

EARTH SYSTEMS SCIENCE

GRADES K-4

LESSON 1: THE BLUE PLANET

The Earth can be considered a family of four major components; a biosphere, atmosphere, hydrosphere, and geosphere. Together, these interacting and all-encompassing subdivisions constitute the structure and dynamics of the entire Earth. These systems do not, and can not, stand alone. This Module demonstrates, at every grade level, the concept that one system depends on every other for molding the Earth into the world we know. For example, the biosphere could not efficiently prosper as is without gas exchange from the atmosphere, liquid water from the hydrosphere, and food and other materials provided by the geosphere. Similarly, the other systems are significantly affected by the biosphere in one way or another. This Module uses Earth's systems to provide the ultimate lesson in teamwork.



LESSON 1: THE BLUE PLANET

LESSON AT A GLANCE

LESSON OVERVIEW

In this lesson, students use NASA photographs and hands-on activities to compare the amounts of land and water on our planet. They discover that the world has five oceans, and that they cover 70% of Earth's surface. Students learn how this affects the entire Earth system.

LESSON DURATION

Two 45-minute classes



CORE EDUCATION STANDARDS

National Science Education Standards

Standard D1: Soils have properties of color and texture, capacity to retain water, and ability to support the growth of many kinds of plants, including those in our food supply.



RELATED EDUCATION STANDARDS

National Science Education Standards

Standard F3: Some resources are basic materials, such as air, water, and soil; some are produced from basic resources, such as food, fuel, and building materials; and some resources are nonmaterial, such as quiet places, beauty, security, and safety.



ESSENTIAL QUESTIONS

- ▶ Why is the Earth described as the “blue planet?”



CONCEPTS

Students will learn the following concepts:

- ▶ Two-thirds of Earth’s surface is covered by water, the remaining one-third is covered by land.
- ▶ The entire Earth is surrounded by our atmosphere.



OBJECTIVES

Students will be able to do the following:

- ▶ Compare the amount of water to the amount of land on our planet

SCIENCE OVERVIEW

People take vacations all over the world to experience different landscapes, climates, and cultures. If you were to explore a section of land the size of the state of Delaware (5,294 km²) every day, it would take you 65 years to see every kilometer of land on Earth. There is a lot of land to explore! Have you ever thought about taking a vacation to the middle of the ocean? Just to see the oceans' surfaces, you would have to explore about two and a half times faster than you explored the land to fit it all in! Even though most vacations are to places on land, the Earth is covered mostly in water. In fact, about 70% of the surface of the Earth is water; over 362 million square kilometers.

Earth is truly a water planet. It is the only body in our Solar System with the unique feature of oceans. In order for liquid water to exist, certain temperature requirements must be met. If the area is too hot, water will evaporate and become steam. If a region is too cold, the water will freeze into ice. Earth is situated within the Solar System at just the right distance from the Sun for liquid water to exist on its surface.

Most of the Earth's water (97.24 %) is found in Earth's five oceans. Icecaps and glaciers hold 2.14% of the water, with the remaining 0.62% consisting of ground water, freshwater lakes, inland seas, soil moisture, water vapor, and rivers (in descending order). Of these resources, the only types immediately useable for human consumption are ground water, freshwater lakes, and rivers: 0.3% of the Earth's water.

<i>Water Resource</i>	<i>Water volume (km³)</i>	<i>Percent of total water</i>
Oceans	1,320,000,000	97.24%
Icecaps, Glaciers	29,000,000	2.14%
Ground water	8,000,000	0.61%
Freshwater lakes	125,000	0.009%
Inland seas	104,000	0.008%
Soil moisture	67,000	0.005%
Atmosphere	13,000	0.001%
Rivers	1,000	0.0001%

THE HYDROLOGIC CYCLE

A pan of water on a window sill will evaporate. Water molecules jump around in the liquid and eventually some of the ones at the surface will pop out, if they have enough thermal energy. If provided plenty of thermal energy and fresh dry air, eventually all the water will be gone. So why do the oceans not dry up? They must be replenished somehow, and in fact, they are replenished by rain water. The rain water comes from ocean water that has evaporated and formed clouds. The hydro-

logic cycle on Earth, the exchange of water in every form between the Earth's systems, is part of what makes Earth so unique.

The Earth is made up of four interdependent systems: hydrosphere (water), atmosphere (air), geosphere (land), and biosphere (life). The hydrologic cycle is an example of how these four systems interact and depend on one another. It begins with the Sun and wind (atmosphere) evaporating water from the oceans (hydrosphere). The water vapor may cool and mix with air to become clouds. Clouds create precipitation, 77% of which falls directly back over the oceans. Rain water that falls on land (geosphere) flows into rivers which empty into the oceans. This cycle has been occurring for billions of years.

The biosphere on Earth could not have evolved as it has without the hydrologic cycle acting as it does. The hydrosphere is home to most of the life on Earth, and the rest rely on it for nourishment. Since over 97% of the Earth's water is in the oceans, this is what we focus on in this lesson.

THE EARTH'S OCEANS

In reality, Earth has only one ocean that is divided into five regions by continents and human definitions. The oceans flow into one another continuously. The borders between them are fictitious, similar to divisions of countries on the land. The placements and relations of the oceans and continents have been changing slowly ever since Earth was very young, and will continue to change in the future. As the surface of the Earth crumples and stretches, the divisions, locations, and shapes of the oceans, seas, and continents will be modified, as well.

The Pacific Ocean is located between Asia, Australia, North America, and South America. The largest of the five oceans, it covers about 28% of the global surface. The Pacific is the deepest ocean (with an average depth of 4,188 m or 13,740 ft), and with such a vast volume, it is easy to imagine the number of living creatures who call it home. It harbors many endangered marine species, and in 1996, provided over 60% of the world's fish catch.

Between Africa, Europe, and North and South America lies the Atlantic Ocean. It is second in size to the Pacific, but has less than half its area, and its deepest point lies almost 2,400 m (7,874 ft) above the deepest point in the Pacific. The most noticeable feature of this ocean is the ridge that runs its entire length from north to south. Most of this Mid-Atlantic ridge lies below sea level, but protrudes above the surface at Iceland, the Azores, Ascension Island, and Tristan de Cunha.

Not much smaller than the Atlantic Ocean is the Indian Ocean, located

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between Asia, Australia, and Africa. The Middle East, Africa, and East Asia are connected with Europe and the Americas via shipping routes in this ocean. These access waterways include the Suez Canal in Egypt and the Strait of Malacca between Indonesia and Malaysia. Approximately 40% of the world's offshore oil production is from the Indian Ocean.

The Arctic Ocean lies between Europe, Asia, and North America, mostly north of the Arctic Circle. Although the smallest of the oceans, it is almost one and a half times the area of the United States. The Arctic has harshly cold winters with continuous night, and damp and foggy summers with continuous daylight. The winters make it almost impossible to use the waterways for shipping, and even in the summer there is not much travel by air, ocean, or land.

The decision to define a fifth ocean was made in the spring of 2000 by the International Hydrographic Organization. The Southern Ocean extends from the coast of Antarctica north to the 60° south latitude, including the southern parts of the Pacific, Atlantic, and Indian Oceans. It is the fourth largest of the world's five oceans, bigger than the Arctic Ocean. Sea temperatures range from -2° C to 10° C. Winds here are on average the strongest of any on Earth. Despite its harsh environment, the Southern Ocean is home to many sea creatures such as squid, whales, and seals.

THE CONTINENTS

Earth's oceans are delineated by large land masses; these are the seven continents. Like the oceans, the continents have changed shape and location over geologic time scales. The continents of today are broken up from one continent that existed over 225 million years ago. The modern continents encompass many bodies of water including seas, lakes, ponds, streams, and rivers.

The largest continent in both size and population is Asia. This continent is home to about three-fifths of the world's people (3.7 billion), and covers almost one-third of the total land area on Earth (43.7 million km²). Its borders include the Pacific Ocean in the east, and Europe and Africa in the west. Both the highest point (Mount Everest at 8,850 m or 27,035 ft) and the lowest point (Marianas Trench at 11,033 m or 36,198 ft) on Earth are in Asia. It holds some of the world's longest rivers, including the Yangtze River, which winds through China for almost 6,400 km.

Africa is second to Asia in both size and population. Its 30 million km² is an immense plateau, and includes terrain of many extremes. The

largest desert in the world, the Sahara, is nearly the size of the entire United States. Africa also encompasses the Nile River, the world's longest river, flowing through the northern part of the continent for 6,670 km.

North America covers 24 million km², making it the third largest continent, but fourth in population, after Asia, Africa, and Europe. This continent is bordered almost completely by water, with the Arctic, Atlantic, and Pacific Oceans bordering its three sides. A narrow strip of land (Central America) connects it to South America. The five Great Lakes exist in the middle of the continent, holding one-fifth of the world's fresh surface water (95% of the United States supply).

The fourth largest continent in area, 17.6 million km², and fifth in population, is South America, which, like North America, is almost completely surrounded by water. The Pacific and Atlantic Oceans border much of South America, and the Drake Passage separates it from Antarctica in the south. The world's largest tropical rain forest exists in the basin of the Amazon River, the second longest river on Earth at 6,447 km.

Bordered by the Southern Ocean, Antarctica would be last on the list of continent sizes if it were not for its icecap. The cap, which averages 2,164 m thick, makes this southern-most continent fifth in size with 14 million km². The cold climate makes it nearly impossible for water to exist there in liquid form. Ice and snow cover 98% of the continent.

One-eighth of the Earth's population lives in Europe, making it third in population, but sixth in area (10 million km²). Europe is part of the same land mass as Asia, which is why they are sometimes referred to collectively as Eurasia. The world's largest lake, or land-locked body of water, is the Caspian Sea at 371,000 km², and is one feature that separates Europe from Asia.

The smallest continent by area and sixth in population is Australia, the only country that includes a whole continent. Australia lies between the Indian and Pacific Oceans, and covers an area of 8 million km².

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WARM-UP & PRE-ASSESSMENT



TEACHER MATERIALS

- ▶ Globe

PREPARATION & PROCEDURES

1. Ask students if any of them have a nickname that has special meaning. Allow students to share their nicknames with the class. Tell students that the Earth also has a special nickname that has meaning.
2. Show students a globe. Ask them if anyone has seen an object like this before. If they have, ask them if they know what it is called. (*Desired answer: globe*) Ask students to tell you one thing that they know about the globe.
3. Tell students that the globe shows where the land and water is on the Earth. Ask students how they could tell where the water is. (*Desired answer: if you are using a standard globe the water will be represented in blue*) Then ask students how they could tell where the land is. (*Desired answer: it is the other colors*) Point to a spot on the globe and ask students if your finger is on land or water.
4. Tell the students that there is another part of the Earth, and it is all around us. Ask them if they know what it is, you can give your students a hint by holding your breath. (*Desired answer: air*) Tell them that the air is called the atmosphere, ask the students to repeat it with you.
5. Ask the students if you can see the atmosphere in the classroom. (*Desired answer: no*) Ask them if they could see the atmosphere outside. (*Desired answer: yes, as clouds*)

TEACHING TIP

For older or more advanced students, you can ask students if the land on the Earth is really the colors that are shown on the globe. Ask students why the different colors might be helpful on a globe.

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ACTIVITY 1: EARTH'S NICKNAME

In this activity, students look at the Earth from space. They observe the Earth as a whole, and compare the amounts of land and water.



TEACHER MATERIALS

- Overhead Projector
- Color overhead transparencies of Figures 1-4

STUDENT MATERIALS (PER STUDENT)

- Student Worksheet 1
- Blue and brown crayon (one set per pair of students)

PREPARATION & PROCEDURES

1. Make color overhead transparencies of Figures 1-4.
2. Dim the lights and ask the students to close their eyes. Read the following description to the class: "Suddenly from behind the rim of the Moon . . . there emerges a sparkling blue and white jewel, a light, delicate blue sphere laced with slowly swirling veils of white, rising like a small pearl in a thick sea of black mystery." Stop at this point and ask students what they think the author is talking about. Take suggestions before reading the final sentence. "It takes more than a moment to fully realize this is Earth... home."
3. Ask students where they think the author might have been in order to see the Earth this way. (*Desired answer: in space or on the Moon*) Ask students who goes into space or to the Moon. (*Desired answer: astronauts*) Tell students that the comments were from astronaut Edgar Mitchell, who saw Earth from the Moon in 1971.
4. Ask students if they would like to see a picture of the Earth taken from the Moon. Show students Figure 1 on the overhead projector and ask the following questions:
 - What is Astronaut Mitchell seeing that is a "delicate blue?" (*Desired answer: Earth's oceans*)
 - What are "swirling veils of white?" (*Desired answer: clouds*)
 - What is the "thick sea of black mystery?" (*Desired answer: space appears black because it cannot reflect any light from the Sun*)
 - Why can't we see the lower half of the Earth from space? (*Desired answer: it is the nighttime side of Earth*)
5. Show students Figure 2. Ask them if they can recognize the United States. Label the United States. Ask older students to identify the other continents in the picture. Label the continents.

TEACHING TIP

Ask students if they, or anyone in their family are from a different continent. Have students describe some of the unique features of that location. You can use the Science Overview to share some interesting facts with your students.

TEACHING TIP

Ask students if the atmosphere is still present in Figures 2 and 3. Explain that Figures 2 and 3 were created from many different images. Clouds are always present in the atmosphere, and it would be impossible to get one photograph that showed no clouds.

6. Have the students identify the oceans in the picture. (*Desired answer: Atlantic, Pacific, Arctic, and Southern*). Label the oceans. Display Figure 3 and ask older students to label the oceans and continents. (Oceans: Indian, Pacific, Atlantic, Arctic, Southern. Continents: Asia, Europe, Africa, Australia, and a sliver of Antarctica)

7. Ask students, based on these pictures, do they believe that the Earth is covered with more land or more water. (*Desired answer: water*) Ask students if they can use that information to come up with a nickname for the Earth. Take some suggestions before telling the students that the Earth’s nickname is the “blue planet.” Ask students why they think the Earth is sometimes called this. (*Desired answer: from space, Earth looks blue because so much of its surface is water. Oceans cover about two-thirds, or most, of Earth’s surface, and more is covered by large seas and lakes.*)

8. Using blue and brown crayons, have students draw a picture of Earth on Student Worksheet 1 as Astronaut Mitchell saw it.

REFLECTION & DISCUSSION

1. Discuss with students why it is helpful to look at the entire Earth in one picture. Have students share the pictures they drew with the rest of the class and ask them the following questions:

▮ What parts of the Earth did you include in your picture?
(*Desired answer: land, water, and atmosphere*)

▮ Which Earth material is not always seen? How did you represent this in your picture? (*Desired answer: the air, it can be shown as clouds*)

▮ Ask students why the Earth is called the “blue planet.” (*Desired answer: it appears blue from space because of all the water on its surface*)

2. Have students read the descriptions they wrote of the Earth. Have other students in the class try to figure out when they are describing the land, water, and atmosphere.

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ASSESSMENT CRITERIA FOR ACTIVITY 1

4 Points

- Student's picture and description of Earth displayed a deep understanding of information learned in the activity.
- Student accurately described the physical characteristics of their planet based on the images provided, and used those characteristics to develop an appropriate nickname.
- Student presented information in logical, interesting sequence, which audience can follow.
- Student correctly responded to all questions asked throughout the activity.

3 Points

- Student's picture and description of Earth displayed an understanding of information learned in the activity.
- Student accurately described some physical characteristics of their planet based on the images provided, and used those characteristics to develop a nickname.
- Student presented information in logical sequence, which audience can follow.
- Student correctly responded to most questions asked throughout the activity.

2 Points

- Student's picture and description of Earth displayed an understanding of some of the major concepts presented in the activity.
- Student accurately described a few physical characteristics of their planet based on the images provided, and used those characteristics to develop an appropriate nickname.
- Student presented information in a difficult to follow sequence.
- Student correctly responded to a few questions asked throughout the activity.

1 Point

- Student's picture and description of Earth displayed an understanding of a few of the major concepts presented in the activity.
- Student attempted to describe the physical characteristics of their planet based on the images provided, but did not use those characteristics to develop an appropriate nickname.
- Student presented information with no logical sequence.
- Student correctly responded to very few questions asked throughout the activity.

0 Points

- No work is completed.

TRANSFER OF KNOWLEDGE

In order for students to apply what they have learned, have them compare the Earth to other planets. Students can record their answers on Student Worksheet 1.

1. Show students Figure 4 on the overhead projector. It contains images of the other planets in the Solar System from NASA's photojournal web site: <http://www.photojournal.jpl.nasa.gov>
2. Have students choose a planet and imagine that they are explorers that are going to visit that planet for the first time. Have students come up with a nickname for their planet, like "blue planet."
3. Let students use their creativity to write a description of their planet as if they are the first person to see the planet. Students should compare their planet to Earth.

EXTENSIONS

- Have students research who discovered each of these planets for the first time.
- Have students create a three-dimensional model of the planet they described and created a nickname for in Student Worksheet 1.

PLACING THE ACTIVITY WITHIN THE LESSON

Discuss with students that, by looking at the different pictures, they can see that the Earth is made up of land, water, and the atmosphere. Show the students Figure 1 again. As a class, brainstorm experiments you could create to determine whether there is more land or water on Earth. How would you determine the amount of cloud cover?

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ACTIVITY 2: GLOBE TOSS

In this activity, students play a globe toss game to collect data, and use probability to determine if the surface of the Earth is covered with more land or water.



TEACHER MATERIALS

- A globe removed from its frame or an inflatable globe
- An overhead transparency of the grade appropriate Globe Toss Game Tally Sheet, in the back of the lesson
- Plastic wrap
- Chalkboard or large piece of paper to make a graph
- Permanent Marker

STUDENT MATERIALS (PER STUDENT)

- One post-it note per student
- Blue and brown crayon (one set per pair of students)
- Marker for the tally student

PREPARATION & PROCEDURES

1. Select the appropriate tally sheet from the back of the lesson and create an overhead transparency of it.
2. Have students sit or stand in a circle. Select one student to tally the results of the game.
3. Show students a globe and ask them to identify the parts of the Earth that they can see. (*Desired answer: land and water*) Ask students what part of the Earth is not represented on the globe, it is the part that is all around us right now. (*Desired answer: the air or atmosphere*)
4. Cover the entire globe with the plastic wrap. Using a marker, draw some clouds on the plastic wrap. Ask students, what does the plastic wrap covering the globe represent? (*Desired answer: the atmosphere*) If students need a hint, draw their attention to the clouds. Place your thumb on a random spot on the globe. Ask the students if your thumb is on land or water. Ask the students what else it is on. (*Desired answer: atmosphere*)

LESSON ADAPTATION

Talented and Gifted: Have students create all of the graph components, including the graph title, axis titles, and scale.

5. Explain the following directions for the Globe Toss game to the students:

The globe is tossed or rolled to a student across the circle. The student receiving the globe will look at his/her right thumb to see where it has landed: on water or land. In addition, students should note if that location is covered by the atmosphere. (Note: the atmosphere covers the entire Earth, just like the plastic wrap, even where clouds are not present) Students should give the information to the tally person, who should record it on the tally sheet.

6. Ask students to predict whether the final tally of the game will have more points for the land or water. (For older students, have them calculate percentages and compare to actual percentages of land and water.)
7. Begin the Globe Toss game. The student tallying the results will record the thumb landings on water, land, and atmosphere on the grade appropriate tally sheet. Make sure each student gets to toss the globe at least once.

8. When you end the game, use a chalkboard or a large piece of paper, and make a bar graph of the tally sheet as a class. Give each student a post-it note. Have them label it water or land, depending on where their thumb landed during the globe toss game. Create the skeleton of the graph on the board. Ask students to put their post-it notes in the correct column on the graph.

CURRICULUM CONNECTIONS

Mathematics: Review with students the difference between a bar graph, line graph, and pie chart.

REFLECTION & DISCUSSION

Ask students, based on the information gained from the activity, what covers most of the surface of the Earth?

(Desired answer: water covers two-thirds or most of the surface) Ask students what covers the rest of Earth's surface. *(Desired answer: land covers one-third or the rest of the surface)* Ask students where the atmosphere is. *(Desired answer: it is everywhere, it can be seen as clouds)*

TRANSFER OF KNOWLEDGE

Have students go back and look at the pictures they drew of the Earth in Activity 1. After graphing the amount of water versus land on Earth, have students evaluate the accuracy of their drawings. Would they make any changes? Why or why not? Have students re-draw the Earth to show the correct ratio of land to water. *(Desired answer: students should determine if they have too much or too little water. Students should also note if they represented the atmosphere with clouds.)*

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ASSESSMENT CRITERIA FOR ACTIVITY 2

4 Points

- Student actively participated in the Globe Toss game.
- Student correctly participated in completing the bar graph for the tally sheet.
- Student demonstrated a deep understanding by answering all class questions with explanations and elaboration.
- Student accurately evaluated and corrected their drawing of the Earth.

3 Points

- Student participated in the Globe Toss game.
- Student correctly participated in completing the bar graph for the tally sheet.
- Student demonstrated an understanding of the major concepts by answering class questions with explanations.
- Student accurately evaluated and corrected their drawing of the Earth.

2 Points

- Student participated in the Globe Toss game with prompting.
- Student participated in completing the bar graph for the tally sheet, but needed some prompting to do so correctly.
- Student demonstrated an understanding of some of the major concepts by answering class questions.
- Student attempted to evaluate and correct their drawing of the Earth.

1 Point

- Student did not participate in the Globe Toss game.
- Student participated in completing the bar graph for the tally sheet, but did so incorrectly.
- Student's answers to class questions demonstrated limited knowledge of major concepts.
- Student incorrectly evaluated and modified their drawing of the Earth.

0 Points

- No work completed.

EXTENSIONS

The Earth is two-thirds water. Have students research how humans use water on Earth, and what living things rely on it.

PLACING THE ACTIVITY WITHIN THE LESSON

Discuss with students how they were able to collect data to determine that the Earth has more water on its surface than land. Ask students to share how they used this information to go back and improve their illustrations of the Earth.

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LESSON WRAP-UP

TRANSFER OF KNOWLEDGE FOR THE LESSON

In order to assess students understanding, have them apply what they have learned to answer the question below.

Draw a pie chart on the board and ask students to complete the pie chart to show how much land and water are on the Earth. Use a blue crayon to show water and a brown crayon to show land. Ask students to label their chart.



ASSESSMENT CRITERIA FOR THE LESSON

4 Points

- Student colored in two sections of the pie chart blue to represent water and one section of the pie chart brown to represent land.
- Students work was neat and labeled.

3 Points

- Student represented more water than land.
- Students work was neat and labeled.

2 Points

- Student represented water and land.
- Students work was readable and labeled.

1 Point

- Student attempted to complete the pie chart.
- Students work was readable.

0 Points

- No work was completed.

LESSON CLOSURE

In this lesson, students familiarized themselves with the different parts of the Earth: land, water, and atmosphere. Students experimented to determine that two-thirds of its surface is covered by water and the remaining one-third is covered by land. Students also realized that the atmosphere is all around the Earth even though they cannot always see it. Discuss with students how these different components make the Earth a unique place in the Solar System, one that can support life.

EXTENSIONS FOR THE LESSON

Have students research other planets in the Solar System. How are they similar to Earth? How are they different?

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INTERNET RESOURCES & REFERENCES

Student-Friendly Web Sites:

How much water is there on (and in) the Earth?

ga.water.usgs.gov/edu/earthhowmuch.html

How Stuff Works

www.howstuffworks.com/question157.htm

NASA Photojournal

www.photojournal.jpl.nasa.gov

Teacher-Oriented Web Sites:

NASA's Photojournal

photojournal.jpl.nasa.gov

National Science Education Standards

www.nap.edu/readingroom/books/nse/html/

Water Science for Schools

ga.usgs.gov/edu/mearth.html

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Internet Resources & References

FIGURE 1: EARTHRISE

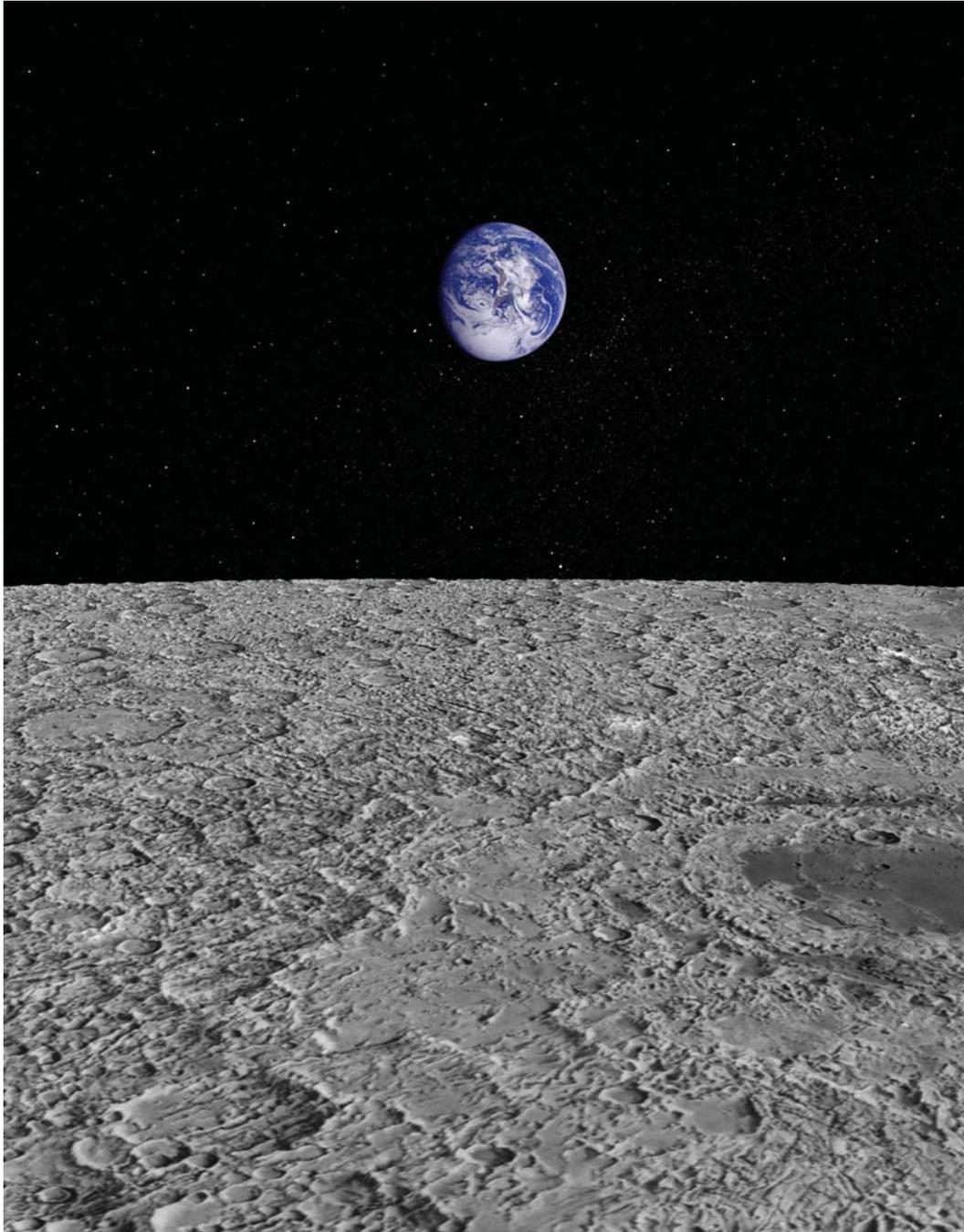
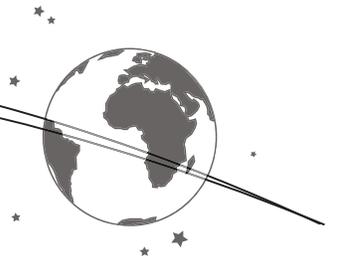
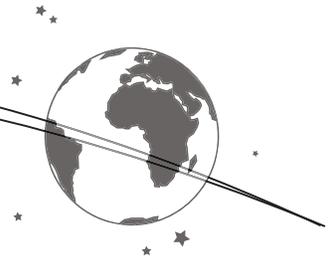


FIGURE 2: EARTH WITHOUT SHADOWS OR CLOUDS



Source: <http://www.fourmilab.ch/cgi-bin/uncgi/Earth>

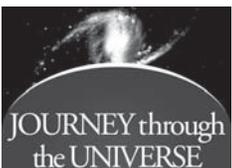
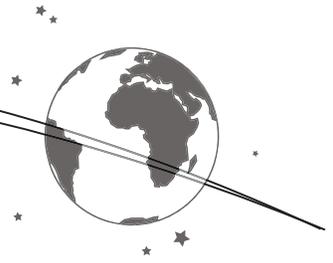


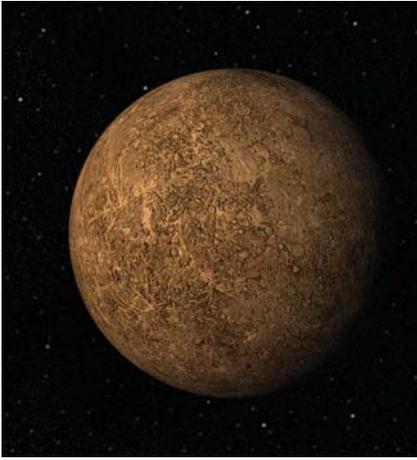
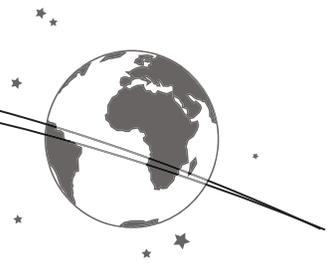
FIGURE 3: EARTH WITHOUT SHADOWS OR CLOUDS



Source: <http://www.fourmilab.ch/cgi-bin/uncgi/Earth>



FIGURE 4: PLANETS IN THE SOLAR SYSTEM



MERCURY



VENUS



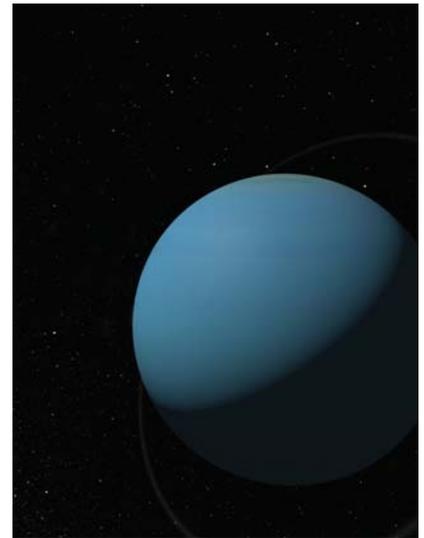
MARS



JUPITER



SATURN



URANUS



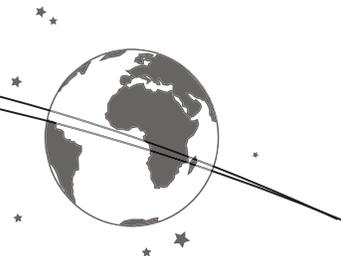
NEPTUNE



PLUTO



GLOBE TOSS GAME TALLY SHEET K-2

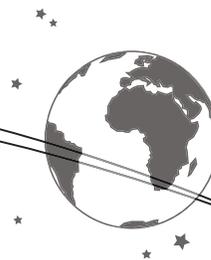


NAME _____ DATE _____

	Water	Land	Is the atmosphere over this spot?
Toss 1			
Toss 2			
Toss 3			
Toss 4			
Toss 5			
Toss 6			
Toss 7			
Toss 8			
Toss 9			
Toss 10			
Toss 11			
Toss 12			
Toss 13			
Toss 14			
Toss 15			
Toss 16			
Toss 17			
Toss 18			
Toss 19			
Toss 20			
Total			



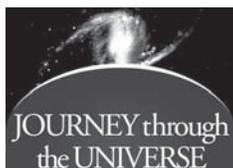
GLOBE TOSS GAME TALLY SHEET 3-4



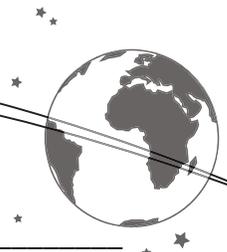
NAME _____ DATE _____

	Water	Is there atmosphere over this spot? Yes or no.
Atlantic Ocean		
Arctic Ocean		
Indian Ocean		
Pacific Ocean		
Southern Ocean		
Other		
Total		

	Land	Is there atmosphere over this spot? Yes or no.
Africa		
Antarctica		
Asia		
Australia		
Europe		
North America		
South America		
Total		



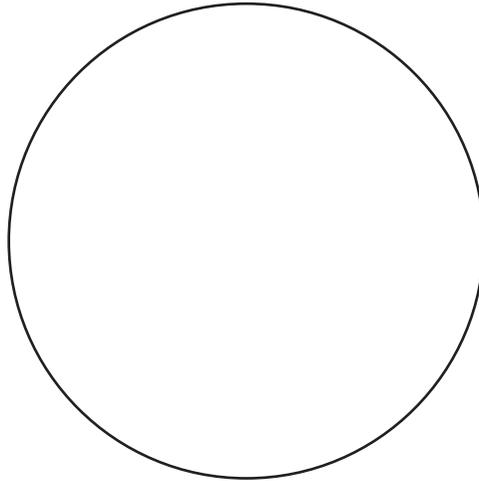
STUDENT WORKSHEET 1: THE BLUE PLANET



NAME _____

DATE _____

Draw a picture of the Earth as Astronaut Edgar Mitchell saw it.



How do other planets compare to the Earth?

Choose a planet from the pictures your teacher shows you.
Imagine that you are an explorer going to visit that planet for the first time!

Planet Name: _____ Nickname your planet: _____

Write a description of your planet as if you are the first person to see it.

