

HOW THE EARTH WAS MADE

CLASSROOM GUIDE

Identification Terms

Using the dictionary at www.merriam-webster.com, an Internet resource such as History.com or an encyclopedia, students should define or explain the significance of the following terms:

Cambrian Explosion

Deep Time

Fisher Canyon

Pangaea

Paradoxides

Plate Tectonics

Radioactive Dating

Thermodynamics

Volcanism

Introduction

The Earth's 4.5-billion-year history has been marked by extreme environments and tremendous catastrophes. Yet this changing world of fire, ice, raging seas and toxic skies is the only known home for human life in our vast and distant universe. From the barren glaciers of Iceland and the breathtaking heights of the Matterhorn, to the rocky shores of Australia and the depths of the Hawaiian ocean, *How the Earth Was Made* takes an incredible journey around the globe.

This 90-minute documentary begins nearly 5 billion years ago with the creation of the Earth and narrates the major changes in its traumatic, though miraculous, history. Insightful commentators, including historians and scientists, describe the unique challenges the human species may face in both the near and distant future.

This program offers students powerful images and graphics to help them visualize how the Earth has transformed over time and how scientists predict the changes that may lie ahead. It is a great overview of the Earth's geological transformations.

Curriculum Links

How the Earth Was Made is appropriate for middle and high school students. It will connect with a variety of courses including Social Studies, Geography, Science and Technology and Earth Sciences.





Discussion Questions

1. What did the Earth look like almost 5 billion years ago?
2. How did 21-year-old Arthur Holmes revolutionize our understanding of the earth's history? How does radiometric dating work?
3. Where do scientists believe most of the Earth's water came from?
4. How did stromatolites change the planet?
5. How did fossils with intercontinental distribution provide the foundations for the discovery of plate tectonics?
6. What did the discovery of the Burgess Shale quarry reveal?
7. What is significant about the Okefenokee Swamp? What is a "modern analogue"? Do you agree with this description?
8. What incredible source of riches was created in the era of the dinosaurs? How is this precious rock produced?
9. What cataclysmic event occurred that wiped out nearly the entire ecosystem of the planet? What remarkable piece of evidence solved the mystery of this mass extinction?
10. How are glaciers formed? What would happen if global temperatures dropped just a few degrees?
11. What major climate challenge might we face in the future? What far greater problems could be caused by changes in plate tectonics?





Activities

1. **How the Earth Was Made** narrates a fascinating timeline of the Earth's history. In small groups, ask students to create projects on posters or in PowerPoint format, mapping out each important stage in the Earth's development. In their presentations, ask students to describe: (1) when each significant event occurred, (2) what the Earth looked like and (3) what forms of life existed during this era. On a shorter timeline students can include the major discoveries over the past 200 years that have helped unravel the mystery of the Earth's incredible past. Ask students to share these projects with the larger class or group.
2. The experts in this documentary explain many turning points in the Earth's history. Ask students to imagine they could interview one of the experts featured in this documentary. What questions would they ask about the Earth and its development? Working in small groups, ask students to create a list of interview questions. Then each student can take responsibility for answering one of these questions. Students can share their questions and answers with the larger class or group.
3. **How the Earth Was Made** helps explain many difficult concepts about the origins of the planet and its changes over time. Ask students to translate this information to a younger audience by creating short picture books for younger readers. These picture books could be presented in PowerPoint format, as written documents, on construction paper or as storyboards. They should be sure to include key concepts from this documentary and transmit the information in a clear and concise manner. Students can illustrate these projects with images or graphics they find online or at the library.
4. The Earth is a constantly evolving planet. **How the Earth Was Made** describes the Earth's highly volatile past, but also looks ahead at the significant changes we may expect in the future. Ask students to imagine that they are living 100, 1,000 or even 1 million years from now. In short essays of 2-3 pages, ask them to describe what the earth looks like, how the environment has changed and what unique challenges face the human species.

Books

Cattermole, Peter. *Building Planet Earth: Five Billion Years of Earth History*. (Cambridge University Press, 2000).

Erickson, Jon and Ernest H. Muller. *Plate Tectonics*. (Facts on File, 2001).

Lambert, David and Simon Adam. *Earth Science: Illustrated Guide to Science*. (Chelsea House Publishers, 2006).

Additional Websites

Read more on History.com:

www.History.com/shows/how-the-earth-was-made

Explore the Smithsonian National Museum of Natural History: www.mnh.si.edu

Learn about plate tectonics from the Smithsonian online exhibit:

www.mnh.si.edu/earth/text/4_1_1_1.html

Read about how diamonds are unearthed:

www.smithsonianmag.com/science-nature/10023256.html

