

Fire From the Earth

Volcanoes are spectacular and destructive features on our planet. They have been described and explained by different cultures for thousands of years. However, it has only been since the middle of the 20th century that their origin in our changing Earth can be adequately explained.

Part of the secret of volcanoes comes from Plate Tectonic Theory. Seven major plates, and numerous smaller cracks within these plates, shift across the mantle of the Earth. At the edges of the plates, magma can seep through cracks in the crust to emerge at the surface. But not all plate boundaries are marked by volcanoes.

If two plates converge, one an oceanic plate and one a continental plate, then the one that is most dense will slide under the other one. Usually the oceanic plate will slide under the continental plate. To illustrate this, move your hands together and have one slide under the other. This process is called *subduction*. Where the two plates converge, an oceanic trench is often formed. The deepest one on Earth is the Mariana Trench in the Pacific. It is near Australia.







When the oceanic plate is sliding under the continental plate, where does it end up? It ends up on the mantle, which is made of molten rock or magma. Since it is so hot, the oceanic plate starts to melt to become part of the magma. Thus, rock is being recycled. Keep in mind that this entire process does not happen quickly but over hundreds and thousands of years. A plate might only move one centimeter a year!

Where two plates meet, there are often tiny cracks, or fissures, where some of the less dense magma might rise. As it rises to fill in these cracks, pressure might build up enough to have the magma break through to the surface of the earth as lava. Depending on the forces involved, a large volcano may erupt violently or lava may just flow from the volcano. If there is a lot of water mixed with the magma, a more violent explosion may occur. If there is a lot of silica in the magma, the lava may flow more slowly. However, if it is moving more slowly, the escape hole (vent) of the volcano may become plugged. If the vent is plugged and the pressure continues to build, again a violent explosion may occur.

Not all volcanoes are formed at plate edges. The Hawaiian Islands are right in the middle of a plate. But they are on a very thin area of the crust. Under them, the magma is so hot that it burns right through the crust to form volcanoes. The lava forms islands. New Hawaiian Islands are formed each century.

Annotation Symbols

Other tasks you can ask students to complete.

	Symbol	Explanation
1	Underline/Highlight	Underline/Highlight sentences in conjunction with a symbol.
2	[]	Put brackets around key ideas or claims being made in the text. Make sure you explain in the margin what the author is saying or doing.
3		Circle key terms and words you do not know. If you do not know a word, make sure you define it.
4		Draw an arrow to illustrate a link between two parts of the text. Write your own explanation near the arrow or in the margin.
5		Put a star next to an idea in the text that you find enlightening, interesting, or that taught you something new.
6		Draw a smiley face next to something that you like. Explain why in the margin.
7	?	Put a question mark next to anything you find confusing. Explain why in the margin.
8		Put a box around a sentence that you think is the main idea, thesis, or organizing concept of the text. Make sure you explain why you think this is the main idea.
9	!	Put an exclamation mark next to anything that you find interesting or surprising.
10	X	Put an X next to anything that you think should be cut from the piece. Explain why it isn't necessary for the reader.
11		Put a triangle next to something you disagree with and write a note in the margin explaining your disagreement.
12	EX	Write EX in the margin when you find a cause/effect in the text.

1	Write a question or a statement about something that you have read in the margin. Draw a line to the relevant portion of the text.
2	Paraphrase or summarize part of the text that you find interesting or confusing.
3	Make a connection to what you have read.
4	Draw a picture or cartoon to help you understand something that you have read in the margin. Draw an arrow to the section of text that the picture/cartoon relates to.
5	Your thoughts, feelings, and reactions to the text.

Annotating an article, or any passage, requires you to “close read.” In addition to underlining what you consider to be important parts, you should also write notes/commentary in the margins using this key.