



**PITTSBURGH ZOO
& PPG AQUARIUM**

It's A Jungle Out There!

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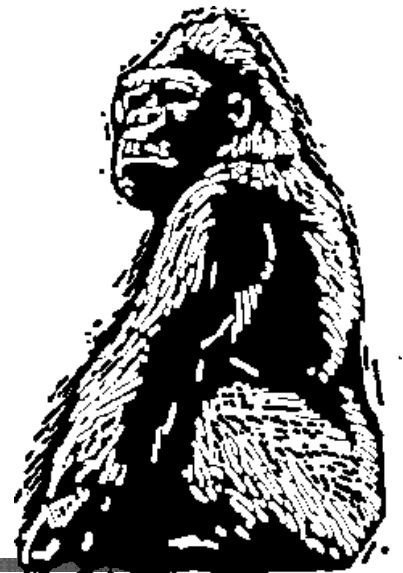
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Its a Jungle Out There!

Academic Standards for Environment and Ecology

4.2. ENVIRONMENTAL HEALTH

- 4. 2. 4 B Identify products derived from natural resources.
- 4. 2. 4 C Know that some natural resources have limited life spans.

4.3. ENVIRONMENTAL HEALTH

- 4. 3. 4 A Know that plants, animals, and humans are dependent on air and water.
- 4. 3. 4 B Identify how human actions affect environmental resources.
- 4. 3. 4 C Understand that the elements of natural systems are interdependent.

4.4. ENVIRONMENTAL HEALTH

- 4. 4. 4 B Know that food and fiber originate from plants and animals.

4.6. ECOSYSTEMS AND THEIR INTERACTIONS

- 4. 6. 4 A Understand that living things are dependent on non-living things in the environment for survival.

4.7. THREATENED, ENDANGERED, AND EXTINCT SPECIES

- 4. 7. 4 A Identify differences in living things that relate to their survival.
- 4. 7. 4 B Know that adaptations are important for survival.

4.8. HUMANS AND THE ENVIRONMENT

- 4. 8. 4 C Explain how human activities may change the environment.
 - 4. 8. 4 D Know the importance of natural resources in daily life.
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Background Information

WHAT IS A TROPICAL RAINFOREST?

A tropical rainforest is an area of heavy rainfall, high humidity and thick vegetation occurring along the earth's equator. Rainforests can be located in South America, Africa, Asia and Australia. Some rainforest areas can receive up to 400 inches of rain a year. General daily temperatures reach 85°F.

WHY DO WE NEED TROPICAL RAINFORESTS?

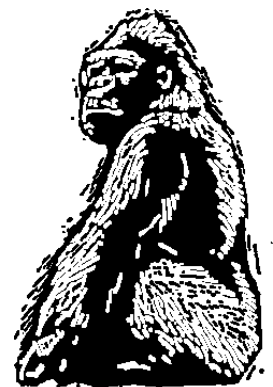
The importance of this ecosystem cannot be underestimated. Tropical trees help to maintain worldwide oxygen levels, absorb carbon dioxide and assist in cooling the Earth. It is believed that the recent rising temperatures contributing to global warming are caused in part by the decimation of tropical woodlands. These are areas of astounding diversity, home to about half of the world's known plant and animal species. In addition to their value ecologically, they are crucial to the world economy as producers of coffee, cocoa, rubber, rice, pineapple and bananas.

TOWERING TREES

The highest zone is the emergent layer. Tops of the tallest trees sometimes reach up into the clouds, attaining heights of urban office buildings. Emergent treetops are alternately pounded by fast moving storm fronts and baked by the unrelenting sun. Few animals are found at this level because of these harsh conditions. Flimsy branches do not support the weight of many species. South American birds like toucans and macaws are among the few creatures that are found here. Their strong beaks are used to break hard-shelled fruits and nuts. Brightly hued butterflies float on the breeze, looking like multi-colored confetti against the sky.

WHO'S WHO IN THE CANOPY?

The second layer, the canopy, with its numerous, criss-crossing tree limbs sustains an endless flow of animal traffic. This is where the fruit and nuts grow, and where many flowers bloom. This rich food supply supports the overwhelming majority of the rainforest's animal population. Gibbons swing through the canopy of Southeast Asia hand over hand in a motion called brachiation. They can be heard singing simple melodies to one another. Sloths spend their lives hanging upside down by their toenails. Their cardiovascular systems are designed so that blood is pumped from their hearts up to their feet. Howler monkeys can be heard three miles from their calling site. Adult males are brown or black, and females are a fawn color. Infants are the same shade as moms to safely camouflage, hiding them from danger.



UNDERSTANDING THE UNDERSTORY

The understory is dim and still since rain, wind, and sunlight seldom penetrate the heavy foliage overhead. But it is not quiet. Emergent birds gather here to find food and mates. Vines woven through branches, the understory's highway system, is used by countless species to navigate the rainforest. Orangutans are large, red, hairy apes inhabiting the understories of Borneo and Sumatra. Scientists speculate that orangs seldom venture to the forest floor, instead, living out their lives in the understory with only occasional canopy visits. Central and South America understories are haunts of jaguars, patrolling the trees without stirring a leaf or breaking a twig. Tree frogs move freely through vegetation, laying eggs in bromeliads (plants that grow on tree trunks).

GROUND FLOOR TENANTS

The forest floor is cloaked in perpetual twilight, but is no less busy than the others. Soil quality is poor, and soil depth is shallow. Millipedes, cockroaches and other decomposers constantly break down dead plants to enrich the soil. Tremendous amounts of vegetation require constant feeding, so huge trees and heavy-leafed shrubs continuously pull nutrition from the earth as fast as decomposition takes place. Pythons slither along the forest floor in search of prey. To find food, a snake uses its sense of smell by flicking its tongue or feeling vibrations or animal movement. These constricting snakes wrap around their prey and squeeze to kill; they have no venom glands. River dolphins live in shallow waters in areas flooded during extended periods of rainfall. These creatures use sonar to help locate food. Gorillas roam rainforest floors eating leaves, playing and sleeping. The silverback, the mature leader of the troop, may weigh over 500 pounds and has the strength of six humans.

WHO IS CUTTING DOWN THE TREES? HOW CAN YOU HELP?

Scientists believe tropical rainforests once covered 25% of Earth. Today, the total area of rainforest remaining is less than 4%. Why is this happening? The number one reason is that the growing human population is consuming rainforest products at a staggering rate. Beyond the need for roads, houses, and farms within the rainforest, goods such as wood, paper, and fruit are being shipped worldwide. Are there practical ways you can help? Yes! Since rainforests help to cool the Earth and are being cut down at a rapid rate, you can partially offset the loss by planting trees. Decide not to buy products made from rainforest trees like mahogany furniture or beef from cows that grazed on rainforest land that had been cleared. Do not purchase fur coats made from endangered cats, tropical birds, or tarantulas taken from the rainforests (ask to see papers indicating that the animals were bred here). Support organizations that back rainforest projects.

Vocabulary

Camouflage - an organism's ability to hide or blend with its surroundings using color, pattern or shape.

Carnivore - an animal that eats only meat.

Conservation - the wise use of natural resources in order to insure continued availability to future generations.

Diurnal - an animal that is mainly active during the daytime.

Ecosystem - an ecological community together with its environment, functioning as a unit.

Equator - imaginary line of latitude that encircles the center of the earth, dividing it into Northern and Southern hemispheres. It represents zero degrees latitude.

Habitat - the place an animal lives.

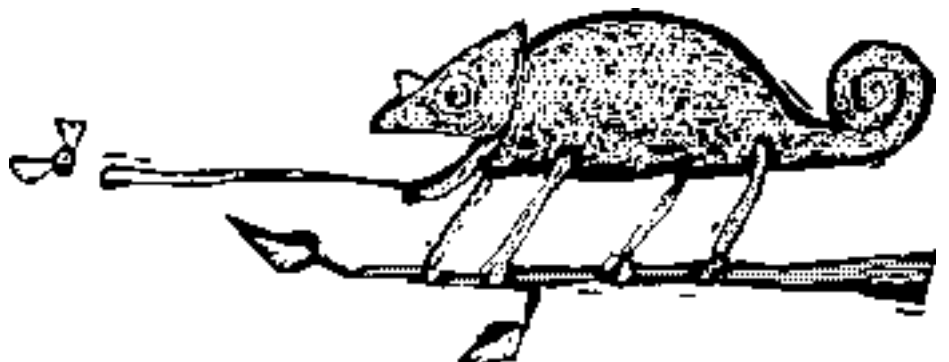
Herbivore - an animal that eats only plants.

Nocturnal - an animal that is mainly active during the night.

Omnivore - an animal that eats both plants and animals.

Prehensile - a body part that is able to grasp.

Tropical Rainforest - an area of forest located in the tropics that receives 160 inches or more of rain per year, rich in biodiversity and found near the equator.



Suggested Reading List

Bushbaby by A. Kennaway (Little, Brown, and Co., 1991).

Caps for Sale by Esphyr Slobodkina (Harper Collins, 1968).

Good Night Gorilla by Peggy Rathmann (G.P. Putnam's Sons, 1994).

The Great Kapok Tree by Lynne Cherry (Gulliver Books, 1990).

I Like Monkeys Because by Peter Hansard (Candlewick Press, 1993).

Jaguar in the Rainforest by Joanne Ryder (Morrow Junior Books, 1997).

Little Gorilla by Ruth Bornstein (Clarion Books, 1976).

One Gorilla by Atsuko Morozomi (A Sunburst Book, 1990).

Welcome to the Greenhouse by Jane Yolen (Scholastic, 1993).

Who is the Beast? by Keith Baker (Harcourt Brace Jovanovich, 1990).

Teacher Resources

Children Save the Rainforest by Dorothy Hinshaw Patent
(Cobblehill Books/Dutton, 1996).

The Classroom Teacher's World Animal Encyclopedia by Sherrill B. Folra
(T.S. Denison & Co., Inc., 1995).

How Monkeys Make Chocolate by Adrian Forsyth (Owl Books, 1995).

Inside the Amazing Amazon by Don Lessem (Crown Publishers, 1995).

Rainforest Animals by Michael Chinery (Random House, 1991).

A Walk in the Rainforest by Kristin Joy Pratt (DAWN Publications, 1992).

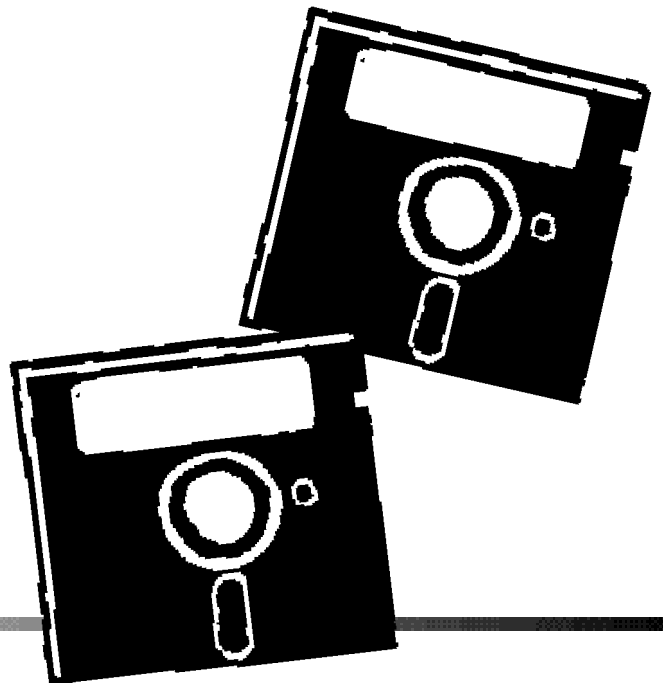


Related Websites

1. **World Rainforest Information Portal:** <http://rainforestweb.org>
2. **Rainforest Action Network:** www.ran.org/ran/index.html
3. **Rainforest Alliance:** www.rainforest-alliance.org/
4. **SeaWorld/Busch Gardens Animal Information Database:** www.seaworld.org
5. **The Wild Ones:** www.thewildones.org

Just for Kids!

1. **The Animal Alphabet:** www.infostuff.com/kids/a.htm
2. **KiddoNet:** www.kiddonet.com *click onKZoo icon*
3. **Kratt's Creatures:** www.pbs.org/kratts/index.shtml
4. **National Wildlife Federation:** www.nwf.org/kids/
5. **ZooBooks:** www.zoobooks.com/



Jungle in the Pantry

Pre-Visit Activity

Time: two 15 - 20 minute sessions

OBJECTIVES:

- TSW locate Tropical Rainforests and Pennsylvania on a globe.
- TSW complete a rainforest product survey in their homes.
- TSW recognize the significance of rainforests in their daily lives.

MATERIALS:

“Riches of the Rainforest” sheet, globe, assortment of rainforest products (from list), How Monkeys Make Chocolate: Foods and Medicines from the Rainforest by Adrian Forsyth (Owl Books, 1995)

PROCEDURES:

ANTICIPATORY SET:

Ask students if there are Tropical Rainforests near us. Locate Tropical Rainforests on the globe. Locate Pennsylvania on the globe. Rainforests are far from where we live. Do you think that they are important to us? Discuss why.

DEVELOPMENT OF LESSON:

1. Point out the rubber on the sole of a student’s shoe. Ask if the students know what the sole is made of. Ask the students to name other things made of rubber. Where does rubber come from? (the sap of plants that grow in the rainforest)
2. Share some of the information from How Monkeys Make Chocolate. Was there anything mentioned that we use everyday? Discuss some rainforest products mentioned and how they fit into our everyday life.
3. Pass out “Riches of the Rainforest” page. Have the students complete the sheet at home.
4. When the sheets are completed, discuss the number of rainforest products they found in their homes. Show some of the products to illustrate. Were they surprised at how many they found?
5. Explain that the rainforest also gives us many medicines, including one for cancer. The most important one of all isn’t even on the list. The rainforest gives us an estimated 30 - 40% of our oxygen.

SUMMARY:

Ask the students again if they think rainforests are important to us. Discuss why and what may have changed their minds.

EXTENSIONS:

- Make a tropical trail mix using some of the foods on the list.
- Select a few of the tropical fruits that are unfamiliar to your students and have a tasting session. Ask them to describe the new tastes or compare them. Which fruits did they like? Which didn’t they like? Why?
- Complete “Where in the World are Tropical Rainforests?”
- Expand your vocabulary by completing the “It’s a Jungle Word Search”.

Riches From the Rainforest

How many tropical rainforest products can you find in your house?
Check all that apply.

FRUITS AND VEGETABLES:

- avocado
- banana
- grapefruit
- guava
- heart of palm
- lemon
- lime
- mango
- orange
- papaya
- passion fruit
- pepper
- pineapple
- plantain
- potato
- sweet potato
- tangerine
- tomato
- yam

WOODS:

- balsa
- mahogany
- sandalwood
- teak

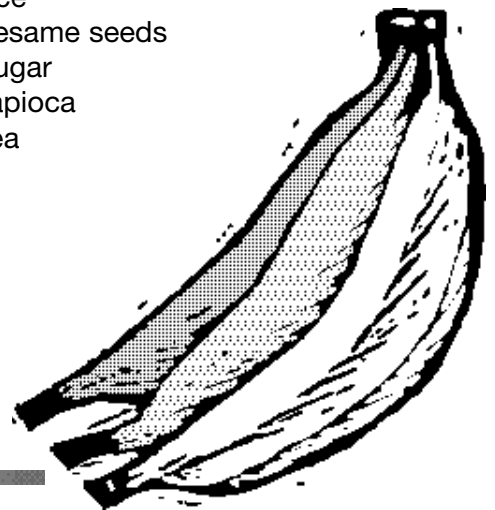
* Woods could include furniture, floors, doors, paneling, cabinets, carvings, toys, and models.

SPICES AND FLAVORINGS:

- allspice
- black pepper
- cardamom
- cayenne (red pepper)
- chili pepper
- chocolate or cocoa
- cinnamon
- cloves
- ginger
- mace
- nutmeg
- paprika
- turmeric
- vanilla

OTHER FOOD PRODUCTS:

- Brazil nuts
- cashew nuts
- coconut
- coffee
- cola
- corn
- macadamia nuts
- peanuts
- rice
- sesame seeds
- sugar
- tapioca
- tea



Primary



CANES AND FIBERS:

- bamboo (cane furniture, crafts)
- jute (rope, twine, burlap)
- kapok (insulation, stuffing)
- ramie (clothing, knit material)
- rattan (furniture, wicker, cane chair seats)

HOUSEPLANTS:

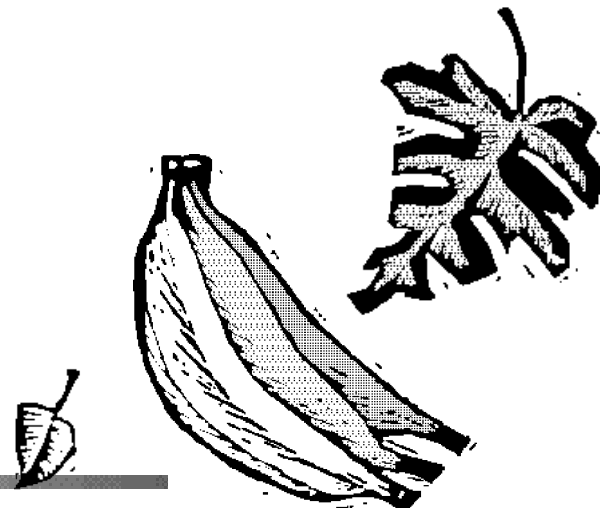
- African violet
- aluminum plant
- Begonia
- bird's-nest fern
- bromeliads
- Christmas cactus
- Joseph's coat (Croton)
- Dracaena
- dumb cane (Dieffenbachia)
- fiddle-leaf fig
- kentia palm
- orchids
- Philodendron
- prayer plant
- rubber plant
- snake plant (Sansevieria)
- spathe lily
- Swiss-cheese plant (Monstera)
- umbrella tree (Shefflera)
- zebra plant (Aphelandra)

OILS:

- bay (bay rum lotion)
- camphor (insect repellent, medicine)
- coconut (snack food, baked goods, lotions, soaps)
- eucalyptus
- lime (food flavoring, candles, soap)
- palm (snack food, baked goods)
- patchouli (perfume, soap)
- rosewood (perfume)
- sandalwood (soap, candles, perfume)

GUMS AND RESINS:

- chicle (chewing gum)
- copal (varnish, printing ink)
- dammar (varnish, lacquer)
- rubber (balloons, erasers, rubber bands, rubber cement, hoses, tires)



Tropical Rainforest Scavenger Hunt

In-Zoo Activity
Time: 45 minutes

OBJECTIVES:

- TSW be able to identify at least 3 rainforest primates.
- TSW be able to identify characteristics of rainforest primates.

MATERIALS:

“Scavenger Hunt” sheet, Rainforest picture bank (younger students), pencils or markers, clipboards/hard writing surface, blow-up beachball globe.

PROCEDURES:

ANTICIPATORY SET (1 OF 3):

Before arriving at the zoo, toss the blow-up globe around your classroom for the students to catch. Ask the students to locate a country or continent that contains a tropical rainforest; or the equator; or one of the tropics (Tropics of Cancer or Capricorn). Continue until each student has a turn.

-Or-

The zoo class, “It’s a Jungle Out There!” may be taken prior to the scavenger hunt.

DEVELOPMENT OF LESSON:

1. After passing out the clipboards and pencils, have students pair up. Depending on the age and level of your students, this activity may be completed without partners. Chaperones may be included in this activity, if appropriate.
2. Starting at the entrance of the Tropical Forest Complex, give a guided tour of the animals seen at each exhibit. The graphics will help with this or use the background information included in this packet. Casually mention in your tour the features on the scavenger hunt the students are searching for. If your class is older or has completed the “It’s a Jungle Out There!” class, you can make the “hunt” more challenging by not giving “hints” during your tour.

SUMMARY

Discuss the answers with the students at the end of the “hunt,” either in the zoo (at the Plaza for example), or back at your school.

Scavenger Hunt

FIND AN ANIMAL THAT:

1. has a prehensile tail _____
2. lives on the forest floor _____
3. uses camouflage _____
4. has extra-long arms
for swinging _____
5. has a brightly colored face _____
6. is one of the smallest
monkeys in the world _____
7. has a very loud voice _____
8. is slow-moving and sleeps
upside-down in trees _____
9. knuckle-walks _____
10. lives in the canopy layer _____

Helpful Hints

Teachers: Please include this word bank if the scavenger hunt is too difficult for your students.

Hint: The animal can be used more than once.

Gorilla Orangutan Mandrill Howler monkey Sloth Lemur Woolly monkey Gibbon

Jungle Building Blocks

Post-Visit Activity
Time: 30 - 45 minutes

OBJECTIVES:

- TSW identify the layers of the rainforest in order.
- TSW determine which animals are found in each layer.
- TSW determine which plants are found in each layer.
- TSW describe light levels found in each layer.
- TSW name four rainforest products.
- TSW create jungle building blocks depicting rainforest plants, animals, products and light levels.

MATERIALS:

- Copies of the rainforest blocks, picture banks, glue, scissors, crayons or markers.
*Note: You may wish to enlarge the rainforest blocks, especially for younger students.

PROCEDURES:

ANTICIPATORY SET:

Review what the students have learned about the rainforest in their class at the Pittsburgh Zoo & PPG Aquarium. Include location, climate, and products. List the products on the board (see "Riches of the Rainforest").

DEVELOPMENT OF LESSON:

1. Have the students name the layers of the rainforest. Put them on the board.
2. Have the students describe the light level of each layer. Discuss why the light levels are different in each layer. Write the description next to the layer.
3. Have the students give examples of animals found in each layer. Write them next to that layer. For multi-layer animals (like birds and snakes), put them in all layers that are applicable. Do the same for plants. Your list should look something like this:

Emergent layer: very bright sun; macaw, toucan, butterfly; treetops with small leaves.

Canopy: sunny; sloth, gibbon, python, black howler monkey, lemur, macaw, toucan, butterfly; traveler's palm, fiddle-leaf fig, bird of paradise, banana, fishtail palm.

Understory: shady; orangutan, jaguar, python, tree frog, toucan; bromeliad, fan palm, tree dracaena, staghorn fern, dragon tree, zebra plant, cycad, bamboo, rubber plant, aralias, orchid.

Forest Floor: very shady; python, gorilla; cast-iron plant, aluminum plant, pineapple plant, corn plant, Seminole bread, palm grass, buttress roots.

4. Divide the students into small groups. Pass out blocks, picture banks, scissors, glue, and crayons or markers.

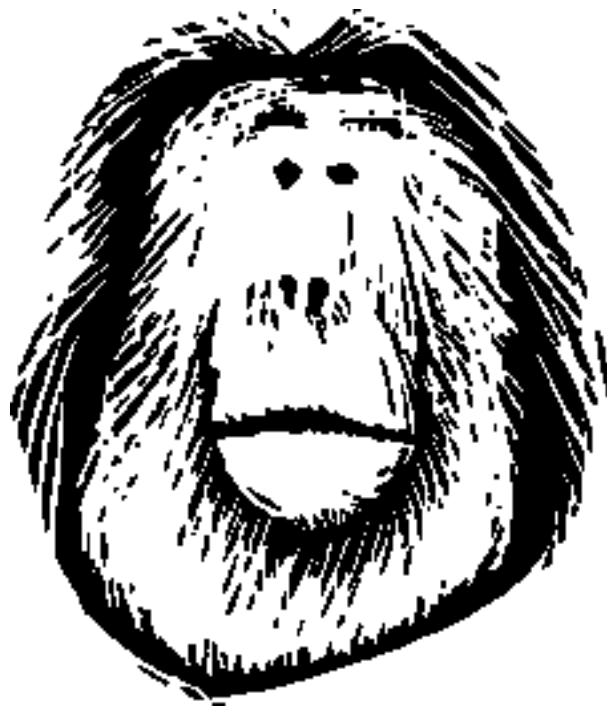
5. Each side of the cubes shows a different aspect of the layer it represents. Animals and plants: select a plant and animal found in the layer. Students may use the picture banks or draw them. Light level: use a color to represent the light level of the layer. From darkest to lightest: purple, blue, green, yellow. Products: show a product that comes from the rainforest. It may or may not come from the layer depicted. Have the students make the blocks.
6. When the blocks are complete, have the students stack them to put the layers in order.

SUMMARY:

Have the students share what they put on their blocks. Discuss similarities and differences between blocks showing the same layer. What does this say about the biodiversity of the rainforest?

EXTENSIONS:

- Make rainforest blocks using medium-sized cardboard boxes. Use the picture banks or pictures from magazines for the sides. If the boxes are quite large, use student artwork and craft projects for the sides. Use the blocks to make a 3D rainforest display.
- Write and perform a skit showing what life is like in the rainforest.
- Learn “Layers of the Rainforest.” Perform it for another class. Use what you have learned about rainforests to write your own song!



Layers in the Forest

(sung to “If You’re Happy and You Know It”)

There are layers in the forest, yes indeed. (Yes indeed!)

There are layers in the forest, yes indeed. (Yes indeed!)

Emergent, canopy, and more,
Understory, forest floor

There are layers in the forest, yes indeed. (Yes indeed!)

The emergent’s home to birds and butterflies. (Butterflies!)

The emergent’s home to birds and butterflies. (Butterflies!)

The trees are so high
That they almost touch the sky.

The emergent’s home to birds and butterflies. (Butterflies!)

The canopy is like a big umbrella. (Big umbrella!)

The canopy is like a big umbrella. (Big umbrella!)

Monkeys, sloths, orangutans
Eat all the fruit they can.

The canopy is like a big umbrella. (Big umbrella!)

The understory’s home to many snakes. (Many snakes!)

The understory’s home to many snakes. (Many snakes!)

They eat cats and bats and rats,
And they like the gnats for snacks.

The understory’s home to many snakes. (Many snakes!)

The forest floor is dim and dark and wet. (Dark and wet!)

The forest floor is dim and dark and wet. (Dark and wet!)

Oh, the ants go marching by
As they watch the birds up high.

The forest floor is dim and dark and wet. (Dark and wet!)



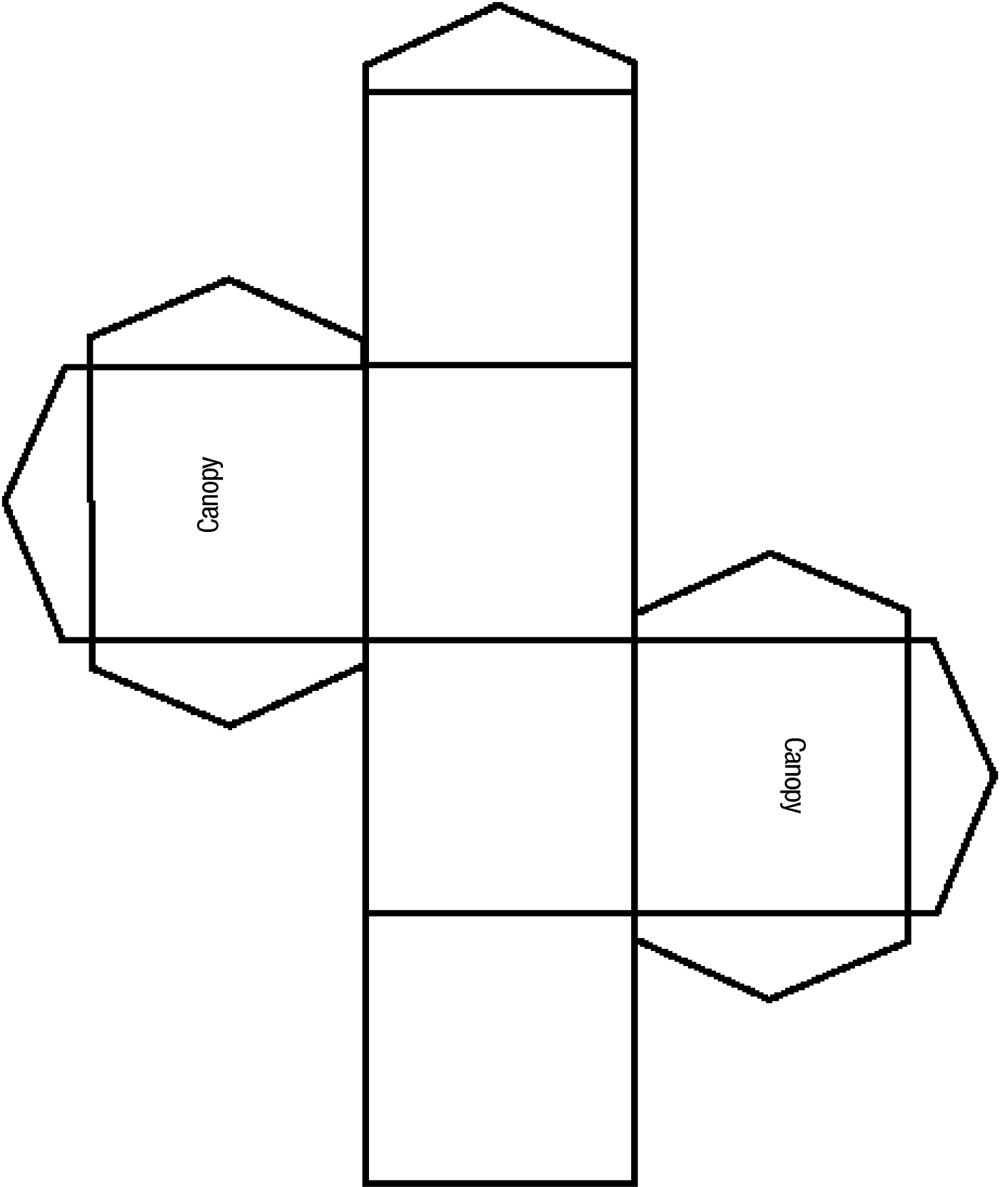
Emergent
Layer

The diagram shows a net of a hexagonal prism. It consists of six rectangular faces arranged in a horizontal row. Two of these rectangles are labeled 'Emergent Layer'. The top and bottom edges of the two outermost rectangles are attached to a hexagonal shape, which will form the top and bottom bases of the prism when folded. The labels are oriented vertically within their respective rectangles.

Emergent
Layer

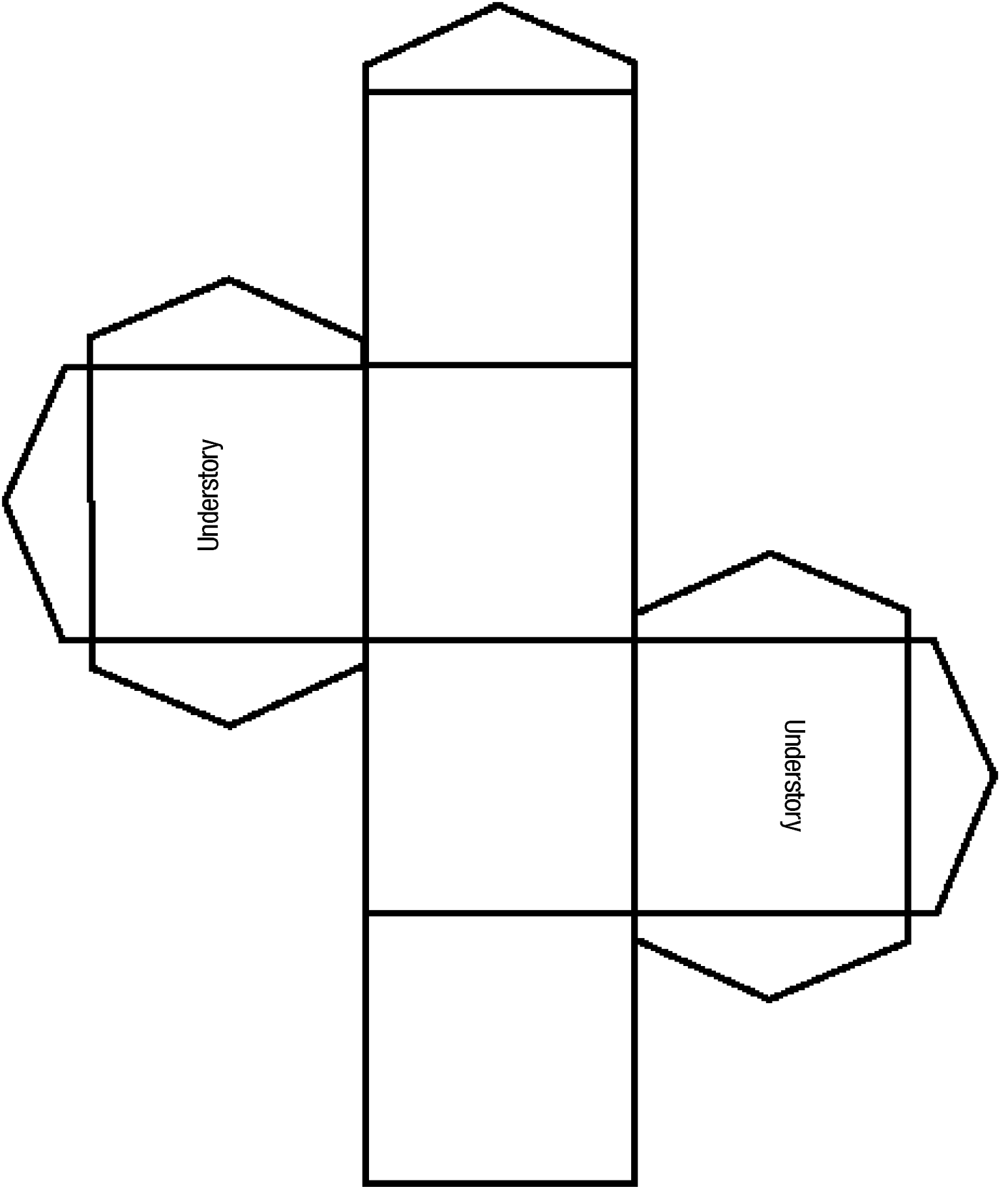
Canopy

Canopy



Understory

Understory



Forest
Floor

Forest
Floor

