# Habitats
## of the World

When we consider life on Earth we notice that different regions contain unique plants and animals that are adapted to local conditions. Scientists have attempted to group these regions into categories called *habitats*.

A **habitat** is the natural environment where an animal, plant or other organism lives. Factors like climate, geography, availability of water, and interactions with other plants and animals determine the number and types of organisms living in a habitat. A habitat can be as large as a continent or as small as a cell. While there are different opinions about the total number of habitats (NASA lists 16 major habitats, and some textbooks only list 6), here we will define 8 habitats. These habitats are Polar, Tundra, Evergreen forests, Seasonal forests, Grasslands, Deserts, Tropical Rainforests, Oceans.

To better understand a habitat we will look at how energy flows through it, starting with its plants (producers) and moving to the animals that eat the plants (consumers) and in some cases the animals that eat those plant eaters (secondary consumers). The relation-ships between these producers, consumers and secondary consumers reveal the ways organisms are adapted to their habitats.

**POLAR HABITATS** are extremely cold. Forming at the highest latitudes on Earth, they receive very little energy from the sun in the summer and virtually none in the winter. The main difference between the North and South Pole is the presence of land and water. The South Pole is land surrounded by sea; the North Pole is a sea surrounded by land. In the South Pole, enormous colonies of penguins can be found on the coasts, and leopard seals and whales can be found just off shore. These animals eat fish and abundant small crustaceans called krill. Krill eat mostly plankton – small microscopic plants living in the cold nutrient rich waters. At the North Pole plankton are eaten by small fish and crustaceans which are then eaten by larger predators like narwhals and polar bears.

**TUNDRA** is the part of the polar habitat that is on land and not covered in ice, found mostly in the north. The tundra looks snowy and lifeless in winter, but in the summer months the snow melts and reveals grassy meadows and small quick growing shrubs. The growing season is too short for trees. Reindeer and wolves are just two of the animals that call the tundra home.
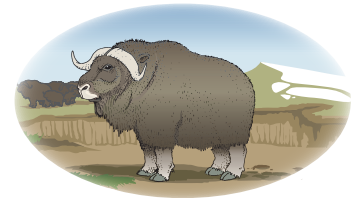
**EVERGREEN FORESTS** are just outside the North Pole and encircle it, stretching all the way across Canada and northern Europe and Russia. There are more trees in this habitat than in any other - mostly conifers adapted to survive the extreme cold winters. Their needle leaves don't lose water to the dry winter air like a big flat leaf and they contain thick resin that prevents the tree from freezing. Conifers are almost inedible to many animals which must eat the seeds produced by pine cones, or eat grasses and soft leaves available only in the warm summer months. Animals like the snowshoe hare survive the winters by burrowing underground and eating soft stems, while the Canada lynx, part of the cat family, eat the hare.

**SEASONAL FORESTS** can be found around the world wherever we see conditions that are not extremely cold, dry, or wet. Some of the trees in these regions are conifers but most are deciduous trees that grow broad flat, sun catching leaves that must be dropped every winter to protect the tree from drying out. Due to the extremely variable nature of weather conditions, plants and animals need to be able to survive in warm and cold conditions. Deciduous leaves are great food sources for large mammals, and deer are common. Owls are one of the top predators and eat a wide variety of prey ranging from fish, frogs, mice, rabbits, insects, snakes and even other smaller birds.

**GRASSLANDS** grow under conditions that are warm enough to support plant life but too dry for trees, and not so dry that a desert forms. The important parts of the grass plants are below the soil surface which protects all but the grass stems from excessive conditions of heat, cold or dryness. Grasslands survive massive fires and severe grazing from large herds of grassland animals like bison in North America and wild horses in Asia. Grasslands support the largest collections of mammals on Earth in places like the African savanna, and in turn, the herds support the largest land predators on Earth like lions, hyenas, and crocodiles.

**DESERTS** form in the driest places on Earth. Although many of them are hot like the Sahara or the Atacama they don't have to be. Cold dry places are also deserts such as the Gobi desert in western China and Antarctica. Water is absolutely essential to life as we know it. The plants and animals that survive in these places need to be able to get by on minimal quantities of liquid water. The plants best adapted to deserts are succulents including cacti like the Saguaro which have extensive roots branching out in all directions close to the surface. When it rains (perhaps only once a year or so), the roots absorb tons of water into the plant which allows it to survive until the next rain. Animals must be equally careful in how they ration water. Some insects get all the water they need by eating the wet tissues of plants and many desert animals like the fennec fox are only active at night when the air is less dry and temperatures are less extreme. Reptiles like sidewinder snakes are well adapted to these habitats due to their scaly skin which has excellent water retention abilities.

**TROPICAL RAINFORESTS** have the perfect conditions to support plants on land – they are warm, bright, and wet. They form near the equator where sunlight is most plentiful on Earth and only in places that receive regular, almost daily rains. The largest continuous rainforest is the Amazon in South America. The Congo rainforest in sub-Saharan Africa is also quite large. There are rainforests on the islands in the Indo-Pacific such as Borneo, New Guinea and Indonesia. These forests are the most biologically diverse places on the planet. The plants grow so thick that very little light reaches the ground surface, so plants must compete for their share of canopy space. Soft leaves and fruit can be found in the trees by herbivores, and predators know tree canopies are the best place to find prey. Many animals have found ways to travel from one treetop to the next without having to travel across the ground by swinging, jumping, flying, or gliding as is the case for the flying lemur.
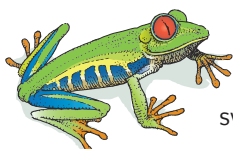
**OCEANS** cover most of the surface of the Earth and are the largest habitat due to their depth. Plants growing in the surface waters of the world's oceans have plenty of sunlight and unlimited water but their growth is limited by mineral availability. Sea grasses and weeds grow in shallow waters rooted to the sea bed, but free swimming microscopic algae and plankton make up the vast majority of biomass in the ocean. Many herbivorous animals in the ocean can filter feed on these microscopic plants. Predators swim the oceans in search of prey that often has no place to hide and must form massive schools for protection. Some species can be found only in certain locations like near coasts or in deep waters. Others are so well adapted that they can be found in almost every ocean environment like the starfish.
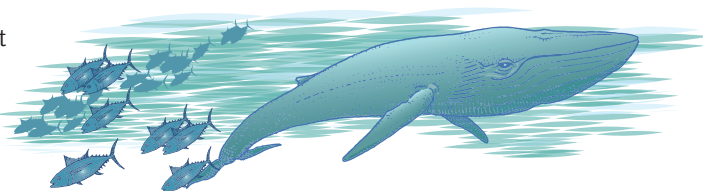
SUB HABITAT OF OCEAN **SHALLOW SEAS**
Shallow and coastal waters tend to support more species of plants that need to root in the seabed but still receive sunlight. The water in shallow regions tends to have more nutrients suspended in the water which promotes the growth of plants, and animals can more easily find shelter and food in these rich ecosystems.

SUB HABITAT OF OCEAN **CORAL REEFS**
Coral reefs are habitats that can be found in warm tropical waters. They are like the rainforests of the sea and support more biodiversity than the rest of the ocean despite being a very small and rare habitat. Coral reefs are supported by a symbiotic relationship between coral animals and microscopic algae that live inside them. The algae supply the coral with energy and the coral provide a safe environment for the algae and a complex network of reef structures in which other species can hide and find shelter.
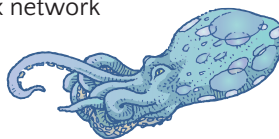
## Ecology

Each of these habitats is interconnected and each of the plant and animal species living within them depends on and influences the others. These are complex communities that often defy any classification and attempts to make a short list of habitats is bound to be an oversimplification. For example, seasonal forest habitat can be thought of as a collection of smaller habitats like streams, forests, and fields.

# *Habitats* of the World

Name:_____

**Habitats are environments that support plant and animal life.** Any place that supports life can be thought of as a habitat. Scientists have attempted to create categories based on the kinds of organisms we find in areas with similar conditions like climate and availability of resources. We will focus on eight habitats: Polar, Tundra, Evergreen Forests, Seasonal Forests, Grasslands, Deserts, Rainforests, and Oceans. These are global habitats that cover vast areas of the Earth. Of course there are habitats that exist at a smaller scale, like regional, local or micro scale habitats.

1. Label each of these habitats as global, regional, local, or micro scale.

a. The continent of Australia _____     c. The Lehigh River _____

b. The Rocky Mountains _____     d. Your backyard _____

Use the brief descriptions of each habitat below to answer the remaining questions.

**Polar**– Cold, dry environments located at the two poles of the Earth. Snow and ice dominate the land but vibrant aquatic ecosystems support coastal and marine species.

**Tundra**– Cold dry landscapes near the North Pole with short growing seasons supporting little plant or animal life except in the summer when these areas resemble grasslands.

**Evergreen Forests**– Warm summers and cold winters, these forests are the largest on Earth and are dominated by hardy evergreen trees and many migratory species of animals.

**Seasonal Forests**– A dynamic habitat where warm, wet summers provide excellent growing conditions for plants and food for animals, which go dormant or hibernate during cool, dry winters.

**Grasslands**– The largest land habitat by area, grasslands are dominated by hardy, quick growing grasses and large herds of grazing animals.

**Deserts**– Normally hot, always extremely dry places where water is a scarce resource and plants and animals are adapted for water conservation.

**Rainforest**– Hot, wet, and sunny, abundant plant life supports the richest diversity of animals anywhere on earth.

**Oceans**– Vast and deep oceans cover over 70% of the Earth and are home to abundant microscopic plant life, fish, and larger predators. Includes sub–habitats like shallow seas and coral reefs.

2. Which is the coldest? _____

3. Which is the largest?_____

4. Which is the driest?_____

5. Which is the most biologically diverse?_____

6. Which has large herds of animals?_____

7. Which has the largest changes in climate due to changing seasons?_____

8. Which has the largest forests?_____

9. Which is like a grassland in summer?_____

**Easier Questions**

1. Can you think of at least one plant or animal from each of the habitats below?

Polar_____     Grasslands_____

Tundra_____     Deserts _____

Evergreen Forests _____     Rainforest_____

Seasonal Forests_____     Oceans_____

2. The North and South Pole are very different. Which is mostly water surrounded by land and which is mostly land surrounded by water? _____

3. Why don't trees grow in the Tundra? _____

4. How are conifers (pine trees) adapted to the cold dry winters of the North?_____

5. The Northeast (here in Pennsylvania) could be classified as a seasonal forest. What wild plants and animals live here? _____

6. Grasslands can be found over large regions of the Earth. Why is grass able to grow in so many places? _____

7. Are deserts always hot? Are they always dry? _____

8. Why do plants grow so well in rainforests? What do they have that other habitats are missing?_____

9. The ocean is a diverse habitat. What are parts of the ocean that are like their own habitats (called sub habitats)? _____

**Harder Questions**

1. How can we use climate and geography to classify habitats?_____
_____

2. How have plants and animals adapted to live in each of the eight habitats?

Polar_____     Grasslands_____

Tundra_____     Deserts _____

Evergreen Forests _____     Rainforest_____

Seasonal Forests_____     Oceans_____

3. Do some plants and animals live in more than one of these eight habitats? _____
Give an example._____

4. We could have easily made our list of habitats longer or shorter. How many habitats do you think there are? _____
Which ones would you add or take away?_____