



Science and Nature

G.A.C. Pack

Here are some environmentally friendly ways for you and your partner to explore the science of habitats, food webs, and food chains and to discover the connections among all living things.



A national collaboration to encourage family involvement in girls' science learning

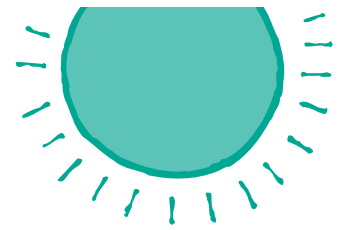
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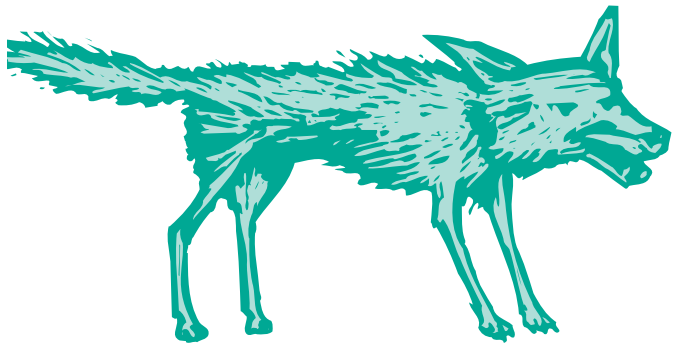
YOU ARE WHAT YOU EAT



In an Ecosystem energy is passed from one organism to another. Plants take in the sun's energy, and this energy supports the animals that eat the plants, as well as predators that feed on those animals.

A food chain is a way of showing what eats what in a habitat, and, therefore, where the energy goes. Everyone is part of a food chain.

Draw arrows between plants and animals on the Everglades Web of Life card to make a food chain.



WHO GOES THERE?



Your cracker-jack detective agency, G.A.C. Partners, Inc., has been hired to track down the animals that have made their habitats in your neighborhood. Use the clues below or clues you observe to discover which slimy, crawly, chirpy, or furry animals are your neighbors.

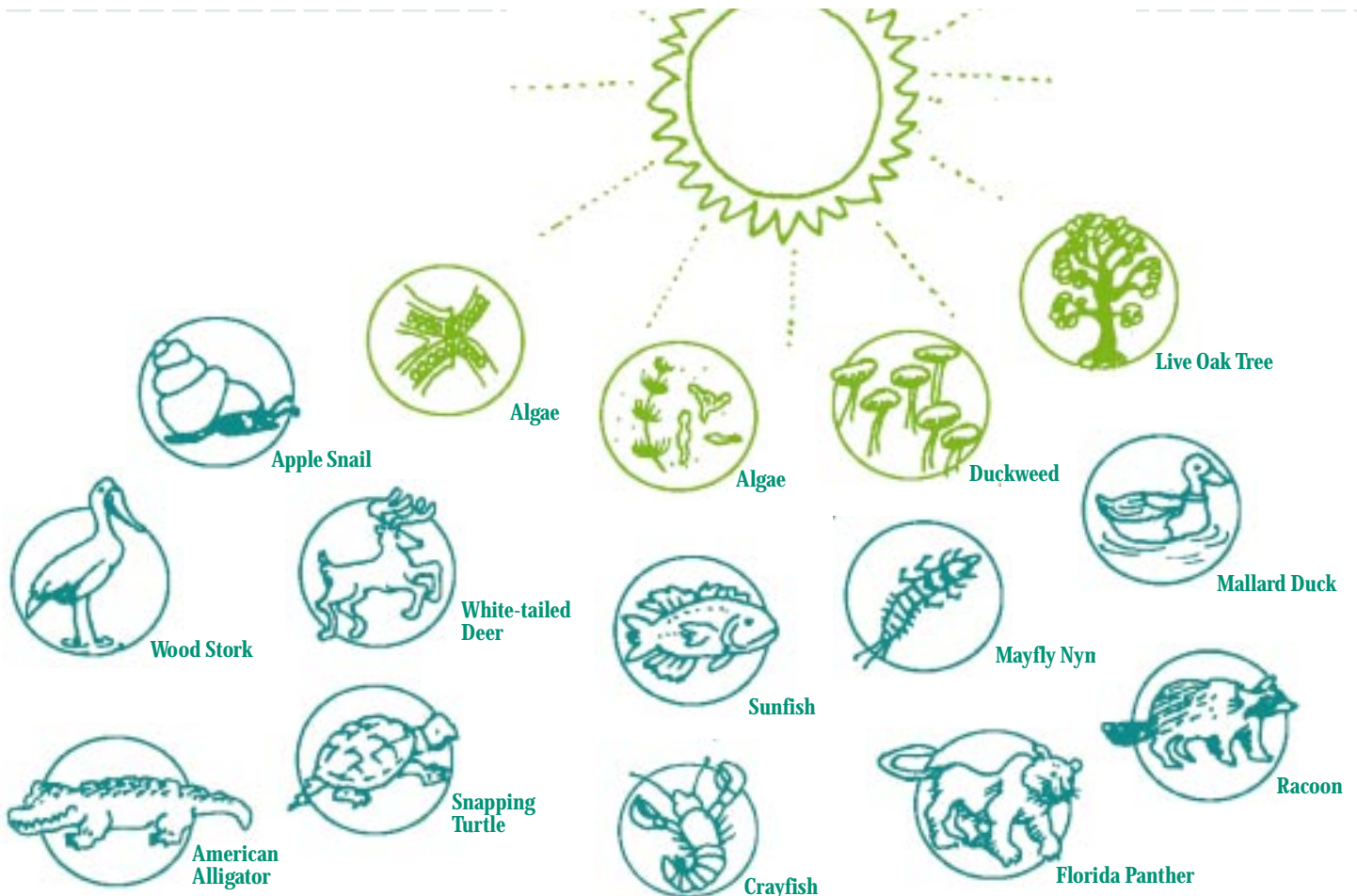
Clues	Animal Suspects	Observed Clues	Animal Suspects
Chewed leaves			
Holes in a tree trunk			
Nest made of leaves			
Slimy trail			
Tracks in mud or snow			
Hole in the ground			
Chewed-on seed			
Candy wrapper			
Tunnels in a leaf or a log			

EVERGLADES WEB OF LIFE

A food web is formed when animals from one food chain eat plants or animals from another food chain. Make more connections between the inhabitants of the Everglades on the other side of this card to create an Everglades food web.

Where do you fit into this food web?
 What do you think a human would eat?
 How do bacteria fit in?

Who Eats What
 Panthers—white-tailed deer, raccoons, and wood storks.
 Young alligators—crayfish, snails, and small fish.
 Older alligators—wood storks, fish, snapping turtles, and raccoons.
 Snapping turtles—ducklings, other birds, and fish.
 Mallard ducks—duckweed and insects (mayfly nymphs)
 Wood storks—sunfish and snails.
 Sunfish—mayfly nymphs, other insects, and duckweed.
 Crayfish—snails, duckweed, mayfly nymphs, and other insects.
 Raccoons—crayfish, snails, sunfish, duck eggs, young ducklings, and turtle eggs.



Poetry in Science

Write a cinquain about an animal habitat with your partner. What's a cinquain? It's a five-line poem, written a special way. Even the way you write the words on paper is special. Check out this cinquain—it looks almost like a diamond. Some people even call a cinquain a diamond poem.

How to Write a Cinquain:

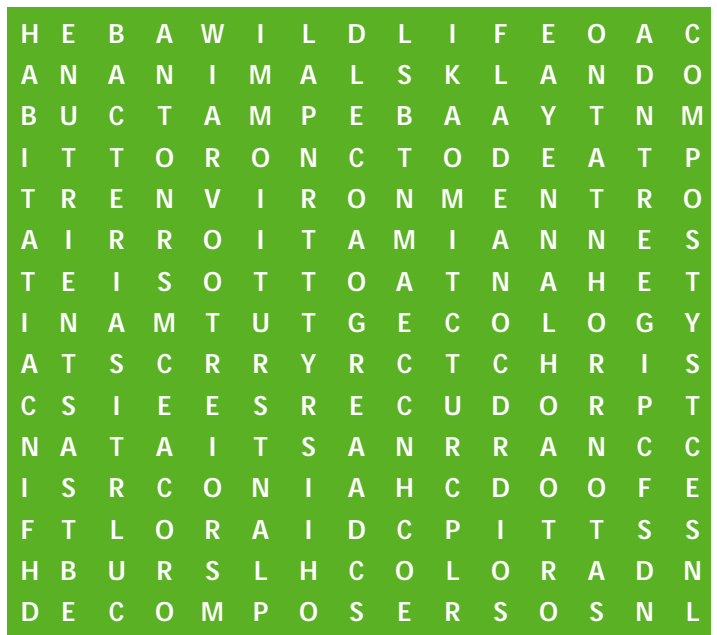
- Line 1: one word to name the subject
- Line 2: two words to describe it
- Line 3: three action words about it
- Line 4: a four-or five-word phrase describing the subject (not a complete sentence)
- Line 5: one word that means the same thing as the first word, or a word that sums it all up.



SCIENCE & NATURE SEARCH

Look for the hidden nature words in the puzzle at right. They can go up and down, across, at an angle, forward or backward.

- ANIMALS
- PLANTS
- ENVIRONMENT
- COMPOST
- NATURE
- HABITAT
- EARTH
- WILDLIFE
- ECOLOGY
- BACTERIA
- PRODUCERS
- FOOD CHAIN
- DECOMPOSERS
- NUTRIENTS
- INSECTS



Girl Scout Program Links

For Brownie Girl Scouts:

Spend some time outdoors with the **Outdoor Adventurer** and **Earth and Sky** Try-Its. Hunt for habitats with the **Animals, Plants, and Water Everywhere** Try-Its.

For Junior Girl Scouts:

Discover the wonders of nature with the **Wildlife** badge. Be a friend to the environment with the **Eco-Action** and **Ecology** badges. The **Outdoor Creativity** and **Outdoor Fun in the City** badges are "natural" ways to explore the great outdoors.

For Cadette and Senior Girl Scouts:

Explore the wonderful world of nature with the **All About Birds, Plant Life,** and **Wildlife** interest project awards. Become an expert on ecosystems with the **Eco-Action, Digging through the Past** and **From Shore to Sea** interest projects.



HOT LINKS

Where have all the animals gone?

Learn about endangered animals from around the world and the people who protect them and their habitats at <http://www.the.wildones.org/wildOnes.html> (English and Spanish).

The Itsy Bitsy Spider? Meet a rainforest spider big enough to eat birds for breakfast! Investigate the intricate network of plants and animals that depend upon one another for survival at <http://www.muohio.edu/dragonfly/webs/>

Ecology Alert! Explore the forests, oceans, and prairies where plants and animals live. Learn what you can do to protect the environment at <http://www.epa.gov/kids/>

Explore the World of Darwin. Wonder at the many colorful and intriguing life forms that populate the Galapagos Islands. Share in the adventures of the field team who are traveling in the islands. Read their daily dispatches and join in discussions at <http://www.terraquest.com/galapagos/education/index.html>

Books about Science and Nature

Who Eats What: Food Chains and Food Webs, by Patricia Lauber. HarperCollins, 1995. Learn how earth's creatures become interconnected through their food needs. Draw the chains for the things you eat. (Ages 6 – 9)

The Gardener, by Sarah Stewart. (Caldecott Winner). Farrar, Straus & Giroux, 1997. Read about a girl whose love of growing things transforms her dour uncle and his environment. (Ages 6 – 9)

City Kids & City Critters! Activities for Urban Explorers from the Houston Arboretum and Nature Center, by Carole Huelbig. McGraw-Hill, 1996. Learn about the importance of protecting wildlife habitats-even in urban environments. (Ages 9 and older)

The Greenhouse Effect, by Rebecca L. Johnson. Lerner, 1991. Explore the effects of global warming on our planet. (Ages 9 and older)

Acting for Nature, by Sneed B. Collard III and Action for Nature. Heyday Books, 2000. Read about young people from around the world who found ways to help solve the environmental problems in their communities. (Ages 9 and older)



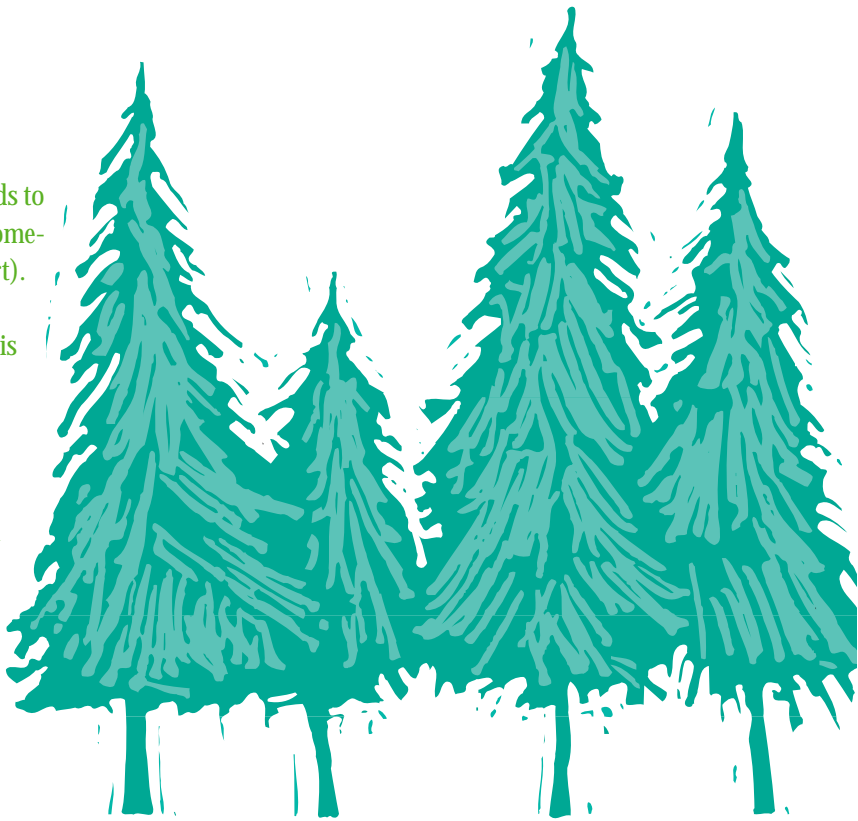
UP WITH O₂!

Take a deep breath in - you just took in something your body needs to live: **oxygen** (O₂ for short). Breathe out - you just got rid of something your body didn't need: **carbon dioxide** (CO₂ for short).

Now look at a plant or a tree. Although you can't see it, that plant is taking in carbon dioxide (CO₂) and releasing oxygen (O₂).

Hmmm, so let's see. We need O₂ to live, and plants and trees are busy making it for us. Plants need CO₂ to live and we are busy making it for them every time we breathe out. That's a really cool relationship!

Having plants and trees around our homes and neighborhoods helps us have cleaner air. Having large forests and rain forests on the planet helps the whole world have cleaner air. In fact, trees make about 40 percent of the world's oxygen and use a large amount of the world's carbon dioxide.



Partner Challenge

Catch a plant in the act of releasing O₂ with this experiment.

You will need:

- A large glass jar
- A few aquarium plants from your local pet or fish store
- A clear glass

What to do:

1. Fill the jar with water.
2. Place the plants in the water.
3. Fill the glass with water (so that there is no air in the glass) and cover some of the plants with the glass.
4. Place the jar in a sunny spot in your house.

As the sun shines on the jar, look for changes. Notice the collection of air that begins to appear in the glass. What do you think it is?



TOO MUCH OF A “GOOD” THING?

Humans are not alone in getting rid of CO₂. Animals also breathe it out, and cars get rid of it in their exhaust. Factories and power plants release CO₂ into the air, too. In fact, any machines that use fossil fuels (like gasoline and coal) make CO₂. Since plants use CO₂, it seems as if all this CO₂ in the air would be a good thing. However, trees and plants can only use so much CO₂. With all the CO₂ being released, trees have much more than they can use.



So what happens to all that extra CO₂? For the most part, it stays in the air and traps the sun's heat around the earth, causing the earth to get warmer and warmer. A warmer earth could mean major changes: warm areas would become too hot; more tropical storms would occur in some areas; and too little rain would fall in other areas. This is called the “greenhouse effect.” To make matters worse, millions of trees that could have helped use some of this extra CO₂ are being cut or burned down!

Partner Challenge

With your partner, brainstorm ways to help slow the “greenhouse effect.” These might include how to use less electricity and gas, how to help others become more aware of the problem, and how to increase the number of trees and plants in the world. Take a pledge to do one activity before the next Girls at the Center event. Plan to share your action with other G.A.C. partners.

Endangered Species Scramble

Animals and plants around the world are in danger of becoming extinct, due in part to human activities and pollution. Extinct means gone forever.

Read the clues and then unscramble the name of each endangered animal.

I am a tall bird that uses my long beak to catch fish. Water levels where I live are changing because of people and farming, so sometimes I can't find food.

D O W O K O T R S

I am a very rare butterfly found only in Florida. Loss of my habitat and pesticides are doing me in.

L A W T S A W L I L O

I am a wildcat that lives in Florida's cypress swamps and forests. My habitat is being destroyed by new construction and highways.

H A R P T E N

I am a mammal that flies at night and sleeps during the day. People have destroyed my roosting sites and poisoned me with pesticides.

R Y G A A T B

I am a large American reptile that lives in salt and freshwater areas. My habitat is being destroyed, I drown in fishing nets, and I am hunted, mostly for my skin.

O C O R C D L I E

Answers: wood stork; swallowtail; panther; gray bat; crocodile

Jobs in the Food Chain



Each job below may play a role in your food chain. How many of these jobs have you seen in action? Can you and your partner match the description of the job to the career?

Career

1. Botanist
2. Geneticist
3. Soil scientist
4. Food scientist
5. Organic farmer
6. Truck driver
7. Conservationist
8. Nutritionist
9. Chef
10. Ecologist

Job Description

- A. Finds better ways to process and package food
- B. Develops new varieties of plants
- C. Fixes tasty meals
- D. Helps to preserve the environment
- E. Studies food chains
- F. Studies plants
- G. Manages soil and water
- H. Plans healthy diets
- I. Delivers food to the market
- J. Grows food without chemicals

Answers: 1F; 2B; 3G; 4A; 5I; 6I; 7D; 8H; 9C; 10E

What Is an Animal Behaviorist?

If you love animals and love science, you'll want to think about a career as an animal behaviorist! An animal behaviorist studies the behavior of animals in different settings. They may study species in their natural environments to help protect their habitats; some work with animals in zoos and aquariums to design healthy habitats; and others study animals in a laboratory setting where they conduct experiments to learn more about how the human brain and body work.

Animal behaviorists study biology, ecology, genetics, psychology, and zoology. They work as researchers, animal trainers, veterinarians, educators, zoo-keepers, naturalists, and psychobiologists. Famous animal behaviorists include conservationist Jane Goodall, who studies chimpanzees, and Diane Fossey, who studied gorillas in their native habitat in Africa.

WOMEN IN SCIENCE



Meet Dr. K. Paige Carmichael, a veterinary pathologist at the University of Georgia College of Veterinary Medicine. Dr. Carmichael teaches students, does research on inherited diseases, and performs autopsies to find out about the causes of death in animals.

Paige decided that she wanted to help animals at age 12, when her pet dog died. She also wanted a career that involved the process of discovery, an aspect of science which she greatly enjoyed. As a veterinary pathologist, she works to discover the causes of disease and death in animals. Sometimes, she is able to detect diseases by a change in the animal's behavior. More often, she uses a light microscope to look for the cause of a disease. At other times, she uses an electron microscope to view animal tissue pieces that are no larger than one-thousandth the size of a pinhead.

Paige spent four years after college at Tuskegee University where she became a Doctor of Veterinary Medicine. She continued her education for four more years to become a pathologist, so that she could conduct research as well as treat animals.