

Space: All About the Earth

DVD and VHS - Teacher's Guide



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Introduction

This guide is a supplement, designed for teachers to use when presenting this programme in a classroom. It also contains the programme summary and vocabulary.

Before Viewing: Research in learning suggests that it is important for the teacher to discover what the students know — or think they know — about a topic, at the start, so that their accurate conceptions can be validated and reinforced, and their misconceptions identified and corrected. Therefore, after reviewing the pre-viewing discussion questions provided for your class, create a “Everything We Know About...” list with them.

Preview key vocabulary words and have students raise additional questions they hope will be answered by this program. Most importantly, students should be told that as “planet earth detectives” they must listen closely, so that after viewing the program, they will be able to tell whether or not the facts/beliefs they put on their list were scientifically accurate.

After Viewing: After a brief discussion about the program, challenge your “planet earth detectives” to prove or disprove the accuracy of the facts they put on their “Everything We Know About...” list. Discuss what else they learned and use the follow-up questions and activities to inspire further discussion. Encourage students to research the topic further using the Internet and the key vocabulary words.

Pre-viewing Discussion

Before students generate their list of “Everything We Know About...” this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this programme:

1. What do all living things need to stay alive?
2. Why is there life on the Earth but not on the moon?
3. What is the Earth made of?
4. Why do we have day and night? Why do the seasons change?

After the class has completed their “Everything We Know About...” list, and before watching the programme, ask them what other questions they have that they hope will be answered during this program.

Ask students to listen closely to the DVD to check if everything on their class list is accurate and to hear if any of their own questions are answered.

Teacher's Guide - Programme

Space: All About the Earth

As the third planet from the sun, the Earth is capable of sustaining life, making it unique among the planets in our solar system.

Our planet can be compared to a “biosphere”— an enclosed environment that uses sunlight and an atmosphere containing oxygen, water and soil to sustain life.

To fully understand the Earth and what makes it special, one must examine our planet as a system — a collection of several parts that, when acting in unison, provide the right conditions for life to thrive.

Unlike the other planets in our solar system, the Earth's atmosphere has oxygen to breathe, good soil to grow food, temperatures that are not extremely hot or cold, and plenty of water — which every living thing needs.

Equally important are the concepts behind the Earth's rotation on its axis — resulting in day and night — and its orbit around the sun, which combines with the tilt of the Earth's axis to give us our seasons throughout the year.

Students will also learn about the layers of the atmosphere and the composition of the Earth itself, while being introduced to the satellites that scientists use to monitor and study the Earth.

Teacher's Guide - Vocabulary

Space: All About the Earth

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

planet — A large body of solid rock, liquid or gas that revolves around the sun.

moon — A solid body which orbits the Earth and is our closest neighbor in space. Other planets have moons, too.

solar system — The sun, the planets and their moons as well as other objects that orbit the sun.

orbit — The path of an object around another body; the moon orbits the Earth, as the Earth and the other planets orbit the sun.

year — The amount of time it takes for a planet to travel around the sun. One year on Earth is approximately 365 days long.

circumference — The distance around the middle or widest part of a sphere. The Earth's circumference is about 24,000 miles.

axis — An imaginary line that connects the North and South poles.

rotation — The spinning of a planet on its axis. On Earth, it takes a day, or 24 hours, for one rotation, which results in night and day.

atmosphere — The layers of gases that surround a planet.

oxygen — The gas in the Earth's atmosphere which all animals breathe in order to survive.

biosphere — An enclosed environment that has everything needed to sustain life (i.e. soil, moisture, air, sunlight, plants and animals).

chlorophyll — A pigment in all green plants, which aids in photosynthesis.

photosynthesis — The process in which green plants create nutrients from sunlight, air and water.

Biosphere 2 — A sealed structure in the Arizona desert containing several ecosystems scientists use to learn about how the Earth works.

troposphere — The first layer of the atmosphere that begins at the Earth's surface, in which we live and planes fly.

stratosphere — The second layer of the atmosphere that acts like a sun block, shielding us from the sun's harmful rays.

mesosphere — The third layer of the atmosphere that protects us from objects such as meteoroids.

thermosphere — The highest layer of the atmosphere, which goes all the way to space. This is where the space shuttle usually orbits.

meteoroid — Small pieces of rock and/or metal that speed through space. It is called a meteorite when it enters the Earth's atmosphere.

space shuttle — NASA's reusable space vehicles that lift off from Florida's Cape Canaveral powered by large rockets.

water vapour — The gas that water becomes during the process of evaporation.

evaporation — The process by which heated water changes from a liquid to a gas.

condensation — The process by which cooled water vapor changes from a gas to a liquid.

meteorologists — Scientists who observe and predict the weather.

satellites — Space objects orbiting another body. The moon is a satellite orbiting the Earth. There are man-made satellites too.

inner core — A hot ball of solid metals at the center of the Earth.

outer core — The layer surrounding the Earth's inner core, composed of very hot liquid metals and rock, called lava, which sometimes comes to the surface in volcanic eruptions.

mantle — The third layer of the Earth, made up of a very thick layer of rock.

crust — The Earth's surface layer, which is covered with rocks, clay, sand and soil. It is thin and is broken into pieces called plates, upon which we live.

Teacher's Guide - After viewing

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Follow-up Discussion

The most important part of this segment is to examine facts and beliefs generated by the class in their “Everything We Know About...” list. Students will retain their previous misconceptions — in preference to the new information — until they actively recognize and correct their own errors. It is important to lead students to the correct ideas while identifying and correcting any misconceptions from the class list. Encourage students to share the answers they got to the questions raised before viewing the program. Raising a thought-provoking question is a good way to assess the overall depth of understanding.

A couple of suggestions are listed below:

1. Ask the class to think about how the Earth would be different if it didn't have an atmosphere.
2. Throughout the program, the Earth is referred to as a system. Ask students what they think this means, and have the class compare and contrast the Earth with other systems they can think of.
3. Discuss the importance of the Earth's axis, focusing on its tilt. Have students discuss how life on Earth would be different if the Earth didn't tilt on its axis.
4. Have students discuss how life would change if the Earth and the sun moved either closer together or further apart.
5. Discuss why scientists are building and studying biospheres.

Further suggestions for “after viewing” - next page.

Teacher's Guide - After viewing

Space: All About the Earth

Focus Questions

You may wish to ask your class the following questions to assess their comprehension of key points presented in the program:

1. Does the Earth move or stand still?
2. What is the Earth made of?
3. Why is there life on Earth?
4. What makes Earth the only planet where we know life exists?

Other questions you can ask your class to assess comprehension of additional points presented in this show are as follows:

1. How long does it take for the Earth to travel around the sun?
2. What makes day and night occur?
3. What is the Earth's axis? How is the tilt of the axis related to the four seasons?
4. What is the name of the process by which plants make food from water, sunlight and air?
5. What happens in each of the four layers of our atmosphere?
6. How much of the Earth is covered by water?
7. What happens when water evaporates? What happens when water condenses? How do these conditions relate to the biosphere?
8. What does a meteorologist do?
9. What is a satellite?
10. Name each layer of the Earth and describe its characteristics.
11. Why is the sun considered the most important part of the Earth's system?

Follow-up Activities

- Divide the class into groups and have students research the different levels of the atmosphere and layers of the Earth. Have students work together to create a visual world (diorama, poster, etc.) of what they learned.
- Engage students in creative problem solving, writing illustrated stories about what life would be like if the physical characteristics of the Earth were to change as a result of a change in the Earth's orbit, the loss of the Earth's atmosphere or an increase or decrease in the rate of rotation of the planet.
- Create a 3-D model that illustrates why we have day and night, or why the seasons change.
- Have students select one new fact they learned from the program and prepare an illustrated poster explaining it.
- Create promotional pamphlets and posters advertising the beauty of the Earth to fictionalized visitors from other planets.
- Have students stretch their imaginations by composing a journal featuring entries written by a space alien visiting from another planet, capturing the alien's observations on the Earth and the plants and animals that inhabit it.