



Grade 9 – Biomes Activity

Biomes Study Activity for Grade 9 Geography at the Toronto Zoo



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Note to the Teacher

The Toronto Zoo is an ideal location for the study of a variety of animals, their biomes, local habitats, and their adaptations to the environment. This activity leads the student through four major zoogeographic regions, making detailed observations on three animals in each region. The accompanying questions require observation and thinking skills although most can be answered by simply reading the signs. We recommend that the students be assigned two regions in the morning, break for lunch, and do the remaining two areas in the afternoon. Copies of the Biomes work sheet should be provided to students for each pavilion area you assign.

You can either assign the animal examples listed or have the students choose 3 animals from each area. Some animals may be “off display” and require a substitute.

Curriculum Connection

- Describe and compare the natural characteristics of the equatorial, mid-latitude, and polar regions of the Americas.
- Describe the patterns of natural characteristics in the Americas (e.g. landforms, vegetation, climate, soils, water bodies)
- Compare the major characteristics of selected ecosystems in the Americas (e.g. tropical rainforest, tundra, boreal forest, grassland, alpine region).

Name: _____

Date: _____

Biomes Study

Instructions:

Find all the animals listed in your package and fill in one Biome Worksheet for each pavilion using the key below. Some answers may require a little searching. **Read the signs.**

Collect the information outlined on the worksheets for the following 3 species in each of the 4 pavilions:

Indo-Malaya Pavilion:

White-handed gibbon
Concave-casqued hornbill
Spectacled cobra

Americas Pavilion:

Common marmoset
Gila monster
Blue crowned motmot

Africa Pavilion:

Naked mole-rat
African bonytongue
West African dwarf crocodile

Australasia Pavilion

Short-beaked Echidna
Tawny frogmouth
Komodo dragon

Key for the work sheets

Biome: Very large areas of terrestrial habitat, each with a characteristic climate, day length, topography and climax flora and accompanying fauna. Most authorities only recognize about 15 biomes for the entire earth:

1. Tundra (treeless, sometimes marshy plains; northern Asia & North America)
2. Northern coniferous forest (a.k.a. boreal, or taiga)
3. Temperate coniferous forest
4. Temperate broadleaf forest (oak - hickory forests of eastern USA)
5. Temperate grassland (prairies of North America)
6. Desert and dry shrub (Sahara)
7. Mediterranean shrub
8. Mountain grassland
9. Flooded grassland and savanna (Florida Everglades)
10. Tropical grassland and savanna (African savanna)
11. Tropical dry forest
12. Tropical coniferous forest
13. Tropical moist broadleaf
14. Mangrove
15. Permanent ice cover (Antarctica, parts of Greenland)

Within each biome are hundreds of specialized ecosystems (e.g. a salt marsh, sand dune, cloud forest, stream or pond) and within these are hundreds or even thousands of habitats or potential habitats. (Tudge, Colin. *Global Ecology*, 1991.)

Biosphere: The part of the Earth, including rock, soil, water and atmosphere that contains living organisms.

Community: All the organisms - plants, animals and microorganisms - that live in a particular habitat and affect one another as part of the food web or through their various influences on the physical environment. (Wilson, E. O. *The Diversity of Life*, 1992.)

e.g. The Rouge River valley, which passes through the Toronto Zoo, has a community of plants and animals.

Ecosystem: The organisms living in a particular environment, such as a lake or a forest (or, in increasing scale, an ocean or the whole planet), and the physical part of the environment that impinges on (touches) them. The organisms alone are called the community. (Wilson, E. O. *The Diversity of Life*, 1992.)

Keystone species: An organism, which provides conditions in an ecosystem on which many other species depend. This role is so vital that when the "keystone species" is removed the ecosystem collapses or changes radically.

Population: In biology, any group of organisms belonging to the same species at the same time and place. (Wilson, E. O. *The Diversity of Life*, 1992.)
e.g. Ontario has a population of raccoons.

Niche: The place or role a species occupies in its community. This includes where it lives, what it eats, where it forages, the season of its activity, etc.
e.g. The niche of the black-footed ferret would be: small, ground dwelling, nocturnal predator of small mammals, particularly the prairie dog, in the prairie grasslands of North America. It usually makes its home in prairie dog burrows.

Habitat: The place in nature, where a species lives, including food, water, shelter and space.

Species: A population or series of populations of organisms that freely interbreed with one another in natural conditions, but not with members of other species. (Wilson, E. O. *The Diversity of Life*, 1992.)
e.g. Tigers and lions are separate species, but both belong to the cat family

Scientific Name: The name that is used by all scientists, regardless of their language, for a species. The name has 2 parts. The first word is the **genus** to which the species and its closest relatives belong to. The second word indicates the **species**. Sometimes a third word is added to indicate the sub-species.
e.g. The wolf is *Canis lupus*

Locomotion: How does the animal normally move?
e.g. crawl, swim, fly, walk, run

Body Covering: Is the animal covered in skin/scales/feathers/fur?
If covering is fur – Is it long/short? Is it thin/thick? Is it straight/curly?

Tail: Does the animal have a tail? Absent/present?
If tail is present – Is it long/short? Is it thin/thick?

Ears: Does the animal have ears? Absent/present?
If the ears are present – Are they long/short? Are they on the side/top of the head? Are they sticking out/indented into the head?

Location of Eyes: Is it on the front/side/top of the head? Are they large/small?
Do they have eyelids? Absent/present?

Colour: Is the animal's body covering dark/light?
Is the body covering one colour/patterned?

Teeth: Does the animal have teeth? Absent/present?
Are the teeth pointed/flat? Large/small?

Type of Food: Does the animal eat only animals (carnivore), plants (herbivore), or both (omnivore)? List some food items.



Field Trip Questions:

Australasia Pavilion

1. How many biomes can be found in Australasia?

2. Describe the niche of the Matschie's tree kangaroo?

3. The Great Barrier Reef is the largest coral reef system in the world and covers

an area of about _____ square kilometers.

(read the signs)

4. Describe the niche of the Komodo dragon.

5. What is the preferred habitat of the Komodo dragon?

6. Describe the range of the echidna.

7. What biome is shared by the green tree python, fly river turtle, and the black tree monitor?

8. What is a unique characteristic of marsupials?

9. What is a "marsupium"?



Field Trip Questions:

Americas Pavilion

1. How would you describe the climate represented at the entrance to this pavilion?

2. What is the natural habitat of the golden lion tamarin?

3. What percentage of the earth is covered by tropical rainforest?

4. What is the habitat of the blue poison dart frog?

5. Why is the alligator called a “keystone species”?

6. How does the river otter mark its territory?

7. How does the beaver create and maintain its habitat?

8. Name 4 species (other than the beaver) that use beaver ponds as their habitat or part of their habitat?



Field Trip Questions:

Africa Pavilion

1. Name an insect with a similar social life to the naked mole-rat.
(find the naked mole-rat at the entrance a the top of the boardwalk in the Burrows and Caves)

2. Approximately what percentage of land plant and animal species are found in rainforests?

3. What is the western lowland gorilla's favourite natural plant food?

4. What special habitat do female spotted-necked otters use when she has pups?

5. List two (2) types of gorilla.
A _____
B _____
6. What is bushmeat?

7. What biome does the slender-tailed meerkat inhabit?

6. List 4 forest food items eaten by ring-tailed lemurs?



Field Trip Questions:

Indo-Malaya Pavilion

1. How would you describe the climate represented in this pavilion?

2. How many eggs are normally laid by the female Malayan water monitor?

3. Why has the Malayan bonytongue become endangered?

4. What is the difference in the methods of reproduction of boa constrictors and pythons?

5. How does the “hinge” help the Vietnamese box turtle survive?

6. What special protection does the crocodile newt possess?

7. Describe the preferred natural habitat of the Gaur.

Answers

Indo-Malaya

1. The climate is humid tropical to subtropical.
2. 20–35 eggs are normally laid by the female Malayan water monitor.
3. It is over collected for the aquarium fish trade.
4. Boas bear live young, Pythons lay eggs.
5. The hinge in the middle of the shell allows the turtle to draw in its feet and head for protection from enemies.
6. The skin of the crocodile newt is toxic.
7. The Gaur lives at altitudes of 750m – 1800m, in rocky, forested hills, with open grassy table lands at the summits.

Indo-Malaya Pavilion:

Common name:	White-handed gibbon	Concave-casqued hornbill	Spectacled Cobra
Scientific name:	<i>Hylobates lar</i>	<i>Buceros bicornis</i>	<i>Naja naja</i>
Habitat:	Dense forest canopy	Forest	Forest, grassland, rice paddies
Major Biome:	Tropical rain forest	Tropical forest	Tropical rain forest
Locomotion:	Brachiation (swinging)	Fly, walk, hop	Swim, slither, climb
Body Covering:	Thick, straight fur	Feathers	Scaly skin
Tail:	Absent	Medium long	Long, conical
Ears:	Small, on side of head	Absent	Absent
Location of Eyes:	On front of face	On side of head	On side of head
Colour:	Blond to dark brown with white hands	Black with white markings and bright yellow beak	Blackish with white flecks, spectacle shape on back of neck
Teeth:	Present, both flat & pointed	Absent	Pointed, small & numerous. Modified fangs in front of mouth to deliver venom
Food:	Omnivore, fruits, leaves, eggs, young birds, insects	Mainly fruits but also insects, snakes, lizards and birds	Carnivore, birds, frogs, small mammals

Africa Pavilion:

1. Termites, ants and bees have a social life similar to the naked mole-rat.
2. 50% or half of all land plant and animal species are found in rainforests.
3. The wild ginger plant is the favourite natural food of the Western lowland gorilla.
4. A den is dug into the riverbank or built in dense reeds when the female spotted-necked otter has cubs.
5.
 - a) the lowland gorilla
 - b) the mountain gorilla
6. “Bushmeat” is the meat of any forest animal and taken for human consumption in the forests of West Africa.
7. The Slender-tailed meerkat lives in the desert biome.
8. Mandrills eat: rodents, insects, roots, bark, stems, leaves, flowers, fruit and seeds.

Africa Pavilion:

Common name:	Naked mole-rat	African bonytongue	West African dwarf crocodile
Scientific name:	<i>Heterocephalus glaber</i>	<i>Heterotis niloticus</i>	<i>Osteolaemus tetraspis</i>
Habitat:	Sandy dry soil	Rivers, streams & swamps	Rainforest rivers & swamps
Major Biome:	Semi-desert & desert	Tropical savannah & rainforest	Tropical rainforest
Locomotion:	Crawls and digs	Swims	Crawls, swims,
Body Covering:	Naked skin	Slimy scales	Thick scaly skin
Tail:	Present, short	Present	Present, long and scaly
Ears:	On side of head	Absent	No external ear visible
Location of Eyes:	On side of head, covered with skin	On side of head	On top of head at each side
Colour:	Pink almost translucent skin	Grey/brown with irregular light markings on the sides	Black with yellowish-white belly
Teeth:	Large prominent incisors exterior to the mouth	Small	Present & large
Food:	Roots of tubers & other plants	Filter feeders, shrimp, algae, zooplankton and phytoplankton	Fish, frogs & small mammals

Americas Pavilion

1. The entrance to the Americas pavilion represents a humid tropical climate.
2. Tropical coastal rainforest of eastern Brazil is the habitat for the Golden lion tamarin.
3. Less than 10% of the earth’s land surface is covered by tropical rainforest.
4. The Blue poison dart frog inhabits small patches of tropical forest surrounded by grassland.
5. The American alligator is called a “keystone species” because during periods of drought in its Everglades home it digs “alligator holes” down to the water line which provide habitat and drinking water for many other species of plants and animals.
6. River otters mark their territory with musk from special glands.
7. Beavers build and maintain dams on streams and create beaver ponds.
8. Species that use beaver ponds include: Pumpkinseed sunfish, Brown bullhead, Bullfrog, Midland painted turtle, Great blue heron, Wood duck, Leopard frog, Spotted turtle, Moose, Dragon fly.

Americas Pavilion

Common name:	Common marmoset	Blue crested motmot	Gila monster
Scientific name:	<i>Callithrix jacchus</i>	<i>Motmotus momota</i>	<i>Heloderma suspectum suspectum</i>
Habitat:	Dense tropical forest	Rain forest understory	Desert
Major Biome:	Tropical rain forest	Tropical rain forest	Desert
Locomotion:	Walks, climbs trees	Flies	Walks, crawls
Body Covering:	Fur, straight, short	Feathers	Scaly skin, beady looking
Tail:	Present, long, ringed	Present, long	Present, thick
Ears:	On side of head, covered with white hairs	Absent or not visible	Absent
Location of Eyes:	On front of face	On side of head	On side of head
Colour:	Grey, with white tufts on ears and dark rings around tail	Bright green, turquoise and black	Black and orange or red
Teeth:	Present, pointed	Absent	Short, sharp
Food:	Omnivore, insects, vegetation, eggs, reptiles,	Omnivore, insects, spiders, lizards, worms, fruit	Carnivore, rodents, birds, eggs, small reptiles

Australasia Pavilion

1. There are 6 biomes in Australasia.
2. The niche of the Matschie's tree kangaroo is: Medium sized, arboreal herbivore
3. The Great Barrier Reef covers an area of approximately 207,000 square kilometers.
4. The Komodo dragon is the top carnivore in its community, preying on reptiles, fish, birds, eggs and large mammals.
5. The Komodo dragon prefers dry savanna, dry river valleys and beach habitats.
6. Short-beaked echidna a.k.a. Spiny anteater is found throughout Australia and the islands of New Guinea and Tasmania.
7. The Green tree python, Fly River turtle and Timor monitor all live in tropical rainforest.
8. Marsupials have a very short gestation period. Young are born at an early stage of development and make their way to a pouch on their mother's body to suckle and grow.
9. "Marsupium" means pouch.

Australasia Pavilion

Common name:	Short-beaked echidna	Tawny frogmouth	Komodo dragon
Scientific name:	<i>Tachyglossus aculeatus</i>	<i>Podargus strigoides</i>	<i>Varanus komodoensis</i>
Habitat:	Wooded areas, and sandy plains	Wooded areas, except rain forest	Savanna, forest, mangrove swamps
Major Biome:	Semi-arid desert	Dry subtropical & temperate forest	Savanna
Locomotion:	Walks, digs	Flies	Walks, runs, climbs (when young)
Body Covering:	Spines (similar to quills)	Feathers, grey, well camouflaged	Scaly skin
Tail:	Short (90mm) and difficult to see under the spines	Present	Present, very long
Ears:	Present, but do not show	Absent	Present, holes at sides of head
Location of Eyes:	On front of head	On front of head	High on sides of head
Colour:	Yellow at base, dark at the tip	Grey	Grey/brown with orange patches
Teeth:	Absent	Absent	Sharp and numerous
Food:	Ants and termites	Carnivore, insects, reptiles, frogs, rodents	Carnivore, reptiles, fish, birds & small to large mammals