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Plants

Brief #1: Vascular Plants *(cont.)*

Leaves

The job of the leaves on vascular plants is to produce a kind of sugar called glucose, which plants use as food.

You may not be able to see them, but there are tiny holes on each leaf. Each hole is called a stoma. **The stoma allows water and gases (oxygen and carbon dioxide) to pass in and out of the plant.** Around each little stoma there are guard cells. **The guard cells help to open and close the stoma.**

Fast Fact

The circumference of the trunk of General Sherman, the largest tree in the world, is 103 feet.

But what causes the guard cells to open and close the stoma? When sunlight hits a leaf, it causes the guard cells to fill with water. As the guard cell fills up, the water pushes the stoma open. Once the stoma opens up, gases in the air enter it and water passes out of it. **When the water leaves the stoma, that process is called transpiration.** This water evaporates.

As water leaves the stoma, it makes room for more water to enter the plants through the xylem and up through the roots. The stomata of most plants are open during the day and closed in the evening.

Leaf Structure

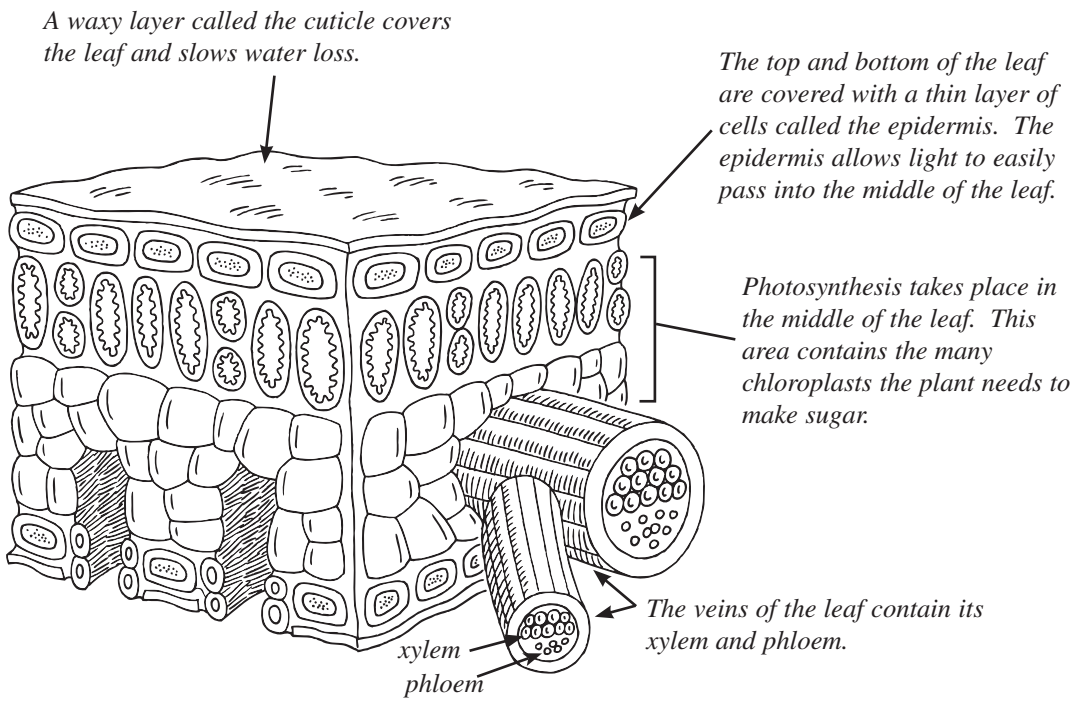
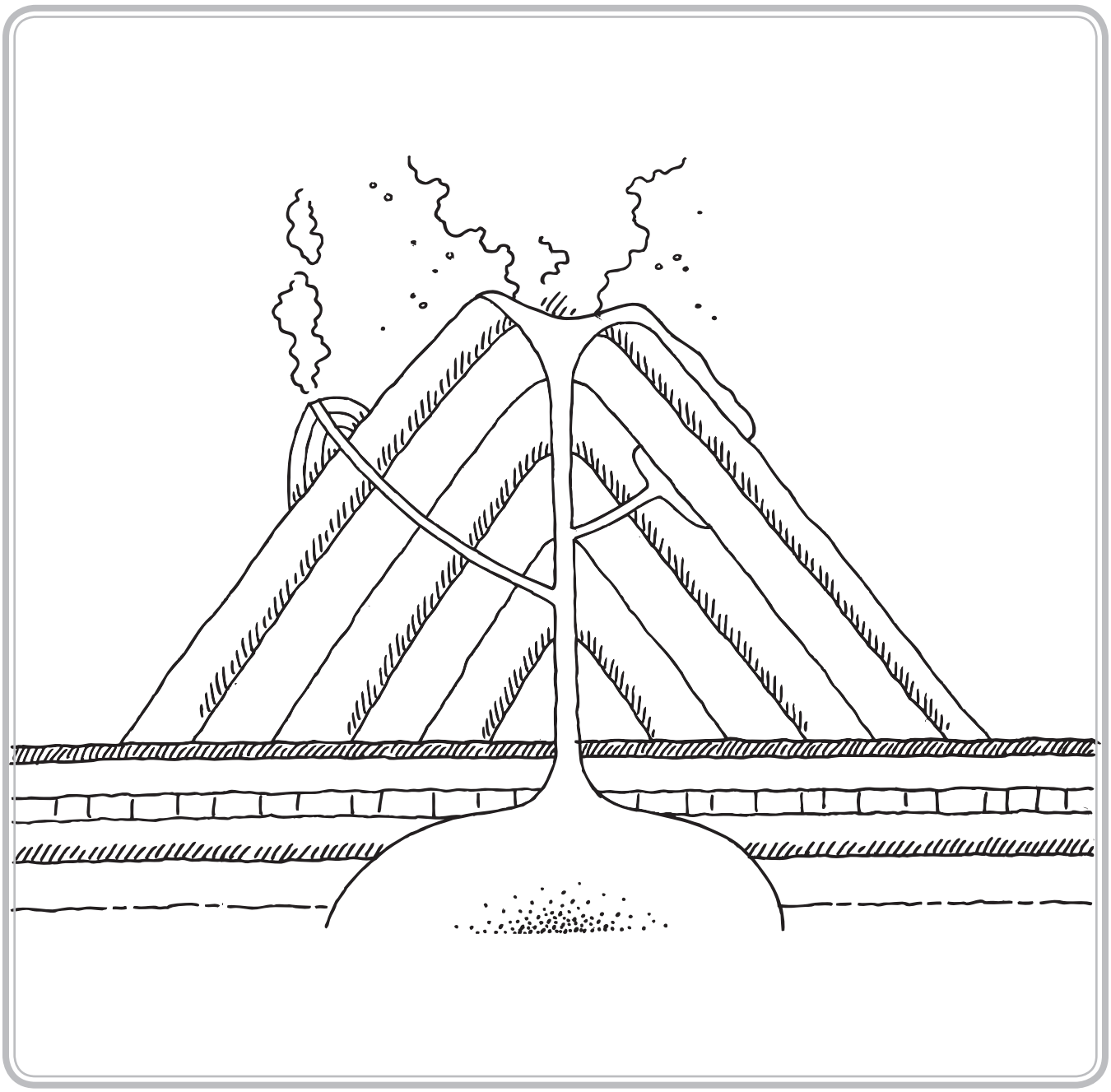


Plate Tectonics

Graphic Assessment

Name: _____ **Date:** _____

Directions: Locate and label the following parts of the volcano below: *ash cloud, crater, lava flow, conduit, magma reservoir, parasitic cone,* and *side vent.*



Force and Motion

Activities *(cont.)*

Brief #4: Motion

- **Go on a Motion Scavenger Hunt:** Take a walk in your school or community and write down as many examples as you can see of circular, uniform, and vibratory motion.

  Key Words: *circular motion, uniform motion, vibratory motion*

Brief #5: Newton's Laws of Motion

- **Perform an Experiment:**

  Supplies: a glass of water, a pie pan, a cardboard tube (from toilet paper), a raw egg

  Procedure: Place the pie pan on top of the glass of water. Place the cardboard tube in the middle of the pie pan right over the water. Place the egg on the top of the tube. Whack the side of the pie pan with the hand you write with. Give it a good whack. The pie plate will fly sideways, the cardboard tube will topple, and the egg will fall directly into the water. This experiment demonstrates Newton's first law of motion: that an object at rest will want to remain at rest. This is why the egg doesn't move. It stays put and the force of gravity pulls it down into the glass of water. (*Note:* If you wish to eliminate the possibility of breaking eggs in the classroom, a small, egg-sized ball could be used instead.)

- **Create Laws of Motion:** Pretend you are an explorer that is studying life on a planet in another galaxy. Force and motion are different on this distant planet. Explain the laws of motion that exist on this planet.

  Key Words: *law of inertia, Newton's laws of motion*

Internet Resources

- *http://www.physicsclassroom.com/* — contains detailed explanations to all kinds of physics questions
- *http://www.aip.org/history/* — website of the American Institute of Physics
- *http://www.fearofphysics.com/* — the Fear of Physics website, which contains entertaining information and demonstrations for students

Force and Motion

Brief #4: Motion

Focus

Motion depends on a frame of reference.

How did you get to school today? Did you get a ride in a car or bus? Perhaps you rode your bike or walked to school. No matter how you got here, at some point you were in motion.

Right at this moment you are probably sitting behind your desk. Are you moving? You may say "No," but the truth is that you are moving very quickly. Because the Earth is spinning on its axis and revolving around the sun, you actually never stop moving.

Vocabulary

1. circular motion
2. uniform motion
3. vibratory motion
4. speed
5. velocity
6. acceleration

Motion and Relativity

In order to describe any type of motion, you need to use a frame of reference. A frame of reference is an object that allows you to compare motion.

For example, let's say that you are sitting in a seat on a train and reading a book. If you use your seat and book as a frame of reference, you could say that, relative to your seat and book, you are not moving. This is because everything around you appears to be motionless.

But what would you think if your frame of reference changed? If your frame of reference was the ground outside of the train, then the seat and the book on the train would appear to be whizzing through space very quickly!

Types of Motion

There are many different ways in which objects can move:

- ✓ **Circular motion is the motion that travels around a central point.** Planets and moons have circular motion. So does a wheel and axle.
- ✓ **Uniform motion** is the motion that keeps object moving in a straight line. Trains and planes have uniform motion.
- ✓ **Vibratory motion** is the rapid back-and-forth movement of objects. The strings on a guitar have vibratory motion. Vibratory motion creates sound.

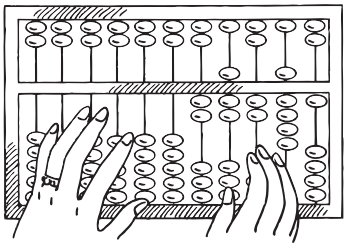
Technology (cont.)

Brief #2: Computers and Robots

Focus

Computer technology began in the 1930s and 1940s.

It is probably hard to imagine a world without computers, but not that long ago that is how the world was. Nowadays, computers are used in almost every area of our lives: agriculture, education, entertainment, exploration, and medicine.



abacus

Some say the world's first "computer" was invented thousands of years ago. It is called an abacus. An abacus is often made of a bamboo frame, and it contains many beads strung on wires. This ancient tool is often called the world's first computer because it was a technology that helped people to perform calculations.

Electronic Computer Technology

As early as the first part of the 20th century, scientists attempted to develop a technology that could perform complex mathematical calculations.

The first electronic computers were gigantic. They took up whole rooms and weighed thousands of pounds. They were not very practical. The first computer that was used commercially was called UNIVAC. UNIVAC stood for Universal Automatic Computer. It was built in 1951. The computer was 25 feet by 50 feet in length. It contained over 5,000 tubes. This enormous first computer could only store 1,000 words!

An important invention in the 1950s revolutionized computer technology and made it much more practical. This invention ultimately made it possible for people to hold computers in their hands. It is called the microchip. **A microchip is a tiny integrated circuit that can process information very quickly.** The circuits on a microchip are so small, they are microscopic.

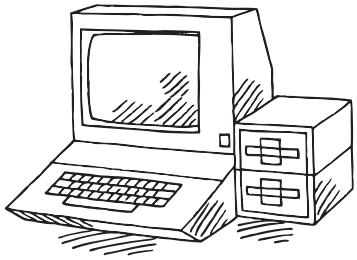
Vocabulary

1. microchip

Personal Computers

In the late 1970s, personal computers were introduced into the marketplace. These computers were small enough and easy enough to use that they became practical for people to own in their homes.

In the early 1980s, computers became even more practical with the introduction of laptop computers. These were smaller and more portable, allowing the user to carry these devices with them. When they were first introduced, however, these computers were very expensive.



Since then, the technology behind personal computers has advanced at such a rate that incredibly powerful computers that fit in the palm of the user's hand have become increasingly affordable.