BrishLab

ES11A The Atmosphere

Name:

Date: / / Period Room

Did you know?

1 From the Greek [atmos] "vapor" and [sphaira] "sphere," we get the word atmosphere - a thin blanket of gases and tiny particles that together are called air. (See Fig. 1)

2 There is life on Earth because the balance of gases, temperature, and water in the air is 'just right' for us. Like everything else, the air stays on the planet because of gravity.

3 If the Earth were the size of a basketball, the atmosphere would only be as thick as a single piece of paper! Without air, the Earth would just be another lifeless rock orbiting the Sun.

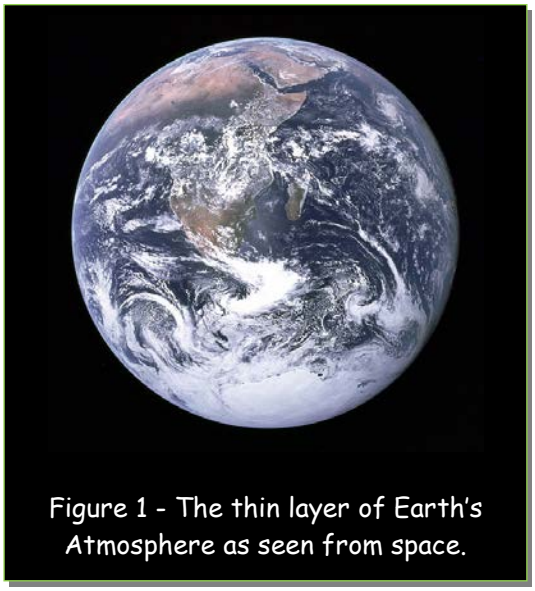

Figure 1 - The thin layer of Earth's Atmosphere as seen from space.

So, why is it important to me?

4 Without the atmosphere, planet Earth would be much more like the moon with no life, no water - generally a rough place to live!

5 Air surrounds us. We are most aware of air when it moves, creating wind. Like all gases, air takes up space. The gases that make up our air are packed closer together near the Earth's surface than at higher elevations. Earth's gravity is pulling the air down on everything.

What are the big ideas I need to know?

6 The atmosphere keeps Earth's temperature stable by trapping energy – just like a greenhouse. Without our atmosphere, Earth's temperature would be somewhere between +250°F in the sun to -250°F in the shade – just like on the moon!

7 Even though you can't see it, air has mass, takes up space and can transmit energy (See Fig. 2). The weight of the air is about 15 pounds on every square inch of area on the ground. Hot air that fills a balloon makes it rise. We hear the birds chirping because the air molecules hit against each other and transmit sound energy.

Figure 2 - A hot air balloon rising in the atmosphere.

ES11A The Atmosphere

Name:
Date: / / Period Room

8 Sound waves are among the types of energy that can travel through the atmosphere. Earth would be as silent as outer space. We could not hear a single sound. Of course, no insect, bird or airplane would be able to fly since there would be no atmosphere to hold it up!

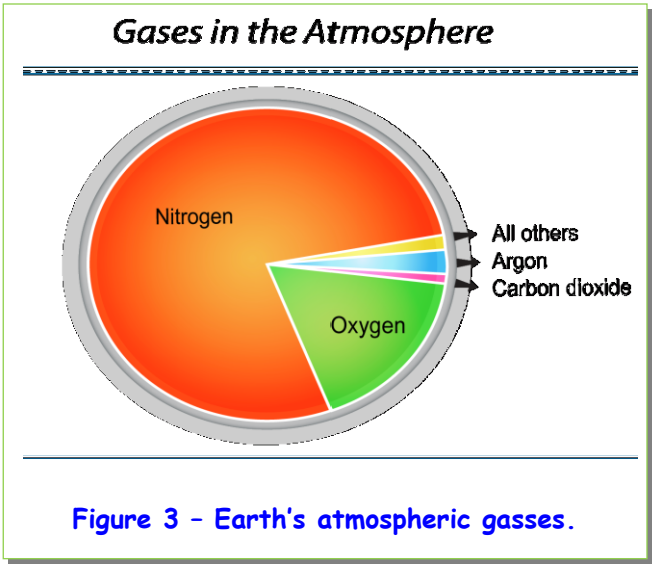

Figure 3 – Earth's atmospheric gasses.

9 The atmosphere is a crucial part of the water cycle. Water falls from the atmosphere as some kind of precipitation – rain, snow, sleet, or hail onto the land. The water flows into the soil, then into the oceans and evaporates back into the atmosphere to do it again and again.

10 Ozone is a molecule composed of three oxygen atoms (O_3). After a lightning storm, you can sometimes smell the metallic odor of ozone. In the upper atmosphere, ozone absorbs high energy ultraviolet (UV) radiation coming from the sun. This protects living things on Earth's surface from the sun's most harmful rays.

11 Atmospheric gases are important for life on Earth. Without the atmosphere, Earth would be lifeless. Nitrogen (N_2) makes up 78% - over three quarters of the air we breathe (see Fig. 3). Oxygen adds almost 21% Together; these two gasses make up about 99% of the atmosphere (See Fig 4). While carbon dioxide (CO_2) and oxygen (O_2) are the most important gases for living organisms, they are NOT the highest percentage (see Fig 4).

Symbol	Gas	Amount
(N_2)	Nitrogen	78.084 %
(O_2)	Oxygen	20.946 %
Top Two Gasses Make Up		**99.030 %**
(Ar)	Argon	0.934 %
(CO_2)	Carbon Dioxide	0.0387 %
(O_3)	Ozone	0.000004 %

Figure 4 – Major gasses of the Atmosphere

What about?

12 Atmospheres of other planets are totally different! Mercury is too hot to have any at all. Venus has an atmosphere that is made of sulfuric acid. Mars has storms that are planet wide. Jupiter has a storm the size of the Earth and Saturn is made entirely of gas – it could float in water! Go and explore a planet yourself; it certainly will be different from ours!