INSTRUCTIONAL OBJECTIVE: to introduce students to the basics components of a habitat – food, shelter, water, sun, nutrients.

INTRODUCTION: Idaho’s varied geography results in a wide range of habitats, different kinds of places for plants, animals, and other living things. Our state has widely different conditions in our lakes, rivers, mountain tops, forests, and desert. No matter where they call home, living things have the same basic needs that they find in their habitat. A habitat is the place where an organism lives. It includes all the living and nonliving aspects of the area. Typical components in a habitat include sun, soil, water, air, food, shelter, and space. During their time at the Idaho Botanical Garden your students will examine different types of habitats – a small pond, a forested area, a vegetable garden, and the Foothill’s sagebrush-steppe. Included in this packet are some pre- and post-visit activities you may use to supplement the lesson provided at the Garden.
**Habitat is a Home** *(adapted from Project Wild “Everyone Needs a Home”)*

*Purpose:* To help students identify what they and other living things need to live. To have them think about the components of their habitat.

*Materials:* drawing paper, crayons, or pencils

*Procedure:*

1. Ask students to draw a picture of where they would like to live. Ask them to include pictures of the things they need to stay healthy, such as a place to keep food, a place to sleep, a place to play.

2. Have the students look at their pictures and share what things they included that they need to live. Write those somewhere that all students can see—large posted paper, whiteboard, etc. Encourage them to come up with the terms food, water, shelter (or the equivalent), space (room to move around and put everything that is needed), air, sun/light (The sun is important for people’s health because it provides warmth and helps our bodies make vitamin D.)

3. Choose an animal and ask them to think about that animal’s home and what it needs to live and grow. Ask them what is the same about that animal’s home and homes for humans. Ask what is different. Human needs should be similar to the animal’s needs.

4. Choose a plant, perhaps a tree in a forest, a sagebrush shrub in the foothills, or rose in a garden. Ask what the plant needs to live and grow, and how a plant’s needs are the same as and different from an animals. Plants need food, but they make it with their green parts, air, and water. Some need more shelter than others. Many, but not all plants, need soil to provide water, minerals and to help their roots hold them in place.

5. Explain that all living things need a home, called a habitat, which provides what they need to live.

**Introduction to Idaho Botanical Garden Pond Life**

*Purpose:* to introduce students to a few of the organisms living in freshwater ponds. Students may see these organisms during the Idaho Botanical Garden field trip.

*Materials:* PowerPoint presentation of Pond Organisms

*Procedure:*

1. Print photos to share with students or show slides of photos. Use the PowerPoint provided by the Idaho Botanical Garden, or create your own.

2. Show the photos to the class and provide some information about each organism. Explain that they will be visiting a pond at the Idaho Botanical Garden and will use nets to capture pond creatures for examination.
Cottonwood Tree – Cottonwoods are one of the few trees native to Idaho’s Treasure Valley. They may be found growing near water. Its seeds are attached to a white, fluffy material that resembles cotton, and are carried away from the tree by wind.

Cattail – Can grow up to six feet tall. This keeps the leaves from being shaded by shorter pond plants. Seeds are carried away from the plant by water and wind. From each seed head a quarter million seeds are released and only a few land in spot that allows them to grow into an adult plant.

Duckweed – These small plants spread like a weed because of ducks. As ducks swim through the duckweed sticks to their feathers and feet. When the ducks land in a new pond, the ducks weed washes off. These plants make tiny flowers rarely seen because they grow inside of small pouches. Seeds are made in the pouches and sprout after the plant dies. They get plenty of sunlight by floating on the water’s surface. Spaces within their bodies hold air, acting as an internal life vest.

Algae – Algae are simple plants. They do not have stems, leaves or roots. They provide food for many pond animals including fish, ducks, tadpoles, salamanders, snails, water boatmen, and daphnia.

Dragonfly – The adult dragonfly catches its insect prey by folding its legs into a basket that scoops up flying insects. It then lands and chews its prey. A dragonfly may eat hundreds of mosquitoes a day. When dragonflies are at rest, their wings are held flat and straight out from the sides of their body.

Dragonfly nymph/naiad - Young dragonfly larvae may live underwater for up to five years before they come out of the water and turn into an adult. Most stay in the water from a two months to three years. They are predators, catching their prey with a jaw with spines at the end that shoots out to hook their food. They eat other aquatic insects, small fish, and tadpoles.

Damsselfly – Damsselfly adults resemble dragonflies, but are slimmer and fold their wings over their bodies when they are at rest. Damsselflies catch small insects and spiders to eat by picking them off of plants with their spiny legs. They often look for insects that have just come out of the water to change into adults. They may also use the spines to catch slow flying prey.
**Damselfly Nymph/Naiad** – Unlike dragonfly nymphs, they have 3 gills at the end of their bodies. Dragonfly nymphs have their gills on the inside. Like dragonfly nymphs, damselfly nymphs are predators. Some sit and wait for their food to come by before they grab it with their extendible, barbed jaw, others actively search for food. They eat small animals, usually insect larvae and daphnia.

**Water Strider** – [https://www.youtube.com/watch?v=E2unnSK7WTE](https://www.youtube.com/watch?v=E2unnSK7WTE) Wonderful video of how they walk on water and how they feed. The insect caught by the strider in the video is a mayfly, not a caddisfly as the narrator claims.

Water striders walk on top of the water and catch insect that become trapped on the surface. They grab their prey with their short front legs and use their piercing mouth parts to inject saliva that digests the insides, and then sucks out resulting fluids.

**Mayfly** – Mayflies are the only insect that molt (shed their exoskeleton) after they have wings. They live for a very short period of time after becoming adults, some for less than five minutes, and rarely for more than a day. The adults cannot eat. Mayflies are an important food supply for fish.

**Mayfly Nymph/Naiad** – You can see the gills of mayfly nymphs on the sides of their bodies. Most eat algae and detritus. Depending on the species of mayfly, the nymph may live underwater from a few weeks to two years.

**Predaceous Diving Beetle & Water Scavenger Beetle** – The two different kinds of beetle have different antennae. The Predaceous Diving beetle has long, thin antennae. The antennae of the Water Scavenger Beetle and a bump, or club, at the end. Both have aquatic young, and live in the water as adults.

The predaceous beetle eats anything it can catch. They are known to attack small fish, tadpoles and frogs. They also eat other aquatic insects.

The name water scavenger beetles suggests that they eat whatever they can find. Some are predators eating other insects or snails, others eat plants, and some eat detritus.

**Water Boatman** – These can be told apart from Backswimmers by how they swim. Water Boatmans swim with their “backs” up and Backswimmers swim upside down, with their “bellies” up. Most Water Boatmans feed on plants. They use their piercing mouthparts to inject digestive juices into the plant and then suck in liquefied food.

**Backswimmer** – Backswimmers are predators, sucking juices out of insects, tadpoles and fish.
**Scud** – Scuds are related to shrimp and crabs. They eat algae and detritus. They swim on their sides.

**Mosquito** – The larva breathe through a tube located on their tail end. They eat algae and bacteria. They are often called “wrigglers” because of how they swim with jerky movements. The pupa do not eat, but they do swim with a spinning motion that earned them the name of “tumblers.” They breathe through a tube attached to the middle of their bodies.

**Water Fleas** – These small animals are related to crabs and shrimp. They are mostly filter feeders, eating single-cell algae, bacteria, and other very small organisms. They beat their legs to draw food to their digestive system. They swim with their antennae. Since it looks like they jump when they swim, they are called “water fleas”.

**Seed Shrimp** – Like scuds and water fleas, seed shrimp are related to shrimp and crabs. They are very small and swim around underwater plants and at pond edges. Their bodies are inside two shell halves. They stick out their antennae and use them to swim. When they close their shells, they look like little seeds.

**Snail** – There are many kinds of snails living in ponds. Most feed by using their radula, a toothed tongue, to scrape algae, detritus, and an occasional animal from the surface of rocks, plants or loose sediment.

**Leech** – Leeches are related to earthworms and have a sucker at both ends. Many leeches eat insect larva and other worms. You can sometimes see leeches swimming in the Garden’s ponds. This video shows it well https://www.youtube.com/watch?v=V6N7wDKEV3w

**Tadpoles** – Idaho Botanical Garden ponds have been home to pacific chorus frog, western toad, and spadefoot toad tadpoles. Most tadpoles eat algae and plants. Children narrate this video of tadpoles turning into frogs, https://www.youtube.com/watch?v=GgCL3JenMCS

**Long-toed Salamanders** – Adult long-toed salamanders live on land and enter the water just for egg-laying. Young salamanders, called efts, live in the water and breathe through gills seen on either side of their heads. Efts are carnivorous and eat seed shrimp, water fleas, aquatic insects, tadpoles, small fish, and efts.

**Mallard** – Almost every year a pair of mallards spend a few months at the Garden’s pond. Mallards are omnivores, eating both plants and animals. They may feed upon snails, insects, worms; and plant leaves, seeds, roots, and tubers.
Introduction to Forested Habitat

The Idaho Botanical Garden does not have a true forest on its grounds, but its wooded area shares many features as a real forest.

**FOOD WEB ACTIVITY**

**Purpose:** to introduce student to the concept of food webs and to help become more familiar with organisms that live in Idaho urban forests. Food webs provide a basic illustration of how energy moves through an ecosystem.

**Procedure:**

1. Explain to/ review with students how sun provides the energy for most all living things. Plants use the sun's energy plus, water and carbon dioxide from the air to make their food. Herbivores and omnivores eat plants and use the energy from the plant food to stay alive. Carnivores and omnivores eat the herbivores and omnivores and use that energy. Decomposers get their energy from consuming dead herbivores, omnivores and carnivores.

2. Introduce students to some of the organisms that live in the Idaho Botanical Garden's forested areas, and what they eat.

3. Give students sheet with organism names on them or create your own. Ask students to draw arrows from the thing being eaten to the animal doing the eating. This could be done as a group or individually.

4. Explain that the examples are of only a few living things found in the Idaho Botanical Garden's forested area. Have them imagine how complicated a food web would be in a wild forest in Idaho's mountains.

**ORGANISMS IN THE GARDEN’S WOODS AND SOME OF WHAT THEY EAT:**

- **Great Horned Owl** – mice, voles, rabbits, skunks, frogs
- **Cooper's Hawk** – birds, squirrels, mice, voles
- **American Robin** – earthworms, insects, berries
- **Downy Woodpecker** – ants, berries, acorns, beetles
- **Vole** – grasses, roots
- **House Wren** – insects, millipedes, snails
- **Cottontail Rabbit** – grasses and other plants
- **Red Fox** – grasses, squirrels, rabbits, mice, voles, insects
- **Striped Skunk** – grasses, mice, voles, insects, snakes, earthworms
- **Raccoon** – insects, earthworms, mice, voles, fruit, nuts
- **Eastern Fox Squirrel** – acorns, pine seeds, insects, bird eggs, maple seeds
- **Centipede** – spiders, worms, insects
- **Pillbug** – dead plants
- **Ground Beetle** – snails, earthworms, caterpillars
- **Bull Snake** – young rabbits, mice, voles, baby birds
**Post-visit activity**

**Compare and Contrast Wooded Area with a Desert-like Area**

*Purpose:* To have students recall two habitat types they saw at the Idaho Botanical Garden and think about how they were different and the same.

*Procedure:*

1. Create two columns on screen/whiteboard. One side labeled “Woods” or “Forest”, the other labeled “Desert” or “Sagebrush-steppe”.

2. Ask the students questions in order to collect information about the conditions and living things in each habitat. List their answers under the appropriate headings. You could ask the same question about each habitat before moving to the next question, or you may ask all the questions for one of the habitats, and then ask all the questions for the other. Possible questions include:
   - Is the habitat dry, moist, or wet?
   - Was it sunny, shady, or did it have a mixture of sun and shade?
   - Were the tallest plants trees, shrubs, or smaller plants?
   - Did some of the plants have large leaves, or did most of the plants have small leaves?
   - What color were the leaves of the plants?
   - Were the plant leaves smooth or hairy?
   - What color was the soil in the habitat?
   - What kinds of animals did you see in the habitat? (Numbers and types will vary by day)
   - What food for animals did they see?
   - What shelter could be found?

Answers may turn out like this:

<table>
<thead>
<tr>
<th>FOREST</th>
<th>DESERT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moist conditions</td>
<td>Dry conditions (unless it was a rainy day)</td>
</tr>
<tr>
<td>Shady</td>
<td>Sunny (unless it was a cloudy day)</td>
</tr>
<tr>
<td>Trees were the tallest plant</td>
<td>Shrubs were the tallest plant</td>
</tr>
<tr>
<td>Some plants had large leaves</td>
<td>Most plants had small leaves</td>
</tr>
<tr>
<td>Most leaves were green</td>
<td>Many plants had white or silvery leaves</td>
</tr>
<tr>
<td>Leaves were smooth</td>
<td>Many leaves were hairy</td>
</tr>
<tr>
<td>The soil was dark</td>
<td>The soil was a light color</td>
</tr>
<tr>
<td>Squirrels, small birds in trees, pillbugs,</td>
<td>Quail, cottontail rabbit, lizards, snakes,</td>
</tr>
<tr>
<td>slugs, snails, millipedes, beetles,</td>
<td>beetles, flies, butterflies, bees</td>
</tr>
<tr>
<td>butterflies</td>
<td></td>
</tr>
<tr>
<td>Other animals, seeds, leaves, flowers,</td>
<td>Flowers, butterflies, leaves, birds</td>
</tr>
<tr>
<td>dead slug</td>
<td></td>
</tr>
<tr>
<td>Nests, rocks, large leaves</td>
<td>Rocks, plants close to the ground</td>
</tr>
</tbody>
</table>

3. Ask the students what was similar for both habitats.

5. Ask them what were the most noticeable differences.
**Vocabulary**

**Carnivore** – an animal or plant (carnivorous plants) that needs to consume (eat) animals to survive.

**Decomposer** – a living thing that breaks down dead organisms, returning nutrients into the ecosystem. This happens as the decomposer feeds on them.

**Desert** – an area that receives 10 inches of water or less each year.

**Ecosystem** – the living and non-living things in an area and how they interact.

**Food web** – a model that shows what eats what in a habitat or ecosystem.

**Forest** – a dense growth of trees and shrubs covering a large area

**Habitat** – the place where something lives. It is home. It includes the things needed for food and shelter.

**Herbivore** – any living thing that only eats plants.

**Naiad** – a special name for the nymphs (young) of dragonflies, mayflies, and stoneflies. These nymphs are so much different from the adults that they get a special name.

**Nutrients** – a chemical or substance eaten or absorbed by a living thing that helps it live, grow, or heal.

**Nymph** – the young of insects that look much like the adult. A nymph turns into an adult, and not a pupa. Examples: grasshoppers, praying mantis

**Omnivore** – a living thing that eats animals and plants.

**Organism** – a living thing.

**Pond** – a small body of water that is fairly still.

**Sagebrush-steppe** – one of Idaho’s ecosystems. Its main plant is sagebrush. It also has grasses and non-grasslike flowering plants. It is found in desert or desert-like areas.

**Shelter** – that which protects a living things from the elements including, cold, heat, wind, sun, rain, snow, and predators.
KINDERGARTEN

**LS: Life Sciences**

**LS1.C: Organization for Matter and Energy Flow in Organisms**

- All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow. (LS1-K-1)

**ESS: Earth and Space Sciences**

**ESS2.E: Biogeology**

- Plants and animals can change their environment (ESS1-K-2)

1ST GRADE

**LS: Life Sciences**

**LS1.A: Structure and Function**

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (LS1-1-1)

2ND GRADE

**LS: Life Sciences**

**LS2.A: Interdependent Relationships in Ecosystems**

- Plants depend on water and light to grow. (LS1-2-2)

**LS4.D: Biodiversity and Humans**

- There are many different kinds of living things in any area, and they exist in different places on land and in water. (LS2-2-1)