

ELEMENTARY SCIENCE PROGRAM
MATH, SCIENCE & TECHNOLOGY EDUCATION

A Collection of Learning Experiences

HABITATS



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HABITATS

GRADE 1

Unit Overview

Students will identify habitats as the place where basic needs are met for the organisms that live there. A study of the plants and animals of the five major biomes of the world will also be studied. Plant and animal adaptations are a focus. Special emphasis will be placed on observing, discussing, describing, predicting, gathering and interpreting data.

Scheduling

This unit may take from five to nine weeks to complete depending upon the goals of the teacher and interests of the students. Use of the section included in this manual called More Ideas may extend the time span of this kit.

Materials to be obtained locally:

Please make **one** student activity book for **each** student.

water	glue
scissors	paste
chart paper	felt tip markers
pencils	insects from the schoolyard
sock	index cards
pictures of summer/winter scenes	colored pens/pencils/markers
construction paper (28 cm x 43 cm (11" x 17"))	
paper towels	photocopy paper boxes
newspaper	map of the world
picture of various organisms	scrap materials
tape	red construction paper
evergreen bough	deciduous tree bough
drawing paper	metric ruler
	crayons

Caution

Remind students to wash their hands after handling any of the materials in the kit. Small objects should be handled with care.

About the Format

Each learning experience is numbered and titled. Under each title is the objective for the learning experience.

Each learning experience page has two columns. The column on the left side of the page lists materials, preparations, basic skill processes, evaluation strategy, and vocabulary. The evaluation strategy is for the teacher to use when judging the student's understanding of the learning experience.

The right column begins with a "Focus Question" which is typed in italicized print. The purpose of the "Focus Question" is to guide the teacher's instruction toward the main idea of the learning experience. The "Focus Question" is not to be answered by the students. The learning experience includes direction for students, illustrations, and

discussion questions. These discussion questions can be used as a basis for class interaction.

A **Student Assessment** has been included in the **Teacher's Manual** and the **Student Activity Manual**. If you do not want the students to have the assessment beforehand, remove it from the **Student Activity Manual** before printing a class set of the student manuals.

Background Information

Basic Needs of Plants and Animals

All organisms require basic needs to be met for survival. **Food** is one of those basic needs. Plants make their own food using water, gases in the air, energy from sunlight, and minerals from the earth. Some animals like humans eat plants for food while some animals eat other animals as their food source. Some animals eat both plants and animals. Organisms also need **water**. Some desert animals get water from the food they eat, but most animals need to drink water. Aquatic animals use water to survive as well as move around in. Plants need water for making food through **photosynthesis**. Another need of animals is **shelter**. Holes in the ground, holes in trees and rocks and/or caves are all examples of places animals may go to hide from predators or seek shelter from extreme temperatures. Plant embryos are sheltered in their hard seed coats. Young plants can survive under the shade of other plants. **Air** and **light** are two other basic needs. Oxygen is required for animals and carbon dioxide and oxygen is required for plants. The amount of light needed for plants and animals vary according to organism. All organisms occupy **space**. Plants are rooted in one place and take up more space as they grow. Animals move around in their space to find the things that meet their needs. The species of animal and the availability of the animal's needs determine the amount of space needed.

Habitats

An organism's **environment** includes everything around it, the soil, water, air, rocks, other plants and animals, etc. An organism's **habitat** is where the organism finds the resources within the total environment to meet all its basic needs for survival. How the organism interacts with its environment and the specific part of the habitat it uses is called its **niche**.

As other animals, humans make a habitat within our homes that provide us with the resources that meet our needs. In the habitat of most animals, they have immediate access to the resources they need to survive. Humans, however, have learned to transport and store materials. Humans can live in an **incomplete habitat** if they are able to bring the needed resources to the habitat they live in. Plants and other animals must have a **complete habitat**.

Areas that provide the resources to meet the needs of a variety of organisms are the richest habitats. Resources are often distributed randomly. The pattern of their distribution will create a pattern for the **microhabitats** (small habitats within the larger habitat). The amount of resources available (habitat quality) determines the number of organisms that can survive there at any given time. As the quality of a habitat changes so do the populations of organisms that depend on that habitat. Even if resources are abundant, predators or competing species may affect the survival of an organism.

Physical conditions such as temperature, humidity, precipitation, and soil texture all affect the nature of a particular habitat and its ability to provide basic resources.

Adaptations

Organisms have different preferences for the physical factors (light, moisture, etc.) in their habitats. Each organism has evolved with different ways of dealing with the variability of the physical factors in its environment. Some have adaptations such as insulating coverings of fur or feathers to deal with temperature changes, some go into burrows to get away from heat or cold, others **migrate** out of an area. Other animals **hibernate** in the cold or **estivate** in the heat to avoid temperature extremes and to conserve energy.

Deserts

Warm deserts are arid regions that support a limited and specially adapted plant and animal population. Deserts cover about one fifth of the Earth's surface. They occur where rainfall is 25 cm/year or less. Deserts have vegetation and vertebrate and invertebrate animals that can live in desert conditions. The soils are coarse in texture, shallow, rocky with good drainage and have no subsurface water. They are coarse because there is less chemical weathering in the desert environment. The finer dust and sand particles are blown elsewhere, leaving heavier pieces behind. Cold deserts are caused by extreme cold and covered by snow or ice.

There are four major types of deserts:

- Hot and dry
- Semiarid
- Coastal
- Cold

Hot and Dry Desert

Hot and dry deserts can be found in southwest United States, along the coast of South America, in Northern Africa, and in the Middle East. The seasons are generally warm throughout the year, however, it is extremely hot in the summer. The winters usually bring little rainfall. These desert surfaces receive a little more than twice the solar radiation received by humid regions and lose almost twice as much heat at night. Rainfall is usually very low and or concentrated in short bursts between long rainless periods. Evaporation rates regularly exceed rainfall rates. Moisture of all kinds evaporate very quickly in the hot, dry desert air. Rain soaks into the sand and disappears. The heat of the ground and the dry wind draws moisture from the plants, soil, and skin. Often the moisture is taken before the plants and animals can use it. Rain sometimes evaporates before it even hits the ground. A barrier of high mountains can also keep moisture from reaching the desert. The Sierra Nevada, Andes, and Himalayas are some of these mountain barriers.

Plants in the hot, dry desert are mainly ground-hugging shrubs and short woody trees. Leaves are supported with nutrients with water-conserving characteristics. They are thick and covered with a thick outer layer. All of the plants with thick and fleshy leaves/stems take in large quantities of water when it is available and store it for future

use. When water is available, the stems with corrugated ridges and grooves swell to the point that the grooves are shallow and the ridges are far apart. The yuccas, ocotillo, turpentine bush, and prickly pears open their **stomata** (microscopic opening in the epidermis of leaves that allow for gas exchange) only at night when evaporation rates are lowest.

Semiarid Desert

The summers are moderately long and dry, and the winters bring low concentrations of rainfall. Summer temperatures normally do not go above 38 degrees Celsius (100 degrees F) and evening temperatures are cool, around 10 degrees Celsius (50 degrees F). Cool nights help both plants and animals by reducing moisture loss from transpiration, sweating, and breathing. As in the hot desert, rainfall is often very low or concentrated.

Coastal Deserts

These deserts occur in moderately cool to warm areas such as the Nearctic and Neotropical realm. A good example of this type of desert is the Atacama of Chile. The cool winters of coastal deserts are followed by moderately long, warm summers. The average summer temperature ranges from 13-24 degrees Celsius (55-75 degrees F). Winter temperatures are 5 degrees Celsius (41 degrees F) or below. The average rainfall measures 8-13 cm in many areas. The soil is fine-textured with a moderate salt content. It is fairly porous with good drainage. Some plants have extensive root systems close to the surface where they can take advantage of any rain showers. All of the plants with thick and fleshy leaves/stems take in large quantities of water when it is available and store it for future use. When water is available the stems with corrugated ridges and grooves swell to the point that the grooves are shallow and the ridges are far apart.

Animal Responses to the Heat

Due to the heat of the desert, many animals are active only at dusk and at dawn. Many animals are completely nocturnal. Geckos and night lizards are active at night instead of during the day. Mammals such as foxes and skunks sleep in a cool den or cave during the day and come out to feed at night. Other desert animals burrow below the surface of the soil or sand to escape the high temperatures at the desert surface. Rodents may plug the entrances of their burrows to keep out the hot air. Some diurnal mammals enter a state of **estivation** when the days become too hot and vegetation too dry. They sleep away the hottest days of the summer. Many desert animals burrow into the ground to reach cooler temperatures. Desert toads remain dormant deep in the ground until the summer rains fill ponds. They then emerge, lay eggs, and replenish their body's reserves of food and water for another long period of dormancy. Certain desert lizards are active during the hottest seasons in the deserts but move rapidly over the hot sand and take shelter in the shade. The fennec, a small fox, has hair on the soles of its feet so it can walk on the hot sand.

Dispersing Heat

Some animals disperse heat absorbed from their surroundings by various mechanisms. Owls and nighthawks open their mouths while rapidly fluttering their throat region to

evaporate water from their mouth cavities. Many desert animals have evolved long appendages to dissipate body heat into their environment. The enormous ears of the jackrabbit, with their many blood vessels, release heat when the animals is resting in a cool, shady location. The turkey vulture is dark in color and thus absorbs considerable heat in the desert. They excrete urine on their legs, which cools them by evaporation. The cooled blood is then circulated throughout their bodies. Vultures and storks also fly high on thermals of cooler air. Many desert animals are paler than their relatives elsewhere in more moderate environments. The pale colors help the animal take in less heat and it helps to **camouflage** the animal in its surroundings.

Plant and Animal Responses to Little Water

Most desert animals and plants must adapt to the lack of water in order to survive. The roots of various trees, including the mesquite tree, dig deep into the ground to find water. The desert tortoise and the barrel cactus store water and use the stored water in drought conditions. Wildflowers and spadefoot toads lie dormant in the desert but speed up their life cycle when the rains fall. Their life cycles can be completed in a matter of days. The kangaroo rat does not need to drink water because its body is so efficient at conserving and recycling water. The turkey vulture obtains the moisture it needs from the food it eats. There are few large mammals in deserts because most are not capable of storing sufficient water and withstanding the heat. The mammals that are found in the desert are usually small, like the kangaroo mice of the North American deserts. However, camels are found in the desert and some camels (dromedary camel) are used to transport goods from one place to another. Succulents like the cactus store water. Desert animals acquire water directly from plants, particularly succulent ones, such as the cactus. Insects tap plant fluids such as nectar or sap from stems, while others extract water from the plant parts they eat, such as leaves and fruit.

Desert Winds

Desert winds range from cool evening breezes to major dust and sand storms. Desert animals can run, fly, burrow, huddle, and hide when the winds come up, but plants are stationary and must have defenses built up. Some are shaped to withstand the wind. For example, varieties of cactus break the force of the wind with thick, interlocking spines. Some plants take advantage of the wind by dispersing their seeds. The tumbleweeds roll over the open desert depositing their seeds as they roll. Cottonwood trees let loose a large amount of “fluff” that contains its seed. Wind also helps increase the aridness and helps shade the desert by building, moving, demolishing, and eroding the landscape.

Cold Desert

These deserts are characterized by cold winters with snowfall less than 10 cm a year. Cold deserts are found west of the Rocky Mountains, in eastern Argentina, and throughout central Asia. They have short, moist, and moderately warm summers with fairly long, cold winters. The average winter temperature is between -2 to 4 degrees Celsius (28 to 39 degrees F) and the average summer temperature is between 21-26 degrees Celsius (69 – 78 degrees F). The soil is heavy, silty, and salty, and the plants are widely scattered.

The Tundra

The tundra is the coldest of all the earth's biomes. The tundra's characteristics are:

- Extremely cold climate
- Low biotic diversity
- Simple vegetation
- Limitation of drainage
- Short season of growth and reproduction
- Energy and nutrients in the form of dead organic material
- Snowy landscapes
- Little precipitation

The two types of tundra are the arctic tundra and the alpine tundra.

Arctic tundra

The arctic tundra is located in the northern hemisphere, encircling the north pole and extending south to the coniferous forests of the taiga. The arctic is known for its cold, desert-like conditions. The average winter temperature is -34 degrees Celsius (-29 degrees F). The average summer temperature is $3-12$ degrees Celsius ($37-53$ degrees F), which allows this biome to sustain life. Rainfall may vary in different regions of the arctic. Yearly precipitation, including melting snow, is $15-25$ cm. Soil is formed slowly. A layer of permanently frozen subsoil called **permafrost** exists, consisting mostly of gravel and finer material. During the brief summers, the top section of the soil thaws out allowing plants and microorganisms to grow and reproduce. The growing season ranges from $50 - 60$ days. There are no deep root systems in the vegetation of the arctic tundra, however there are still a wide variety of plants that are able to resist the cold climate. These plants include:

- Low shrubs, reindeer mosses, and grasses
- Sedges
- Lichen
- Grasses
- Mosses
- Dwarf willows

All of the plants are adapted to the winds and the disturbances of the soil. The plants are short and grouped together to resist the cold temperatures and are protected by the snow during the winter. They are able to carry out photosynthesis at low temperatures and at low light intensities. The growing season is short and most plants reproduce by budding and division rather than by flowering. Animals in the arctic are diverse. The arctic animals include:

- Herbivorous mammals: lemmings, voles, caribou, arctic hares, and squirrels
- Carnivorous mammals: arctic foxes, wolves, and polar bears
- Migratory birds: ravens, falcons, loons, snow birds, and gulls
- Insects: mosquitoes, flies, moths, grasshoppers, black flies, and arctic bumble bees

- Fish: cod, salmon, and trout

The animals are adapted to handle long, cold winters and to breed and raise young quickly in the summer. Animals such as mammals and birds also have additional insulation from fat. Many animals hibernate during the winter because food is not abundant. Another alternative is to migrate south in the winter. Reptiles and amphibians (cold-blooded animals) are few or absent because of the extremely cold temperatures.

Alpine tundra

Alpine tundra is located on mountains throughout the world at high altitudes where trees cannot grow. The nighttime temperature in the alpine tundra is usually below freezing. Unlike the arctic tundra, the soil in the alpine is well drained. The plants are very similar to those of the arctic. Animals living in the alpine tundra are well adapted to this area, as well. These include:

- Mammals: pikas, marmots, mountain goats, sheep, and elk
- Birds: grouse-like birds
- Insects: springtails, beetles, grasshoppers, and butterflies

Grasslands

The grasslands are lands dominated by grasses rather than large shrubs and trees. There are two main divisions of grasslands: savannas and temperate grasslands.

Savanna

The savanna is grassland with scattered individual trees. They cover almost half the surface of Africa and large areas of Australia, South America, and India. Climate is the most important factor when a savanna is created. Savannas are always found in warm or hot climates where the annual rainfall is from about 50-127 cm a year. Rainfall is concentrated in six or eight months of the year, followed by a long period of drought when fires can occur. If the rain was well distributed, many areas would become a tropical forest. Seasonal fires play a vital role in its biodiversity. Fire is prevalent around January, the height of the dry season. Fire kills insects in the area then birds eat the insects killed by the fire. The dry stems and grasses are burned in the fire but the deep roots of the grasses are untouched. They begin new growths once the soil becomes moist. Once the new grasses grow, newborn antelope calves are able to feed on it. Trees survive a fire by retaining moisture in their trunks, branches, and leaves. Savannas that result from climatic conditions are called **climatic savannas**. Savannas that are caused by soil conditions and that are not entirely maintained by fire are called **edaphic savannas**. A **derived savanna** results from people clearing forest land for cultivation. Farmers cut a forest, burn dead trees, and plant crops in the ashes. When the soil is no longer fertile, the field is abandoned and grasses take over the ground. The soil of the savanna is porous with rapid drainage of water. The vegetation consists of grasses and forbs. **Forbs** are small broad-leaved plants that grow with the grasses. Because there are a large number of species competing for living space, usually only one or a few kinds of grasses are successfully grown in a particular area. The savanna has both a dry and rainy season. Giraffes, zebras, buffaloes, kangaroos, mice, moles,

snakes, termites, beetles, lions, leopards, and elephants are animals found in savannas around the world.

Temperate Grassland

This type of grassland is characterized as having grasses as the dominant vegetation. **Prairies** are grasslands with tall grasses while **steppes** are grasslands with short grasses. Prairies are known to have hot summers and cold winters. Summer temperatures can be well over 38 degrees Celsius (100 degrees Fahrenheit) and winter temperatures can be as low as -40 degrees Celsius. Rainfall is less than in the savannas, and it usually occurs in the late spring and early summer. The annual average rainfall is about 50-88 cm. The rainfall influences the height of the grasses. The wetter regions have taller grasses. Seasonal drought and occasional fires are also important in these grasslands. The soil is nutrient rich from the growth and decay of the grass roots. The rotted roots hold the soil together and provide a nutrient source for plants. The drought, occasional fires, and grazing by large mammals prevent wood shrubs and trees from becoming established. These type of grasslands are found in South Africa, Hungary, Argentina, Uruguay, Soviet Union, and in the plains and prairies of central North America. The animals found in the temperate grasslands around the world are gazelles, zebras, rhinoceros, wild horses, lions, wolves, prairie dogs, jack rabbits, deer, mice, foxes, skunks, sparrows, hawks, owls, snakes, grasshoppers and spiders.

Steppes are dry areas of grassland with hot summers and cold winters. They receive 25-50 cm of annual rainfall. Steppes occur in the interiors of North America and Europe. People use steppes to graze livestock and to grow wheat and other crops.

Forest

Forests occupy approximately one-third of the Earth's land area. As human populations have increased, deforestation, pollution, and industrial usage have brought problems to this important biome. These biomes are dominated by trees and other woody vegetation. There are three major types of forest: tropical, temperate, and boreal forests (taiga). They are classified according to latitude.

Tropical Forest

The rainforests are found near the equator, within the area bounded by latitudes 23.5 degrees N and 23.5 degrees C. One of the major characteristics of tropical forests is that winter is absent and only two seasons are present (rainy and dry). The temperature is on average 20-25°C (68-77 degrees F) and varies little throughout the year. The average temperatures of the three warmest and three coldest months do not differ by more than 5 degrees. Precipitation amounts are evenly distributed throughout the year with the annual rainfall exceeding 2000 mm. The soil of the tropical forest is nutrient-poor and acidic.

These forests have the greatest diversity of species. Plants such as orchids, bromeliads, vines (lianas), ferns, mosses, and palms are present in tropical forests. Animal life includes numerous birds, bats, small mammals, and insects. The plant life is highly diverse: one square kilometer may contain as many as 100 different tree species. Trees are 25-35 meters tall, with supporting trunks and shallow roots. More than half of

tropical forests have already been destroyed. Different plant and animal life live in different layers (zones) of the rain forest based on the environment. Starting at the top layer (zone), **Emergents** – giant trees that are higher than the average canopy height. It houses many birds and insects. **Canopy** – the upper parts of the trees. The canopy is multilayered which does not allow much light to penetrate the forest floor. This environment is home to insects, birds, reptiles, and mammals. **Understory** – a dark, cool environment under the canopy leaves but over the forest floor. **Forest floor** – many insects are found in this layer and the largest animals of the rainforest live in this layer.

Rainforests are also classified into various types. The **evergreen rainforest** has no dry season while the **seasonal rainforest** has a short dry period in a very wet tropical region. The seasonal rainforest exhibits definite seasonal changes as trees undergo developmental changes simultaneously, but the general vegetation remains the same as in the evergreen rainforests. The **semi-evergreen rainforest** has a longer dry season (the upper tree story consists of deciduous trees, while the lower story is still evergreen). Lastly, in the **moist/dry deciduous forest** the length of the dry season increases further as rainfall decreases (all trees are deciduous).

Temperate forests

These forests occur in the middle latitudes around the globe. The areas where these forests are located have distinct seasons with warm summers and cold winters. The trees are **deciduous**, which means they drop their leaves in the fall. Some temperate forests have a mixture of evergreen and deciduous trees. The temperature varies from -30° C to 30° C (-22 to 86 degrees F). Precipitation (75-150 cm) is distributed evenly throughout the year. The soil is fertile due to the decaying litter on the forest floor. The canopy is moderately dense which allows light to penetrate, resulting in a well-developed and richly diversified understory. The plant life is characterized by 3-4 tree species per square kilometer. Trees are distinguished by broad leaves that are lost annually and include such species as oak, hickory, beech, hemlock, maple, basswood, cottonwood, elm, willow, and spring-flowering herbs. The animal life is represented by squirrels, rabbits, skunks, birds, deer, mountain lion, bobcat, timber wolf, fox, and black bear. The temperate forests can also be classified due to the climate in their location.

Boreal forests, or taiga

These forests are found between 50 and 60 degrees north latitude. Boreal forests can also be found in the broad belt of Eurasia and North America. Two-thirds of the boreal forests are found in Siberia with the rest in Scandinavia, Alaska, and Canada. Seasons are divided into short, moist, and moderately warm summers and long, cold, and dry winters. Temperatures are very low and precipitation is primarily in the form of snow, 40-100 cm annually. The soil is thin, nutrient-poor, and acidic. The canopy of this forest also permits low light penetration to the understory. Plant life consists mostly of evergreen conifers with needle-like leaves, such as pine, fir, and spruce. Animals that live in this forest include woodpeckers, hawks, moose, bear, weasel, lynx, fox, wolf, deer, hares, chipmunks, shrews, and bats.

Aquatic

The aquatic biome covers nearly 75% of the Earth's surface. These regions are home to various species of plants and animals. Although water temperatures can vary widely, the aquatic areas tend to be humid with cooler air temperatures.

The aquatic biome can be broken down into two types: freshwater and marine (saltwater).

Freshwater Regions

Freshwater is defined as having a low salt concentration—usually less than 1%. Plants and animals in freshwater regions are able to live in the low salt water content and have adapted to it. They would not be able to survive in areas of high salt concentration, like the ocean. There are different types of freshwater regions: ponds and lakes, streams and rivers, and wetlands. Each have different characteristics.

Ponds and Lakes

Many ponds are seasonal, lasting just a couple of months. Lakes, on the other hand, may exist for hundreds of years or more. Ponds and lakes are often isolated from other water sources so the diversity of species may be limited. Lakes and ponds are divided into three different “zones”. These zones are determined by depth and distance from the shoreline. The zone near the shore of a lake or pond is the **littoral zone**. This zone is the warmest since it is on the surface and can absorb sunlight. It is a fairly diverse community, which can include several species of algae, rooted and floating aquatic plants, grazing snails, clams, insects, crustaceans, fishes, and amphibians. In the case of the insects, such as dragonflies and midges, only the egg and larvae stages are found in this zone. The vegetation and animals living in the littoral zone are food for other creatures such as turtles, snakes, and ducks. The littoral zone surrounds the **limnetic zone**. Plankton dominate the limnetic zone. **Plankton** are small organisms with short life spans that play a vital role in the food chain. Without aquatic plankton, there would be few living organisms in the world. A variety of freshwater fish also occupy this zone. The deep-water part of the lake/pond is known as the **profundal zone**. This zone is much colder and denser than the zones closer to the surface. Little light penetrates into the profundal zone.

Temperature varies in ponds and lakes during different seasons. During the summer, the temperature can range from 4°C (39 degrees F) near the bottom to 22°C (71 degrees F) at the top. During the winter, the temperature at the bottom can be 4°C (39 degrees F) while the top is 0° C (32 degrees F – freezing point).

Streams and Rivers

Streams and rivers are bodies of flowing water moving in one direction. They get their start in springs, through snowmelt or lakes. They then travel all the way to their mouths, usually to another water channel or the ocean. As a stream or river flows from the source to the mouth its characteristics change. The temperature is cooler at the source than it is at the mouth. The water is clearer, has higher oxygen levels, and freshwater fish such as trout are found there. Towards the middle part of the stream/river, the width increases, as does the diversity of specific numerous aquatic green plants and algae

that can be found. Toward the mouth of the river/stream, the water becomes murky from all the sediments that it has picked up upstream, decreasing the amount of light that can penetrate through the water. Since there is less light, there is less plant life. Due to the lower oxygen levels, fish that require less oxygen, such as catfish and carp, can be found.

Wetlands

Wetlands are areas of standing water that support aquatic plants. Marshes, swamps, and bogs are considered wetlands. Plant species that are adapted to the very moist and humid conditions are called **hydrophytes**. These include pond lilies, cattails, sedges, tamarack, and black spruce. Many species of amphibians, reptiles, birds (such as ducks and waders), and furbearers can be found in the wetlands. There are some salt **marshes** that have high salt concentration. These salt marshes support different species of animals, such as shrimp, shellfish, and various grasses.

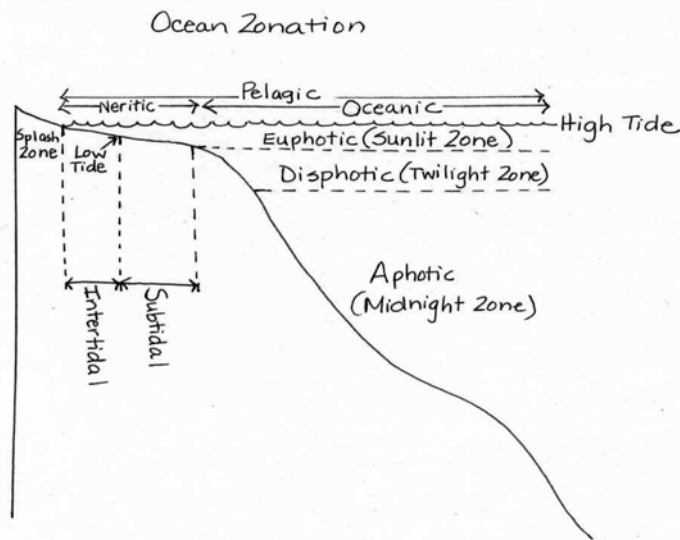
Marine Regions (Saltwater)

Marine regions cover about three-fourths of the Earth's surface and include oceans and coral reefs. Marine algae supply much of the world's oxygen supply and take in a huge amount of carbon dioxide. The evaporation of the seawater provides rainwater for the land.

Oceans

The ocean can be divided into many zones. The ocean bottom is the **benthic** zone, and the water itself is the **pelagic** zone. The **neritic** zone is the part of the pelagic zone that extends from the high tide line to an ocean bottom less than 600 feet. Water deeper than 600 feet is called the **oceanic zone**. This zone is also divided on the basis of water depth into the **epipelagic, mesopelagic, and bathypelagic zones**. These zones are based on the amount of sunlight they receive (sunlight zone, twilight zone, and midnight zone.) Although the **sunlight zone** makes up only a small percentage of the ocean by volume, more than 90 percent of all marine species live there. It is the only zone where enough light penetrates the surface to support photosynthesis. Plant plankton grows near the surface. Some fish remain below the surface during the day and then feed close to the surface at night when darkness helps them hide from predators. As the amount of light changes with the seasons, it affects the plant and animal life. As waters warm in the spring, the plankton growth increases. Some animals migrate to the areas of plankton growth to feed on it. When marine organisms die, their remains sink toward the ocean floors and decompose. This becomes food for the animals that live in the deeper ocean depths. Below the sunlight zone lies the **twilight zone**. Descending about 1000 meters, water pressure increases, temperature decreases, and most of the sunlight has been absorbed by the upper layer of water. Therefore, there is less light. Plants cannot grow in the dimmer waters, fewer animals live here and those that do live here are smaller in size. Some of these animals swim to the sunlight zone at night to eat. Others prey on other animals in the twilight zone and others survive by eating plant and animal remains that fall from the sunlight zone. Ninety percent of the ocean space lies in the **midnight zone**, where no light is penetrated. In the midnight zone, water pressure can exceed two tons per square inch

and the water temperature is near freezing. It is completely dark in this zone. It is believed that only one percent of all ocean species live here. These animals have unique organs and body parts that allow them to function in total darkness. On the floor of this zone, hydrothermal vents are found where the Earth's crust releases hot, mineral rich water out of various cracks. Bacteria consume the hydrogen sulfide in the water and the animals that live in the vent communities feed on this bacteria.



Coral Reefs

Coral reefs are widely distributed in the warm shallow waters. They can be found as barriers along continents (the Great Barrier Reef off of Australia) and islands. The dominant organisms in coral reefs are corals. Corals are interesting since they consist of both algae and tissues of animal polyp. Corals obtain nutrients through the algae via photosynthesis. They also obtain plankton from the water through their tentacles. Species of microorganisms, invertebrates, fishes, sea urchins, octopuses, and sea stars are found in the coral reefs. There are many threats to coral reefs that include using cyanide and dynamite in fishing practice and pollution.

Seagrass Meadows

In these meadows are a variety of fish and small plants and animals that live on the stems and leaves of the seagrass. One square meter of seagrass can generate up to 10 liters of oxygen per day. Seagrasses are flowering plants that grow underwater in coastal marine environments. They grow in shallow, well-lit water in the shelter of bays and inlets and often form dense meadows that look like the grasslands that are on land. The seagrass roots absorb nutrients from the water around them but do not take up water. These meadows are important breeding and feeding grounds for fish and invertebrate species. They play an important role in the food web of inshore coastal areas. Australia has about 51,000 sq. km of seagrass meadows. Seagrass meadows

are quite sensitive to human impacts and are important indicators of the health of the marine environment.

Mangrove Forest

Mangrove forests stabilize the shoreline and provide habitat and breeding sites for wildlife. They are woody communities that develop on sediments in sheltered estuaries, inlets, and bays in the tropics and subtropics. Mangroves are tropical trees that are adapted to saltwater and the regions of tides. Such adaptations include foliage of salts and a shallow or above ground spreading root system. The tree canopy is a habitat for mammals, birds, and insects.

Kelp Forests

Kelp forests are made up of giant seaweed called kelp, and they live in cold, nutrient rich water. Due to their dependence on light for photosynthesis, they are rarely deeper than 15 to 40 meters. They are found in shallow, open coastal waters. The larger forests are restricted to temperatures less than 20°C (168 degrees F), extending to both the Arctic and Antarctic circles. Kelp consists of three parts: the holdfast, the stipe, and the blade. The **holdfast** attaches the kelp to the ocean floor, the **blade** is the leaflike part that takes in the sunlight to make food and the **stipe** is the part that connects the holdfast to the blade.

Learning Experience 1: Planting Bean Seeds

Objective: Students will plant seeds in individual jars and predict the basic needs of plants for proper development.

Materials:

For the class:

8 plastic jars
20 bean seeds
Potting soil
Sand
Water*

*provided by teacher

Preparation:

Read background information on page 3. These bean plants are for use in Learning Experience #4. Only four bean plants are needed but materials to plant eight seeds have been provided in case some of the seeds fail to germinate. The planting jars should be checked daily, even though it may not be necessary to water the plants daily. Bean seeds germinate in 10-14 days.

Basic Skills Development:

Discussing
Observing
Describing
Manipulate Materials
Predicting
Inferring

Evaluation Strategy:

Students are able to demonstrate the proper method for planting seeds and predict that a plant needs water, sunlight, and nutrients from the potting soil to survive.

Vocabulary:

soil seed
nutrients plant

What is the proper method to plant a seed?

Students are to assist in planting bean seeds in the plastic jars provided. These bean plants are to be used in Learning Experience #4. It may be beneficial to plant a couple of the same seeds in each jar to increase the chances of germination. If multiple plants grow, they can be transplanted into individual containers at a later time.

First, pour sand into the bottom of the jar to approximately one centimeter in height. Students are then to fill their jar with potting soil. Dig a hole in the potting soil (twice as deep as the diameter of the seed). Place the seed in the hole and cover it with potting soil. Repeat these steps with all the seeds. Water the potting soil. Set the jars in a location where they can get a lot of light/warmth but not near a cold or drafty window.

Discuss how a plant grows and develops. Emphasize with students that the roots grow underground, and the stem and leaves grow above ground.

Discussion Questions:

What parts are going to grow from the seed?

How do you think roots will help the plant?

How do you think a stem helps a plant?

How do you think leaves help a plant?

Learning Experience #4 should be started once plants grow to about 5 cm in height.

Learning Experience 2: Basic Needs

Objective: Students will identify the needs of various organisms and then compare and contrast the needs of various organisms to develop a common list of needs for all living things.

Materials:

For each pair of students:

2 Habitats Student Activity Books
Construction paper* 28 cm x 43 cm or (11" x 17")*
Pictures of various organisms of choice*
Scissors*
Paste*

For the class:

Chart paper*
Felt tip markers*

*provided by teacher

Preparation:

Read background information on page 3. Students may need access to books, magazines, and internet sites to gather a picture of their organism.

Basic Skills Development:

Interpreting Data
Discussing
Generalizing
Predicting

Evaluation Strategy:

Students will identify the needs of familiar organisms and develop a list of similar needs of all living things.

Vocabulary:

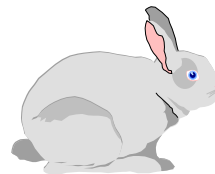
organism
need
shelter
living things
non-living things
compare
contrast

What are the needs of living things?

Ask students to get into pairs and have them think of an animal or plant they are familiar with. Teacher may provide student pairs with pre-determined pictures of animals or plants. Students should find a picture of that animal or plant and paste it on a large piece of construction paper. Each student pair should have a different animal or plant. Encourage a student pair to choose a human being for their animal and a bean plant for their plant.

Introduce the word **organism** as a living thing. Students are to think about what their chosen organism needs to survive. They are to write the various needs of their organism in the boxes on their activity sheet for Learning Experience #2 in the Habitats Student Activity Book. Students should be as specific as possible. These boxes can be cut out and pasted under their picture. Students should think about the "needs" as the things essential to survival rather than just the wants of the organism.

Rabbit



Water

Rabbit Pellets

House

Daisy



Water

Sunshine

Learning Experience 2 continued

Page 2

Discussion Questions:

What kinds of food does your organism eat?
What kind of house does your organism need?
Do you think your items are real needs? Explain.

Student pairs should then share their work with the class. The papers created are to be posted on the chalkboard and students are to look for patterns and similarities. Students should notice that each organism needs food, water, shelter, space, light, and air, but that those needs are met in different ways and in different degrees. Write the list of basic needs on chart paper and add to student lists on their organisms as necessary. Students may list food as a need under various plants. Explain that plants do need food but they make their own food from sunlight (another need of a plant).

Discussion Questions:

What can we say about the needs of all organisms?
How are the needs alike? Different?
Are there any needs of certain organisms that are unique?
What does the plant/animal do if they can't meet their basic needs?

It is also important for students to see that the needs (food, water, shelter, etc.) are all non-living things and that the living things (organisms) depend on these non-living things to survive.

Learning Experience 3: School Habitat

Objective: Students will classify a habitat as complete or incomplete and will generate solutions on how to make an incomplete habitat more complete.

Materials:

For each student:

Habitats Student Activity Book

Pencils*

Drawing paper*

Crayons*

*provided by teacher

Preparation:

Read background information on pages 3 and 4. A map of the school divided into sections is to be drawn in advance and given to students as their activity sheet for Learning Experience #3 in the Habitats Student Activity Book. Students could assist in creating the map of the school. This is an important skill that teachers may wish to include in this learning experience. The walk around the school and drawing of the map could be done on a prior day.

Basic Skills Development:

Observing

Discussion

Gathering Data

Interpreting Data

Evaluation Strategy:

Students will identify the basic needs that are met in the school habitat and describe how the habitat could be more complete.

Vocabulary:

habitat

complete habitat

incomplete habitat

What parts of a habitat meet the needs of living things.

As a class, choose one of the animals from those displayed from Learning Experience #2. Ask students to review the needs of that animal and begin to discuss some specifics about those needs.

Discussion Questions:

Where do you think the animal gets its food?

Where does it find shelter?

How does it get water?

Where does the animal live?

What do you think its living environment looks like? Why do you think so?

What does the animal need in the area where it lives?

Students could also draw a picture of what they think this animal's environment looks like. The picture should include some or all of the animal's needs. Introduce the word **habitat** to students. A habitat for this animal is what they just described and habitats of different organisms may be similar to one another. For example, the habitat for a rose bush may be within the habitat of ants. Insects share space, but they gather food from different areas.

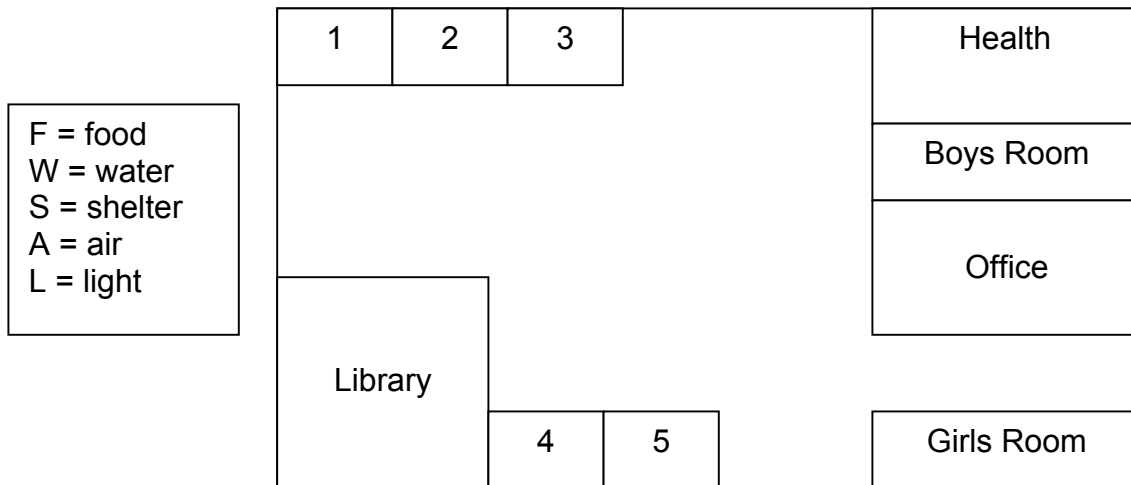
Students are now going to closely examine their school habitat to see if it is a good habitat for people. In other words, some habitats are complete and some are incomplete. Is the school a complete habitat?

Learning Experience 3 continued

Page 2

As a class or in small groups, with the teacher, ask students to take a walk around the school and school grounds to locate where the needs of living things in the school building are being met. Students are to record on their school maps where they found their needs being met. Developing a key with students to help illustrate on the map where these needs are being met may be helpful for students.

Example:



Discuss the group(s) findings.

Discussion Questions:

- Do you think we could live at school? Why or why not?
- How does the school meet the need for food?
- Where does the food come from?
- Where would you get food if the cafeteria ran out?
- How does the school meet its need for water?
- Where does the water come from?
- What if water pipes were closed?
- What do the rooms provide shelter from?
- Do they protect us from heat/cold? How?
- Is there enough space to be comfortable?
- Is there a place for sleep?
- Is there a place to rid bodily waste?
- How well does the school meet our basic needs?
- Is the school a complete or incomplete habitat?

Learning Experience 3 continued

Page 3

Students should begin to see that the school does not have everything to meet all our basic needs. How could the school become a complete habitat? (Grow food, collect rainwater) Because the school is an incomplete habitat, we must go into the community to meet those needs not met on school grounds.

Extension:

To reinforce concepts, students could be given homework to draw and label a map of their home similar to what was created at school. Parent involvement will be needed and it would be a nice home/school connection.

Learning Experience 4: Needs of Bean Plants

Objective: Students will identify the needs of a bean plant through experimentation.

Materials:

For each student:

Habitats Student Activity Book

For the class:

Bean plants

Interlocking centimeter cubes

Preparation:

Read background information on page 3. Bean seeds should be grown to 5 cm for this learning experience to be successful.

Basic Skills Development:

Observing

Comparing

Gathering & Organizing Data

Interpreting Data

Predicting

Identify Variables

Evaluation Strategy:

Students will identify the needs of a bean plant through experimentation that alters the needs of the plant.

Vocabulary:

seedling

experiment

need

change

What are the needs of plants?

In Learning Experience #2, students planted bean seeds for use in a class experiment. Once the seedlings have grown to 5 cm, their needs and conditions can be altered to identify the needs of the plant. Have students complete the activity sheet for Learning Experience #4 in the Habitats Student Activity Book.

Review with students the needs they predicted their bean seeds would need. Ask students what they think might happen if the bean seed did not get the things it needed. One way to find out is to change in some way the needs of the bean plants. Refer back to Learning Experience #2 and the needs of the plants listed. Ask students to think of some ways we could alter some of the plant's conditions. (examples: Place plant in sunny spot and continue to water – Plant A, stop watering one plant, but keep it in sunlight – Plant B, place plant in shady spot but continue to water – Plant C, place plant in darkness but continue to water – Plant D. Place plant under artificial light (no sunlight) and continue to water (Plant E). Be sure students predict what they think will happen to the plant before beginning their observation. Once plant conditions have been altered, students are to observe one specific plant over a period of time and record the effects of the changes of the needs of the plants. Students can use the interlocking centimeter cubes to measure the height of the plant. After observations are complete, ask groups to share how the

Learning Experience 4 continued

Page 2

plant they observed changed because its needs changed.

Discussion Questions:

Do plants need water? Why do you think so?

Do plants need sunlight? Why do you think so?

Are the things our bean plants need living or nonliving?

What do you think would happen if we tried to grow our plants without soil? What does soil do for the bean plant?

What do you think would happen if we had many bean plants growing in our jar?

Learning Experience 5: Animal Parts & Defenses

Objective: Students will identify various structures of animals and explain how these structures help the animal meet its needs and protect itself from harm.

Materials:

For each pair of students:

2 Habitats Student Activity Books
Double lens magnifier
Petri dish
Insects from the schoolyard*

For the class:

Pictures from Learning Experience #2
Chart paper*
Felt tip markers*
Index cards*

*provided by teacher or students

Preparation:

The chart on animal defenses will need to be created prior to this learning experience with the class.

Basic Skills Development:

Observing
Discussing
Describing

Evaluation Strategy:

Students will describe the defense structures of animals including their insects and explain how these structures help the animal/insect meet its needs.

Vocabulary:

adapt
adaptation
antenna
animal
insect
protect
predator
prey
defense
food chain

How do animals protect themselves in their environment?

Ask students to look again at the pictures of the animals from Learning Experience #2. Ask students to locate an animal with sharp teeth and inquire what this animal may do with its sharp teeth. Some students may say eat, but others may say bite. Although both are correct, ask students how would the animal use its teeth to protect itself. Of course, an animal may bite to protect itself. Create a chart similar to the example on page 24 in which students are looking at the pictures of all the animals from Learning Experience #2 and recognizing the body parts the animal has that could help it protect itself and what the animal does as a defense. Other animals can be added to the chart. Pictures of the additional animals may also need to be located.

Have students complete the activity sheet for Learning Experience #5 in the Habitats Student Activity Book.

Learning Experience 5 continued

Page 2

Defense Chart

Animal	Things Animal Has	Things Animals Done
Dog	Teeth	Gowls, bites, runs away
Cat	Teeth, claws	Bites, scratches, climbs
Deer	Long legs	Runs swiftly, kicks
Bird	Wings	Flies away
Turtle	Hard shell	Hides in shell
Skunk	Odor glands	Fans tail as warning and sprays
Butterfly	Protective coloration, wings	Remains still, flies away
Bee	Stinger, wings	Stings, flies away
Lizard	Teeth, tail, spines	Bites, runs, hides, plays dead, whips with tail

Once animal defenses have been identified, pictures can be grouped by common defenses. Be sure the discussion includes how humans (an animal) protect themselves (kick, run, scream, cover up under something).

Introduce the words “predator” (an animal that eats other animals) and “prey” (an animal that is hunted and eaten). Use the pictures and student background knowledge to identify predator-prey relationships among the pictures. For example, cat is predator of mice. Extend the predator-prey concept by introducing the idea that a predator may become prey for another animal. For example, the cat that is predator to the rat can become prey to a hawk or wolf.

Learning Experience 5 continued

Page 3

These are all links in a **food chain**. If there are pictures missing in the predator-prey chain, index cards can be used to write missing animal names into the chain.

Discussion Questions:

What body parts on these animals could help them defend themselves?

How could they use these body parts?

Do any of the animals posted prey on another animal that is posted? Explain.

Could any of the animals that are predators become prey? Explain.

What is a food chain?

Can we create a food chain with our pictures?

Could we add animals in to create food chains?

Session 2:

Each pair of students are to go out into the schoolyard and collect an insect that they would like to examine closely. They are to put this insect into their petri dish and bring the insect back to the classroom.

Students are to observe their insects very carefully and to look for specific structures that would help the insect get what it needs from its habitat and possibly to avoid danger. These structures help the insect adapt to its habitat. Students can make a careful, detailed drawing of their insect on the activity sheet for Learning Experience #5 in the Habitats Student Activity Book. They can then describe to the class the special structures of their insect and what the insects use their structures for.

Discussion Questions:

What structures help the insect meet its needs?

What parts help it move? How are they shaped?

Do these parts help it move quickly, climb, hang on to things?

What parts help it see?

How does the insect's body covering help the insect?

How do you think it protects itself?

(Example: outer covering acts as protection, butterflies and mosquitoes have sucking mouth parts like a straw, outer part of insect's feet are like hooks, crickets and grasshoppers legs act like springs, caterpillar's mouth parts act like scissors.)

Students are to return their insects to their homes. Take this opportunity to discuss why keeping them in the classroom may cause problems for the insects: not right food, wrong temperature, not enough space, etc.

Learning Experience 6: Animals Change With The Seasons

Objective: Students will identify and describe the actions of various plants and animals in the winter and how these actions help the animals adapt to its environment.

Materials:

For each student:

2 pieces of newspaper*
5 small pieces of red construction paper*
Construction paper*
Scrap materials*

For the class:

Book - Arctic Tundra by Michael Forman
2 plastic jars w/lids
4 #32 rubberbands
2 thermometers
Map of biomes
Sock*
Pictures of summer and winter scenes*
Map of the world*
Index cards*
Chart paper*
Felt tip markers*
Tape*
*provided by teacher

Preparation:

Read background information on pages 7 and 8. Summer and winter scenes can be found on the internet, as well as in books and old calendars. Students could even begin the learning experience by drawing their vision of summer and winter. A large map of the world will be used to illustrate where the various biomes of the world are located. A guide for mapping the biomes of the world can be found in this kit. Index cards can be taped to maps to show where these biomes are located.

How do plants and animals change throughout the different seasons?

Session 1:

Ask students to think about how we know when winter is coming (trees lose leaves, less animal activity, cold damp snow) and the things that humans do to prepare for the winter. (Get out winter clothes, add storm windows to houses, etc.) Explain that other animals besides humans and plants also get ready for winter.

Show students pictures of a summer scene and a winter scene.

Discussion Questions:

Discuss how the scenes are different. How are the summer and winter scenes different? What is missing? (plants covered with snow, ground covered with snow, no leaves on the trees) What type of animals live in an area similar to this summer picture? (squirrels, rodents, birds, etc.) Do you think these animals from the winter would have trouble getting food? (yes) Why? (food they normally eat is not available) How do they survive?

Introduce the book, Arctic Tundra to the students by explaining that in the tundra the winters are long. This book will help us understand how different animals survive in the tundra during the winter. Even though these animals live in the tundra, some of the things they do to prepare for winter are similar to what

Learning Experience 6 continued

Page 2

Basic Skills Development:

Interpreting Data
Discussing
Observing
Describing
Making Decisions

Evaluation Strategy:

Students will identify and describe the actions of various plants and animals in the winter and how these actions help the animals adapt to their environment.

Vocabulary:

hibernate	protect
migrate	permafrost
store	camouflage
active	defenses
energy	adapt

other animals do to prepare for winter that do not live in the tundra.

Locate the tundra areas on the world map and tape index cards with the name "tundra" to the map and the appropriate locations.

Before beginning the actual reading of this book, take a "picture walk" through the book to name some of the animals and plants found in the tundra.

Students are to focus on how those plants and animals change with the seasons.

Once the book has been read, ask students to list what different animals do to survive the winter. List on chart paper hibernate, migrate, stay active. Students can role play three reactions to winter. (Pretend they are sleeping – hibernate, arms like flapping wings or fins - migrate, walking motion - stay active)

Students should be familiar with the term "**adapt**" as the reason why animal behavior changes in the winter. Animals are adapting to their environment.

Discussion Questions:

How does the winter effect animals?
What animals hibernate? What does it mean to hibernate? Migrate?
Do some animals stay active during the winter? (yes) Name some of those animals.

Focus first on the animals that stay active during the winter. Discuss the changes that occur to fur or feathers. They grow more fur or feathers to keep warm. Demonstrate this to students by filling two jars with warm/hot water and

Learning Experience 6 continued

Page 3

cover the jar with its lid. Attach a thermometer to the jar with two rubberbands. Cover one of the jars with a sock. This sock represents the additional fur/feathers the animals that grow in the winter. Chart the temperature changes between the water in the jar that is left uncovered and the one that is covered. Both jars should start at the same temperature but the sock covering one of the jars should keep the water in the jar at a higher temperature longer. Check temperature every hour and chart and discuss the results.

Time	Jar With Covering	Jar Without Covering

Discussion Questions:

How does the temperature of the water in the uncovered jar compare with the jar that is covered with a sock? (water in covered jar stays warmer longer)

Why do you think this happens?

How does this compare to what happens to the bodies of animals that stay active during the winter?

This book also illustrates ways that animals protect themselves in the tundra. Review with students what was discussed in Learning Experience #5 concerning animal defenses.

Discussion Questions:

In what ways do animals protect themselves in the wild?

Why do they need to protect themselves? (predators)

What are predators?

What are prey?

Are there any predator/prey relationships described in the book?

Pass out two pieces of newspaper to students. One piece of newspaper will be placed on their desk while the other piece will be cut up into small pieces. Pass out to students five small pieces of red construction paper to add to their newspaper pieces. When

Learning Experience 6 continued

Page 4

students are ready, they are to hold their small pieces of newspaper and the small red pieces of construction paper in their hand over the newspaper covering their desks. They are to then dump them onto the desk. They are then to turn away from the desk and their partner can count to ten slowly. As soon as they reach the number ten, they can turn around and try to pick up as many of the various pieces as they can in 10 seconds. They are to count the number of pieces they picked up and notice if they picked up newspaper pieces or red pieces. The partners can then switch places. They can see who picked up the most pieces and then discuss how difficult it was to see the newspaper pieces on the newspaper. The red pieces stood out very well.

Discussion Questions:

What pieces (red or newspaper) were the easiest to see? Most difficult? Why?
Sometimes animals change to match their surroundings. It is called **camouflage**. How does this help the animal? (hides the animal so predators do not see it easily)
What animals in the tundra use camouflage? (ptarmigans, arctic fox, weasels)
What other animals do we know that use camouflage? (rabbits, baby deer, chameleon)
Do humans ever use camouflage? (soldiers, hunters)
Why do humans use camouflage?

Ask student pairs to use construction paper and scrap materials to create/draw an insect of their choice. Groups can choose a place they want to hide their insect and then camouflage their insect based on their chosen place. For example, if the students chose a bookshelf to hide their insect, they should look at the colors of the books on the shelf and match their insect's color to those books. Have each group hide their insect one at a time. Other groups can "hunt" for the camouflaged insects of other groups.

Move on to discuss the animals that **hibernate** in the winter. On page 16 of the book, the author refers to the ground squirrel hibernating in its nest during the winter in a nest underground. Review with students what it means to hibernate and how a squirrel can stay underground all winter, asleep, with no food.

Discussion Questions:

What does it mean when animals hibernate?
Why would an animal hibernate during the winter?
How does a squirrel prepare for winter? (gathers food, eats food, puts on fat for winter sleep, gathers materials for nests, page 27)
How does putting on extra fat help the animal survive during the winter? (uses fat as energy while sleeping to survive the winter)

Ask students how hibernation is different than migration. Migration is when animals move to a different location to meet their needs (food) in the winter when food may be scarce. Look at examples of that in the book (page 20,22). Refer back to Learning Experience #3 and have a discussion of a complete and incomplete habitat. In the

Learning Experience 6 continued

Page 5

winter, the habitat for these animals becomes incomplete so they move to another place where they can live in a complete habitat. In the summer, they return to the tundra area because their habitat is complete again.

Discussion Questions:

Why would animals store fat in the winter before hibernating/migrating? (store energy for the long winter and lack of food)

Why do other animals go elsewhere for the winter? (lack of food, shelter, needs not met)

Review this learning experience on how plants and animals change with the season by creating a chart like the one below. In a discussion with students, fill in the chart with the information from the book. See sample below.

Adapt to the Tundra

<u>Spring</u>	<u>Summer</u>
<u>Winter</u>	<u>Fall</u>

Learning Experience 6 continued

Page 6

Adapt to the Tundra

<p style="text-align: center;"><u>Spring</u></p> <p style="text-align: center;">Warmer temperatures Soil wet Bearberry and poppies grow Lichens cover rocks</p>	<p style="text-align: center;"><u>Summer</u></p> <p style="text-align: center;">More life Grizzlies, musk oxen shed coat (p. 24) Caribou return and graze Arctic wolves return Sandpipers fly from Mexico Swans and arctic terns returns from migration Ptarmigans turn brown to camouflage (p. 23) Flowers grow Insects flying around</p>
<p style="text-align: center;"><u>Fall</u></p> <p style="text-align: center;">Animals begin to move Animals get ready for hibernation Squirrels gather food and dig nests Arctic foxes and ptarmigans begin to turn white Insects die or prepare for winter Animals (musk oxen and grizzlies) grow thick coats</p>	<p style="text-align: center;"><u>Winter</u></p> <p style="text-align: center;">Squirrels, lemmings, grizzly bear hibernate (p. 16) Polar bear, musk ox, weasels, arctic fox grow thick coats (p. 16 & 17) Caribou, arctic wolves, sandpipers, swans, arctic terns migrate Few trees exist – permafrost Ptarmigans, arctic fox, weasels turn white for camouflage (p. 15) Ptarmigans grow extra features to keep warm and walk on the snow</p>

Learning Experience 7: Desert

Objective: Students will describe the conditions of a desert and identify the adaptations of plants and animals that live there.

Materials:

For each pair of students:

2 Habitats Student Activity Books

For the class:

4 #32 rubberbands

5 pie tins

5 thermometers

Plastic jar

Waxed paper

Book - The Desert by Gail Gibbons

Sand

Map of biomes

Index cards*

Map of the world*

Chart paper*

Felt tip markers*

4 paper towels*

Water*

*provided by teacher

Preparation:

Read background information on pages 4-6. A large map of the world will be used to illustrate where the various biomes of the world are located. A guide for mapping the biomes of the world can be found in this kit. Index cards can be taped to maps to show where these biomes are located.

Basic Skills Development:

Describing

Predicting

Discussing

Evaluation Strategy:

Students will describe a desert habitat and the adaptations of the plants and animals that live in the desert.

Vocabulary:

desert adapt

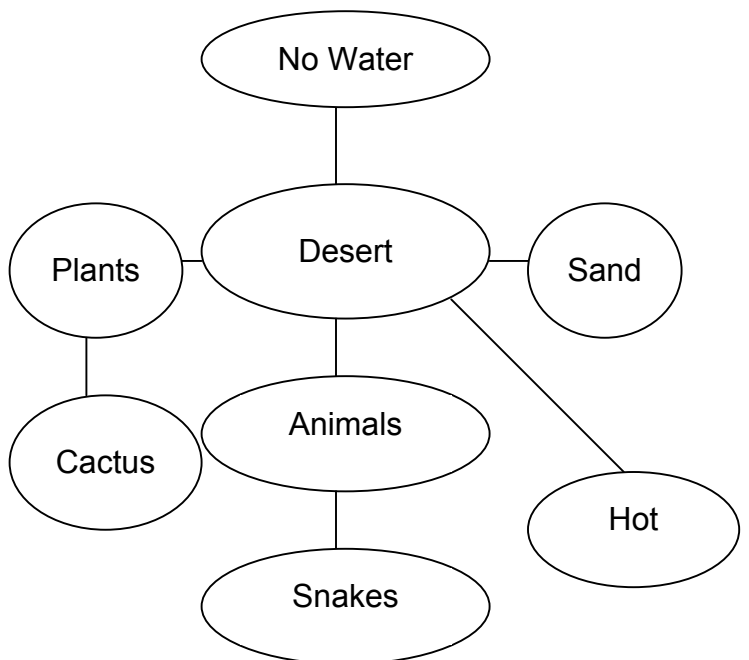
estivation evaporate

waxy hibernation

migrate

How do plants & animals live in the desert

Ask students to create a class word web on deserts.



Emphasize with students that the various plants and animals that live in these desert habitats have adapted to their habitat. Review the word **adapt** with students. Plants and animals have certain adaptations that allow them to adapt to their habitat. Explain that in this learning experience, we are going to look at the desert habitat in detail.

Begin reading the book Deserts by Gail Gibbons. Using the book as a resource, note where all the deserts in the world are located and use index cards to label them on the world map.

In the book, the author discusses how the water evaporates in the desert

Learning Experience 7 continued

Page 2

because of high temperatures. Introduce the word **evaporation**. When water is heated, it turns into a gas and it rises into the air. This is often what happens in a desert. It is so hot that any rains that fall evaporate. This heat and lack of water causes animals to adapt to an environment with little water. Five pie tins have been provided. Create a mini-desert by pouring a jar full of sand into the pie tin. Add the same amount of water to the sand in each pie tin. (1/4 jar full of water). Discuss with students locations in the classroom to place the five aluminum pie tins where the temperature differ. For example, place a few of them in a sunny window or near a heater then place a few of them in locations that would be cooler.

Take the temperature (in Celsius) in each location and record it on chart paper. Have students predict in what location the water will evaporate the quickest. The time difference of the evaporation of water from each pie tin can be charted. The sand should be observed at various intervals throughout the learning experience.

Discussion Questions:

How do you think the warm temperatures will effect the wet sand?

Is this similar to what happens in the desert? How?

What happened to the water? Where do you think it went? (into the air)

What do you think caused this? (heat)

In the book, the author also discusses how the waxy covering on the cactus allows the cactus to hold water.

Complete an activity in which four paper towels are dampened. Roll wax paper around two of the paper towels with rubberbands wrapped around the ends. The other two paper towels can be attached at the ends with rubberbands with no waxed paper. Place both paper towel bunches in one of the warm areas of the room. That can be located by reading the various thermometers placed around the room.

Discussion Questions:

What do you think will happen to the paper towel wrapped in waxed paper? Explain.

What kind of coating does a cactus have? (waxy)

How does this coating help the cactus? (keeps water/moisture inside the cactus)

The next day unroll the paper towels and have students compare how they feel. The waxed paper keeps the moisture inside the cactus. This waxy skin of the cactus allows the cactus to survive where there is little water. It is a way that cacti **adapt** to desert life.

Focus on the word “adapt” with students and look for any additional adaptations of animals that are in the book. (Example: jackrabbit gets its water from plants, camels live off fat stored in humps, long eyelashes, and thin eyelids of camels keep sand from getting in their eyes, camels can close nostrils to keep sand from getting in their nose,

Learning Experience 7 continued

Page 3

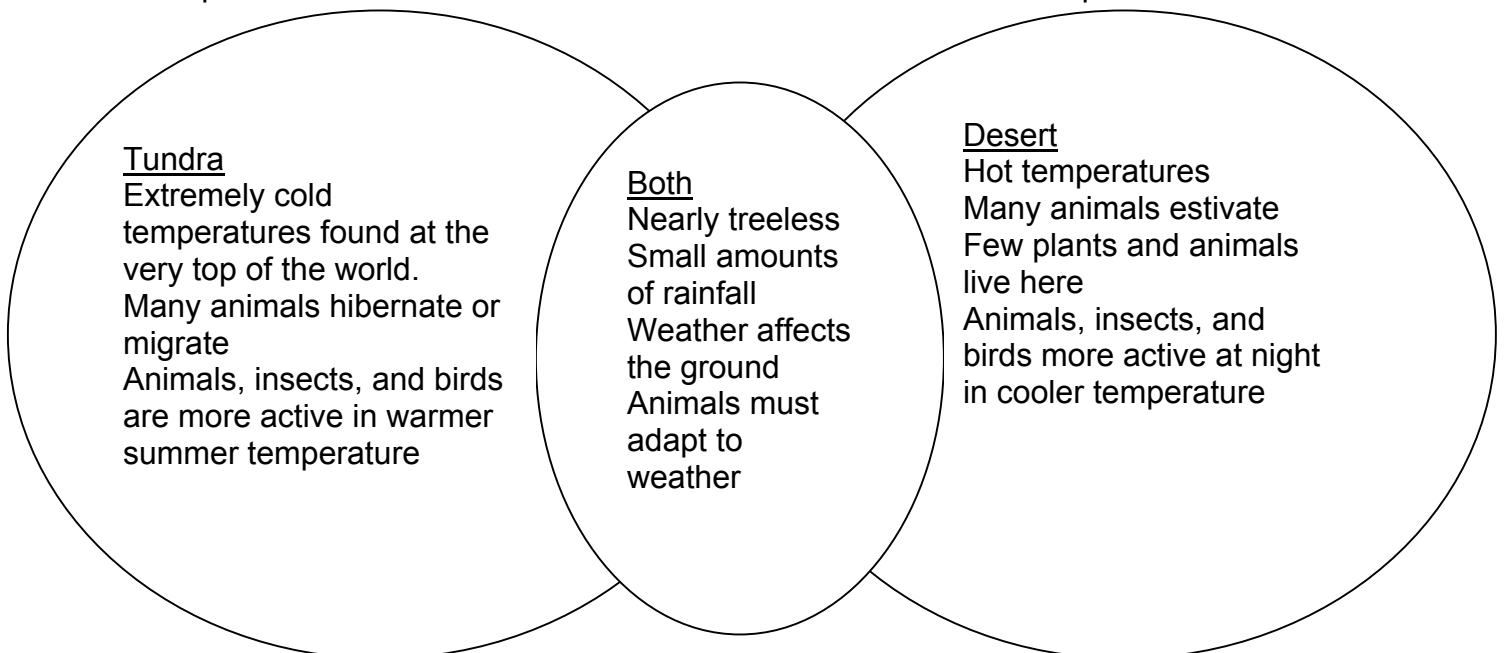
cactus grow taproots to gather water from great depths or shallow roots to gather water from the surface.) Also introduce the word **estivation**. It is when an animal becomes inactive. Compare this with hibernation. Emphasize again that burying themselves in the sand helps animals **adapt** to the desert.

Discussion Questions:

Why do you think animals would have to estivate? (too hot, estivate to keep cool)
Think about the sand on a hot beach, what does it feel like when you dig down into the sand? (cooler)
How do you think some of the animals of the desert keep cool? (bury themselves in the sand)
If you are outside in the hot sun and you want to cool down, where do you go? (in the shade)
When do you think the animals look for food if they are estivating during the day? (at night when it is cooler)
Think back to the information you learned about the tundra, how is the tundra similar to a desert? How are they different?

On the activity sheet for Learning Experience #7 in the Habitats Student Activity Book, ask students to draw a picture of a desert. Students should include one plant and one animal that live in the desert. Students can share their picture with the class.

On the activity sheet for Learning Experience #7 in the Habitats Student Activity Book, students can work with a partner or the whole class can create a Venn Diagram to compare and contrast tundra and desert environments. See example below.



Learning Experience 8: Rainforests

Objective: Students will investigate the number of plants and animals found in the rainforest, how we use items from the rainforest in our homes, and create a model of the layers of the rainforest using dioramas.

Materials:

For each pair of student:

2 Habitats Student Activity Books.

String (90 cm or 3 ft)

For each group (total of 3 groups):

Background picture for layer rainforest

Picture of rainforest animals

Book – Natures Umbrella – The Tropical Rainforests by Gail Gibbons

Photocopy paper boxes*

Glue*

Colored pencils/crayons*

For the class:

Tape measure

Map of biomes

Map of the world*

Index cards*

Tape*

*provided by teacher

Preparation:

Read background information on pages 9 and 10. Before this lesson is taught, ask students to complete their activity sheet for Learning Experience #8 in the Habitats Student Activity Book. On this activity sheet students are to find items from home that are found in the rainforest with the help of their parents/guardians. A large map of the world will be used to illustrate where the various biomes of the world are located. A guide for mapping the biomes of the world can be found in this kit. Index cards can be taped to maps to show where these biomes are located.

How does the rainforest help our life on Earth?

Begin this learning experience by asking students to take their 90 cm of string and tie it into a loop. Teacher may need to tie the loops ahead of time. Take the students outside so they can place this loop on the ground in an area of the playground. Have student pairs observe carefully and count the number of different plants and animals inside their loops. After five to ten minutes, call students back and ask them to share results. Tell students that the same amount of space in the rain forest would have ten times that many species of plants and animals. Figure out what those numbers would be. (ex. 15 different species = 150 species in the rain forest.)

Take students inside and ask them to share from their activity sheet for Learning Experience #8 in the Habitats Student Activity Book the different items that they have at home that came from the rainforest. This list will also emphasize with the students the number of plants we use for food and other items that we use in our home that come from the rainforest.

Use the world map to show students where the rainforests are located. Index cards, labeled as “rainforest” can be taped onto the map to show these locations. Compare the rainforest’s location to that of the tundra and the desert.

Learning Experience 8 continued

Page 2

Basic Skills Development:

Create Models
Observing
Describing
Discussing

Evaluation Strategy:

Students will create a model of each rainforest layer using a diorama and explain the importance of the rainforest to life on Earth.

Vocabulary:

rainforest
ecosystems
canopy
understory
forest floor

The book, Nature's Green Umbrella – Tropical Rain Forest by Gail Gibbons will help students with the names of the plants and animals that live in the rainforest. Compare the rainforest where it rains 240 inches per year to the desert where it rains less than 10 inches per year.

Discussion Questions:

How does the rainforest compare with the desert?

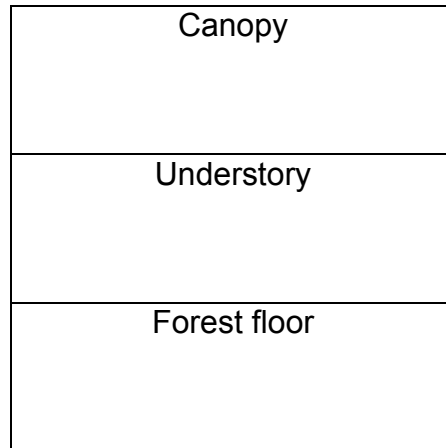
Do you think the plant and animals that live in the rainforest could live in the desert? Why or why not?

Do you think plants and animals that live in the desert could live in the rainforest? Why or why not?

In the book, the three layers of the rainforest are described. Once students are familiar with the three layers, they can create dioramas of each using photocopy paper boxes. Paste the backgrounds provided for each layer of the rainforest to the back of each box. Each box will represent one layer of the rainforest. Have students divide into three groups. Each group will focus on one layer of the rainforest. Using the book to help them, they will color in the pictures of various animals that are found in their layer of the rainforest. They are to cut out and paste the pictures of the animals that live in their layer of the rainforest to the background and or front portion of the box of their diorama to recreate their rainforest layer. Once all groups complete their layer, their boxes can be stacked in order and taped together.

Learning Experience 8 continued

Page 3



Student groups can then present to the class the animals that live in their layer of the rainforest and why they feel that particular animal lives in that layer.

(The author of the book, Nature's Green Umbrella only briefly discusses the emergent layer of the rainforest. The emergents are the tallest trees scattered throughout the rain forest. There are animals that live in this layer, however the book does not specifically list those animals. Although a layer has not been drawn for the emergent layer, the emergents can be drawn into the canopy layer picture.)

Discussion Questions:

How would you describe the layers of the rainforest?

What animals and plants live in each layer of the rainforest?

How is each layer of the rainforest different?

In the final pages of the book, the author discusses how the rainforests around the world are being cut down at a fast rate. Measure an area of the schoolyard equal to 91 meters (100 yards) to illustrate to students how much of the rainforest is being destroyed per second. Discuss the various reasons why the rainforest is being cut down and how cutting down the rainforest is harmful to the Earth.

Learning Experience 9: Temperate Forests & Boreal Forests

Objective: Students will identify adaptations and habits of plants/animals that live in temperate and boreal forests and compare/contrast these two type of forests.

Materials:

For each pair of students:

28 x 43 cm (11" x 17") large piece of construction paper*

Colored pencils/crayons*

For the class:

Book – Temperate Forests by Elaine Landau

Book – Northern Refuge by Audrey Fraggaloch

Map of biomes

Map of the world*

Chart paper*

Felt tip markers*

Index cards*

Evergreen bough*

Deciduous tree bough*

*provided by teacher

Preparation:

Read background information on page 10. Create the outline of the H chart from the page to be filled out by the class. A large map of the world will be used to illustrate where the various biomes of the world are located. A guide for mapping the biomes of the world can be found in this kit.

Basic Skills Development:

Comparing

Describing

Discussing

Evaluation Strategy:

Students will discuss the adaptations of plants and animals in temperate and boreal forests and compare the forests through a pictorial representation.

Vocabulary:

temperate forest boreal forest

migration hibernation

evergreen

How do the different types of forest compare?

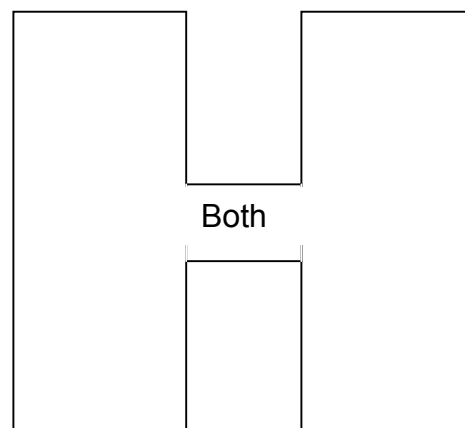
Session 1:

Refer to the map labeled with the variety of habitats and ask students if we have rain forests in our area. No rainforests are in our area but we do have forests around our area that are known as **temperate forests**. The book, Temperate Forest Mammals by Elaine Landau describes these forests and the types of mammals that live in the temperate forests. Students will recognize the picture on page 6 of the book as a forest in the fall similar to those in this area. Locate the areas on the world map where the temperate forests are located and label those areas using index cards.

Use an "H" chart to compare the rainforest to the temperate forest.

Rainforest

Temperate Forest



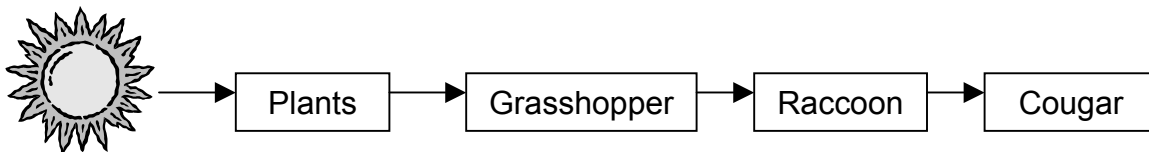
Learning Experience 9 continued

Page 2

List the animals in the book that are found in our temperate forests. Some animals are only found in the temperate forests of Australia or New Guinea.

Use the pictures in the book to point out the parts of the animals that help them live in the forest. An animal's body parts can tell us a lot about its lifestyle. (ex. the type of teeth found on the beaver helps it gnaw at trees – page 18, the beaver's tail is shaped to help it swim – page 14, sharp spines of the echidna is a defense of this animal – page 21)

Discuss some of the predator/prey relationships in the book. For example, it states in the book that one of the things that raccoons eat is grasshoppers. What do grasshoppers feed off of? (plants) What feeds on raccoons? (cougar)



Teacher may wish to enlarge the drawing above and display it on the chalkboard.

Reinforce with students that a food chain always begins with the sun. A plant makes its own food from the sun then the animal eats the plant and so on.

Session 2:

On the world map, label the Canadian Boreal Forest that extends across Canada from the Atlantic to the Pacific and up to Alaska. Show, also, that boreal forests are found in Siberia and Scandinavia (50-60° north latitude). This forest has long, cold winters, a short growing season, and evergreen forests. In North America, these forests stretch from Alaska to Newfoundland. The book, Northern Refuge by Audrey Fraggalosch, explores the Canadian Boreal Forest through the eyes of a moose calf. The moose calf is preparing for the winter ahead. Bring in a twig from an evergreen tree and compare its leaves to that of a broad leaf deciduous tree. Explain to students that many evergreen trees are found in a boreal forest. Discuss why many of these trees are found in the boreal forest by discussing the needs of plants. Focus on the need for water.

Discussion Questions:

What do plants need to survive?

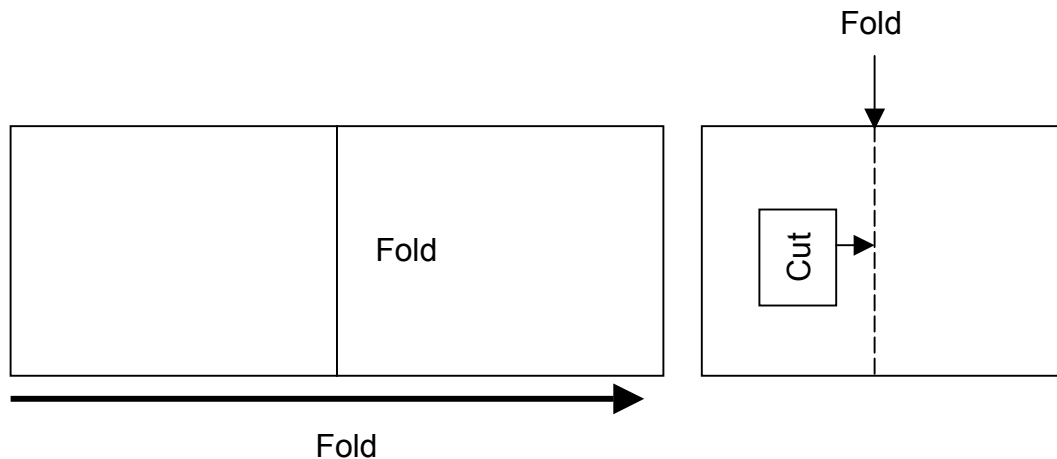
Look back at page 3 of the rainforest book. It shows how plants release water vapor through their leaves. Can plants get water if the ground is frozen during the winter? What does that tell about evergreen plants? (do not release as much water)

Learning Experience 9 continued

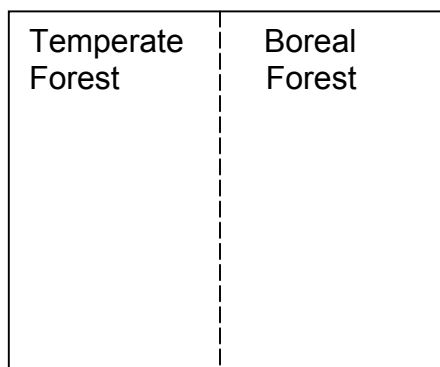
Page 3

Take a picture walk through the book and list the variety of plants and animals that are found in the boreal forest to be a complete habitat. The last pages of the book “Northern Refuge” will also help with this list. Students may notice that beavers are found in both books on the temperate forest and boreal forest. Examine the pictures of the beaver and ask students what parts of the beaver and/or habitat allow it to live in the temperate and boreal forest. (fur – keep warm in colder temperatures, both boreal and temperate have tree bark, leaves, shrubs that they eat for food, both have sources of water to build lodges). Now ask students to examine another animal that doesn’t live in the boreal forest like the koala bear. The koala lives in the temperate forest of Australia. Ask students why a koala could not live in the boreal forest (fur may not be thick enough to withstand cold temperatures, no eucalyptus in boreal forest which is the koala’s main food source). The boreal forest would be an incomplete habitat for the koala and it would not survive there. Ask students if they can make any other comparisons between the animals and plants in the temperate and boreal forests.

Using a large piece of construction paper, ask student pairs to draw a scene from the temperate forest and the boreal forest. After completing the scenes, have the student pairs create another so each student has an individual set. Students can fold their paper in half and cut from one end of the paper to the fold.



On one side, the words temperate forest can be written by/for students and on the other side boreal forest.



Learning Experience 9 continued

Page 4

Under each flap, they can draw their picture, so when they lift each flap only one picture can be seen. Be sure students include animals and plants that live in these forests. Students can then explain each picture and compare the two forests in their explanations and by the pictures. The students may want to draw the picture of each forest in the same season in order to compare the two more easily.

Session 3:

Refer back to the world map and ask students to take notice of how the boreal forests borders the tundra biome. Ask students what similarities they noticed between the tundra and the boreal forest. Referring back to the books may be necessary. Create another season chart (similar to the one created for the tundra) that takes the plants and animals through the seasons in the boreal forest. Compare the two charts. Look for similarities. See sample below.

Spring	Summer
Winter	Fall

Learning Experience 9 continued

Page 5

Spring	Summer
Frozen lakes/ponds thaw Flowers grow Moose calf sheds winter coat Moose calf begins to grow antlers	Warblers return from tropics Birds lay eggs Insects flying
Fall	Winter
Leaves change color Squirrel gathers spruce cones Black bear, spruce, grouse eat to store fat Canadian geese migrate south Moose calf grows under fur	Snow falls Active moose, lynx, owl, porcupine Not much food Bulls shed antlers

Learning Experience 10: Grasslands

Objective: Students will compare and contrast the three types of grasslands and use a graphic organizer to gather information about the various mammals that live in the grasslands in order to compare their adaptations.

Materials:

For each pair of students:

Scissors*

Glue*

For the class:

Book – Grassland Mammals by Elaine Landau

String

Map of biomes

Metric ruler*

Map of the world*

Chart paper*

Felt tip markers*

Index cards*

*provided by teacher

Preparation:

Read background information on pages 8 and 9. Prepare graphic organizer for this learning experience. A large map of the world will be used to illustrate where the various biomes of the world are located. A guide for mapping the biomes of the world can be found in this kit. Index cards can be taped to maps to show where these biomes are located.

Basic Skills Development:

Comparing

Describing

Interpreting data

Measuring

Describing

Evaluation Strategy:

Students will compare and contrast the different types of grasslands and give reasons why the animals that live in the grasslands can survive there.

Vocabulary:

prairie steppes

savanna joey

predator defense

continent

How do the different types of grasslands compare?

Locate the grasslands on the world map and label them appropriately with index cards. Explain to students that there are different types of grasslands depending upon their location. The book Grassland Mammals by Elaine Landau includes pictures of these three types of grasslands. **Prairies** (page 4) are tall grasses found in moist areas. The area looks like a green blanket and grasses can grow to several feet high. Use a metric tape measure to measure that height in comparison to the grass in the schoolyard to show them how high grass grows in a prairie. Another type of grasslands are the **steppes**. They grow in warmer, drier areas (page 8). The grasses are shorter due to the lack of rain. The last type of grassland is the **savanna**. The grasses cover the ground in patches with scattered trees and shrubs.

Compare and contrast the three different types of grasslands with the pictures on page 4, 7, and 8.

Prairie	Steppes	Tropical Savanna

Learning Experience 10 continued

Page 2

Continue on with the book Grassland Mammals. For all the mammals in this book the author includes information on where the animal was located and the size of the animal, their predators, how they defend themselves, and what they eat. Focus on each animal individually by using the information in the book. Create a graphic organizer for each animal and fill it in as you read the book. The string provided in the kit can be measured out to show students the size of these various animals. Students could also see how their jump matches up to the 8.5 m jump of the kangaroo. See sample graphic organizer below.

Animal	Location	Size	Food	Predators	Defense
African Elephant	Africa south of the Sahara Desert	Ears 1.3 meters wide	Grasses, bushes, leaves, fruit from trees	Lions prey on elephant calves Humans for ivory tusk	Large Size Strength Walk quickly
Prairie Dogs	Live in western North America	30 cm tall 7.6 cm long tail burrows 5 meters below ground	Grass, roots, seeds, green plants	Ferret, eagle, coyote, bobcat	Dig burrows to hide Loud chirping sound to warn off danger Move quickly
Giraffe	East Africa south of the Sahara Desert	5.5 meters tall (male) 4.3 meters tall (female)	Leaves of trees, shoots, fruits	Hyenas Lions	Runs fast with long legs Kicks with legs/hooves
Aardvark	Africa south of the Sahara Desert	90 cm tall	Ants, termites	Lions, leopards, hunting dogs, pythons	Hides in holes and digs with claws. Roles over and defends with claws.
Kangaroos	Live in Australia and neighboring islands.	1.8 meters tall	Grasses and plants	Dingo, eagles, foxes, prey joey	Moves quickly at speeds of 30 mph. Jump 8.5 meters in one jump.

Discussion Questions:

What defenses do the animals that live in the grasslands have?

Why do you think they need to be able to run fast?

What kinds of food do these animals eat that is plentiful in the grasslands?

Learning Experience 11: Aquatic Habitats

Objective: Students will identify the plants and animals and their adaptations in the various aquatic habits and compile the plants and animals of the various aquatic habitats into an ABC book.

Materials:

For each student:

28 cm x 43 cm (11" x 17") piece of construction paper*

Colored pencils/markers*

For the class:

Book – Our Wet World by Sneed B. Collard

Book – Freshwater Habitats by Diane Snowball

Book – Saltwater Habitats by Sue Smith

Chart paper*

Felt tip markers*

*provided by teacher

Preparation:

Read background information on pages 11-14. In the book Saltwater Habitats they have a section on tide pools, and in the book Freshwater Habitats, there is a section on cypress swamps and freshwater swamps that are not in Our Wet World book. The tide pool section and cypress swamp section in these books could also be presented as a read aloud.

Basic Skills Development:

Describing

Discussing

Inferring

Communicating

Observing

Evaluation Strategy:

Students will identify the plants and animals and their adaptations that allow them to live in their aquatic habitats and create a reproduction of these habitats by contributing to a class ABC book.

Vocabulary:

aquatic	lake	freshwater
ecosystem	river	saltwater
pond	stream	plankton
ocean		

How do the animals that live in freshwater habitats and saltwater habitats compare?

Ask students to give examples of natural bodies of water they have swam and waded in. (ponds, lakes, oceans, and rivers). Ask students if these bodies of water were freshwater or saltwater and how they know the difference between the two. Using the "T" chart, create a list of freshwater bodies of water and saltwater bodies of water.

Freshwater	Saltwater

Introduce the word aquatic to students and ask them what they think it means. Use the book Our Wet World by Sneed B. Collard to familiarize students with the various aquatic habitats. After reading the book to students, ask them what they think the word "aquatic" means.

The book is divided into sections based on the type of aquatic habitat. Look for the name of each aquatic habitat in the "T" chart the students have begun to create. If the type of habitat is not listed, then add that type of aquatic habitat to

Learning Experience 11 continued

Page 2

the chart. Some of the aquatic habitats can also be plotted on the world map so students again can see where these animals and plants are located. As the information from the book is read for each aquatic habitat, create a list of the plants and animals that live in each aquatic habitat on chart paper. Discuss some of the adaptations of the plants and animals that live in each type of aquatic habitat.

- (ex. Salt marsh – plants need salty water to survive.
Mangrove forest – mud has little oxygen so mangroves have prop roots so the plant can breathe.
Kelp forest – kelp crabs and fish camouflage themselves in the kelp.

The books can be used to, again, create some food chains from the animals listed.

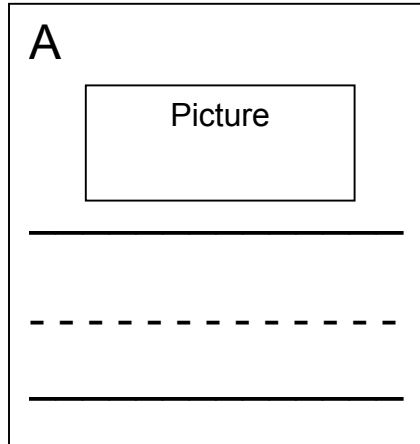
Ponds and lakes: sun – plankton – minnow – bass
Kelp forest: sun – kelp – sea urchins – sea otters

As you read about the ocean waters, create a drawing of the ocean layers (see background information on page 13) so students can get a visual of how sunlight hits the surface water but does not reach the deep waters.

Once all the aquatic habitats have been discussed and the plants and animals for each have been listed, create a class ABC book on the plants and animals that live in these aquatic habitats. This book can combine the plants and animals of both saltwater and freshwater habitats or one book could be completed on freshwater habitats and a separate one could be completed for saltwater habitats. Each student can prepare a page for the book by choosing a letter of the alphabet and an animal or plant that they would like to include in the book for that letter. The letters “I”, “J”, “Q”, “X”, and “Z” are not included in the books provided so additional research could be done to find an aquatic plant or animal that begins with that letter. Some samples that are not included in the books provided are: I – ink sprayed from squid. J – Jellyfish, Q - Quabog – clams with hard shell, X – Xiphias Gladius scientific name for swordfish, Z - Zebrafish. Two pages of the book could also be done on the same letter. The books Freshwater Habitats by Diane Snowball and Saltwater Habitats by Sue Smith have been included to assist students in the creation of the pages for the ABC book. It is suggested that students include a picture of their plant or animal and a sentence or two about the plant or animal. This information should include where the animal lives. It should also include whether the plant or animal is a freshwater or saltwater species.

Learning Experience 11 continued

Page 3



The pages of the book can be created with large pieces of construction paper and bound with yarn or thick tape.

Some sample plants and animals for each letter in the alphabet are listed below for each book.

Freshwater Habitats by Diane Snowball

- | | |
|-------------------|---------------|
| A – alligator | N – |
| B – barkal sea | O – opossum |
| C – cypress swamp | P – pike |
| D – dragonfly | Q – |
| E – everglades | R – raccoon |
| F – frog | S – salmon |
| G – gar | T – turtle |
| H – hippo | U – |
| I – | V – |
| J - | W – wetlands |
| K –kingfish betta | X – |
| L – lily pads | Y – |
| M – marshes | Z - zebrafish |

Learning Experience 11 continued

Page 4

Saltwater Habitats by Sue Smith

A – antarctica	N –
B – butterfly fish	O – octopus
C – coral reefs	P – parrotfish
D – deep seas	Q – quahog
E – emperor penguins	R – rockfish
F –	S – sea otter
G – Great Barrier Reef	T – tubular sponges
H – hermit crab	U – urchin
I – ink	V – viperfish
J – jellyfish	W – whale
K –kelp forests	X –
L – lanternfish	Y –
M – mussels	Z -

Our Wet World by Sneed Collard

A – algae	N – northern harriers
B – bass	O – otters
C – crayfish	P – plankton
D – deep sea	Q –
E – eels	R – rainbow trout
F – flounder	S – snails
G – glassworts	T – tuna
H – herring	U – urchin
I –	V – vestmentiferans
J –	W – worms
K –kelp	X –
L – limpets	Y –
M – minnow	Z -

Name: _____

Date: _____

Habitats Student Assessment

Directions: Read the question carefully and answer based on your knowledge about habitats. Circle the correct answer.

1. What are some of the needs of any animal? Name three.

2. Why is our school an incomplete habitat?

- a. It does not give us shelter.
- b. It does not have its own supply of food.

3. Which is a part of an insect that helps to protect it? (Circle all that are correct)

- a. Wings
- b. Stingers
- c. Head

4. What might some animals do to survive the tundra winter? (Circle all that are correct.)

- a. Hibernate
- b. Migrate
- c. Stay Alive
- d. Estivate

5. Which plant survives in the desert because of its waxy surface?

- a. Bean Plant
- b. Cactus
- c. Poinsettia

6. What happens a lot in a rainforest?

- a. Snow
- b. Wind
- c. Rain

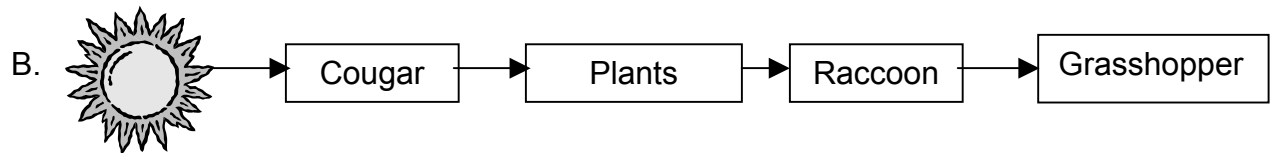
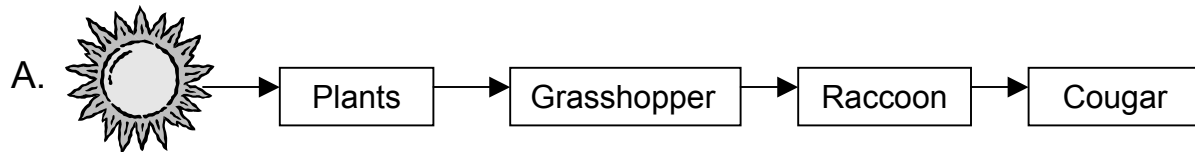
7. What does a freshwater habitat not have?

- a. Fish
- b. Salt
- c. Water

8. What is a predator?

- a. Animal that hunts other animals for food.
- b. Animal that makes its own food.

9. Which picture shows a correct food chain? (Circle)



10. An arctic fox's white fur provides it with everything but:

- a. warmth
- b. protection
- c. food
- d. covering

Habitats Student Assessment Key

1. Food, water, shelter, light, air
2. B
3. A, B
4. A, B
5. B
6. C
7. B
8. A
9. A
- 10.C

MORE IDEAS

Language Arts

- ◆ Have students write stories about living in their favorite biome.
- ◆ Write poems about cacti or tropical fish.
- ◆ Role play an animal going through its adaptation through the seasons.
- ◆ Discuss the ways pets in our home adapt to our home environment.
- ◆ Write a class letter to an environmental agency of why we should protect the rainforest.
- ◆ Write a letter to a friend about your favorite animal from this unit.

Book Suggestions:

Crinkleroot's Guide to Knowing Animal Habitats by Jim Arnosky
All Kinds of Habitats by Sally Hewitt
The Magic School Bus Hop Home: A Book About Animal Habitats by Patricia Reif
Exploring Land Habitats by Terri Halas
A Walk in the Rainforest by Kristin Joy Pratt
Rainforest by Helen Cowcher
Rainforest Birds by Bobbie Kalman
The Great Kapok Tree by Lynne Cherry
The Forest Has Eyes by Bev Doolittle
The Hidden Forest by Jeannie Baker
Here is the African Savanna by Madeleine Dunphy
Into the A, B, Sea: An Ocean Alphabet Book by Deborah Lee Rod
See the Ocean by Estelle Condra
Oceans by Seymour Simon
Look Closer: Pond Life by Barbara Taylor
Rivers, Ponds, and Seashores by Sally Hewitt

Art

- ◆ Design a travel brochure of all the things a tourist would see if they went to one of the biomes of the world.
- ◆ Create a collage for each biome of the world.
- ◆ Design an animal of one habitat so it can live in another habitat.

Social Studies

- ◆ Label the continents of the world on a map.
- ◆ Map out your neighborhood and show where you and your neighbors find their basic needs in your neighborhood.

Math

- ◆ Find out the size of various animals in the biomes and measure their height and width in the classroom.

Science

- ◆ Find out what acid rain is and how it effects plant and animal life.
- ◆ Create a food chain from the plants and animals in your community.
- ◆ What is a chaparral? Describe this biome.

Health

- ◆ Name a variety of foods that come from the rainforest and how they provide nutritional value to our bodies.

INQUIRY AND PROCESS SKILLS

Classifying	Arranging or distributing objects, events, or information in classes according to some method or system.
Communication	Giving oral and written explanations or graphic representations of observations.
Creating Models	Displaying information by means of graphic illustrations or other multi-sensory representations.
Formulating Hypothesis	Constructing a proposition or assumption of what is thought likely to be true based on reasoning, which serves as a tentative testable theory.
Gathering & Organizing	Collecting information about objects and events which show a specific situation.
Generalizing	Drawing general conclusions from information.
Identifying Variables	Recognizing the characteristics of objects or events which are constant or change under different conditions.
Inferring	Making a statement or conclusion based on reasoning or prior experience to explain an observation.
Interpreting Data	Analyzing information that has been collected and organized by describing apparent patterns or relationships in the information.
Making Decisions	Choosing an alternative from among several and basing the judgment on defensible reasons.
Manipulating Materials	Handling or treating materials, equipment or procedures skillfully and effectively.
Measuring	Making quantitative observations by comparing to a standard.
Observing	Becoming aware of an object or event by using any of the senses to identify properties.
Predicting	Making a forecast or estimate of what future events or conditions may occur.

GLOSSARY

Active:	constantly in action.
Adapt:	to adjust to new conditions.
Adaptation:	the adjustment made to survive in a new condition.
Animal:	a living being that moves on its own.
Antenna:	a sensory organ, occurring in pairs on the heads of insects.
Aquatic:	living or growing in water.
Boreal forest:	forests found between 50 and 60 degrees north latitude. Trees include mostly evergreen conifers.
Camouflage:	to disguise/blend into the environment to deceive a predator.
Celsius:	a metric temperature scale in which water freezes at 0° and boils at 100°.
Change:	to make something different.
Compare:	to compare for similarities and differences.
Complete habitat:	one that meets all an organism's needs naturally.
Continent:	one of the main land masses of the globe.
Contrast:	to compare to show difference.
Canopy:	tree top layer of the rainforest.
Defense:	to protect/resist against attack.
Defenses:	to resist against attack or harm.
Desert:	a region of extremely dry land and little vegetation.
Ecosystem:	a system formed by the interaction of organisms in the environment.
Energy:	the ability for activity.
Estivate (estivation):	a type of hibernation that animals go into due to extreme heat.

Evaporate:	to turn to vapor due to heat.
Evergreen:	trees that have green leaves through the entire year.
Experiment:	a procedure used to discover facts or test ideas.
Food chain:	a series of organisms that are fed upon by a larger one that in turn feeds a still larger one.
Forest floor:	floor of the rainforest.
Freshwater:	water without salt.
Habitats:	a place that provides everything that an organism needs.
Hibernate (hibernation):	to spend the winter in a state of rest or inactivity.
Incomplete habitat:	one that only partly meets an organism's needs.
Insect:	a segmented invertebrate with a body divided into three parts (head, thorax, abdomen, three pairs of legs, and two wings.)
Joey:	name given to a baby kangaroo.
Lake:	an inland body of water of considerable size.
Living things:	organisms that need air, water, and food to live and thrive.
Migrate (migration):	to pass from one region or climate to another.
Need:	a non-living thing which an organism must have to survive - examples food, water, shelter.
Non-living things:	objects that can be created by humans and do not live and thrive.
Nutrients:	providing nourishment.
Ocean:	a vast body of salt water that covers three fourths of the Earth's surface.
Organism:	any living thing.
Permafrost:	frozen subsoil in arctic regions.

Plankton:	floating or drifting organisms in a body of water.
Plant:	any living organism that grows in the ground and makes its own food through photosynthesis.
Pond:	a body of water smaller than a lake.
Prairie:	a large, grassy area of land.
Predator:	an animal that preys on other animals.
Prey:	an animal hunted for food by another animal.
Protect:	to cover or shield from danger.
Rainforest:	a tropical forest in an area of high rainfall.
River:	a natural stream of water flowing in a definite course.
Saltwater:	water with a significant salt content.
Savanna:	grassy plain, with low, scattered trees.
Seed:	a fertilized, mature plant ovule containing an embryo that can form a new plant.
Seedling:	a seed that has germinated and become a young plant.
Shelter:	a place or area that provides cover.
Soil:	the thin layer of the Earth's surface in which plants grow.
Steppes:	a large plain without trees.
Store:	to supply or keep for further use.
Stream:	a flowing body of water; a small river.
Temperate forest:	forests that are found in middle latitudes around the globe.
Understory:	middle layer of the rainforest.
Waxy:	resembling wax

TEACHER REFERENCES

Levenson, Elaine. Teaching Children About Life and Earth Sciences. TAB Books . 1994

Habitats . Natural Science Foundation. Education Development Center. 1994

Living Things. Natural Science Foundation. Education Development Center. 1994

Media Library

Call the media library to order media materials and to check on new materials that are available. The number to be reached is (716) 376-8212.

Web Sites

<http://www.kids.infoplease.lycos.com/ipka/A0769052.html>

<http://www.runet.edu/~swoodwar/CLASSES/GEOG235/biomes/main.html>

<http://library.thinkquest.org/26634/featuresf.htm>

<http://www.quia.com/jq/515.html>

<http://www.nationalgeographic.com/forest>

<http://www.jason.org/expeditions/jason10/>