to find volcanoes.

   ![Map of the world with X marks for volcanoes]

   b. Where are you least likely to experience an earthquake?

      *(Mark the one best answer.)*

      - A  Along a volcanic island chain
      - B  Along the boundary of a crustal plate
      - C  In a subduction zone
      - D  Randomly anywhere on Earth

2. What causes plates to move?

   *(Mark the one best answer.)*

   - A  Earthquakes and volcanoes
   - B  Thermal energy from the core
   - C  Sinking of the lithosphere into the asthenosphere
   - D  Plate interactions
3. Consider these three samples of different types of rocks.

| Sample A: Igneous (Granite) | Sample B: Metamorphic (Gneiss) | Sample C: Sedimentary (Sandstone) |

a. In the space below, draw a diagram to explain how earth materials can cycle among these three types of rocks.

b. Consider sample D, another igneous rock with a glassy surface. Which cooled faster, sample A or sample D? What feature provides evidence to support your argument about which one cooled faster when it formed?
4. Look at the river in the illustration. The water at F is moving much faster than at G. The bank is much deeper on the outside of the river bend (F) than it is on the inside of the river bend (G).

Compare the two sides of the river.

a. How does the faster current at F affect erosion and deposition at the riverbank?

b. How does the slower current at G affect erosion and deposition at the riverbank?

c. Assume that for the next 1,000 years, the only geological processes affecting this area are erosion and deposition from the river. What might you expect to see at the end of 1,000 years?

(Mark the one best answer.)

- A  The river will be straighter.
- B  The river will have more dramatic curves.
- C  The delta will have dammed the river.
- D  The river will have cut a deep canyon.
5. Use the illustration of a rock column to answer the following questions.

![Rock Column Diagram]

a. Which feature is youngest?  
(Mark the one best answer.)

- ☐ A  Dike (A)
- ☐ B  Canyon (G)
- ☐ C  Shale (C)
- ☐ D  Limestone (D)

b. Which feature is oldest?  
(Mark the one best answer.)

- ☐ F  Dike (A)
- ☐ G  Canyon (G)
- ☐ H  Shale (C)
- ☐ J  Limestone (D)

c. Using various dating techniques, geologists have calculated the following ages for two rocks in the rock column.

<table>
<thead>
<tr>
<th>Rock</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rock A</td>
<td>3 million years old</td>
</tr>
<tr>
<td>Basalt</td>
<td></td>
</tr>
<tr>
<td>Rock E</td>
<td>200 million years old</td>
</tr>
<tr>
<td>Sandstone</td>
<td></td>
</tr>
</tbody>
</table>

Based on the data in the table, how old is rock B?  
(Mark the one best answer.)

- ☐ A  Between 200,000 to 3 million years old
- ☐ B  Less than 3 million years old
- ☐ C  Between 3 million to 200 million years old
- ☐ D  More than 200 million years old
6. A geologist finds a rock layer that is tilted. The fossils in the rock include oyster shells and brachiopods. It fizzes when acid is dropped on it. Evidence supports that this rock ________.

Write **Y** next to each statement that can be supported by the evidence; write **N** next to each statement that cannot be supported.

- ____ is a sedimentary rock
- ____ was originally horizontal
- ____ contains salt deposits
- ____ was deposited in a marine environment
- ____ contains calcite
- ____ was deposited on a slope
- ____ was originally part of a sand dune

7. Scientists have discovered that Mount Everest is growing taller by about 2 centimeters per year.

What is a possible scientific explanation for this?

*(Mark the one best answer.)*

- **A** The Indian Plate and Eurasian Plate are converging and pushing the Himalaya mountains upward.
- **B** The Indian Plate is subducting under the Eurasian Plate, pushing the Himalaya mountains upward.
- **C** The Eurasian Plate is subducting under the Indian Plate, pushing the Himalaya mountains up.
- **D** The Eurasian and Indian Plates are moving past each other, pushing the Himalaya mountains up.
8. Fault lines or cracks can be found throughout the Rocky Mountains, and all three types of rocks are found there. What does this tell you about these mountains?

Write Y next to each statement that is supported by the evidence; write N next to each statement that is not supported.

_____ An ocean covered this part of the country before the mountains formed.
_____ A great ice sheet once covered this part of the country.
_____ This part of the North American Plate has experienced intense pressure.
_____ Faults allowed melted rock to come to the surface.

9. Mountains of the British Isles and the Caledonian Mountains of Scandinavia have the same rock composition as the Appalachian Mountains.

What does this tell us about the story of the past geology of this part of Earth?
10. James Hutton was a Scottish geologist and experimental farmer. He would often think about how the land on his farm changed over time.

   a. Which processes formed the soil on his land?

      Write **Y** next to each process that likely helped form the soil; write **N** next to each process that did not help.

      ____ Weathering
      ____ Melting
      ____ Deposition
      ____ Crystallization
      ____ Decomposition

   b. Many scientists of Hutton’s day thought Earth’s landforms had formed during one sudden event, then didn’t change. Hutton watched how the stream running through the hills on his farm carried soil away after each rainstorm. “If soil is always being carried away,” he wondered, “why was the land not completely flat by now?”

      If you were a modern-day scientist who was able to go back in time to have a conversation with Hutton at the moment he made this observation, what would you tell him?

      __________________________________________
      __________________________________________
      __________________________________________
      __________________________________________
      __________________________________________
      __________________________________________