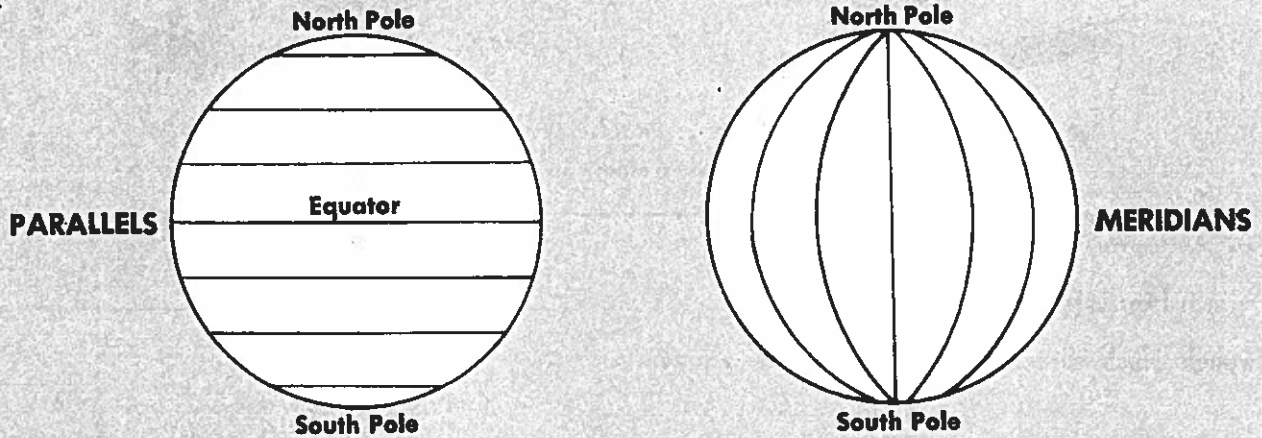


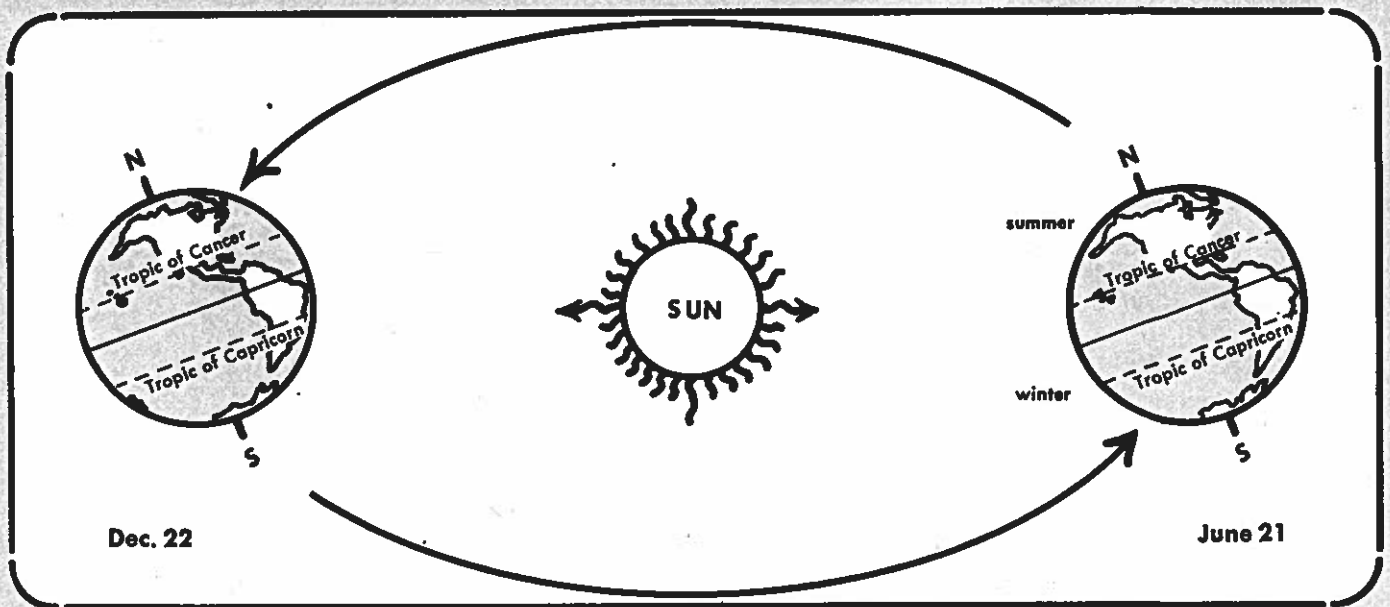
Latitude and longitude

The globe has **other imaginary lines** besides the equator. Lines circle the globe at equal distances from the equator. They are **parallel** to the equator and are called **lines of latitude**. They are used to measure **distance** on the earth **north** and **south** of the equator.

There are also lines that make half circles around the globe and meet at the North Pole and South Pole. These are called **meridians** or **lines of longitude**. They are used to measure **distance east** and **west** on the earth.



The **Tropic of Cancer** and the **Tropic of Capricorn** are two important lines of **latitude**. The bodies of land and water between these two latitudes are called the **Tropics**. The drawings below show you why the tropics are **warm** all year. The drawings also show you that when it is **summer** in the **Northern Hemisphere** it is **winter** in the **Southern Hemisphere**. Can you **explain** why this is so?

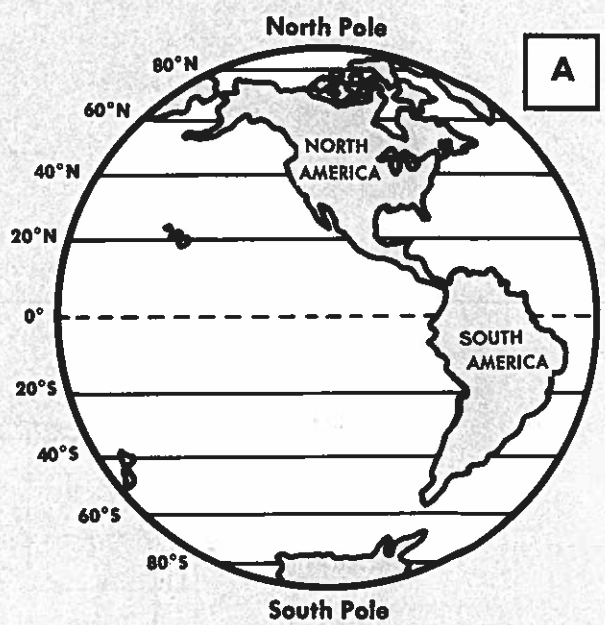


Study **Drawing A** below. It shows that **lines of latitude** measure distance in **degrees north** and **south** of the **equator**. The equator is at **0 degrees (0°) latitude**. Distances north of the equator are measured to **90° north latitude** at the North

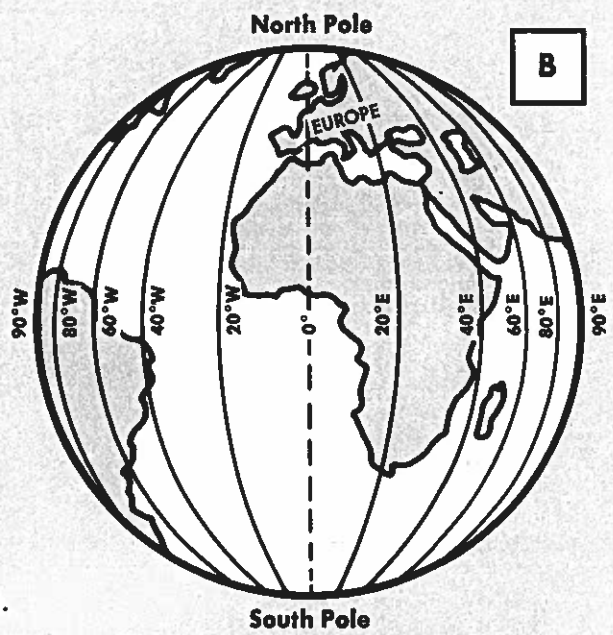
Pole. Distances south of the equator are measured to **90° south latitude** at the South Pole. If you live in Philadelphia, you are at about **40° north latitude (40° N)**. If you go to Rio de Janeiro, Brazil, you are at about **20° south latitude (20° S)**.

Use **Drawing A** and write **T** next to each sentence below that is **true**. Write **F** next to each one that is **false**.

- _____ 1. The farthest point north on earth is **90° N**.
- _____ 2. **60° S** is closer to the equator than to the South Pole.
- _____ 3. **40° N** and **40° S** are equal distances from the equator.



Study **Drawing B** at the right. It shows how the **meridians** go half way around the globe and meet at the Poles. These lines measure **longitude** or distances **east** and **west** from **0° longitude**, or the **Prime Meridian**. Meridians are numbered from **0°** to **180°** east and west. The meridian at **180°** longitude is exactly half way around the earth from **0°** longitude. In **Drawing B**, the coast of South America is about **40° west** of **0°** longitude (**40° W**). Central Africa is about **20° east** of **0°** longitude (**20° E**).



Use **Drawing B** and write **T** next to each sentence below that is **true**. Write **F** next to each sentence that is **false**.

- _____ 1. **30° E** shows how far east of **0°** longitude a place is.
- _____ 2. **30° W** shows how far north of the equator a place is.
- _____ 3. All of Asia is east of **20° E**.

research: the act of studying, observing, or collecting in order to gain knowledge

investigator: someone who closely examines evidence to reach a conclusion

facts: things that really exist or happen; things that can be proven true

evidence: facts that help prove something

artifacts: simple objects, like tools, that show evidence of a human culture

conclusions: decisions made with careful thought

Police detectives use science, too. Forensic science is the use of science in solving crimes. Fingerprinting and DNA tests can help identify people. Clothing can be tested to show chemicals used in making explosives. All sorts of electronic devices have been invented to help investigate crimes.

How does a scientist do his or her job?

When most people think of a scientist, they picture someone in a lab wearing a white coat. Of course, some scientists do work in labs, but just as many are out in the world doing their research. They wear jeans and dig through the dirt hoping to discover the bones of a new dinosaur. They wear snowsuits, gloves, and goggles as they trudge through the snows of Antarctica. Scientists go wherever the search for an answer takes them.

Like a detective, a scientist is an investigator. He or she looks for clues that will help solve the mysteries of our world. The most useful clues to a scientist are facts. Gathering facts is probably a scientist's most important job. Scientists collect samples, make observations, and perform experiments to get the facts they need.

The main kind of investigation a scientist does changes from one kind of science to another. For example, an archaeologist studies human history. He or she spends many hours outdoors, sifting through layers of ground looking for evidence. Pieces of bone, chips of clay pots, or the remains of an ancient campfire are all good clues. Archaeologists collect these artifacts, study them closely, and draw conclusions about our human ancestors.

Observation is another important method of investigation. Zoology is the science of animal life on Earth. Much of a zoologist's work is observing animals in their natural habitats. Dian Fossey was a famous zoologist who studied gorillas. For years, she lived in the mountain forests of Rwanda. The gorillas went about their lives while Fossey quietly observed them and took notes. Then, like any good scientist would do, she shared her information with the world.

Collecting and observing are both good ways of getting clues, but the scientists aren't really in charge. Instead, they must be in the right place at the right time to get the facts they need. With an experiment, though, the scientist is in control. He or she designs an experiment to test exactly what needs to be known. Experimenting is an important scientific tool. It lets the scientist be in control.



Circle the letter of the best answer to each question below.

1. A biologist who wants to know what kind of fish live in a lake would
 - a. design an experiment.
 - b. make observations.
 - c. collect all the fish from the lake.
 - d. None of the above

2. Which of the following is an example of collecting evidence?
 - a. a geologist gathering rocks from a mountainside
 - b. a paleontologist cleaning fossils
 - c. a botanist clipping leaves from plants
 - d. All of the above

3. A physicist wants to know whether salt water boils more quickly than tap water, so she
 - a. designs an experiment.
 - b. collects evidence from the ocean.
 - c. observes chefs cooking at a restaurant.
 - d. asks a detective.

Write your answer on the lines below.

4. What kind of scientist would you want to be?

Unifying Concepts and Processes

Do you think each branch of science uses only one method of investigation? Explain your answer.

Name _____

Date _____

$$\begin{array}{r} 20 \\ \times 78 \\ \hline \end{array}$$

$$\begin{array}{r} 0 \\ 160 \\ 0 \\ + 1400 \\ \hline 1560 \end{array}$$

Handwritten annotations:
8x0
8x20
70x0
70x20

$$\begin{array}{r} 59 \\ \times 60 \\ \hline \end{array}$$

$$\begin{array}{r} 95 \\ \times 39 \\ \hline \end{array}$$

$$\begin{array}{r} 56 \\ \times 21 \\ \hline \end{array}$$

$$\begin{array}{r} 92 \\ \times 21 \\ \hline \end{array}$$

$$\begin{array}{r} 79 \\ \times 28 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ \times 97 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ \times 67 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ \times 11 \\ \hline \end{array}$$

$$\begin{array}{r} 33 \\ \times 79 \\ \hline \end{array}$$

$$\begin{array}{r} 88 \\ \times 87 \\ \hline \end{array}$$

$$\begin{array}{r} 49 \\ \times 52 \\ \hline \end{array}$$

$$\begin{array}{r} 65 \\ \times 25 \\ \hline \end{array}$$

$$\begin{array}{r} 41 \\ \times 58 \\ \hline \end{array}$$

$$\begin{array}{r} 84 \\ \times 76 \\ \hline \end{array}$$

$$\begin{array}{r} 88 \\ \times 30 \\ \hline \end{array}$$