

# SELF-GUIDED TOUR



Junior

# Eurasia Wilds

# TABLE OF CONTENTS

<b>Note to Educator</b> .....	3
<b>Toronto Zoo &amp; Eurasia Wilds Maps</b> .....	4-5
<b>Curriculum Connections</b>	
Big Ideas and Specific Expectations .....	6-8
Concepts to Review .....	9-11
<b>Tour</b>	
European Reindeer.....	12
Meadows .....	13-14
Red Panda.....	15
Domestic Yak.....	16
Bactrian Camel .....	17
Mouflon.....	18
Przewalski’s Horse.....	19
Steller’s Sea Eagle.....	20-21
Eurasian Eagle Owl .....	22
Snow Leopard.....	23
Chamois .....	24
West Caucasian Tur .....	25
<b>Follow-up Questions</b> .....	26

---

## To The Educator

---

The Toronto Zoo's Education Branch is pleased to provide you with **Self-guided Tour: Eurasia Wilds – Junior**, a resource package designed to support the educational component of your self-guided field trip and enhance your students' learning. The questions and information provided in this resource package will help you and your supervisors guide your students' learning and discovery as they explore Eurasia Wilds. The self-guided tour package includes curriculum connections, concepts to review, a tour script, and follow-up questions. It has been designed for students in grades 4-6, with curriculum links to the Understanding Life Systems strand of The Ontario Curriculum, Grades 1-8: Science and Technology 2007.

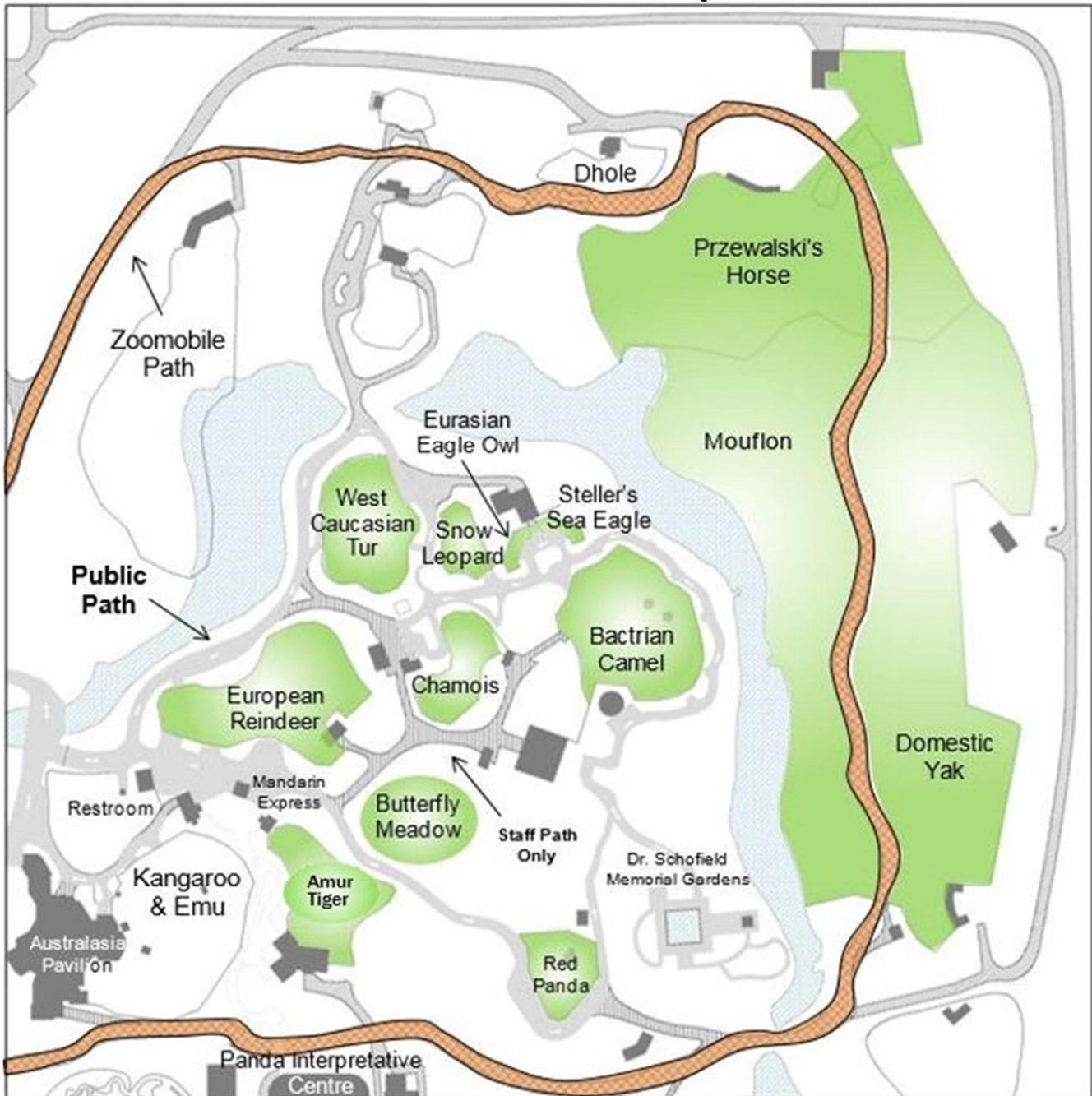
The self-guided tour covers topics across grades 4, 5, and 6, including habitats and communities, animal organ systems with a focus on the digestive system, classification, and biodiversity. The tour includes a variety of questions (bolded) for each animal, as well as background information, which in combination with exhibit signage, can be used as reference material for you and your supervisors. The questions have been developed not necessarily for students to get the right or wrong answer, but rather to encourage students to draw conclusions from their own observations, prior knowledge, and through discussions with other students. During the tour, students should record any questions they might have or things they would like to learn more about. These can form the basis of a follow-up discussion or research project when students return to the classroom.

### **Suggestions for how to best utilize this self-guided tour package:**

1. Develop learning outcomes or educational goals for the trip.  
→ What would you like students to learn during the self-guided tour or Zoo trip in general?
2. Review the entire resource package, including curriculum expectations, concept review, tour script, and follow-up questions.
3. Determine how students will 'show' their learning (e.g. oral discussions at each exhibit, notes and observations recorded in a notebook, etc.).
4. Plan pre-visit activities or a concept review lesson.  
→ Visit the Teacher Resource section of [torontozoo.com/educationandcamps/schoolprograms](http://torontozoo.com/educationandcamps/schoolprograms) for additional resources, including the Giant Panda Teacher Resource and Activity Guide
5. Print a copy of the tour script (p. 12-27) for each supervisor/group and **highlight** the specific questions you would like covered.
6. Review your expectations of the trip, including learning outcomes and expected behaviour, with your students and all supervisors prior to visit.
7. Plan a follow-up lesson(s) or post-visit activities to wrap-up the Zoo visit and address any questions students may have.



## Eurasia Wilds Map



**\*Please Note:** Przewalski's Horse, Mouflon, and Domestic Yak visible from Zoomobile or by looking across river.

## Curriculum Connections

*The Eurasia Wilds – Junior self-guided tour is intended to assist educators in connecting animals that their students are observing to curriculum expectations from the Understanding Life Systems strand The Ontario Curriculum, Grades 1-8: Science and Technology 2007.*

*Big ideas and specific expectations for each grade are listed below.*

### GRADE 4

#### **Big Ideas**

- Plants and animals are interdependent and are adapted to meet their needs from the resources available in their particular habitats.
- Changes to habitats (whether caused by natural or human means) can affect plants and animals and the relationships between them.
- Society relies on plants and animals.

#### **Specific Expectations**

##### ***Relating Science and Technology to Society and the Environment***

- 1.1** Analyze the positive and negative impacts of human interactions with natural habitats and communities, taking different perspectives into account and evaluate ways to minimizing the negative impacts.
- 1.2** Identify reasons for the depletion or extinction of a plant or animal species, evaluate the impacts on the rest of the natural community, and propose possible actions for preventing such depletions or extinctions from happening.

##### ***Developing Investigation and Communication Skills***

- 2.2** Build food chains consisting of different plants and animals, including humans.
- 2.3** Use scientific inquiry/research skills to investigate ways in which plants and animals in a community depend on features of their habitat to meet important needs.
- 2.5** Use appropriate science and technology vocabulary, including *habitat, population, and community, adaptation, and food chain*, in oral and written communication.

##### ***Understanding Basic Concepts***

- 3.1** Demonstrate an understanding of habitats as areas that provide plants and animals with the necessities of life (*e.g., food, water, air, space, and light*).
- 3.2** Demonstrate an understanding of food chains as systems in which energy from the sun is transferred to producers (plants) and then to consumers (animals).
- 3.3** Identify factors that affect the ability of plants and animals to survive in a specific habitat.
- 3.4** Demonstrate an understanding of a community as a group of interacting species sharing a common habitat.
- 3.5** Classify organisms, including humans, according to their role in a food chain.
- 3.6** Identify animals that are carnivores, herbivores, or omnivores.

## GRADE 5

### **Big Ideas**

- Organ systems are components of a larger system (the body) and, as such, work together and affect one another.
- Organ structures are linked to their functions.

### **Specific Expectations**

#### ***Developing Investigation and Communication Skills***

**2.4** Use appropriate science and technology vocabulary, including *circulation, respiration, digestion, organs, and nutrients*, in oral and written communication.

#### ***Understanding Basic Concepts***

- 3.1** Identify major systems in the human body and describe their roles and interrelationships.\*
- 3.2** Describe the basic structure and function of major organs in the respiratory, circulatory, and digestive systems.\*

\* Students can compare and contrast human organ systems to animal organ systems

## GRADE 6

### **Big Ideas**

- Biodiversity includes diversity of individuals, species, and ecosystems.
- Classification of the components within a diverse system is a beginning point for understanding the interrelationships among the components.
- Because all living things are connected, maintaining diversity is critical to the health of the planet.
- Humans make choices that can have an impact on biodiversity.

### **Specific Expectations**

#### ***Developing Investigation and Communication Skills***

- 2.2** Investigate the organisms found in a specific habitat and classify them according to a classification system.
- 2.3** Use scientific inquiry/research skills to compare the characteristics of organisms within the plant or animal kingdoms.
- 2.4** Use appropriate science and technology vocabulary, including *classification, biodiversity, natural community, interrelationships, vertebrate, invertebrate, stability, characteristics, and organism*, in oral and written communication.
- 2.5** Use a variety of forms to communicate with different audiences and for a variety of purposes.

***Understanding Basic Concepts***

- 3.1** Identify and describe the distinguishing characteristics of different groups of plants and animals.
- 3.2** Demonstrate an understanding of biodiversity as the variety of life on earth, including variety within each species of plant and animal, among species of plants and animals in communities, and among communities and the physical landscapes that support them.
- 3.3** Describe ways in which biodiversity within species is important for maintaining the resilience of those species
- 3.5** Describe interrelationships within species and between species.





## Concept Review – Grade 4

### Habitats and Communities

- **Habitat:** The natural home or environment of an animal, plant, or other organism.
  - **Food, water, shelter, and space** must all be available for organisms to survive in their habitat.
  - All organisms within a habitat form a **natural community** that depend and rely on each other for survival. These interrelationships are necessary for plants and animals to survive within an ecosystem.

### Niche and Food Chain

- **Niche:** The role an organism plays within their community.
  - A niche is defined by what that organism does, such as where it lives, what it eats, what *eats it*, and when it's active.
  - **Example:** The niche of the honeybee is to take nectar from plants, pollinate plants, provide food for birds, etc.
- In every natural community, three categories of niches that exist are: **producers, consumers, and decomposers**. These niche categories form a **food web**.
  - **Producers:** Make food that is eaten by other organisms (e.g. plants use photosynthesis to produce leaves and fruits that are eaten by animals).
  - **Consumers:** Eat other living organisms in order to survive (e.g. giant pandas eat bamboo, snow leopards eat other animals).
  - **Decomposers** (e.g. bacteria and fungi): Obtain their food and energy by breaking down dead plants and animals. Decomposers release nutrients trapped in dead materials, returning them to the soil, which makes them available for plants and other producers to re-start the cycle of the food web.

### Adaptations

- **Adaptation:** An evolutionary process of change where an organism or species becomes better suited to its environment.
  - Adaptations are physical characteristics or behaviours that help plants or animals survive in its habitat and fulfill its niche.
  - **Example:** Beavers have glands that produce castoreum, a reddish-brown oily substance that is used to waterproof their fur.

## Concept Review – Grade 5

### Human Organ Systems

- **Prior** to visiting the Zoo, it is recommended that students have a basic understanding of the organ systems in the human body (respiratory, circulatory, digestive) and how they work together to make the body function.
- While at the Zoo, students can compare how animal organ systems differ from human organ systems, with particular attention focused on the digestive system.

### Human Digestive System

- **Why do humans need to eat?**
  - Eating food allows us to get energy for our bodies to work and nutrients to for growth.
- **Digestion:** The process of our body breaking food down into smaller molecules in order to be used as energy.
  - **Mechanical digestion** is the process of physically breaking food into smaller pieces (e.g. when we use our teeth to chew food into smaller pieces for swallowing).
  - **Chemical digestion** occurs when enzymes in our stomach/saliva chemically break down the smaller pieces of food, allowing the body to absorb nutrients from the food.
- Anything that our body is unable to break down and digest is excreted as waste.
- Human digestive system components: Mouth (teeth, saliva) → Esophagus → Stomach (gastric juices) → Small Intestine → Large Intestine → Rectum/Anus.

### Animal Digestive Systems

- Do animals digest food the same way as humans? Do all animals digest food the same way? The digestive systems of animals vary depending on what they eat.
- **Herbivores** eat only plant material.
  - Some have digestion systems similar to humans (**monogastric**), while others have multi-chambered stomachs (**ruminants**).
  - Herbivores have longer digestive tracts because it takes longer to absorb nutrients from plant material than from meat.
- **Carnivores** are meat eaters whose diets consist almost entirely of other animals.
  - Carnivores have shorter digestive tracts because they can obtain nutrients from the meat they consume much faster than herbivores.
- **Omnivores** have a diet that consists of both plants and animals.
  - Omnivores usually have a digestive system that resembles herbivores.
  - Humans are an example of an omnivore.

## Concept Review – Grade 6

### Biodiversity

- **Biodiversity:** The variety of living things in an ecosystem.
- As all living things, including humans, are connected, maintaining biodiversity is critical to the health of the planet.
- **Note:** Through their observations while at the Zoo, students will have a first-hand opportunity to appreciate the diversity of living things, while recognizing the roles and interactions of individual species within the whole.

### Interdependence

- **Interdependence:** The idea that everything in nature is connected to everything else; what happens to one plant or animal affects other plants and animals.
- Within an ecosystem, all organisms are essential to the survival of the others. If one plant or animal is impacted (positively or negatively), species who are dependent on it will also be affected.
- **Example:** An increase in rabbits will affect the grasses they eat and the predators that eat them within an ecosystem.

### Conservation

- **Conservation:** The protection and preservation of plants, animals, and their environment.
- **H.I.P.P.O** is an acronym that represents the five leading causes of the endangerment or extinction of animal or plant species:
  - H**= Habitat Loss (the destruction of a species' environment)
  - I** = Introduced/Invasive Species (species introduced to new environments often negatively impact ecosystems as they outcompete native species)
  - P**= Pollution (contaminants entering natural habitats have a detrimental effect on species)
  - P**= People (growth of population decreases natural habitats; poaching)
  - O** = Over Collection/Overharvesting (human exploitation of natural resources/land)
- **Note:** When assessing human impacts on species and/or ecosystems, students can investigate on how to minimize the negative impact of their actions and make more informed decisions. This is represented by the positive **H.I.P.P.O** acronym:
  - H**= Habitat Restoration (the maintenance and restoration of our natural ecosystems)
  - I** = Information (becoming informed about conservation and helping to promote it)
  - P**= Practice 3 R's (reduce, reuse, recycle)
  - P**= Purchase Responsibly (buy products that are recognized as having a reduced effect on the environment)
  - O** = Organizations (support organizations that promote conservation, like the Toronto Zoo!)

## SELF-GUIDED TOUR

### EUROPEAN REINDEER

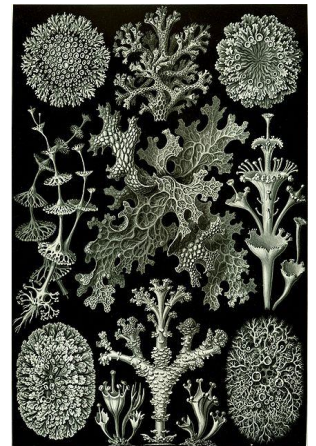


- **Depending on the season, European reindeer inhabit two different habitats, evergreen forests and the tundra. Why?**
  - There is a natural mass migration between the two areas due to the availability of food and water. In the winter months, they travel to evergreen forest areas, and in the spring, they return to the tundra when the snow melts.

#### Cool Facts!

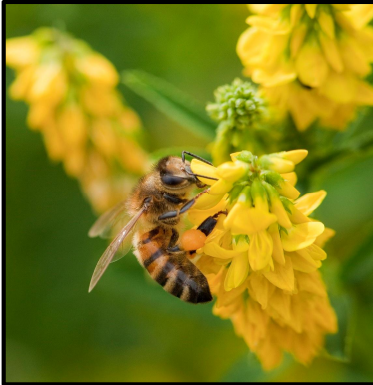
- Unlike other deer, both male AND female reindeers have antlers!
- They travel further than any migrating terrestrial mammal per year (up to 5000 km) – similar to you walking from Toronto to Vancouver)
- They are excellent swimmers, swimming across lakes and rivers if they have to, swimming up to 10 km/hr!

- **What adaptations allow European reindeer to survive in each of their habitats?**
  - Excellent sense of smell, which is strong enough to smell food buried underneath deep snow!
  - Their hooves shrink and bend in winter to give them good grip on icy ground and become sponge-like for better traction in the summer.
- **What do European reindeers eat? Are they herbivores or carnivores?**
  - Plants are very important to reindeer because they are grazing herbivores.
  - They feed on a variety of plant matter, particularly grasses in summer and lichen (see photo) in winter.
  - European reindeer are ruminants. Their four-chambered stomach helps them digest plants and grasses.
- **Are there any variations between different species of reindeer?**
  - Reindeers are divided into two major groups - tundra reindeer and woodland reindeer. The European reindeer is classified as a tundra reindeer.
  - Tundra reindeer have smaller bodies compared to woodland reindeer.
  - In North America, reindeer are referred to as caribou.
- **How will an increase in the reindeer population affect the natural community they live in?**
  - In order to sustain larger populations of reindeer, the amount of vegetation available would decrease. Natural predators, such as bears and wolves, would benefit from an increase in the number of reindeer, as more prey are available to catch.



Lichen

## MEADOWS – HONEYBEES AND POLLINATORS



- ***How do meadows contribute to a healthy ecosystem? Why are they important?***
  - Grasses and flowers are a great source of food for herbivores.
  - The nectar found in various flowers provides food for many insects living within these ecosystems, like the honeybee.
  - Tall grasses also provide shelters for many small animals and insects.
- ***How do pollinators, like honeybees, help contribute to the biodiversity of meadows and other ecosystems?***
  - Pollinators contribute greatly to the biodiversity of plants. Honeybees (and all pollinators) transport pollen by flying from flower to flower in search of nectar, which in turn fertilizes the flowers.
  - If it were not for pollinators, it would be difficult for many plants to reproduce, as most plants rely on pollinating insects in order to produce fruits and seeds.
  - The greater amount of pollinators in a given area will lead to a greater variety of plants inhabiting the area.
- ***Honeybees originate from Eurasia and humans are primarily responsible for their spread around the world. Discuss the impact that this introduced species has had in ecosystems worldwide.***
  - Honeybees have helped farmers worldwide pollinate crops and increase crop production.
  - Introducing honeybees to new ecosystems may negatively impact native pollinators who now have to compete for food.
- ***What do you think would happen to an ecosystem if pollinators, like honeybees, disappear? What can you do in your own backyard to help protect pollinators?***
  - Pollinators have recently been under attack from pesticides, disease, and habitat destruction. This has led to a serious decline in pollinator populations around the world.
  - A decline in pollinators often leads to a decline in plant populations within an ecosystem, which negatively affects the food web.
  - Herbivores that depend on these plants would decrease in numbers, which in turn will impact omnivores and carnivores (e.g. snow leopard) that consume them due to the reduction of prey.
  - This is a reminder that all organisms within an ecosystem are interconnected and essential to the biodiversity of natural communities.
  - We can plant gardens to preserve pollinator populations by giving them more access to the nectar they need to survive.

- **What does the name ‘honeybee’ tell us about this pollinator? How is honey made?**
  - The process begins when ‘forager’ bees collect nectar from flowering plants. The foragers drink the nectar and store it in their ‘crop’ (also called the honey stomach). The crop is used solely for storage and the forager bee does not digest the nectar at all.
  - The forager bee then takes the nectar back to the hive, regurgitating the nectar directly into the crop of a “processor” bee at or near the entrance to the hive. The processor bee takes the nectar to the honeycomb and regurgitates it into a hexagonal wax cell. This is where the nectar begins to ripen.
  - During the ripening process, the bees “dry out” the nectar. One of the ways they do this is by fanning their wings, which creates airflow around the honeycomb and helps water evaporate from the nectar. Once dried and ripened, the honey is ready for consumption!



## RED PANDA



- **After seeing both the giant panda and red panda, what similarities can you observe between them?**
  - Both need access to bamboo to meet their basic needs (90% of the red panda's diet consists of bamboo).
  - Like the giant panda, the red panda has a special pseudthumb on their front paws to help them grasp bamboo stalks!
  - Red pandas are also consumers. Like the giant panda, the digestive system of the red panda has adapted to enable it to survive predominately on bamboo.
  
- **What differences can you observe?**
  - Red pandas are much smaller and are not closely related to giant pandas.
  - Red pandas look more like a raccoon, but actually belong to their own taxonomic family. They are the only living species of the genus *Ailurus* and the family *Ailuridae*.
  - Giant pandas are ground-dwelling animals, while red pandas are tree-dwelling animals (look high up in the trees if you haven't spotted the red panda yet!).
  - Unlike giant pandas, red pandas do not eat the stem of bamboo. Instead, they only eat bamboo leaves and can eat about 200,000 of them in a single day!
  - Red pandas have big, bushy tails that help them balance when climbing and jumping.
  - They also have sharp claws and front legs that are angled inward to help them climb. These physical adaptations allow the red panda jump up to 1.5 m from branch to branch.
  
- **What is the niche of the red pandas?**
  - They are an arboreal species (adapted for living in trees).
  - Spend most of their time in the branches eating bamboo, some berries, and the occasional insect.
  - They are a food source for predators, such as snow leopards.
  
- **If red pandas share similar habitats with giant pandas, what threats do you think are affecting the biodiversity of their habitat?**
  - Expanding human population in Southeast Asia, an increasing need for land and lumber, competition with local livestock for food, and pollution.
  - Deforestation destroys the red panda's nesting sites and the bamboo that provides the majority of their diet.

### Quick Activity!

Red pandas can jump 1.5 m in a single leap!

Can **you** jump like a red panda?

## DOMESTIC YAK

- **What type of habitat do you think yak live in?**

- Wild yak inhabit the alpine tundra at altitudes of 5000 to 7000 m, but it can also survive at much lower altitudes.
- Their habitat can vary, consisting of three areas with different vegetation—alpine meadows, alpine steppes, and desert steppes (*steppe: flat, unforested grasslands*).
- Habitat can also be dependent on the season. Some herds migrate large distances seasonally to feed on grass, moss, and lichens. However, they prefer the colder temperatures of the mountain plateaus.



- **How do yak survive at high altitude (extreme cold temperatures and low oxygen)?**

- Conserve heat (rather than generate) through their coat (long, shaggy hairs and a thick undercoat of fine down hairs), a thick layer of subcutaneous fat, almost non-functional sweat glands, and a short, compact body (less exposed surface area).
- Their larger heart and lungs (1.5 to 2 times larger than cattle found at lower altitudes) gives them a greater capacity for transporting oxygen through their blood.

- **Yak are herbivores. What components of the digestive system do you think they have?**

- Yak are ruminants. They have a four-chambered stomach that allows for a more complete digestion of the plants they have eaten.
- Food remains in the stomach longer in order to absorb more nutrients from the plants eaten.
- Food is then regurgitated and chewed again. This is called ‘*cud*’.
- Like other herbivores, their intestines are longer than carnivorous digestive systems and they have flat molars to help grind plants when chewing.

- **Domestic yak play an important role in Tibetan culture and society. Why?**

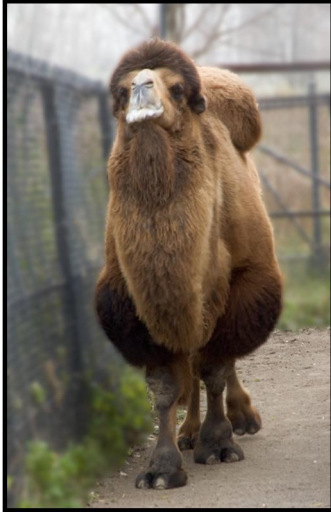
- Domesticated in Tibet for centuries, yak now have a much wider distribution than the original wild range.
- Very important to the nomadic tribes of the region because of its ability to withstand very low temperatures and because they are so surefooted on the steep mountain trails.
  - Used for transportation purposes— they can carry loads of 150 kg or more on the steepest mountain paths.
- Source of food for Tibetans— their milk is highly nutritious and older yaks are used for their meat.
- Yaks are sheared once a year, with the wool being spun into yarn and used for blankets, clothing, ropes, etc.
- Yak manure is used for fuel due to the lack of trees/brush in the mountains of Tibet.

**Yak Have Enormous Lungs!**

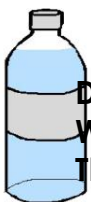
Yak have an extra pair of ribs to expand their lung capacity!



## BACTRIAN CAMEL



- **Using your prior knowledge, what type of habitat do you think Bactrian camels live in?**
  - Bactrian camels inhabit arid (dry) regions with little to no rainfall.
  - They live primarily in the deserts of Central Asia, north of the Himalayan Mountains, where temperatures range from  $-29^{\circ}\text{C}$  in the winter to  $38^{\circ}\text{C}$  in the summer (similar to temperatures found in Canada).
  - Agriculture, mining, and urban development have destroyed the habitat of camels, pushing them to more remote areas where food and water are hard to find.
  - In 2003, only 100 Bactrian camels were found to still be living in the Gobi Desert.
  
- **What adaptations do Bactrian camels need to survive such extreme temperatures?**
  - One physical adaptation is their tough feet, which help them move through the rocky Asian deserts. These tough, even-toed feet also help them trek through the snow and sand.
  - They have long, thick eyelashes to help keep sand out of their eyes.
  - Due to the extreme differences in temperature, Bactrian camels grow long, thick coats in the winter, which they then shed in warmer seasons.
  
- **Is a Bactrian camel a herbivore, carnivore, or omnivore? How do you know?**
  - They are herbivores, eating grasses, plants, leaves, etc.
  - Bactrian camels are ruminants. They store partly digested food in a chamber in their stomachs, regurgitate it, and chew it thoroughly again before swallowing.
  - Bactrian camels have very tough-skinned mouths. Some plants have thorns to protect themselves from being eaten by animals, but camels can eat them with ease!
  - Take a look at the camels' two humps. Most people believe that these humps hold water, but they are actually made of fat! These fat deposits are an adaptation that provides nourishment for Bactrian camels when food is scarce (they can store up to 36 kg of fat in their humps!).
  - They can go without drinking water for several weeks and obtain receive water by eating plants.
  - Their skin contains no sweat glands! This helps them retain more moisture in their bodies, instead of sweating it out.



### Wow!

Did you know that a camel can go several weeks without water? When they are thirsty, they can drink 114 liters of water in 10 minutes! That is the equivalent of 270 water bottles!

## MOUFLON



- **Where do mouflon live?**
  - They live in mountainous regions, usually above the tree line or in mountain meadows.
  - Living on such steep-sided rocky peaks helps to protect mouflon from predators.
  - They originated on the islands of Corsica, Sardinia, and Cyprus (Mediterranean Sea).
  
- **What type of animal is a mouflon? What animal does it remind you of?**
  - Mouflon are Europe's only true wild sheep species! They are thought to be one of two original species of all modern day sheep.
  - **Classification:** Vertebrate, mammal.
  
- **What do mouflon eat? Mouflon have a digestive system that is similar to other animals seen in Eurasia Wilds. Which animals do you think it is and why?**
  - Mouflon are herbivores, so plants are very important to their survival.
  - Mouflon have an interesting adaptation. Like Bactrian camels and yaks, they have multi-chambered stomachs that can break down the cellulose of plant cell walls. It eats, regurgitates its food, chews it again, and then swallows it one last time.
  - This type of digestion is necessary for mouflon to receive enough nutrients from the plants they eat.
  
- **How do mouflon contribute to the biodiversity of their natural habitat? What types of plants or animals rely on mouflon for their own survival?**
  - Mouflon are important for the health of its ecosystem because their waste fertilizes the soil, which helps vegetation grow.
  - They are a source of food for predators. Wolves, foxes, wildcats, and eagles all depend on mouflon for food (they are a major contributor to their ecosystems food web).
  
- **How do you think humans have impacted mouflon populations?**
  - Populations have declined in the last 50 years due to habitat loss, hunting for their horns, and interbreeding with domestic sheep.
  - They are listed as vulnerable by the International Union for Conservation of Nature (IUCN), which has placed restrictions on hunting or trapping them.
  - Humans have been able to successfully introduce mouflon to other parts of Europe where they are now thriving.

### I Wonder...

Should humans introduce species to new ecosystems?  
What factors should they consider?

## PRZEWALSKI'S HORSE (*pronounced sheh-val-skee*)



- **What is the natural habitat of the przewalski's horse?**
  - The arid (dry) cold steppes of the Gobi Desert in Mongolia and China.
  - Unfortunately, these horses have been driven to extinction in the wild, but due to the collaboration of zoos and organizations worldwide, they have been re-introduced into the wild.

- **Identify similarities and differences between Przewalski's horses and domesticated horses.**

- They are smaller than domestic horses, have a stiff, erect mane, and their tail hair sheds each year and is re-grown!
- They also have bigger heads and brains than domesticated horses, but have a stockier build (shorter legs).



- **What factors do you think contributed to the extinction of Przewalski's horses in the wild?**

- Driven from ancestral grazing areas by domestic herds or taken by nomads to breed with domestic horses.
- Too timid to compete for natural resources with domestic herds. Unable to get water, a basic need, they were unable to survive.
- Other factors include infectious diseases from domestic horses and social stress.



- **How might the lack of genetic diversity affect Przewalski's horses?**

- Breeding with domestic horses (hybridization) led to a loss of genetic diversity.
- Lack of genetic diversity can make them more susceptible to diseases that can wipe out large portions of the population.

- **How are Przewalski's horses able to survive in the extreme environmental conditions of the Gobi Desert, while domestic horses cannot?**

- Unlike domestic horses, it can survive on desert plants. These plants can survive in extreme temperatures with little water, providing an alternative food source when others are not available (desert scrub, roots, leaves, etc.).
- Przewalski's horses grow a dense coat for very cold winters and shed into a lighter coat for hot summers.

### Did You Know?

Przewalski's horses have NEVER been tamed for riding. They are truly the LAST species of wild horse!

## STELLER'S SEA EAGLE

- **What characteristics or features do Steller's sea eagles require in their habitat?**

- Rocky outcrops and trees that make good nesting sites.
- Steady supply of fish for food.
- Fresh water.
- Steller's sea eagles are always found near water, mainly on seacoasts. During breeding season, they can also be found on coastal lagoons and lakes.
- They inhabit coastal strips from the Bering Sea in Eastern Russia to the northern-most Japanese island of Hokkaido.



- **What adaptations help the Steller's sea eagle survive?**

- Have a look at those giant wings! This eagle has a wingspan of over 2 m - that's wider than the height of an average man!
- Their giant wingspan allows them to glide over water for long periods of time when hunting fish.
- Like other eagles, Steller's sea eagles have a remarkable sense of vision (6-8 times better than humans!). They use their binocular vision to find their food from far away.

- **What types of food do you think Steller's sea eagles eat? Why?**

- Steller's sea eagles feed primarily on salmon, except on the Japanese island of Hokkaido, where they feed on Alaskan pollock and cod.
- They also hunt mammals, including hare, musk beaver, and the carcasses of seals and sea lions.
- It is also common for this species to steal catches from other birds. Steller's sea eagles will pretty much eat whatever is available!

- **How do Steller's sea eagles digest their food?**

- There are several organs that make up a bird's digestive tract. Since birds lack teeth, their digestive systems are adapted to process food items that are swallowed whole. They use their sharp beaks to tear their food into smaller pieces and swallow their food.
- From the beak, food moves down the esophagus and into the crop, which stores excess food so the bird can digest it more slowly. The food then moves to the proventriculus, the first part of the stomach, where it is softened by gastric acid, mucus and other digestive juices.
- The lower part of its stomach, the 'gizzard', is where food is mechanically digested. Instead of teeth for mechanical digestion, the gizzard uses small rocks, shells, and sand, all ingested on purpose, to break apart hard food. If the food is particularly tough, it may move between the proventriculus and the gizzard several times for more efficient digestion.

- Once the food is sufficiently broken down, it moves into the small intestine, where the liver and pancreas help with absorbing nutrients. In the area where the small and large intestines join are the caeca, two pouches that help absorb any remaining water from the food and finish the digestive process.
- ***How have humans impacted Steller's sea eagles and the ecosystems they live in?***
  - Increasing development on Russia's east coast is impacting their remote and formally undisturbed habitat.
  - Chemicals used by humans, such as DDT and PCBs, are dumped into rivers, resulting in thinner egg shells that are more likely to break during incubation. A lack of chicks hatching endangers future generations.
    - Bald eagles faced the similar problems in North America during the mid-1900s, but their populations have increased since the banning of DDT and they are no longer classified as endangered.
  - Further pollution of water systems from plants and factories, as well as the building of hydroelectric dams, hamper salmon spawning. These actions greatly reduce the population of the sea eagle's main food source, making it harder for them to catch enough food.
  - Steller's sea eagles are now a protected species by Russia and Japan. Their population has stabilized in recent times to 5,000 to 7,500 birds.



**Did you know that the wingspan of the Steller's sea eagle is twice the length of its body!**

**They are also the heaviest species of eagle in the world!**

## EURASIAN EAGLE OWL



- ***What kind of habitat do Eurasian eagle owls occupy?***

- The Eurasian eagle owl mainly inhabits rocky cliffs or steep slopes with trees or bushes nearby.
- They can also be found in semi-arid areas, deserts, and even in some European cities where rabbits are plentiful.
- Their habitat can vary from sea level to roughly 2,000 m, and can be found as

as 4,500 m in the Himalayan mountains (that's the height of 8 CN Towers!).

- ***What unique adaptations do Eurasian eagle owls have?***

- Do you see their big orange eyes? These owls are nocturnal, so they need excellent night vision in order to hunt prey— their night vision is 10 times more accurate than humans!
- Owls have unique flight feathers that allow them to fly quietly. Being quiet fliers is beneficial because they are able stalk/hunt their prey silently.
- They also have an acute sense of hearing in order to hear their prey at night.

- ***How does the digestive system of the Eurasian eagle owl differ from the human digestive system?***

- Eagle owls swallow their prey whole! Any parts of their prey that cannot be digested (e.g. bones, fur, etc.) are regurgitated as pellets, instead of being excreted as waste, which is what happens in humans.
- The Eurasian eagle owl preys on a variety of small mammals. Favourites include rodents, rabbits, hedgehogs, and shrews, but they are also capable of hunting larger mammals, such as fox and small deer!

- ***In the past, populations of Eurasian eagle owls have declined greatly. How does this affect the biodiversity in their ecosystem?***

- Cars, power lines, and pesticides kill many Eurasian eagle owls. In certain cultures, they are also eaten for supposed health benefits.
- Decreases in owl populations could lead to an increase in small mammal populations, like rodents, which happen to be disease carriers.
- Due to a lack of competition for food, other predator populations would increase.
- With reintroductions and protected status in place, Eurasian eagle owls are making a great comeback, but remain sparse in some areas because of habitat destruction.

### Quick Question!

How is the eagle owl similar to Steller's sea eagle?  
Can you think of any differences?

## SNOW LEOPARD

- ***From its name, what can you infer about the snow leopard's habitat? What does their exhibit at the Zoo tell us about the features that must exist in their natural habitat?***

- Snow leopards inhabit mountain steppes and areas of rocky wilderness, such as snowfields, glaciers, and alpine meadows.
- The altitudes of this habitat can vary from 900 to 6,000 m above sea level.
- Known to travel in the summer and winter, following the migrations of their prey.
- Primarily found in the Himalayan Mountains and are able to endure a temperature range of  $-40^{\circ}\text{C}$  –  $40^{\circ}\text{C}$ !



- ***Snow leopards belong to the cat family. What adaptations make them unique compared to most other cat species? Why do they need these adaptations?***

- They have very large paws that are covered in fur on the bottom. This adaptation makes their paws act like snow shoes, giving them more traction in the snow, as well as keeping them warm. The adaptation is a result of their cold habitat.
- Snow leopards have a remarkable respiratory/circulatory system. Their noses are designed to heat up the cold air they breathe in before it reaches their sensitive lungs.
- A great sense of smell that helps determine their territory and locate prey and other snow leopards.
- Front legs are short and stocky to help climb, while their back legs are long to quickly leap towards prey (up to 15 m!).
- Big, strong tails help them move, making sure they stay balanced when running and leaping (their tails are almost as long as the rest of their body!).
- The long tail also acts like a scarf, wrapping around the snow leopard to provide warmth.

### Fun Fact!

Snow leopards can travel up to 40 km in one night! That's the distance from the Toronto Zoo to the CN Tower!

- ***Snow leopards have the digestive system of a true carnivore. How do they depend on plants for their survival?***

- Snow leopards teeth are large and sharp in order to pierce into flesh.
- Plants are important to the snow leopard because their prey depend on plants for food (herbivores). A lack of biodiversity would harm the interrelationships between species and disrupt the food web.

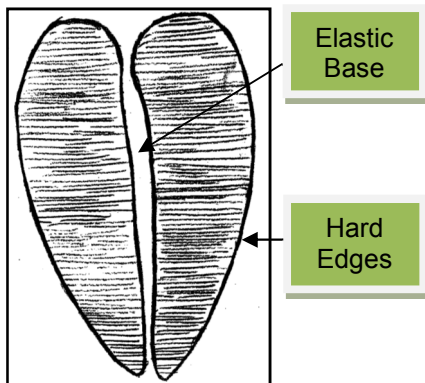
- ***Referring to the acronym HIPPO, what factor(s) are currently impacting snow leopards?***

- **Habitat loss** – growing number of domestic livestock reduce amount of wild prey typically eaten by snow leopards.
- **People** – hunted both for their pelts and because they pose a threat to herders livestock. Bones and body parts also taken for use in traditional Asian medicine.

## CHAMOIS



- **Describe the type of habitat you think chamois might inhabit?**
  - Chamois inhabit steep, rocky cliffs at altitudes of over 1800 m and alpine pastures. They inhabit lower altitudes in winter.
  - The northern chamois is native to mountainous parts of central and southern Europe and Asia Minor.
  - They have also been introduced to New Zealand and Argentina without interrupting native species in the area.
- **What adaptations allow chamois to survive in their habitat?**
  - Its ability to move with ease among rocks in extremely difficult terrain is due mainly to the structure of the hooves, which have an elastic base in the middle of the hoof and hard, thin edges that help them 'clamp' onto rocks.
  - This physical adaptation helps the chamois 'clamp' onto rocks, making it harder for predators, like lynx and wolves, to reach them on mountain cliffs.
  - Apart from their hooves, chamois have strong hind legs and can jump almost 2 m high and 6 m in length!
  - Unlike giant pandas that eat 10-16 hours a day, chamois can go up to two weeks without food in the snowy periods! This adaptation helps them survive the long winter months when food can be scarce.
  - If a female is badly injured or killed, other females will take care of her young (behavioral adaptation), which has played a major role in the survival of the species.



- **Are chamois herbivores or carnivores? How do you know?**
  - Chamois are herbivores, eating flowers, herbs, and other small plants.
  - During winter, when food is scarce, chamois will move to lower ground to eat lichen and mosses that can survive extreme weather conditions.
  - Their eyes are positioned on the side of their heads, indicating that they are prey for carnivores (mainly lynx and wolves).
- **What threats do chamois face in the wild? Why does human activity have little impact on their natural habitat?**
  - A fatal type of scabies (skin disease of itch mites), known as "gamsraude," periodically decimates herds.
  - Human disturbance is not a major factor, although increased tourism and leisure activities in mountain areas have slightly affected their natural habitat.
  - Habitat loss due to humans is not a major concern due to the extreme environment and weather where they live.



## WEST CAUCASIAN TUR



- **Using your prior knowledge about other animals in Eurasia Wilds, what type of environment do tur inhabit?**
  - They live in the western part of the Caucasus Mountains in Georgia and Russia in rugged mountain areas between 800 m and 4,000 m above sea level.
  - They need to have good climbing skills to be able to meet their basic needs in this habitat.
  - Turs live in herds and do not like to be alone. These herds can sometimes consist of up to 500 individuals!
- ***With a remote habitat like this, what do tur eat?***
  - West Caucasian tur are herbivores, just like chamois, yak, reindeer, and mouflon. They have a varied diet and eat over one hundred different species of plants. They have even been spotted in forests eating mushrooms!
  - In the winter, foraging is made harder by the snowfall, so they use their hooves to scrape away the snow in order to reach the vegetation buried below.
  - A behavioral adaptation that these animals have is seasonal migrations, with tur migrating depending on where there is a supply of plants and warmth.
  - When it is cold, they will migrate down the mountain to find food and when it warms up, they migrate back up to the mountain to exploit the growing vegetation.
- ***Where in the food chain would you place the tur? Why?***
  - Tur are consumers of plants and are also consumed by carnivores higher in the food chain like lynx and wolves.
  - Position of eyes on side of head indicates they are prey (gives them a larger field of view).
- ***How have humans affected West Caucasian tur population?***
  - Habitat loss and degradation of native lands has negatively affected their natural habitat.
  - Livestock grazing affects the biodiversity of their habitat, which results in the tur having to compete for food and resources.



## Follow-Up Questions

### ***Possible discussion questions/activities for Grade 4***

- Discuss and sort the animals found in Eurasia Wild into three categories: herbivore, carnivore, and omnivore.
- Why do herbivores have to find new food resources in the winter?
- Draw food chains consisting of the different plants and animals found in Eurasia Wild. Include their niche and how they are interconnected to other organisms within the ecosystem (include humans if you want).
- Investigate the specific characteristics/adaptations of an animal you saw in Eurasia Wilds. How do these adaptations help the animal to survive in its habitat?
- If you could have any adaptation you saw today, what would it be and why?
- How do humans contribute to the destruction of natural habitats? How can people contribute to the conservation of natural habitats?

### ***Possible discussion questions/activities for Grade 5***

- Compare and contrast the human digestive system to the digestive system of an animal found in Eurasia Wilds...OR...Compare the digestive systems of two different animals found in Eurasia Wilds.
- Do carnivores have the same digestive system as herbivores? Give specific examples of digestive systems of animals in Eurasia Wilds and how/why they differ.
- The Steller's sea eagle and the Eurasian eagle owl are both birds. Do they digest food the same way? Explain.

### ***Possible discussion questions/activities for Grade 6***

- Why is biodiversity important for the health of an ecosystem?
- Why plants are important to animals that are carnivores? How are plants important to the biodiversity of an ecosystem?
- How can humans help to promote biodiversity in the wild?
- How do humans contribute to the destruction of natural habitats and biodiversity?
- Why does the extinction (or diminishing population) of one species affect other species within the same ecosystem? How do you know this?
- What is the importance of insects and pollinators within an ecosystem? Discuss how the honeybee helps to promote biodiversity.