



Engaging Students in Conservation:

Protecting the Endangered Snow Leopard



An Interdisciplinary Curriculum
Recommended for Grades 5–8



1–2 Week Curriculum Unit



Facing
THE Future™



Snow
Leopard
Trust

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Protecting the Endangered Snow Leopard



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Curriculum developed by:



Generous funding provided by:



M.J. Murdock
Charitable Trust

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The ***Snow Leopard Trust*** is the world's leading authority on the study and protection of the endangered snow leopard. The Trust protects the endangered snow leopard from extinction, supports rural families, and safeguards the mountain environment of Asia through long-term partnerships, community-based conservation, and rigorous science. We use a combination of approaches that focus on partnering with communities in snow leopard habitat. As we build community partnerships we use science and research to determine key snow leopard habitat, assess wildlife-human conflict levels, and identify potential resources for conservation programs. For more information, visit www.snowleopard.org.

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Facing the Future is a nonprofit organization dedicated to educating and motivating today's students to be responsible stewards of tomorrow's world. We develop and deliver standards-based hands-on lessons, student textbooks, curriculum units, and professional development opportunities for educators that promote critical thinking on global issues, sustainability, and positive solutions. *Facing the Future* curriculum is in use in all 50 U.S. states and over 85 countries by teachers and students in grades K-12, in undergraduate and graduate classes, and across multiple subject areas. For more information, visit www.facingthefuture.org.

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About This Curriculum:

Students Taking Action for Snow Leopard Conservation

The snow leopard is a majestic and elusive endangered species found in the remote mountains of Central Asia. Uniquely adapted to one of the harshest environments in the world, these cats survive at extreme altitudes and are a keystone species. Their presence influences and regulates the balance of plants and animals within their ecosystem.

Although they have roamed the mountains for centuries, like other top predators they face threats due to the overlap in landscape and resource use between humans and snow leopards. Threats to snow leopard survival include illegal hunting by poachers and loss of habitat and wild prey as people and their livestock move into new areas. Human-wildlife conflicts such as these are not unique to snow leopards; they occur all around the world. Solutions for wildlife conservation are complex because they are often linked to the livelihood and needs of humans who share a habitat with wildlife.

This unit of study encourages students to explore a variety of topics and activities related to snow leopard conservation. By learning about snow leopards and the threats to their survival, students will understand the pressures facing wildlife around the world and the interconnections among those pressures. They will engage in activities that allow them to consider the many different stakeholders and points of view involved in wildlife conservation. Students will also engage in real and meaningful efforts to protect these important animals, envisioning and designing solutions that balance the needs of people and natural ecosystems. Additionally, these lessons encourage students to develop 21st century skills such as criti-



JOHN STAHL

cal thinking, collaborating with peers, and employing a global perspective.

The series of five lessons in this curriculum unit is presented in a suggested sequence. The series begins with an introduction to snow leopards and their unique ecosystem, then moves into an exploration of the human-wildlife conflicts that exist where people and snow leopards overlap, and engages students in the creative process of developing conservation solutions for real-life wildlife conflicts.

The unit culminates with a service learning activity that provides students with the opportunity to directly contribute to the protection of these cats. In this final activity, students engage in a conservation project called Snow Leopard Enterprises. Snow Leopard Enterprises, operating in Mongolia and Kyrgyzstan, is a conservation project of the Snow Leopard Trust.

Though the lessons are designed as a comprehensive unit, each lesson can also stand alone.

Grade Level: 5-8

Unit Length: 1-2 weeks

Key Concepts

- adaptation
- biodiversity
- civic participation
- community-based conservation
- ecosystem
- environment
- food web
- government
- human-wildlife conflict
- negotiation
- point of view
- service learning
- sustainable solution

Student Objectives (Abbreviated)

- Discover how wild cats, in particular snow leopards, are adapted to ecosystem conditions
- Understand how species are connected in a food web
- Evaluate how to meet the needs of humans and wildlife simultaneously
- Devise sustainable solutions for enhancing human and ecological communities where snow leopards live
- Participate in Snow Leopard Enterprises, a conservation project of Snow Leopard Trust
- Determine how to support an important conservation, community, or school project

National Standards Addressed

National Science Education Standards

C. Life Science

F. Science in Personal and Social Perspectives

National Council for the Social Studies

III. People, Places, and Environments

IV. Global Connections

V. Individuals, Groups, and Institutions

VI. Power, Authority, and Governance

VII. Science, Technology, and Society

IX. Global Connections

X. Civic Ideals and Practices

North American Association for Environmental Education

1 Questioning, Analysis, and Interpretation Skills

2.2 The Living Environment

2.3 Humans and Their Societies

2.4 Environment and Society

3.1 Skills for Analyzing and Investigating Environmental Issues

3.2 Decision-Making and Citizenship Skills

4 Personal and Civic Responsibility

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The Cat's out of the Bag!

This lesson begins with a word splash activity in which students explore environmental features of the snow leopard's mountain habitat. In a hands-on group activity, students assemble puzzles in order to construct four distinct cat species. Students consider how these cats are uniquely adapted to their ecosystems. The activity concludes with a focus on snow leopards in particular, including photos and videos of the cat in its natural habitat, and an expansion of the word splash to include snow leopard adaptations.





STEVE TRACY

Inquiry/Critical Thinking Questions

- How do an animal's physical characteristics and behaviors aid its survival?
- How is the snow leopard uniquely adapted to its habitat?

Objectives

Students will:

- Link cat adaptations to environmental conditions
- Compare morphology and habitats of four cats—snow leopard (*Uncia uncia*), Canadian lynx (*Lynx canadensis*), jaguar (*Panthera onca*), and cheetah (*Acinonyx jubatus*)
- Become familiar with unique characteristics of snow leopards—habitat, adaptive features and behaviors

Time Required

1 class period

Key Concepts

- adaptation
- environment

Subject Areas

- science
- English/language arts
- geography

National Standards Alignment

NSES

C. Life Science (structure and function in living systems; diversity and adaptations of organisms)

F. Science in Personal and Social Perspectives (populations, resources, and environments)

NCSS

III. People, Places, and Environments

IV. Global Connections

NAAEE

2.2 The Living Environment (organisms, populations, and communities)

2.4 Environment and Society (environmental issues)

Vocabulary

adaptation—a physical characteristic or behavior that helps an organism to survive in specific environmental conditions

ecosystem—all the living and nonliving components found within a given area that function together as a unit; an ecosystem includes an *environment* and the organisms living within it

environment—physical surroundings; in science, environment often refers to the natural world

habitat—the natural environment where an organism lives



STEVE TRACY

Materials/Preparation

9 pieces of paper, each with one of the following phrases written in large letters with a marker: *high altitude, thin air, very cold, long winter, deep snow, few trees, rocks, steep slopes, cliffs*

Post the pieces of paper on a wall or board where all students can read them

Handout: *Four Ecosystems*

Clear plastic bag that closes securely (e.g. Ziploc bag), 1 for each group of 4 students

Cat Characteristic Cards, photocopied, cut, and placed in a Ziploc bag; 1 complete set of 4 cats per group of 4 students [use dotted lines as cutting guides]

Handout: *Big Cat Facts*, 1 per group

Handout: *Graphic Organizer*, 1 per group

Internet access for snow leopard videos and photos (could be downloaded and saved on a computer ahead of time)

Blank index cards, 1 for each student or pair

Activity

Introduction: Word Splash (5-10 minutes)

1. This lesson begins with a *word splash*. A word splash is an assortment of words related to a particular topic that allows students to brainstorm around that topic.
2. Ask students to silently read the words on the nine pieces of paper that you've posted (see Materials/Preparation section). Tell them that these pertain to what you will study in class today. Ask students to brainstorm about possible things they will study today based on the word splash. Explain that even if they are not familiar with some of the words, they can still make predictions based on words they do know.
3. Read the phrases out loud one at a time. Ask students to share their ideas about how these phrases might be related.
4. Have students brainstorm with a partner five items they would need to survive in this environment. (*Examples might include a warm coat and snowshoes.*)
5. Ask volunteers to share their brainstorm items.
6. Let the class know that today you will study how animals are adapted to survive in particular environments.



Core Activity: Cat Characteristics (30-40 minutes)

1. Tell the class that they are about to investigate the physical characteristics of different cat species that help the cats survive in their **habitats**.
2. Divide the class into groups of four. Distribute a bag of prepared Cat Characteristic Cards to each group.
3. Provide each group with one copy of the handout *Four Ecosystems*. You may want to review the definition of **ecosystem** with students.
4. Give students a couple of minutes to construct four distinct cats using the cards in their bag.
5. Once cats are constructed, ask student groups to make educated guesses about which cat lives in each of the four ecosystems. Encourage them to think about which characteristics make a cat more likely to live in one ecosystem versus another.
6. Pass out one *Big Cat Facts* sheet and one graphic organizer to each group. The fact sheet will allow them to determine whether they have correctly constructed and guessed the identity of the cats. Ask students within each group to take turns reading aloud about each of the four cat species.
- **(Optional)** You may want to have students do their own research, rather than using the handout. The *Big Cat Facts* references may be used as starting points for research.
7. Allow student groups 15-20 minutes to read the *Big Cat Facts* and complete the graphic organizer. You may want students to read the facts and highlight information or take notes prior to writing on the graphic organizer.
8. Tell them that this exercise is not just about wild cats in general but is an introduction to a study of snow leopards in particular. Snow leopards only live in the mountains of Central Asia and in zoos.
9. Ask student groups to share the features of snow leopards, from the Facts sheet or from prior knowledge, that they consider unique. What is most unusual about snow leopards?
10. Explain that the snow leopard is one of the least known cat species in the world. This is due to a small estimated population, its remote environment, its secretive behaviors, and a huge range (across twelve countries in Asia).
11. Show one or more of the following short videos (each is 2-3 minutes) of snow leopards and their habitat from Discovery Channel's *Planet Earth*:
 - <http://dsc.discovery.com/videos/planet-earth-mountains-snow-leopard-hunt.html>



CHARLES DYE

- <http://dsc.discovery.com/videos/planet-earth-elusive-snow-leopard.html>
- <http://dsc.discovery.com/videos/planet-earth-mountains-on-the-edge.html>

12. Ask students how the images of snow leopards compared to their impressions of snow leopards from the puzzle activity and the reading.
13. Either as a group discussion or a journal writing activity, have students answer the following discussion questions.

Discussion

1. How is each cat adapted for its particular environment?
2. Describe the snow leopard's environment.
3. What kinds of things (for example, specific items of clothing or types of shelter) would you need to survive in that type of environment?
4. How is the snow leopard adapted to live in the central mountain region of Asia?
5. Do you think cheetahs, lynx, and jaguars could survive in the central mountains of Asia? What adaptive features do they have? What adaptations do they lack?
6. What species live near you? What adaptations do they have? Would it be easy or difficult for those species to live where snow leopards live?

Wrap Up: Making a Bigger Splash (5 minutes)

1. Distribute blank index cards to individual students or pairs. Have each student or pair write one snow leopard adaptation (physical characteristic or behavior) on an index card.
2. Post the cards on the wall to expand your word splash.
3. **(Optional)** Keep the cards up for the remainder of your snow leopard unit of study. Continue to expand your word splash using the directions provided in subsequent lessons.

Extension Activity

Create a board game that would teach younger children about the special characteristics and behaviors of snow leopards. The object of the board game is for students to learn about characteristics unique to snow leopards and understand how specific adaptations help them to survive. Each player could roll a die and then draw an adaptation card (*ex: What is the purpose of a snow leopard's long furry tail?*). If he or she correctly guesses the way in which a particular characteristic of snow leopards allows them to thrive in their environment (*ex: Snow leopards wrap their tails around their faces to stay warm.*), the player advances on the board according to the number on the die.



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Additional Resources

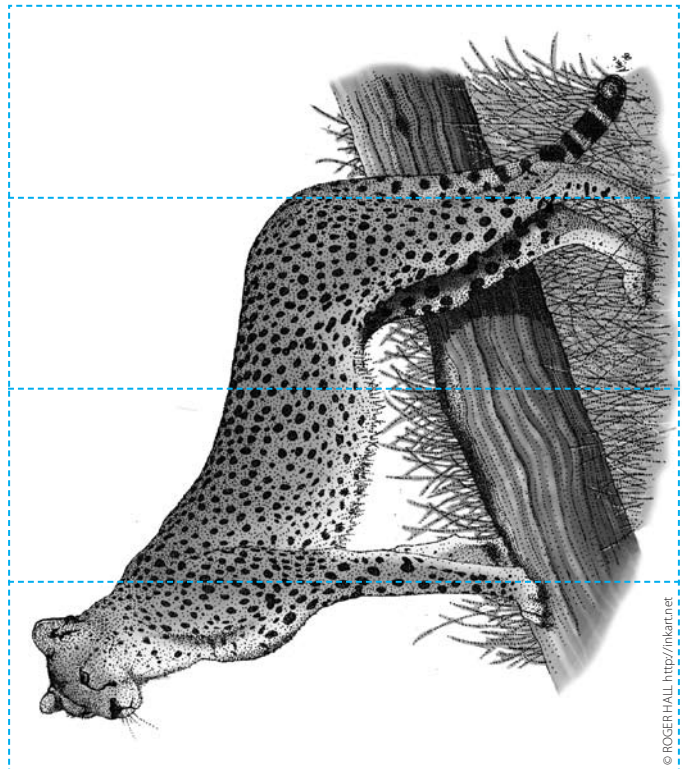
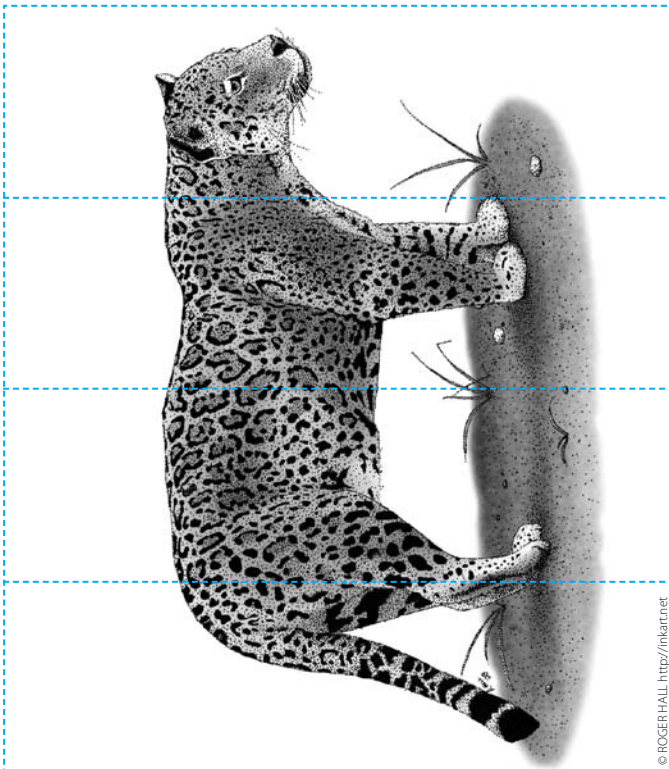
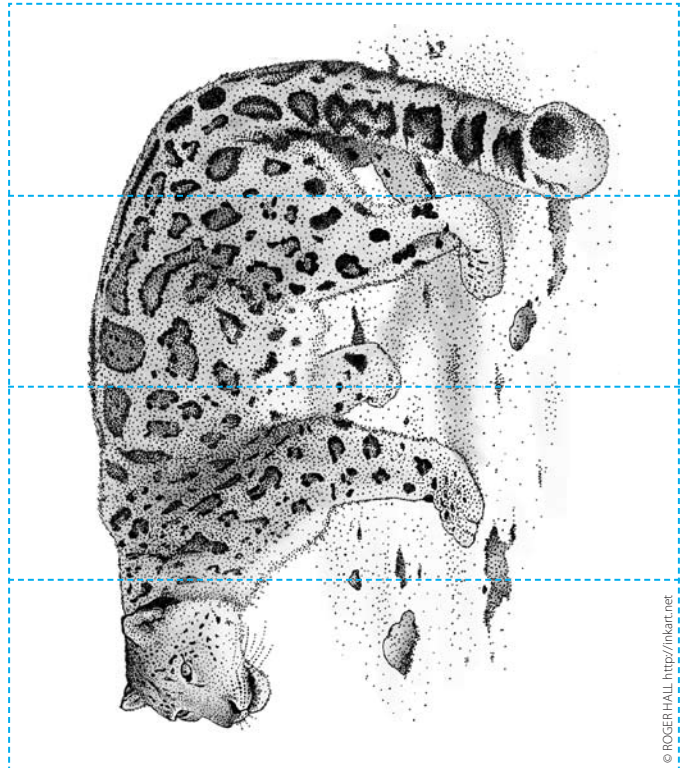
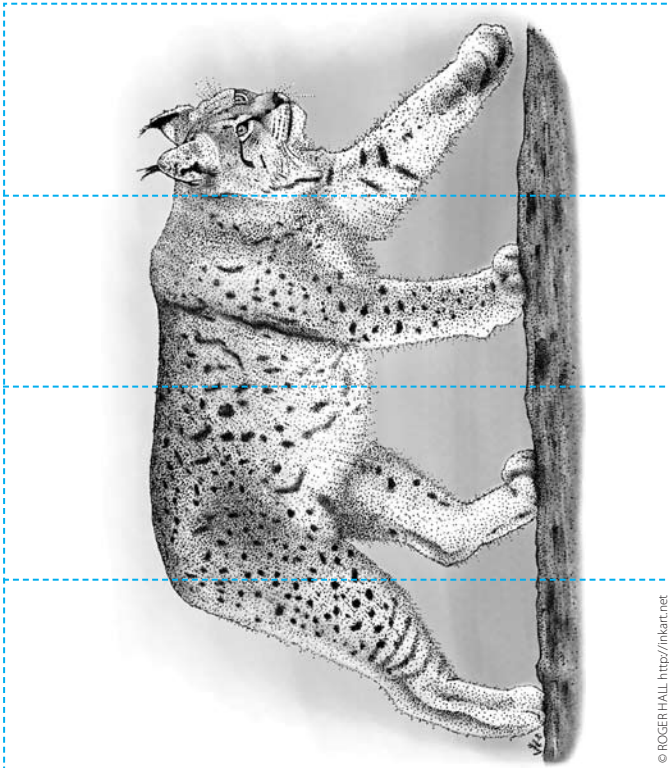
Photos and Videos

- www.snowleopard.org—Snow Leopard Trust has many photographs and videos of snow leopards available on their website. Their photo gallery also includes images of landscapes, people, and cultures of Central Asia.

Websites

- <http://animals.nationalgeographic.com/animals/mammals/snow-leopard.html>—National Geographic has a snow leopard webpage. Here you will find basic information about the animal, an audio feature that allows you to hear a snow leopard, and a link to a photo gallery of big cats including cheetahs, jaguars, and bobcats.
- www.thebigcats.com/snowleo/snowleo.htm—The Big Cats website contains a snow leopard photo gallery, as well as extensive photo collections of other big cat species.

Cat Characteristic Cards

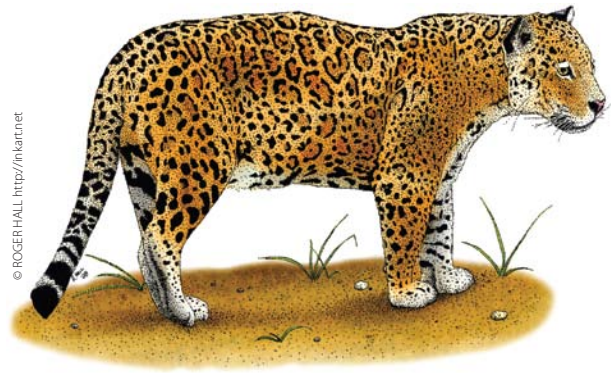


Jaguar

Jaguars (*Panthera onca*) are the largest cats in North, Central, and South America and the third largest cat species in the world. The name jaguar means “able to kill with a single bound.” Jaguars kill their prey with one crushing bite to an animal’s skull. They have strong jaws and sharp teeth to do this. Their prey include deer, crocodiles, snakes, monkeys, turtles, frogs, and fish.

Jaguars usually hunt on the ground, stalking prey at night. They have mirror-like structures in their eyes that allow them to see better at night than they do during bright light. Their short, thick legs allow them to climb, crawl, and swim.

Jaguars live in many different habitats, including deciduous forests, rainforests, swamps, and grasslands. Most jaguars are found in lowland tropical rain forests. Unlike many cats, jaguars



enjoy being in water. They are able to swim and have been known to hunt for fish.

Jaguars look similar to leopards, but they are stockier and have shorter, thicker tails. They usually have yellow and tan coats, with black spots shaped like rosettes or small flowers that may provide camouflage. Some jaguars that live in rain forests appear almost black.

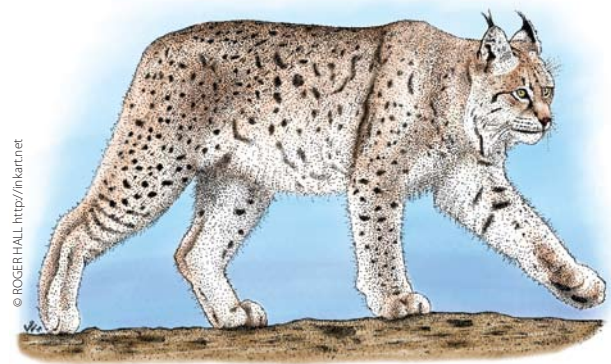
Canadian Lynx

Canadian lynx (*Lynx canadensis*) are fairly small wildcats, about twice the size of an average housecat. They are recognizable by their long black ear tufts, short black-tipped tails, and long legs.

They have grayish-brown fur. Their long, coarse hair keeps them warm in the snowy boreal forests where they live, in the northern United States and Canada. Large, furry paws act like snowshoes to help lynx walk in deep snow.

Lynx primarily reside in coniferous forests characterized by pines and firs. They use different types of forests for different purposes. Hunting is best in younger forests with dense vegetation. However, older forests are best for making dens.

Lynx primarily prey on snowshoe hares, though they also eat other small mammals and ground birds. Lynx are not particularly fast. They



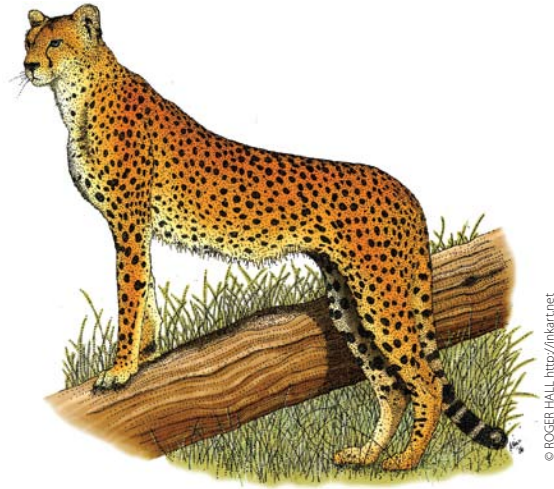
wait in hiding for their prey or stalk it and then attack by surprise, pouncing on the prey. Most hunting occurs at night.

Cheetah

Cheetahs (*Acinonyx jubatus*) typically live in grassy savannahs and plains in Africa and Asia. The word cheetah means “spotted one.” Cheetahs have tan coats with small round black spots. They have distinctive black “tear tracks” that run from the inside corners of their eyes down to their mouths.

Cheetahs are the fastest land animal in the world. They can run up to 70 miles per hour, aided by narrow bodies and long legs. They are the only cats that cannot retract their claws, which help them maintain traction when they run (like cleats). Wide nostrils and large lung capacity also help them to run quickly. However, they can only run short distances before they become exhausted.

The cheetah has weak jaws and small teeth. It overtakes its prey by stalking the animal, then bursting into full speed until it trips the animal with its front paw, and finally biting the animal's



throat when it falls. Its diet consists of small antelopes, small mammals, and birds.

The cheetah eats quickly to prevent other predators from taking its food. Cheetahs also eat during the day when many competing predators are sleeping.

Snow Leopard

Snow leopards (*Uncia uncia*) are considered shy because they are rarely seen in the wild. They live high in the mountains of central Asia, where plants are scarce. Mountain air is “thin” because air pressure in higher altitudes is lower than at sea level. Snow leopards have strong lungs and large chest cavities to allow them to get enough oxygen from the air.

Thick, long fur helps them stay warm in snowy conditions. Their fur, which is typically yellowish-gray with black rosette-shaped spots, camouflages them in rocky and snowy conditions. The snow leopard's large furry paws act like snowshoes to help it walk on snow. Their large paws also allow them to grip rocks.

The snow leopard primarily preys on mountain sheep, goats, rodents, birds, and deer. Snow leopards hunt by hiding behind rocks on slopes



above prey animals, then leaping down and pouncing on the prey. Snow leopards can jump up to 30 feet, assisted by long, muscular hind limbs. They have extremely long tails (up to 1 meter, or 40 inches), which aid their balance. Their long tails are also useful for covering their faces to stay warm while they are resting.

Graphic Organizer

Directions: Organize information from Big Cat Facts using this graphic organizer.

Jaguar	Cheetah
<p>physical features:</p>	<p>physical features:</p>
<p>environment:</p>	<p>environment:</p>
<p>adaptations (physical characteristics or behaviors that help jaguars survive):</p>	<p>adaptations (physical characteristics or behaviors that help cheetahs survive):</p>
<p>an interesting or unique fact about the jaguar:</p>	<p>an interesting or unique fact about the cheetah:</p>

Canadian Lynx	Snow Leopard
<p>physical features:</p>	<p>physical features:</p>
<p>environment:</p>	<p>environment:</p>
<p>adaptations (physical characteristics or behaviors that help lynx survive):</p>	<p>adaptations (physical characteristics or behaviors that help snow leopards survive):</p>
<p>an interesting or unique fact about the lynx:</p>	<p>an interesting or unique fact about the snow leopard:</p>

Graphic Organizer Answers

Jaguar

physical features:

yellow/tan coat with large black spots called rosettes - a central spot surrounded by a circle of spots; strong jaws; large sharp teeth

environment:

rain forest, deciduous forest, swamp, grasslands

adaptations (physical characteristics or behaviors that help jaguars survive):

strong jaws and sharp teeth allow them to eat crocodiles and turtles; eyes adapted for nocturnal hunting; short, thick legs aid in climbing, crawling, and swimming; able to swim to catch fish

an interesting or unique fact about the jaguar:

can kill prey with one bite

Cheetah

physical features:

tan coat with black spots like dots; black tear tracks; long legs; narrow body; weak jaws; small teeth

environment:

savannahs, grassy plains

adaptations (physical characteristics or behaviors that help cheetahs survive):

narrow bodies, long legs, unretracted claws, wide nostrils, and large lung capacity allow for fast sprinting; eat during the day to avoid competition

an interesting or unique fact about the cheetah:

fastest land animal in the world

Canadian Lynx

physical features:

twice the size of a housecat; grayish-brown fur; long black ear tufts; short black-tipped tails; long legs

environment:

boreal or coniferous forest

adaptations (physical characteristics or behaviors that help lynx survive):

coarse, long hair to stay warm; furry paws help to walk on snow; because they are not fast, they can kill prey by ambush instead of running

an interesting or unique fact about the lynx:

they ambush their prey

Snow Leopard

physical features:

strong lungs; large chest cavity; long fur; large paws; long tail; yellow/gray coat with large spots; strong back legs

environment:

mountains at high altitude (alpine ecosystem)

adaptations (physical characteristics or behaviors that help snow leopards survive):

strong lungs and large chest cavity to get oxygen at high altitude; thick, long, grayish fur for warmth and camouflage; large paws help to walk on snow and rocks; long tails aid balance and provide warmth

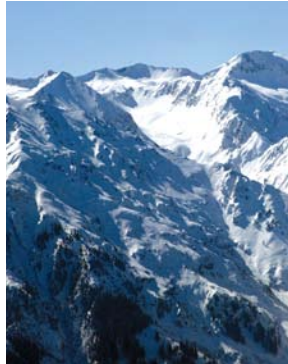
an interesting or unique fact about the snow leopard:

it can jump 30 feet

Four Ecosystems

Alpine

High in the mountains it is very dry and cold. Temperatures can fall well below freezing. There is less and less vegetation as altitude (height above sea level) increases. The landscape includes steep cliffs, rocks, and very little soil. Between the mountain slopes are meadows and deserts.

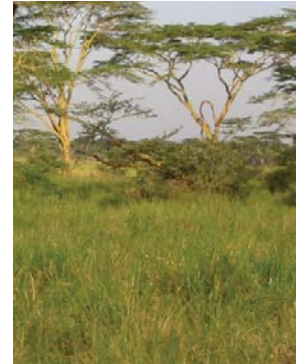


BILL HOQUE

This is known as an alpine ecosystem. One example of this ecosystem is the Himalaya mountain range in Central Asia.

Savannah

Savannahs are grassy plains with a few scattered shrubs and trees. They are warm all year long. Savannahs have a wet season in the summer, followed by a long dry season in the winter. Not enough rain falls to support growth of a forest. Most of the vegetation in savannahs is tall grass.



KIM RANDOLPH BERNER

Savannahs are often called grasslands. One example of this ecosystem is the Serengeti plains in Eastern Africa.

Tropical Rainforest

Lowland tropical rainforests are located near the equator. These rain forests are warm all year long and receive lots of rainfall. There are many species of trees and plants in the rain forest; in fact, this ecosystem supports more species of plants than any other. There are also many different kinds of animals in a tropical rain forest. Trees in the rain forest grow very tall, in some cases over 100 feet high.

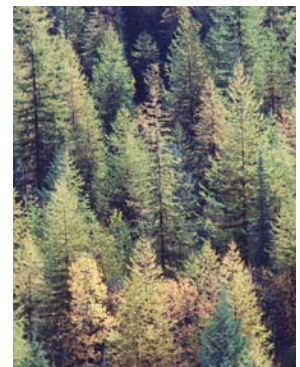


JESSICA MCDUGALL

One example of this ecosystem is the Amazon rain forest in South America.

Coniferous Forest

Coniferous forests are found in northern latitudes, such as those that occur in Canada and Russia. They are characterized by conifers, trees like pines and spruces that typically stay green all year long. These forests have long, cold, dry winters and short summers.

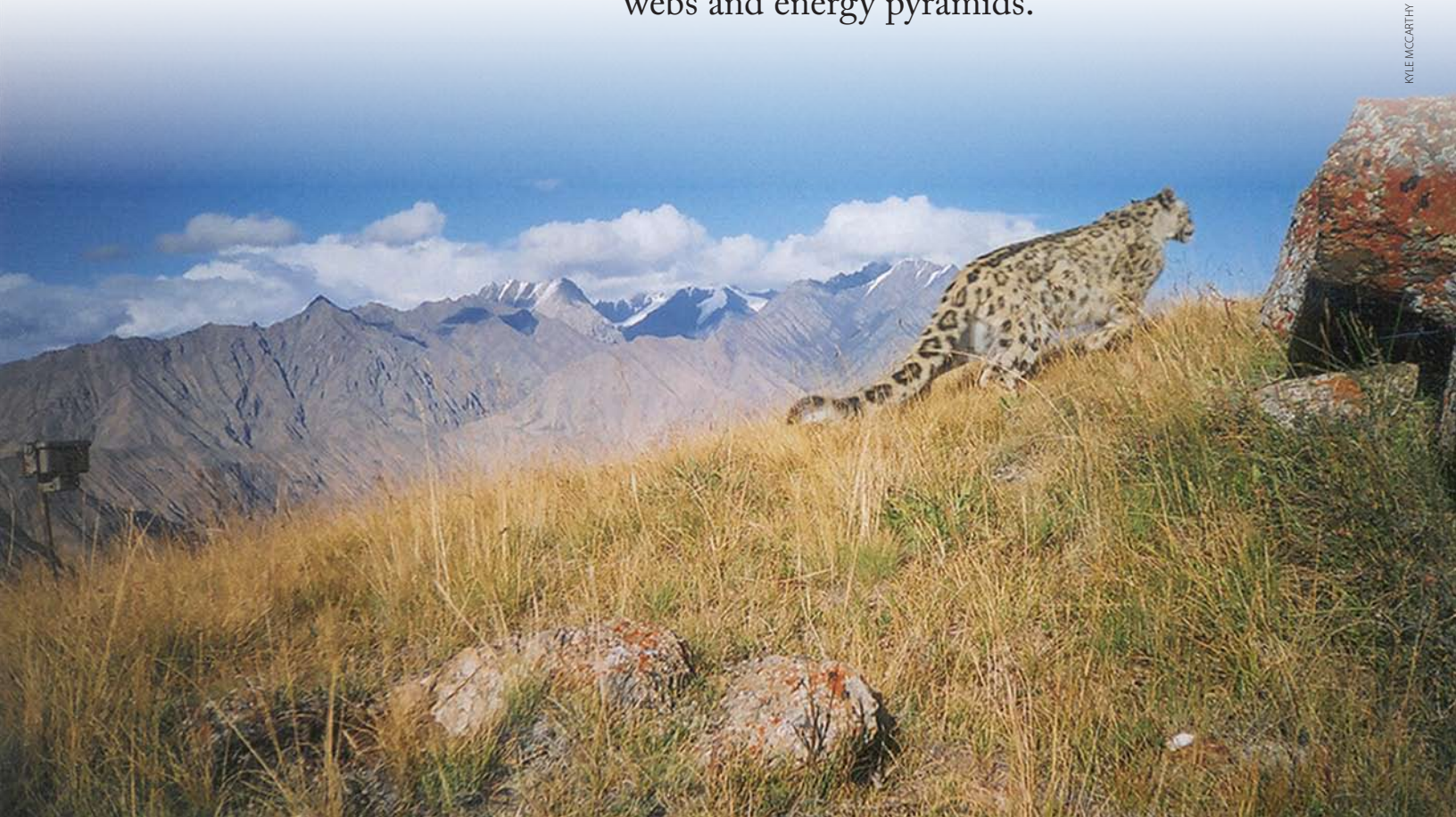


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Some coniferous forests are found in the northern boreal forest biome. Forests in Alaska and Canada are an example.

2 Mountain Mixer

In a lively “mixer” activity, students take on the roles of organisms in the environment where snow leopards live in order to understand relationships among species. Students are then able to construct a food web that includes wild species, domestic livestock, and humans. Extension activities utilize mathematics skills to further investigate food webs and energy pyramids.





YASHVEER BHATNAGAR

Inquiry/Critical Thinking Questions

- How does the survival of one species affect the survival of other species in an ecosystem?
- How do humans impact the biodiversity of ecosystems in which they live?

Objectives

Students will:

- Visualize interconnections among different components of a mountain ecosystem
- Recognize the importance of each species in a food web
- Recognize that humans are part of and have an impact on natural ecosystems
- Understand the influence of a keystone species, the snow leopard, on its food web

Time Required

1 class period

Key Concepts

- biodiversity
- food web
- ecosystems

Subject Areas

- science
- geography
- math

National Standards Alignment

NSES

C. Life Science (structure and function in living things; populations and ecosystems)

F. Science in Personal and Social Perspectives (populations, resources, and environments)

NCSS

III. People, Places, and Environments

NAAEE

1 Questioning, Analysis, and Interpretation Skills (working with models and simulations)

2.2 The Living Environment (organisms, populations, and communities; systems and connections; flow of matter and energy)

2.4 Environment and Society (human/environment interactions)



MUNKHTSOG

Vocabulary

biodiversity—variety of living forms; three major types of biodiversity are species, genetic, and ecosystem diversity

carnivore—an animal that eats mostly meat

consumer—an organism that does not make its own food (i.e., not a producer); there are different types of consumers: *primary consumers* eat producers, *secondary consumers* eat primary consumers, and *tertiary consumers* eat secondary consumers

ecosystem—all the living and nonliving components found within a given area that function together as a unit

energy—ability to do work; energy can take many forms including *heat* and *light*

food web—an interconnected network of feeding relationships

herbivore—an animal that eats only producers

keystone species—a species that has a large fundamental influence on the types and numbers of other species in an ecosystem despite its relatively small numerical abundance

producer—an organism that is able to make its own food (i.e., plants, algae)

Materials/Preparation

Handout: *True/False Quiz: Ecosystems & Biodiversity*, 1 per student pair

Handout: *Mountain Mixer*, 1 per student

(Optional) Clipboards for students to write on Mountain Mixer handout while mingling
Ecosystem Role Cards, 1 per student in accordance with the following guidelines:

	For a Class of 20	For a Class of 30
grass	5	8
shrub	5	7
woolly hare	2	3
marmot	2	3
Chukar partridge	1	2
bharal	1	2
ibex	1	2
domestic goat	1	1
snow leopard	1	1
human	1	1



YASHVEER BHATNAGAR

Activity

Introduction: True/False Quiz

(5-10 minutes)

1. Divide the class into pairs.
2. Give each pair a *True/False Quiz* handout.
3. Allow pairs to work for 2-3 minutes on the quiz.
4. Go through these answers as a class, one at a time.
 1. **False.** An environment is the place where organisms live, referring to nonliving or abiotic factors. An ecosystem includes all the living and nonliving components within a particular area.
 2. **True.** Biodiversity can refer to species, genetic, or ecosystem diversity.
 3. **True.** Each species plays a unique part in its ecosystem. Keystone species actually regulate the other species in the ecosystem. When they are removed, the ecosystem changes in dramatic ways.
 4. **False.** Humans are consumers, not producers. They are not able to create their own food, like plants do.
5. Ask volunteers to share one thing from the quiz that surprised them or that they found interesting.

Core Activity: Ecosystem Mingle

(30 minutes)

1. Ask students to recall what they know about snow leopards.
2. Ask students to recall what type of ecosystem snow leopards live in. (*high mountains in central Asia; snowy, rocky terrain; sparse vegetation and few trees; cold and dry*)
3. Tell the class that each of them will take on the role of one component in the snow leopard's ecosystem.
4. Pass out an *Ecosystem Role Card* to each student. Make sure that all students have a chance to read their role cards before beginning the mingle activity.
 - Review the definition of **energy** with students. (*Energy refers to the ability to do work; energy can take many forms including heat and light.*)
 - Go over all cards so that everyone understands their roles.
 - **Note:** For classes with English language learners, you may want to have students complete the activity in pairs.
5. Pass out one *Mountain Mixer* handout to each student.



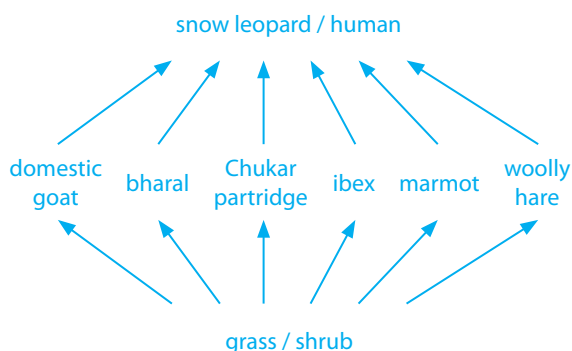
BILL HOGUE

6. Student will use the *Mountain Mixer* handout to record information about individuals they meet in the ecosystem.
 - Go over the definitions of **producer** and **consumer**. (*A producer can make its own food, whereas a consumer cannot.*)
 - Review the following activity guidelines with students.
 - a. They will have 15-20 minutes to mingle with the other members of the ecosystem in order to complete their handout.
 - b. Students must meet every individual in the ecosystem.
 - c. When they encounter a new person, that person should provide information needed to complete the portion of the *Mountain Mixer* handout related to his/her role.
 - d. **Note:** For English language learners, it may be useful to walk through a familiar example such as grass – cow – human.
7. Allow students to mingle and complete their *Mountain Mixer* handouts.
 - For an additional element of fun, ask students to perform movements or actions that they think would be similar to those done by the plants or animals on their *Role Cards* as they mingle. For example, movement for grass might include swaying arms overhead.
 - As students interact with each other, be prepared to help them interpret information from their *Role Cards* or come up with possible actions and movements to perform while mingling.
8. Ask students to return to their seats after 20 minutes.
9. Ask students the following questions:
 - Which individuals in the ecosystem seem to be most abundant (i.e., the ones they kept meeting during the mixer)? (*grass and shrub*)
 - Which are the least abundant? (*snow leopard, human*)
 - How would you explain these numbers? (*in any ecosystem, there are more producers than consumers; producers contain the largest amount of energy in an ecosystem*)
10. Write *grass* and *shrub* on the board or anywhere that all students can see. Ask students to raise their hands if they directly relied on plants. List, or alternatively have the students come up and list, the names of those organisms with connecting arrows to the plants. [Make sure the arrows show movement of energy *from* the plants to the consumers. Explain to students that energy flows from the food to the consumer.]



11. Continue investigating links among ecosystem components by asking students to identify which ecosystems members are connected to the individuals that were connected to the plants. Continue writing names and connecting food web components with arrows until all components are listed in a large food web. (See sample illustration below.)

- **Note:** You will need to decide as a class where humans fit into the food web. One could argue that humans are at the top of the food web, since they hunt snow leopards.



12. **(Optional)** On your food web, include numbers of individuals from each species that participated in the mingle activity to indicate the available energy at various levels of the food web.
13. Ask students to share one thing that comes to mind when they see the web. *(For example, most species are connected to*

many other species. Also, the food web would look very different without plants.)

14. Remind students that the snow leopard is an endangered species, meaning that it is in danger of going extinct. Draw a large X through the snow leopard in the food web, as if it no longer existed.
15. In a class discussion or as a written exercise, ask students which species would be directly affected by the disappearance of snow leopards from the ecosystem.
- How would each of these species be affected in the short term?
 - Would their numbers increase or decrease?
 - How would each species be affected long-term, such as a year from now?
16. Review the definition of **keystone species** with students. Tell them that the snow leopard is considered a keystone species because its presence in an ecosystem regulates the other types of species that are in that ecosystem.
17. **(Optional)** Read about and discuss the importance of other keystone species, such as wolves in North America.¹
18. Discuss the contribution of all species to ecosystem biodiversity. To illustrate this idea, ask how the ecosystem would be affected if all of the woolly hares disappeared. *(Likely there would be more*



predation on the remaining primary consumers. There might also be less pressure on the plants.)

19. Conclude with the following questions, presented as either a discussion, small group discussions/presentations, or as journal prompts.

Discussion

1. Why might a large variety of herbivores, or plant-eating consumers such as marmots and ibex, be beneficial to snow leopards?
2. How would an ecosystem change if all predators, or animal-eating consumers, were absent?
3. If populations of herbivores like hares and marmots became very large in number, what would happen to the plants in their ecosystem? How would that affect hares and marmots in the future? How would this affect other animals in the ecosystem?
4. What species are in the ecosystem where you live? What roles do you think each of these species plays in a food web?
5. Do you think it is important to protect keystone species like the snow leopard? Why or why not?
6. How could humans negatively impact biodiversity within the ecosystem? How could they help to increase biodiversity?

Wrap Up: Making a Bigger Splash (5 minutes)

Continue to expand your word splash from Lesson 1 (“The Cat’s out of the Bag!”), or start a new word splash, by asking students to write words related to the snow leopard’s role in its ecosystem. Possible words to add might include *predator*, *consumer*, *carnivore*, or *keystone species*.

Extension Activity

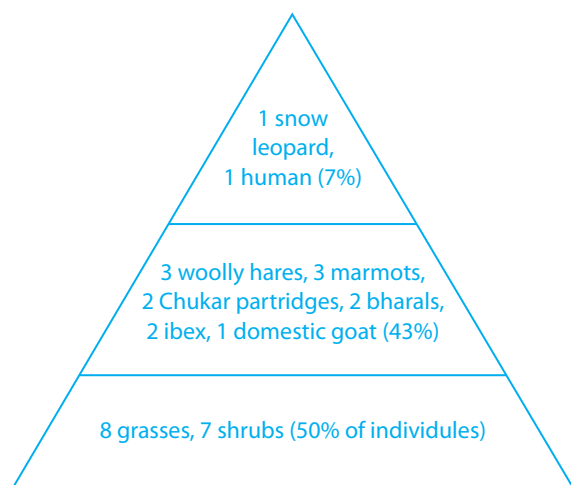
Make a simple food web with grass, ibex, marmots, and snow leopards. Assign the following population values: 30 ibex, 100 marmots, 10 snow leopards. Tell students that each snow leopard needs 2 ibex and 15 marmots to survive. (Note: These numbers are fictional.)

- How would marmots be affected by the ibex population falling to 15, due to ibex overgrazing the grass?
- How would ibex and marmots be affected in the short-term by the snow leopard population falling to 0?
- How would ibex and marmots be affected in the long-term by removal of the snow leopard from the food web, keeping in mind that grass is sparse at high elevations?



Mathematics Connection

Create an energy pyramid with the species presented in this activity. Indicate the number of individuals assigned to each species in the Mountain Mixer (i.e., for a class of 30 you had 8 grasses, 7 shrubs, 4 woolly hares...). Have students calculate the percentage of individuals at each level of the energy pyramid. Then ask them to identify which level of the energy pyramid has the most individuals). (*The lowest level of the energy pyramid, the producers, has the most members. This is the level with the greatest amount of energy.*) If only 10% of the energy in any level of the pyramid is transferred to the level immediately above it, what percentage of energy embodied in the producers will reach the top level of this pyramid? (1%)



Additional Resources

Video: Planet Earth

- “Mountains: Snow Leopard Hunt,” a 2-minute video clip from Discovery Channel’s Planet Earth series, shows the snow leopard in pursuit of prey: <http://dsc.discovery.com/videos/planet-earth-mountains-snow-leopard-hunt.html>
- “Mountains: On the Edge,” a 3-minute video clip, shows the mountain environment in Pakistan, along with footage of snow leopards and one of their prey species, the Markhor. <http://dsc.discovery.com/videos/planet-earth-mountains-on-the-edge.html>

True/False Quiz: Ecosystems & Biodiversity

- _____ 1. The words *ecosystem* and *environment* mean the same thing.
- _____ 2. *Biodiversity* is a word that describes the variety of life forms in a region.
- _____ 3. Certain species, called *keystone species*, may determine what other species live in an ecosystem.
- _____ 4. Humans are *producers* because they make their own food.

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Ecosystem Role Cards, page 1

1. Grass

Who I am: a green plant with thin leaves, small flowers, and brown seeds

Where I live: in sunny areas of the Himalayas where soil is present

Where I get energy: from the sun

Who depends on me as an energy source: sheep, goats, other herbivores



KOUSTUBH SHARMA

2. Shrub

Who I am: a plant with woody stems and small round green leaves

Where I live: in sunny areas of the Himalayas where soil is present

Where I get energy: from the sun

Who depends on me as an energy source: rodents, sheep, goats, and other plant-eating mammals



KOUSTUBH SHARMA

3. Woolly Hare

Who I am: a small mammal similar to a rabbit

Where I live: in dry mountain areas where grass grows

Where I get energy: from grass and other plants

Who depends on me as an energy source: carnivores, such as snow leopards and lynxes



MARC FOGGIN

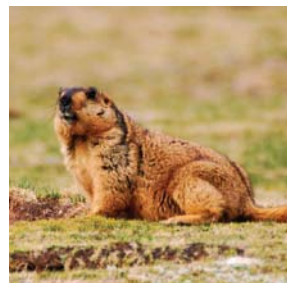
4. Marmot

Who I am: a ground-dwelling rodent related to squirrels

Where I live: in burrows in the soil

Where I get energy: from grasses, lichens, mosses, berries, roots

Who depends on me as an energy source: foxes, wolves, bears, eagles, snow leopards



MARC FOGGIN

5. Chukar Partidge

Who I am: a mostly grey ground-dwelling bird with a red beak and legs

Where I live: on rock outcrops and cliffs

Where I get energy: from seeds, grasses, insects

Who depends on me as an energy source: snow leopards, humans, wolves, and other predators



KARUNAKAR RAYNER

Ecosystem Role Cards, page 2

6. Bharal

Who I am: a blue sheep with horns that curve behind my body
Where I live: near cliffs
Where I get energy: from grasses and shrubs
Who depends on me as an energy source: snow leopards, wolves



ASHLEY SPEARING

7. Ibex

Who I am: a large wild goat with curved horns
Where I live: on rocky mountain slopes
Where I get energy: from grasses, leaves, shrubs
Who depends on me as an energy source: snow leopards, wolves, bears, lynxes, humans



KYLE MCCARTHY

8. Snow Leopard

Who I am: a large spotted cat with broad paws and a very long tail
Where I live: on steep, rocky slopes and valleys
Where I get energy: from sheep, goats, rodents, ground birds
Who depends on me as an energy source: I have no natural predators, but humans hunt me for fur and traditional medicine.



STEVE TRACY

9. Domestic Goat

Who I am: a mammal with horns and long hair
Where I live: in mountain areas where plants grow
Where I get energy: from grasses, leaves, shrubs
Who depends on me as an energy source: humans (who eat goat milk, cheese, yogurt, and meat) and sometimes predators such as snow leopards



CHARLES DYE

10. Human

Who I am: a person who herds livestock
Where I live: in mountain areas where my livestock can graze
Where I get energy: from domesticated animals, such as goats, and occasionally from wild animals
Who depends on me as an energy source: domestic animals depend on me to provide them with food, or grazing land



CHARLES DYE

Mountain Mixer

1. Grass

Circle one: producer / consumer

Upon what/whom does the grass depend?

What/who eats grass?

2. Shrub

Circle one: producer / consumer

Upon what/whom does the shrub depend?

What/who eats shrubs?

3. Woolly Hare

Circle one: producer / consumer

Who/what does the hare eat?

What/who preys on the hare?

4. Marmot

Circle one: producer / consumer

Who/what does the marmot eat?

What/who preys on the marmot?

5. Chukar Partridge

Circle one: producer / consumer

Who/what does the partridge eat?

What/who preys on the partridge?

6. Bharal

Circle one: producer / consumer

Who/what does the bharal eat?

What/who preys on the bharal?

7. Ibex

Circle one: producer / consumer

Who/what does the ibex eat?

What/who preys on the ibex?

8. Snow Leopard

Circle one: producer / consumer

Who/what does the snow leopard eat?

What/who preys on the snow leopard?

9. Domestic Goat

Circle one: producer / consumer

Who/what does the goat eat?

What/who preys on the goat?

10. Human

Circle one: producer / consumer

Who/what does the human eat?

What/who preys on the human?

Mountain Mixer Answers

1. Grass

Circle one: producer / consumer

Upon what/whom does the grass depend?
sun, soil

What/who eats grass?
sheep, goats, marmots, hares, partridges

2. Shrub

Circle one: producer / consumer

Upon what/whom does the shrub depend?
sun, soil

What/who eats shrubs?
sheep, goats, marmots, hares, partridges

3. Woolly Hare

Circle one: producer / consumer

Who/what does the hare eat?
plants (grass, shrub)

What/who preys on the hare?
snow leopards, other predators

4. Marmot

Circle one: producer / consumer

Who/what does the marmot eat?
plants (grass, shrub)

What/who preys on the marmot?
snow leopards, other predators

5. Chukar Partridge

Circle one: producer / consumer

Who/what does the partridge eat?
plants, seeds (grass, shrub)

What/who preys on the partridge?
snow leopards, humans

6. Bharal

Circle one: producer / consumer

Who/what does the bharal eat?
plants (grass, shrub)

What/who preys on the bharal?
snow leopards, wolves

7. Ibex

Circle one: producer / consumer

Who/what does the ibex eat?
plants (grass, shrub)

What/who preys on the ibex?
snow leopards, other predators, humans

8. Snow Leopard

Circle one: producer / consumer

Who/what does the snow leopard eat?
sheep, goats, marmots, hares, partridges

What/who preys on the snow leopard?
humans sometimes hunt me

9. Domestic Goat

Circle one: producer / consumer

Who/what does the goat eat?
plants (grass, shrub)

What/who preys on the goat?
snow leopards, humans

10. Human

Circle one: producer / consumer

Who/what does the human eat?
livestock (goats) and wildlife (ibex, partridge)

What/who preys on the human?
no one

It Takes All Kinds of People

Students consider ways in which humans and wildlife interact, including how poverty can lead to human-wildlife conflicts. A town hall meeting is held to determine how a protected area for snow leopards and their prey should be managed. In small groups, students take on different identities. Student groups have an opportunity to form alliances in order to develop guidelines for the protected area that encompass multiple points of view.





BOKHARON

Inquiry/Critical Thinking Questions

- In what ways do different groups of people interact with snow leopards?
- Why do different people have different attitudes toward species conservation?
- How can the needs of both humans and animals in a shared habitat be met?

Student Objectives

- Analyze ways in which different people interact with snow leopards
- Understand that groups of people with different perspectives may require unique conservation solutions
- Evaluate how to meet the needs of humans and wildlife simultaneously (i.e., consider how snow leopard protection can also benefit people)
- Recognize that poverty can intensify human-wildlife conflicts
- Examine the role of government, conservation groups, and individuals in conservation efforts

Time Required

1 class period for group work; 1 class period for town hall meeting

Key Concepts

- negotiation
- point of view
- government
- conservation
- human-wildlife conflict

Subject Areas

- social studies
- science
- English/language arts

National Standards Alignment

NSES

F. Science in Personal and Social Perspectives (populations, resources, and environments; risks and benefits; science and technology in society)

NCSS

III. People, Places, and Environments

V. Individuals, Groups, and Institutions

VI. Power, Authority, and Governance

VII. Science, Technology, and Society

IX. Global Connections

X. Civic Ideals and Practices

NAAEE

2.3 Humans and Their Societies (individuals and groups; global connections; change and conflict)

2.4 Environment and Society (human/environment interactions; places; environmental issues)

3.1 Skills for Analyzing and Investigating Environmental Issues (sorting out the consequences of issues)

3.2 Decision-Making and Citizenship Skills (forming and evaluating personal views)

4 Personal and Civic Responsibility (recognizing citizens' rights and responsibilities)



TERI AKIN

Vocabulary

consensus—a state of agreement among multiple individuals or groups

conservation—the act of protecting something, such as natural environments and wild species

herder—a person who raises livestock, such as domesticated sheep and goats

human-wildlife conflict—an interaction between wild animals and people when their populations overlap, which results in a negative impact on people or wild animals

poacher—a person who illegally kills wildlife, usually for money

poverty—the state of being poor and living without necessary resources

Materials/Preparation—Days 1 and 2

Handout: *Rugged Realities*, 1 per student

(Optional) Handout: *Town Hall Scenario*, 1 per student

Handout: *It Takes All Kinds of People*, 1 for each group; 8 total

Sheet of blank paper for group name/identity signs, 1 per group

Activity—Day 1

Introduction: Life among Snow Leopards (10-15 minutes)

1. Ask students to brainstorm all the different kinds of people that they think are affected by snow leopards in some way.
 - **(Optional)** Save this list and refer to it at the close of the lesson, to measure and reflect on learning.
2. Let students know that they are about to learn a lot more about different kinds of people who interact with snow leopards.
3. Ask them what they think the word **conservation** means. Review the definition with them. This lesson will focus on species (snow leopard) and ecosystem conservation.
4. Explain to the class that they are going to participate in a town hall meeting where they will represent various groups whose lives are connected to or affected by snow leopards. A town hall meeting is a forum where citizens can voice their opinions. Attempting to reach **consensus**, or general agreement, will be especially important to this meeting, even though groups come from different backgrounds.
5. To give students background information about the people who will be represented at the meeting, have students read the handout *Rugged Realities*.



TER AKIN

Core Activity: Town Hall Meeting Preparation (30 minutes)

1. Read the following scenario to the class. (**Optional:** Provide students with a *Town Hall Scenario* handout so they can read along.)

Scenario: *There is a protected area for snow leopards and their prey species in the region where most of you live. Many things are not allowed in this area, including building or construction, livestock grazing, and hunting. Some nomadic herders live in this protected area in the winter, and they have lived there for generations. There has been a long history of grazing and hunting in the protected area because the boundaries of the area are unclear. A local conservation group, concerned about the well-being of the snow leopard and its wild prey has called for a town hall meeting to make the rules for this area more clear. You have all come together to voice your opinions and make a group decision about how the land should be used in the future. The local conservation group hopes that any decision will take both human and animal needs into consideration.*

2. Divide the class into eight equivalently sized groups. Each group will represent a group of people that are connected to or affected by snow leopard conservation.
3. Briefly review the different groups (nomadic herders, craftspeople, etc.) so that students are clear about who will participate in the meeting.
4. Pass out a different *It Takes All Kinds of People* handout to each group.
5. Explain that each group will answer specific questions about snow leopard conservation in order to complete their handout.
6. Have each group choose one representative to be the recorder for the handout. Each person must speak at least once during the group presentation.
 - **Note:** Group members must take on the character of their group identity during the meeting. When they have statements to make, they can begin by saying, 'As a herder...' or 'As a wildlife hunter...'
7. Explain to them that they will present the information they came up with during the next class period.



Activity—Day 2

Introduction: Getting Organized (5-10 minutes)

1. Have students get into the same groups from Day 1.
2. Have each group write their group name/identity on a sheet of paper folded like a tent on one of its members' desks so others know who they represent.
 - **(Optional)** Have students come up with other creative ways to illustrate who they are.
3. Before the meeting begins, explain to students that there will potentially be conflicts that arise because different groups of people have different needs and different relationships with the snow leopard.
4. Create ground rules about what is expected at the meeting to ensure that students are respectful of each other. For example, you may make a rule that no one may talk while someone is presenting.

Core Activity: Town Hall Meeting (35-40 minutes)

1. Each group will have three minutes to present their group's identity, concerns, and perspective to the class. They will explain in character:
 - how their lives are connected to the survival of snow leopards
 - recommendations about how the protected area should be used (refer to questions 2-6 on the handout, *It Takes All Kinds of People*)
2. **(Optional)** Give students the option of presenting in creative ways other than reading from their handout. For example, students could use costumes or props related to their identity.
3. As groups share their answers to the questions from the handout, record their answers on the board where all can see, or ask the recorder from each group to do it.
4. After each group presents, allow other groups to ask questions about the opinions and ideas they expressed.
5. After everyone has presented, ask each group to consider whether their goals are similar or complementary to any other group's goals.
6. Go around the room asking each group with whom they would want to form alliances. (**Note:** You may find that more than one group wants to form an alliance with the same group. This will make it interesting and may cause tensions to be revealed between these groups.)
7. Allow approximately 10 minutes for groups to meet with each other and



TERI AKIN

form an alliance with at least one other group. They should revise their recommendations (questions 2-6 on the handout) according to these alliances.

8. After all groups have revised their recommendations to accommodate the needs of at least one other group, have each allied group share their recommendations.
9. As groups share their thoughts, ask students to take notes (or, you could write proposed ideas on the board).
10. Take a vote on each of the final recommendations to see which are the most popular. Tell students that these will be the final rules related to the protected area because they were created by and for people who interact with snow leopards.
11. After a reasonable time, whether or not a decision is reached, stop the process and begin a discussion using the following questions.

Discussion

1. Name the different groups of people that are affected by snow leopards in some way. In what ways is each group connected to snow leopards?
2. Why is achieving consensus a difficult process?
3. Does snow leopard conservation conflict with any group's needs? What is the

conflict?

4. Was it difficult for some groups to form alliances with others? Why?
5. How could you have persuaded other groups to join you?
6. Did any group feel its perspective and needs were not incorporated into the final recommendations and rules? Did all groups or individuals within a group feel that their voices were heard equally?
7. What difficulties would you face if you wanted to manage natural resources, such as wildlife, where you live?

Wrap Up: Making a Bigger Splash (5 minutes)

Continue to expand your word splash from the previous two lessons with words related to people who interact with snow leopards. Possible words to add might include *craftspeople*, *herders*, *hunters/poachers*, and *conservationists*.

Extension Activity

Create a campaign (posters, public service announcements, newspaper articles, etc.) explaining to others why it is to their benefit to support snow leopard conservation efforts. Students should think about the intended audience for the campaign in order to determine the type of messaging they want to use.

Rugged Realities

Life is not easy for people in the high mountains of central Asia, where snow leopards also reside. Most of the twelve countries where snow leopards can be found are considered developing countries, meaning people in these countries typically earn little money. These nations include Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan.

Many people who live alongside snow leopards are nomadic herders, meaning they move their livestock such as goats and yaks throughout the year in search of grazing land. In the mountains, grazing land can be scarce. Livestock herders make money by selling wool, milk, and meat from their animals.

Many of the people who live in the mountains of central Asia live in poverty. For example, people who live alongside snow leopards in China make just \$227 a year on average. The average income of people who live alongside snow leopards in Mongolia is \$600, though many people earn less than \$100 a year. In India, the average annual income of people in the mountains is between \$378 and \$638. In Pakistan, people who live in snow leopard areas earn approximately \$200 to \$430 a year. In Kyrgyzstan, nomadic herders earn just \$120 a year on average.¹

Threats to Snow Leopards

Earning money as a nomadic herder is unpredictable. When winter weather is especially severe, livestock animals may die. A herder's income also depends on the health of livestock animals. If livestock are diseased, a herder will lose money. Because people who herd livestock in these regions make very little money, each livestock animal is very important to them.

For various reasons, snow leopards will sometimes attack and kill livestock. In some cases, the snow leopard's natural prey—wild sheep and goats—are not easily available because hunters have killed them for meat. In other cases, livestock



animals overgraze the same grass on which wild sheep and goats rely, leaving less prey for snow leopards. When snow leopards attack domestic livestock, some herders retaliate by killing snow leopards.

While many people in these regions value the snow leopard, they are often able to earn more money from killing snow leopards than they could earn from protecting the animals. For example, a poacher who kills snow leopards illegally can make as much as \$1000 from the sale of a snow leopard's fur and body parts.² People in the region can also make money from oil mining, which destroys wildlife habitat.

Snow leopards are an internationally recognized endangered species. It is illegal to kill snow leopards anywhere in the world. There are also laws to protect snow leopards within individual countries. Most of the large wild goats and sheep that are prey for snow leopards are also illegal to hunt.

Town Hall Scenario

Scenario: *There is a protected area for snow leopards and their prey species in the region where most of you live. Many things are not allowed in this area, including building or construction, livestock grazing, and hunting. Some nomadic herders live in this protected area in the winter, and they have lived there for generations. There has been a long history of grazing and hunting in the protected area because the boundaries of the area are unclear. A local conservation group, concerned about the well-being of the snow leopard and its wild prey has called for a town hall meeting to make the rules for this area more clear. You have all come together to voice your opinions and make a group decision about how the land should be used in the future. The local conservation group hopes that any decision will take both human and animal needs into consideration.*

Groups

1. Nomadic Herders
2. Craftspeople (make crafts from wool)
3. Mongolian Government Representatives—
Ministry of Nature and Environment
4. Mongolian Department of Tourism
5. Mongolian Snow Leopard Conservation Foundation
6. National Park Staff
7. U.S. Middle School Students (traveled to Mongolia to learn about snow leopards)
8. Wildlife Hunters (some are actually poachers)

Town Hall Scenario

Scenario: *There is a protected area for snow leopards and their prey species in the region where most of you live. Many things are not allowed in this area, including building or construction, livestock grazing, and hunting. Some nomadic herders live in this protected area in the winter, and they have lived there for generations. There has been a long history of grazing and hunting in the protected area because the boundaries of the area are unclear. A local conservation group, concerned about the well-being of the snow leopard and its wild prey has called for a town hall meeting to make the rules for this area more clear. You have all come together to voice your opinions and make a group decision about how the land should be used in the future. The local conservation group hopes that any decision will take both human and animal needs into consideration.*

Groups

1. Nomadic Herders
2. Craftspeople (make crafts from wool)
3. Mongolian Government Representatives—
Ministry of Nature and Environment
4. Mongolian Department of Tourism
5. Mongolian Snow Leopard Conservation Foundation
6. National Park Staff
7. U.S. Middle School Students (traveled to Mongolia to learn about snow leopards)
8. Wildlife Hunters (some are actually poachers)

It Takes All Kind of People:**Nomadic Herders (Group 1)****Group Members:** _____

As **nomadic herders**, your existence depends heavily on the well-being of your horses, sheep, goats, and camels. Sheep provide you the daily sustenance that you need since they give you meat, milk, and wool. Since you are nomads, you do not have one single home. You move periodically, trying to find land for your livestock and food for your family. Grazing land for your animals is important so that they have enough to eat. You try to sell raw wool to traders you see as you travel, but your sales are very low. There are times when you have lost your livestock as prey to snow leopards. This is devastating to your livelihood. Some people in your group have gotten so upset by this that they have killed snow leopards, even though they risk fines or worse penalties since snow leopards are endangered. Poaching, or illegal hunting,



of snow leopards and their prey is tempting to you because you can make a decent amount of money by selling snow leopard pelts and bones. Snow leopards are worth more than ever these days. Your main concern is survival at this point.

1. From your perspective, what are advantages and disadvantages of the protected area?

Advantages	Disadvantages

2. Who should be able to use the protected area and who should not? Why?

3. Would you ever agree to prohibit livestock grazing in the protected area?

If yes, what would you need in order to make you agree to this?

4. What should happen to people who currently live in the protected area?

5. Do you think hunting should be allowed in the protected area? Why or why not?

6. What, if anything, are you willing to do to help with the management and conservation of the protected area?

It Takes All Kind of People:**Craftspeople (Group 2)****Group Members:** _____

As livestock herders who are also **craftspeople**, you have decided to sell traditional crafts, such as high-quality rugs and mats, at your local market and abroad. The wool for your crafts comes from sheep, camels, and yaks that your family owns. You have been guaranteed business by the Snow Leopard Trust, an international conservation organization, as long as you agree not to harm snow leopards or their prey species. You are motivated to keep the snow leopards safe since their survival is tied to your survival. With the money you make from the crafts that you create, you can afford the high cost of food, medicine, and school for your families. Life is not as much of a daily struggle for you now that there is a market for your handcrafted items. You know how to spin yarn and felt wool and how to make products that people from all over the world are interested in purchasing. In an exchange for a cash bonus at the



CHARLES DYE

end of the year, your community members have been asked to stop all poaching of snow leopards within the area where you live. If anyone does kill a snow leopard, you still get paid for your products, but no one in the region will get the conservation bonus—even if the person who killed the snow leopard wasn't a member of your community.

1. From your perspective, what are advantages and disadvantages of the protected area?

Advantages	Disadvantages

2. Who should be able to use the protected area and who should not? Why?

3. Would you ever agree to prohibit livestock grazing in the protected area?

If yes, what would you need in order to make you agree to this?

4. What should happen to people who currently live in the protected area?

5. Do you think hunting should be allowed in the protected area? Why or why not?

6. What, if anything, are you willing to do to help with the management and conservation of the protected area?

It Takes All Kind of People:**Ministry of Nature and the Environment (Group 3)****Group Members:** _____

As part of the **Ministry of Nature and the Environment**, one of your major goals is to oversee environmental and forestry programs. You prioritize the conservation of plants and animals, prevent and control pollution, and monitor the numbers of wildlife species in protected areas and national parks. You make policy recommendations to the government about what areas are in need of protection and what areas could instead be used for new economic development. You want to protect the places where wildlife live. However, some of those areas could potentially be used for land to build schools, businesses, and homes if economic development were to become a priority. It is challenging to decide how certain areas should be used and designated, such as core wildlife zones. You have become very interested in the money that hunting and mining groups have offered your department if they are allowed to do business in the area; you could use that money to



MARK ROSENWALD

pay for other environmental projects. International hunters bring lots of money to your country—in some cases they will pay \$50,000 to hunt wild animals. Mining groups are also willing to pay large amounts of money to search for gold, copper, and silver. These activities will likely have a negative impact on snow leopards and other wild species but would bring more money into the Ministry.

1. From your perspective, what are advantages and disadvantages of the protected area?

Advantages	Disadvantages

2. Who should be able to use the protected area and who should not? Why?

3. Would you ever agree to prohibit livestock grazing in the protected area?
If yes, what would you need in order to make you agree to this?

4. What should happen to people who currently live in the protected area?

5. Do you think hunting should be allowed in the protected area? Why or why not?

6. What, if anything, are you willing to do to help with the management and conservation of the protected area?

It Takes All Kind of People:**Mongolian Tourism Department (Group 4)****Group Members:** _____

As part of the **Mongolian Tourism Department**, you want tourists to leave with a very good impression of your country. You want people to appreciate Mongolia's culture, history, national symbols, geography, and environmental resources. Specifically, you want people to leave with a positive perception of how beautiful the wilderness is, how peaceful and friendly the nomadic peoples are, and how rich the history is. You believe painting a picture of Mongolia in this manner will attract a lot of visitors, which brings money to your country. Therefore, it is in your interest to make sure nature and people live in harmony. You would like to have permission to put a tourist lodge in the protected area so that people can enjoy nature up close. You think this lodge will benefit your business and the country. You do not want the tourists to see domestic sheep and



goats when they come; instead you want them to see wildlife. You sometimes allow hunters to stay in your tourist lodges and sites—they bring lots of money to Mongolia. It would be great if they could hunt wildlife near the protected region.

1. From your perspective, what are advantages and disadvantages of the protected area?

Advantages	Disadvantages

2. Who should be able to use the protected area and who should not? Why?

3. Would you ever agree to prohibit livestock grazing in the protected area?
If yes, what would you need in order to make you agree to this?

4. What should happen to people who currently live in the protected area?

5. Do you think hunting should be allowed in the protected area? Why or why not?

6. What, if anything, are you willing to do to help with the management and conservation of the protected area?

It Takes All Kind of People:

Mongolian Snow Leopard Conservation Foundation (Group 5)

Group Members: _____

As part of the **Mongolian Snow Leopard Conservation Foundation**, you are concerned with both snow leopards and humans. You want to develop solid relationships with the communities that inhabit the same environment as the snow leopard by involving the people living in these habitats in your conservation efforts. You also want to improve the quality of life for these people because many of them are very poor. You want the protected land to be a safe place for snow leopards to raise cubs and hunt wild prey, such as wild goats and sheep. You are concerned that too many livestock go into the protected area and eat all of the grass, which leads to decreased numbers of wild prey for the snow leopard. If the livestock keep going into the area, snow leopards will prey on the livestock. When that happens, herders sometimes kill the snow leopards. Other activities such as hunting also reduce numbers of snow leopards and their prey. This hunting is not regulated—meaning



Leaders of seven Mongolian River Movements advocate for protection of the country's rivers and forests.

the numbers of wild sheep, goats, and snow leopards killed are not reported—and therefore should not happen in the protected area. You hope that people will still be able to live in the area, but there have to be more regulations about who can use the land.

1. From your perspective, what are advantages and disadvantages of the protected area?

Advantages	Disadvantages

2. Who should be able to use the protected area and who should not? Why?

3. Would you ever agree to prohibit livestock grazing in the protected area?
If yes, what would you need in order to make you agree to this?

4. What should happen to people who currently live in the protected area?

5. Do you think hunting should be allowed in the protected area? Why or why not?

6. What, if anything, are you willing to do to help with the management and conservation of the protected area?

It Takes All Kind of People:**National Park Staff (Group 6)****Group Members:** _____

As part of the **National Park staff**, you work to increase and maintain biodiversity throughout the country. A large part of your job involves working to increase populations of endangered animals such as the snow leopard. You work on protecting specific areas so that poaching and economic development do not decrease the numbers of animals and plants. You want to develop more parks to protect wildlife and native plants. You have been working to build strong relationships with government leaders so that they will provide money for your efforts. You are torn because you want to make the protected area safe for wildlife, but you have very little money for uniforms, horses or vehicles, walkie-talkies, and other items that would help you to make sure the boundaries of the protected area are not being crossed by poachers and herders with livestock. The Ministry of Nature and the Environment believes the only way to get money is to allow mining and hunting in



DAVE FERROW

the protected area. The Ministry also suggests that the people who currently live in the region need to leave the area. You want money, but you don't really agree with kicking people out of their homes. Because the Ministry is your boss, you are concerned about sharing your ideas and opinions in front of Ministry officials. You want to monitor wildlife and hunting better but don't have the resources or skills.

1. From your perspective, what are advantages and disadvantages of the protected area?

Advantages	Disadvantages

2. Who should be able to use the protected area and who should not? Why?

3. Would you ever agree to prohibit livestock grazing in the protected area?
If yes, what would you need in order to make you agree to this?

4. What should happen to people who currently live in the protected area?

5. Do you think hunting should be allowed in the protected area? Why or why not?

6. What, if anything, are you willing to do to help with the management and conservation of the protected area?

It Takes All Kind of People:

U.S. Middle School Students (Group 7)

Group Members: _____

As U.S. middle school students, you have been learning about conservation efforts throughout the world that help maintain biodiversity. Your school won an award that gave your class the opportunity to visit one place that has an endangered species, to create a proposal to educate students around the world about this species, and to support efforts to ensure the safety and livelihood of the species. Your class has been researching the snow leopard, and you are amazed that you finally have the chance to visit the region where these important animals live. You have met nomadic herders that live in the mountains where snow leopards also live. While you know that the herders' livestock need to graze on available grass, you also know that overgrazing by livestock can make it difficult for snow leopards and their prey



to find food. You are excited that you are able to attend a meeting that could potentially save a number of snow leopards. When you return to the United States, you will create a campaign that educates students about what you have learned.

1. From your perspective, what are advantages and disadvantages of the protected area?

Advantages	Disadvantages

2. Who should be able to use the protected area and who should not? Why?

3. Would you ever agree to prohibit livestock grazing in the protected area?

If yes, what would you need in order to make you agree to this?

4. What should happen to people who currently live in the protected area?

5. Do you think hunting should be allowed in the protected area? Why or why not?

6. What, if anything, are you willing to do to help with the management and conservation of the protected area?

It Takes All Kind of People:**Wildlife Hunters (Group 8)****Group Members:** _____

As **wildlife hunters**, you hunt all types of wildlife, including species that are illegal to kill. Catching snow leopards and their big prey, like wild sheep, is a huge business that helps you survive. The money you make from poaching supports your family, though you risk expensive fines and jail time if you are caught. Catching just one snow leopard can provide you with a steady income for one year. Because of their beautiful fur, snow leopard pelts are in high demand throughout Central Asia, Eastern Europe, and Russia. Other buyers want these animals to add to their private animal collections. You can also sell snow leopard bones for use in traditional medicines. Throughout your whole life, you have grown up knowing about the snow leopard. You know that the survival of snow leopards is important for the ecosystem, but



COURTESY OF SNOW LEOPARD TRUST

your family's survival is more important. You often go into the protected area yourself or pay herders to go there to set traps to catch snow leopards and other wildlife. Right now you have 200 traps set that your friends are watching for you.

1. From your perspective, what are advantages and disadvantages of the protected area?

Advantages	Disadvantages

2. Who should be able to use the protected area and who should not? Why?

3. Would you ever agree to prohibit livestock grazing in the protected area?

If yes, what would you need in order to make you agree to this?

4. What should happen to people who currently live in the protected area?

5. Do you think hunting should be allowed in the protected area? Why or why not?

6. What, if anything, are you willing to do to help with the management and conservation of the protected area?

What's the Plan?

This lesson begins with a simulation activity in which students learn what daily life is like for a livestock herder in the mountains of Mongolia. Students then work in small groups to develop solutions that would support both snow leopards and humans. Solutions are presented through skits or in other engaging presentation styles. A final kinesthetic activity requires students to make connections among complex issues such as poverty, conservation, and sustainability.





TERAKIN

Inquiry/Critical Thinking Questions

- What makes a solution sustainable?
- How is the well-being of snow leopards related to human well-being?
- What are sustainable conservation solutions?

Student Objectives

Students will:

- Understand that a sustainable solution includes long-lasting economic, environmental, and social considerations
- Devise sustainable solutions for enhancing human and ecological communities where snow leopards live
- Recognize that snow leopard conservation is a multi-faceted effort that involves consideration of multiple perspectives and incentives

Time Required

1 class period for group work; 1 class period for presenting skits

Key Concepts

- sustainable solution
- conservation
- economy
- environment
- society

Subject Areas

- social studies
- English/language arts
- science

Vocabulary

economy—the distribution of money and goods throughout a community, region, or country

environment—everything in nature that surrounds us and supports our ability to live and grow

livestock—domesticated animals used for food or labor

poaching—the act of killing wildlife illegally, usually in order to make money

society—a group of people that share common interests or a common culture

sustainable solution—an approach to solving a problem that will provide a long-lasting solution that contributes to economic, environmental, and social well-being

National Standards Alignment

NSES

C. Life Science (regulation and behavior; populations and ecosystems; diversity and adaptations of organisms)

F. Science in Personal and Social Perspectives (populations, resources, and environments)



CHARLES DYE

NCSS

III. People, Places, and Environments

IV. Global Connections

NAAEE

2.2 The Living Environment (Organisms, populations, and communities; systems and connections)

2.3 Humans and Their Societies (global connections; culture; change and conflict)

2.4 Environment and Society (human/environment interactions; environmental issues)

3.1 Skills for Analyzing and Investigating Environmental Issues (sorting out the consequences of issues; identifying and evaluating alternative solutions and courses of action)

Materials/Preparation - Days 1 and 2

Teacher reading: *A Day in the Life of a Herder*

(Optional) Materials corresponding to teacher instructions provided in *Day in the Life* simulation: small bell, coats, hats, pretzels, hummus, sweetened tea, index cards

Student readings: *Goals 1-4*, 1 per group of 3-4 students

Handout: *Creating Solutions*, 1 per student

Handout: *Skit Graphic Organizer*, 1 per student

Skit Assessment Rubric

Ball of yarn

Snow Leopard Connections Cards (use tape to stick to shirts or make into necklaces with yarn), 8 total

Activity – Day 1

Introduction: A Day in the Life of a Herder (5-10 minutes)

1. Ask students to recall from the previous lesson (“It Takes All Kinds of People”) information about nomadic herders in the Himalayas. How do they make a living? What is their life like?
2. Tell students that they are going to get a better idea of the daily life of a livestock herder in Mongolia.
3. Read through the simulation, *A Day in the Life of a Herder*.
 - **(Optional)** Follow the teacher instructions provided inside brackets to bring the simulation to life.

Core Activity: Developing Solutions (30-40 minutes)

1. Tell students that they are going to read about specific issues affecting snow leopards and humans that inhabit the same land. Then they will devise **sustainable solutions** that protect both snow leopards and humans.
2. Explain to them that a sustainable solution is a long-lasting one that considers the **environment**, **society** (people), and the **economy**. Therefore, if a solution supports humans, but does not support snow leopards, it is not



SHAWNNA PECKHAM

sustainable. If students are not familiar with these three pillars of sustainability, go over the definitions with them.

3. Divide the class into four different groups of 3-4 students. (If your class is larger, you can have more than one group per goal. Thus, a class of 32 students would result in 8 groups, 2 for each goal.)
4. Explain that each group will be working on one of the following goals:
 - Group 1- Increase the income of herders
 - Group 2- Increase the amount of wild prey available to snow leopards
 - Group 3- Decrease the number of livestock killed by snow leopards
 - Group 4- Decrease the illegal hunting (poaching) of snow leopards
5. Explain to the class that each group will be responsible for making a recommendation for how to protect snow leopards and people in Mongolia. Their recommendation will be heard by the class and can be shared with a real conservation organization.
6. Write the following guidelines where students can see them.
 - Your plan must support community equity (i.e., the plan does not benefit some people at the expense of others).
 - Your plan must contribute to increased numbers of snow leopards.
 - Your plan must consider herders' quality of life (i.e., maintain or improve herders' current standard of living).
7. Explain that after they create a sustainable solution, each group will present its problem and solution to the class through a skit.
 - **Alternative:** Any means of presentation can be substituted for the skit. For example, student groups could do formal presentations with visual aids, such as posters, PowerPoint slides, or video.
8. The skit must:
 1. ...focus on the problem that students read about.
 2. ...offer a realistic and sustainable solution.
 3. ...include visual aids, such as props or costumes.
 4. ...be no longer than 4 minutes. (Note: You may want to allow more time for smaller classes.)
9. Give each group one reading, and each student one *Creating Sustainable Solutions* handout. One representative in each group can be given the *Skit Graphic Organizer*.



10. Have students read about their goal together and brainstorm possible solutions to the issue.
11. Have them discuss and complete the handouts *Creating Sustainable Solutions* and the *Skit Graphic Organizer* with their group members. Share with the class the assessment rubric to help them prepare their skits.

Activity – Day 2

Core Activity: Presentations (40 minutes)

1. Have student groups present their skits while other students watch and take notes on the solutions suggested in the skits. Encourage students to ask questions about each other's solutions after the skits have been presented.
2. After all groups have presented, lead a short discussion using some or all of the following questions.

Discussion

1. Were there any conflicts in your group you had to resolve in order to reach the proposed solution?
2. Why does considering multiple perspectives help to make a solution more sustainable?

3. Why would a solution that supports snow leopards, but not humans, be unsustainable?
4. Were any of the proposed solutions not necessarily sustainable? How could they be made more sustainable?
5. Are the proposed solutions that each group suggested mutually exclusive, or could any of them work together? How?
6. How would you revise your solution now that you have heard others?

Wrap Up: Making Connections (10 minutes)

1. Have students form a large circle in a cleared area.
2. Pass out one *Snow Leopard Connections Card* to each student. For classes with more than 16 students, do this activity in pairs.
3. Have students affix the cards to their shirts or hold them where everyone can see.
4. Tell students their task is to connect different issues related to snow leopards.
5. Hand the ball of yarn to one student and have him/her read his/her card out loud.
6. Have this student pass the ball of yarn (while still holding on to the end) to another student.



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7. Have the first student state how the second card is connected to his/her own card (e.g., the student with the *snow leopard* card could pass the ball of yarn to the student with the *conflict* card explaining that snow leopards eating livestock causes conflict with humans).
8. Now the second student passes the ball of yarn to a third student, and the process is repeated until everyone is holding a piece of the yarn.
9. Ask students the following questions:
 - If one student tugs on the yarn, what happens? [Have one student tug the yarn he/she is holding to test student predictions.]
 - What can we observe about the connections among these issues?
 - How does that relate to finding sustainable solutions?
10. **(Optional)** Add the cards to your growing word splash from the previous three lessons. As a culminating exercise, have students each use ten words from the expanded word splash to write a paragraph about snow leopard conservation.

Extension Activities

- Have students research conservation efforts going on in their city or state. Local organizations or regional branches of national groups such as the Audubon Society or National Wildlife Federation may be helpful resources. Which organization or conservation effort do they think is most interesting and why? What are ways they can get involved? Have them create a proposal of how they would get involved, and send it the organization working on the conservation effort.
- Sustainable solutions that help herders and snow leopards are highlighted on the Snow Leopard Trust website. Have students compare their solutions with the ones in place in communities that work with Snow Leopard Trust and see how they are similar and how they differ. Students can then send their proposals to Snow Leopard Trust (info@snowleopard.org) for possible inclusion on their website.

Simulation: A Day in the Life of a Herder, page 1

[Simulation to be read aloud by teacher or student volunteer. Instructions in brackets are optional.]

It's really cold tonight—even inside the *ger* (a large weather-proof tent) with the coals still warm in the stove. It's quiet, really still outside. The only sound is an occasional cough from the camels and goats.

You are a nomadic herder born in the country of Mongolia. The weather in the mountains of Mongolia changes depending on the seasons. Lately the summers have been much hotter than usual and winters have been brutal. It is winter season now, and your mother has been trying to hide her worry that a *dzud* (cold weather storm) is coming. The last *dzud* was so bad that many of the animals died.

But hey, lay your heads down and close your eyes. It's four o'clock in the morning and you are still sleeping! The stars are shining so brightly in the area where you live, the sky seems so vast, and a dog howls in the distance. **[Howl faintly.]**

[Have students close their eyes quietly for 15 seconds and then clap your hands or ring a bell.]

It is five a.m.—time to wake up! You get ready for the day. Sudden changes in weather, like snow or sand storms, require you to prepare yourself for all types of conditions. You usually put on your wool fur-lined *deel* (a long coat) over your clothes. It keeps you nice and warm and can also be used as a blanket, tent, or to wrap a sick goat or sheep if they need warmth.¹

[Have students wrap coats around themselves to simulate this preparation.]

You will use this *deel* to travel throughout the desert. If it is extremely cold outside, you would add a jacket underneath to keep you warm. Long sleeves can serve as gloves. You put on a *louz* (hat) that your mom recently made for you and roll the sides down to keep your ears warm. **[Have students put on a hat.]** Some of these are embroidered with silk, velvet, and even stones. Yours is perfect: red velvet, marmot fur and black silk. Finally, you slip on your big *gutuls* (boots which are great for horseback riding).²

[Hand out pretzels and hummus to children.]

What you are eating is camel jerky and curd (a type of yogurt). You snack throughout the day because this is the only food you will eat until supper—after dark.

Like most of your friends, you take care of livestock every day from morning to sunset. You are not able to go to school. You will roam the desert to find good grazing land for your herd. When night falls, you will bring them back to where you started. Every single animal in your herd is important because they are the means by which your family makes money. If you come across any traveling traders, you attempt to sell them raw wool from your animals, but this does not happen every day. At times, you are asked in the evening to guard the animals because if even one is lost, your family will be devastated.

[Have students walk around the room a few times so they can simulate the movement of a herder searching for grazing land.]

It's been a long day and the sun has finally set. Once you return home from herding, you take off your *louz*, *deel*, and *gutuls*. Now it's time for supper. Your meal consists of sheep meat, camel milk, and curd. Sometimes you add rice or noodles to this

Simulation: A Day in the Life of a Herder, page 2

mixture. You also drink salty tea, dipping a sugar cube into the tea, letting the cube absorb the tea, and then eating it while it is soft and warm.

[Hand out tea with sugar or a substitute to students, or ramen noodles in a cup.]

You look around the room at your possessions. Since you are a nomadic herder, you can't have more stuff than you can pack on a camel or carry while riding a horse. You have to pack up your entire house and move at least five times each year.

[Tell students to write on an index card the five objects they would take with them if they had to move like a nomadic herder. Remind them that these objects would have to fit in a backpack.]

You are lucky. You live close to a river at your spring home. When dishes and clothes get dirty, you wash them in the river. You also take a bath

in this river. But at your winter site, higher in the mountains, you have to carry water from a spring that comes from above your camp on the mountain. When it is freezing outside, you quickly pour a bucket of water over your head and run inside!

It's late—time for you to go to sleep. You sleep on the floor in one room with all of your brothers and sisters and your aunt and cousins. There is a slight possibility that you might get a bed next year. Your entire family sleeps in one large ger where you all cook, eat, play, and tell folktales.

The stars shine brightly outside. You have had a long day of work, and it is time for you to rest. Close your eyes and fall asleep so you can get ready for a new day.

[End simulation.]

For photos of items mentioned in the simulation, visit www.mongoliatoday.com/issue/7/clothes.html.



TERI AKIN

Increase the Income of Herders (Goal 1)

The Reality of the Herder

Imagine living in extremely harsh weather conditions where you may only be able to eat one meal per day. You depend on your livestock—sheep, camels, horses, yaks, or goats—to provide for your daily needs, such as food and clothing. If you made less than \$1 per day, as many herders do, how would you survive? How would you keep your livestock alive?

The herders that share the same mountains throughout Asia with snow leopards live day to day without a stable income. They move with their livestock many times a year in search of land for grazing, fresh water, and seasonal foods such as berries. Many herders do not keep their livestock in pens because they move so often.

Interactions with Snow Leopards

Livestock animals provide herders with milk, meat, and wool. Herders' lives can be devastated by the loss of a single livestock animal. At times, this loss is a result of disease or bad weather. Other times, when snow leopards do not have enough to eat, they may kill and eat livestock. This makes some herders so angry that they kill the snow leopards out of vengeance or for fear that the snow leopard might attack their animals again. As one herder said after her horse was killed by a snow leopard, "My husband still is quite angry about the snow leopard killing our horse, and sometimes talks about going out with his gun."¹

Herders who live in snow leopard habitats survive on less than a few hundred dollars per year.² When snow leopards kill just one livestock animal, a herder can lose 3% to 20% of his or her income for the year.³ While snow leopards are clearly an endangered species, the basic needs of herders are in danger, too.



Daily Living

Cold, dry weather conditions force herding families to move constantly throughout the land in search of an environment appropriate for their families and their livestock. Many herders sell wool to traveling traders they meet as they journey, but they never know if or when the next trader will cross their path. They do not own cars or motorcycles that can take them to markets to sell their products, so they have to accept whatever price is offered to them by the traveling traders.⁴

A small number of herders are able to get a more reliable source of income by selling their wool or products made from wool to organizations that can sell them to people in distant places. They can make more money by selling high-quality finished products, like rugs and sweaters, made from their wool to these organizations. Selling to these organizations provides herders with different options for earning money.

What do you think is a sustainable solution to increase the income of herders?

Increase the Amount of Wild Prey Available to Snow Leopards (Goal 2)

Sharing the Land

When you are at school or at home, do you often have to share things with your friends or your siblings? How do you decide to share what you receive? Imagine how complicated it might be to share the land you need to survive. Life is not easy where snow leopards and humans live in the same place. Daily survival is important to both species. Herders sometimes move higher in the mountains into snow leopard territory to find grassy areas for their livestock to graze. This sharing of land can lead to tension between humans and wildlife when they compete for limited resources.

Overlapping Homes

It is estimated that the number of livestock animals in Mongolia is approximately 33 million.¹ Those livestock all require food. Herders move with their livestock wherever grazing land is available. When herders move into the same region as the snow leopards, their livestock inhabits the same land as the snow leopard. Sharing land can lead to competition for the same type of food that both livestock and the snow leopard's wild prey species, such as ibex and hares, depend on. Overgrazing, which happens when there are more livestock than the grass can support, can destroy the mountain grasslands, leaving less food for all types of animals.

This decrease in food from overgrazing can make it difficult for wild prey to survive, and they are not able to compete for land with the large numbers of domestic sheep and goats. Snow leopards depend on wild prey species, including wild blue sheep (bharal), wild goats (ibex), and wild argali sheep. They also eat small prey including marmots, hares, and wild birds. When prey animals disappear, snow leopards have to find other food immediately or they will starve to death.² Herders have been known to accidentally scare



wild sheep and goats away from the mountains, making it more difficult for snow leopards to find wild prey. Some conservation organizations have worked with herders to find areas where livestock can graze and reserve other areas only for wild prey species.

Tension between Snow Leopards and Humans

If the wild prey animals which snow leopards typically consume are not available, snow leopards will consume whatever animals are nearby, including livestock.³ Since herders' incomes depend almost entirely on their livestock animals, if they lose even one animal to a snow leopard they could retaliate by finding the snow leopard and killing it. As one herder said after her horse was killed, "My husband still is quite angry about the snow leopard killing our horse, and sometimes talks about going out with his gun."⁴

What do you think is a sustainable solution to increase the amount of prey species for snow leopards so they do not have to eat livestock?

Decrease the Number of Livestock Killed by Snow Leopards (Goal 3)

The Importance of Livestock

Imagine that you are a yak herder in the mountains of central Asia trying to support your family. You want to keep your animals well fed because they are your only source of money. Unfortunately, you are unable to find grazing land to feed your livestock. The only option you have is to move higher into the mountains to find new lands for grazing. This move puts you in closer contact with the snow leopards that live high in the mountains. Losing even one livestock animal makes your life more difficult. Unfortunately, you have already lost some of your livestock to disease and harsh winters. You have also lost some because snow leopards have eaten them.

Out of fear that they will lose too many livestock, some herders try to increase their herd sizes. Unfortunately, it is difficult to make sure that all of the animals are healthy, to pay for their vaccinations, and to keep track of them in the mountains. Also, because they compete with each other for the limited grass, they can become malnourished when there is not enough grass for all of them, leaving them more susceptible to disease and predators. Smaller herds tend to be healthier, provide better meat and milk, and have thicker wool.

Many herders sell wool from their livestock to traveling traders they meet as they journey, but they never know if or when the next trader will cross their path. They have to accept whatever price is offered since they don't have any other options.

Hunting for Food

Snow leopards are predators, and their usual diet consists of wild blue sheep (bharal), wild goats (ibex), and wild argali sheep.¹ They also eat small prey including marmots, hares, and some birds. When herders bring their livestock to the same areas where snow leopards live, the livestock may



JENNIFER SNELL RULLMAN

eat much of the grass that wild sheep, goats, and other prey also need. The amount of prey available to snow leopards decreases when the prey animals can't find enough food to survive.

Conflicts between Wildlife and Herders

Snow leopards are opportunistic hunters, which means they attack any available animals. Therefore, if their usual prey is not available, snow leopards will eat livestock animals. Snow leopards have been known to attack livestock at night when there has not been enough protection or when children are guarding the herd.² Some herders have reacted by killing snow leopards in retaliation or for fear that the snow leopard might attack their animals again.

Some conservation organizations have worked to create programs that pay herders money for any livestock they lose to snow leopards in exchange for not hurting snow leopards. They also help find ways to protect livestock from predators at night.

What do you think is a sustainable solution that can discourage snow leopards from preying upon livestock?

Decrease the Illegal Hunting of Snow Leopards (Goal 4)

Making a Living

Imagine you are a herder living in the same mountains where snow leopards live. The mountain temperatures are freezing. You haven't been able to sell much wool to make money, and you have lost some of your sheep, horses, and goats to cold temperatures and wild predators. You earn less than \$1 a day, and this money has to support your entire family. Your children cannot attend school because you need them to help take care of the livestock. If you could not make money on a daily basis to provide for your family, how would you take care of them?

If herders do not earn enough money, they cannot survive. While many herders sell their wool to traveling traders they meet as they journey, they never know if or when the next trader will cross their path. They have to accept whatever price is offered since they don't have any other options for making money. They do not have cars to travel to markets to sell their wool for a higher price. A small number of herders are able to get a more reliable source of income by selling their wool or products made from wool to organizations that can sell them to people all over the world.

Illegal Income

Some herders turn to poaching snow leopards to make money. Poaching is the illegal hunting of animals. Under Mongolia's Wildlife Law, the fine for killing a male snow leopard is 8,000,000 tugrik (U.S. \$5,825). In Nepal, this illegal trade could result in anywhere from five to fifteen years in jail.¹ Why would people choose to poach if it puts their lives at such extreme risk?

Consider this: catching one snow leopard can provide a herder with a lot of money—up to \$100 for a cat's body parts, which are used in traditional Asian medicines, and between \$200 and \$900 for the snow leopard's pelt, or fur.² That's a lot of money to herders who typically earn just \$200–\$350 in a year, depending on the market rate for wool.



Why Snow Leopards?

Snow leopards are highly prized throughout Central Asia, Eastern Europe, and Russia. Each year, within the Xinjiang province of China, at least 20 to 30 snow leopards are killed and traded at a market for use in traditional Asian medicines.³ In Tibet, wearing clothing with tiger or leopard skin is very popular and considered a sign of wealth.⁴ Some people even want to own these animals as pets. Therefore, hunters will spend months searching for snow leopards. The money poachers can make catching just one snow leopard provides them with far more money than what they make in an entire *year* by herding.⁵

Having more options for making money, or making snow leopards more valuable alive than dead, could provide herders with the stable income that they need to survive.

What do you think is a sustainable solution to decrease the poaching of snow leopards?

Creating Solutions

Goal: _____

1. What is the problem that you read about?

2. What are possible solutions?

Don't forget that any solution must:

- support community equity (meaning that the plan does not benefit some people at the expense of others)
- contribute to increased numbers of snow leopards
- consider herders' quality of life (i.e., maintain or improve herders' current standard of living)

3. What solution does your group recommend that supports both herders and snow leopards?

4. Which of the following groups of people should be involved in your solution? Why?

- Nomadic Herders
- Craftspeople (make crafts from wool)
- Mongolian Government Representatives – Ministry of Nature and Environment
- Mongolian Department of Tourism
- Mongolian Snow Leopard Conservation Foundation
- National Park Staff
- U.S. Middle School Students (traveled to Mongolia to learn about snow leopards)
- Wildlife Hunters

5. Create a skit using the *Skit Graphic Organizer* to represent the problem you read about and the solution you created. Follow these guidelines:

- focus on the problem you read about
- offer a realistic and sustainable solution
- use visual aids, such as props or costumes
- limit skit to 4 minutes

Skit Graphic Organizer

Title:

Characters involved (i.e., herders, snow leopards, conservation organizations):

Plot (include sequence of events from the problem to the solution):

Important types of dialogue to include (i.e., between herder and family, between herder and snow leopard organization, between snow leopard organization and government):

Props needed:

Costumes:

Skit Assessment Rubric

Assessment Component	3 Exceeds Expectation	2 Meets Expectation	1 Needs Improvement
Organization	Group presents skit in a logical, interesting way that is easy for the audience to understand.	Group presents skit in a somewhat logical, interesting way.	Group does not present information in a logical, interesting way.
Solutions	<p>The solution includes everyone's perspective and voice.</p> <p>The solution is detailed, realistic, and well thought-out. It includes 3 or more different groups of people.</p>	<p>The solution includes most of the group's voice.</p> <p>The solution is somewhat detailed, realistic, and thought-out. The solution includes at least 2 different groups of people.</p>	There is no real solution presented to solve the problem.
Collaboration	Group works well together, and all members contribute equally to the skit.	Some members of the group contribute more than others.	The group is not able to work together in an effective way.
Creativity	<p>Group uses props and costumes.</p> <p>Group includes thoughtful dialogue.</p>	<p>Group uses some props and costumes.</p> <p>Group includes some dialogue.</p>	Group does not use any props, costumes, or dialogue to contribute to the skit.
Total Points/12			

SNOW LEOPARD CONNECTIONS, page 1

Snow Leopards	Survival
Herders	Migration
Poachers	Poverty
Conflict	Environment

SNOW LEOPARD CONNECTIONS, page 2

Livestock

Government

Conservation

Education

Quality of Life

Biodiversity

Money

Sustainability

Taking Action!

This project allows students to participate in a proven solution to help snow leopards, while also supporting people living in poverty who share the snow leopards' habitat. Students determine how they could most effectively support Snow Leopard Enterprises, a conservation project of Snow Leopard Trust. By participating in this service learning project, students can also earn money to support any conservation, community, or school project of their choosing.





Note: *This lesson will guide you through a comprehensive service learning project focused on a conservation project of the Snow Leopard Trust. Please contact the Snow Leopard Trust (education@snowleopard.org, or 1.206.632.2421) if you are thinking about participating in the project. Staff will provide more information, schedule your dates and send you a free packet with information and fundraising materials. You are welcome to participate in the conservation program without utilizing this lesson.*

- Determine how to allocate proceeds in order to support an important conservation, community, or school project

Time Required

Estimated 3 class periods (for Preparation, Reflection, and Demonstration activities), plus time spent implementing the service project

Key Concepts

- community-based conservation
- service learning
- civic participation

Subject Areas

- science
- English/language arts
- mathematics
- social studies

National Standards Alignment

NSES

C. Life Science (populations and ecosystems; diversity and adaptations of organisms)

F. Populations, Resources, and Environments

NCSS

IX. Global Connections

X. Civic Ideals and Practices

Inquiry/Critical Thinking Questions

- How can learning about an endangered species connect to direct and meaningful action to protect that species?
- Why is it important to involve human communities in wildlife conservation projects?
- How can a conservation solution involve and benefit human communities?

Objectives

Students will:

- Brainstorm the most effective way to support Snow Leopard Enterprises, a conservation project of Snow Leopard Trust
- Take on a variety of roles and responsibilities necessary to complete a project
- Raise money for or otherwise support snow leopard conservation



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2.3 Humans and Their Societies (individuals and groups; global connections)

3.1 Skills for Analyzing and Investigating Environmental Issues (identifying and evaluating alternative solutions and courses of action; working with flexibility, creativity, and openness)

3.2 Decision-Making and Citizenship Skills (evaluating the need for citizen action; planning and taking action; evaluating the results of actions)

Vocabulary

community-based conservation—a conservation approach that involves the human communities that live in a region affected by conservation in a positive solution for humans and wildlife

service learning—providing service to others while simultaneously learning specific skills and information

Materials/Preparation

Reading: *Helping Snow Leopards, Helping People*, 1 per student or pair

Handout: *Service Learning Project Brainstorm*, 1 per group of 2-3 students

6 large sheets of paper hung where everyone can see them. Write the following titles on the sheets: Participation Method, Advertising, Obstacles, Resources Needed, Measuring Success, Investing Proceeds

Marker for writing on large sheets of paper

Handout: *Details of Class Project*, 1 per student

Sample Order Form

(Optional) *Sample Project Assessment Rubric*

(Optional) Snow Leopard Enterprises-Herder Contract

(Optional) Sales flyer

(Optional) *Making Felt Balls*

Activity

Because a service learning project includes many steps, it is recommended that students keep all related materials in an organized notebook.

Service Learning Step 1: Preparation

Introduction

1. Tell students that they will be participating in a conservation project organized by Snow Leopard Trust, one of only two organizations in the world that focus on snow leopard conservation.
2. Let students know that their project will take the form of **service learning**. Review the definition of service learning.



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3. Have students read *Helping Snow Leopards, Helping People*, either individually or in pairs.
 - **(Optional)** Read the *Snow Leopard Enterprises–Herder Contract* to further understand this **community-based conservation** model.
4. When students are finished reading, lead a brief discussion about the reading:
 - Did anything in the reading surprise you?
 - What is an interesting fact mentioned in the reading?
 - What do you think about the SLE conservation model?
 - What challenges do you think SLE might have?
5. Do a 5-minute freewrite or journal activity using one or more of the following questions.
 - What do you think might happen during this project?
 - What kinds of activities do you think will be involved?
 - What are you looking forward to?
 - What do you expect to learn from this project?
6. Ask students to recall some of the solutions they proposed during Lesson 4 (“What’s the Plan?”).
 - How are each of those solutions related to conservation of snow leopards?
 - How does the Snow Leopard Enterprises conservation model compare to your proposed conservation solutions from Lesson 4?

Preparing for Service Learning Project

This project is designed to support Snow Leopard Enterprises. One way this can be done is through an advertising and marketing campaign. Students can help snow leopards by educating people about snow leopards and about Snow Leopard Enterprises. Students can also directly participate in the Snow Leopard Enterprises conservation model through marketing and selling handicrafts made by herders. Money from sales of the handicrafts helps to support the Snow Leopard Trust, a nonprofit conservation organization that works to protect snow leopards and the ecosystems in which they live.

Note that the following are suggested activities and may or may not be appropriate for your class’s needs. For example, you may want students to have a greater voice in choosing roles for the project, or you may want to decide on some of the project components ahead of time.



1. Break students up into groups of 2-3.
2. Pass out one *Service Learning Project Brainstorm* handout to each group.
3. Allow students sufficient time to discuss the questions, think of thoughtful answers, and fill out the handout.
 - **Note:** Students will not only have the opportunity to raise money for snow leopards, but can also contribute to other conservation programs. You may want to give students an opportunity to research other conservation issues, both local and global, to provide background for question 6. They could use the money for any project the class deems worthy, from creating a butterfly garden to adopting a whale.
4. Once all groups have completed the brainstorm handout, go through student answers, one group at a time. Have one person from each group share that group's answers to each question. Have another person from each group write the answers in marker on the large sheets of paper hung in the classroom.
5. After all groups have shared their brainstorming, go through each large sheet of paper to see if similar answers can be combined.
6. Tell the class that they will have to reach consensus on some of the questions, such as how they plan to support Snow Leopard Enterprises. Possible ideas include:
 - host an event to highlight what they have learned about snow leopards and conservation issues
 - set up a table with products from SLE and sell them at an event like a school carnival
 - take SLE order forms home and take orders and collect money from friends and family
7. Have students vote on which proposed method of participation they think will be most successful in supporting snow leopards.
8. Students will now need to decide on the supporting details—how to advertise, overcome potential obstacles, decide on and gather the resources needed, and measure success. Decide on these details either through class discussion until a consensus is reached, or via a vote.
9. Provide each student with the handout, *Details of Class Project*. Go over the final details together as a class, making sure that each student records the information as you go. Students should keep this handout as a reference.



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10. You can either decide on the individual role assignments, or you can ask volunteers to agree to take on roles. Each role should have at least 2 students responsible for completing it. You may also think of additional roles that need to be filled.
11. As a class, develop a rubric which will measure the success of the project based on different metrics you create together. These metrics can be divided into specific project components: preparation, action, reflection, and demonstration. Remind students that building awareness about snow leopards and conservation solutions is an important goal, in addition to raising money.
 - **(Optional)** View *Sample Project Assessment Rubric* for ideas.
12. After talking to the Snow Leopard Trust to set your fundraising date (or to get options for dates), together as a class construct a project timeline, indicating deadlines for certain events. Post this in a place where all students can refer to it throughout the project.

Service Learning Step 2: Action

Before You Begin Marketing and Selling

1. In some cases, you may need to obtain permission for students participating in off-campus or after-hours activities.
2. If you choose to do a fundraiser, contact the Snow Leopard Trust at 1.206.632.2421 or education@snowleopard.org to schedule your fundraising event time, as only a limited number of fundraisers can take place each month depending on inventory numbers. Once you schedule your fundraiser, you will receive a fundraising kit with free product samples, order forms, and more.
3. Have students learn about the items they will be marketing and/or selling (wool cat-toy mice and ornaments). Information can be found at www.snowleopard.org/shop.
4. If you choose to sell SLE items, go over the guidelines for ordering the items on the *Sample Order Form*. For example, if you purchase cat-toy mice wholesale for \$2.50 each, and you sell them retail for \$5, how much money per mouse did you earn for your own project? Make sure that students understand the mathematics used and the terms wholesale and retail price. (*Wholesale refers to selling goods in large quantities. Snow Leopard Enterprises sells you items*



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at wholesale prices. You then sell the items at retail prices. Retail refers to selling goods directly to consumers.)

5. Make sure that your event, whether it is a 1-day event or an ongoing project, is well advertised and well attended. You may want to involve other classes, other schools, parents and families, community members, neighbors, local government representatives, and media (such as newspaper or TV reporters).
6. Decide upon and create any materials that may be needed for your event. For example, if your class decides to sell the items at an event in the gymnasium, have them create visuals such as posters and brochures to set on tables and hang on walls.
 - **(Optional)** Use the *Sales Flyer* provided at the end of this lesson as a reference.

Completing Your Service Learning Project

1. You may want students to lead an activity or presentation to help buyers and others become informed and excited about the project. Here are some ideas:
 - lead one of the lessons included in this series, such as the simulation activity “A Day in the Life of a Herder” from Lesson 4
 - lead the activity explained in the handout *Making Felt Balls*

2. Be sure to provide information about how the purchase of SLE handicrafts protects snow leopards and how the proceeds will also be used to support a conservation project chosen by the students.
3. If participants/attendees want to learn more about Snow Leopard Trust and SLE, be prepared to tell them where they can get more information. Students can design handouts that share more information about Snow Leopard Enterprises or contact the Snow Leopard Trust for brochures.
4. After the project is completed, measure success according to the rubric agreed upon by the class.
5. **(Optional)** If students created a video or PowerPoint presentation, poster, or other product for the event or as part of the reflection, send a copy to the Snow Leopard Trust (info@snowleopard.org) for inclusion on their website.

Service Learning Step 3: Reflection

Ideas for individual reflection:

- Write a letter explaining the project and its outcome
- Write a poem or song inspired by the project



- Write an essay explaining the skills utilized during the project (including communication, mathematics, science, and art skills)
- Create a brochure or poster that includes statistics and graphs from the project results
- Create a public service announcement for radio or TV summarizing the project

Discussion questions for group reflection:

- What was the best part of the project? Why?
- What was the hardest part of the project? Why?
- What did you learn that you didn't know at the beginning of the project?
- What is the most valuable thing you learned during your project?
- If you could improve upon or change the project, what would you do differently?
- How does the project connect to your life?
- What have you learned about yourself through completion of the project?
- In what ways could you continue to support wildlife conservation in the future?

Service Learning Step 4: Demonstration

Please note that the Demonstration can actually occur as part of the Action itself. For example, students could sell products from Snow Leopard Enterprises (the action) at a "festival" in which they serve Mongolian food; share poems, skits, and posters related to the snow leopard; and lead educational activities about the snow leopard and the herders who live in Mongolia.

The final part of a complete service learning project is a demonstration of what students have learned and accomplished. This can take many forms. Here are a few ideas:

- Create a student presentation for the school community (either as a video or a live assembly). Have students explain the project details and outcomes.
- Write an article for a community newspaper that provides readers with background information on SLE, project details carried out by students, and outcomes of the project. Include personal reflections from students, as well as photos from the project.
- Compile a book of poems or essays, one from each student. Have students include drawings and illustrations with their submissions. Compile the pages into a single bound volume that current and future classes can enjoy.

Be sure to send thank-you notes to any people or groups that assisted with your project.

Helping Snow Leopards, Helping People

In 1998 the Snow Leopard Trust, a group that works to protect snow leopards around the world, started a project called Snow Leopard Enterprises (SLE). Snow Leopard Enterprises operates in two Asian countries: Mongolia and Kyrgyzstan. SLE helps snow leopards by helping people who live in the same areas.

One reason that humans kill snow leopards is in retaliation for snow leopards killing their livestock. Snow leopards occasionally eat domestic goats and sheep. Herders who lose livestock to snow leopard attacks may be angry about the loss of their livestock and fearful that they will lose more. After all, they rely on selling wool from their livestock to support their families, and they feed their families with milk and meat from livestock animals. Some families in the region live on less than \$50 a year.

The Snow Leopard Trust realized that in order for people living in snow leopard habitat to help protect snow leopards, they would need to be involved in finding a solution. Because people in these areas make very little money, it was clear that a long-lasting solution would have to provide herders with income and involve them in helping to protect snow leopards in the area.

A Sustainable Solution

That's where Snow Leopard Enterprises comes in! The SLE program allows people living in snow leopard areas to earn money from the sale of wool handicrafts, such as rugs and slippers. To participate in the program, communities in snow leopard areas must agree not to kill snow leopards and their prey. If everyone keeps their agreement, herders receive cash bonuses once a year. If just one person in the community breaks his or her agreement, no one receives a bonus.

Snow Leopard Enterprises is a conservation solution that not only pulls people out of poverty, but also improves the lives of women. Take Aigul for example. Aigul is a woman who makes a living in Mongolia by selling wool. She used to earn \$46



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a year from selling camel and sheep wool. Now she uses the wool to make handicrafts that SLE sells. Her income is now \$255 a year!

Almost 500 women participate in SLE. They use the money they earn for food, medicine, education, and clothing. Participating in the project also increases their self-esteem. In the past, mostly men made decisions about the environment and wildlife issues. Women participating in SLE now also make decisions such as how the environment and snow leopards should be treated.

Sometimes we learn about endangered species and feel like there is nothing we can do to make a difference. Participating in the SLE program gives you a way to directly protect snow leopards and also to help people living in these regions so that they will protect snow leopards, too.

There are several ways you can participate in the program, such as advertising the program or actually selling handicrafts. No matter how you participate, you will be raising awareness about an endangered species. Learning about endangered species helps people to appreciate the importance of all species. There are probably endangered species that live near you. By participating in Snow Leopard Enterprises, you can earn money for snow leopard conservation and at the same time earn money for any other conservation or community project that is important to you!

Service Learning Project Brainstorm: Snow Leopard Enterprises

Group Members: _____

Project Goals

- To meaningfully participate in a snow leopard conservation program, through the sale of SLE handicrafts and/or through raising awareness about SLE to others
- To understand and demonstrate the link between snow leopard conservation and poverty alleviation
- To support a project of your choice such as a local conservation project or school grounds improvement

Group Brainstorm

1. What is the best way to participate in the SLE program?

For example: host a snow leopard night for students and parents

2. What are two ways that your event could be advertised?

For example: distribute flyers around town

3. List at least two potential obstacles to completing this project successfully, along with ways that these obstacles might be addressed.

4. What resources will be needed to complete the project (information, money, time, etc.)?

5. What are two ways to measure the success of your service learning project?

For example: the number of people that purchased handicrafts

6. If you decide to sell SLE handicrafts, your class can also raise money for any project it chooses. The wholesale price of the handicrafts is the amount of money that will be used to protect snow leopards. The proceeds from the fundraiser will be used to support a conservation project chosen by your class. How do you think the proceeds should be spent?

For example: use the money to improve a local park used by wildlife

7. How could your class demonstrate all that you have learned about snow leopards and SLE?

For example: create a presentation to show friends and family

Details of Class Project

1. How will your class participate in the Snow Leopard Enterprises program?
2. How will this project be advertised?
3. What are potential obstacles to completing the project with success, and how will you overcome them?
4. What resources will you need to accomplish your goals?
5. In what ways will you measure the success of your efforts?
6. If you do a fundraiser, what will your class do with the proceeds?
7. How will your class demonstrate what you learned and did?

8. Role Assignments

- Project managers (coordinate the various components of the project):

- Advertisers (produce flyers, send emails, post notices in local newspaper):

- Inventory Specialists (order sufficient SLE items for event):

- Event Coordinators (set up and manage event):

- Treasurers (account for purchases and money collected):

- Reporters (update Snow Leopard Trust about the final outcome of the project, send photos to Snow Leopard Trust and local newspaper):



Snow Leopard Enterprises

Schedule a Snow Leopard Fundraiser for your School!

Why a Snow Leopard Fundraiser? Because it is easy to do, it can raise money for your school project, AND it helps protect snow leopards and improve the lives of herders living in Asia. All that in one fundraiser!

If 100 students sell just 10 products each, they can easily raise a total of \$5000! \$2500 of that would go to support snow leopard conservation and the remaining \$2500 for your school, community or conservation project!

So How Does it work? *(this is one way it can work, but your class may have other ideas! Give us a call and let us know so we can hold enough product for your school)*

Step 1: Call the Snow Leopard Trust office! 206-632-2421 or e-mail at marissa@snowleopard.org.

In order to do a fundraiser, we need to ask some questions and book your date, so you need to call or e-mail our office.

Step 2: Book your fundraiser—set a date!

When you call, you can let us know that you want to hold a fundraiser. We will ask you for a date. We schedule a limited number of these each month to make sure that we have plenty of inventory, so make sure you plan ahead and book a slot for your event.

Step 3: Receive your 'Fundraising Kit'. Once you set the dates for your fundraising event, we will ship you a 'fundraising kit' which will include color product sheets and order forms for each student, samples of the products for each classroom, a DVD about the Trust, and more. Your students will have the designated time to take orders from friends and family or to hold snow leopard event (or both). Maybe your class will have there own idea for a fundraiser! If you are holding one event—we will ship you a box of product for your sales table.

HOLD THE FUNDRAISER *(Ideas included in the Fundraising Kit you receive from SLT)*

Step 4: How much did you raise? Count your funds and determine your total funds raised. **Send in your order form and money for snow leopard conservation** if students have taken orders from friends and family. We will then send you your products and students can distribute them to each person or have them come pick them up at designated time. If you have hosted one event, ship back remaining product and the money on the invoice (which should be approximately half of your total funds raised).

Step 5: We want to hear from you! We hope you had a successful fundraiser—both raising money for snow leopard conservation and for your school. We'll send you a certificate and place your school and photos on our website.



Product Photos by Kathryn Barnard

Sample Order Form, page 2



Snow Leopard Enterprises

Mail order form to:
Snow Leopard Trust
Attn: Marissa Niranjan
4649 Sunnyside Avenue North #325
Seattle, WA 98103 USA

Phone to: (206) 632-2421
Fax to: (206) 632-3967
Email to: marissa@snowleopard.org

Name: _____
School: _____
Address: _____
City: _____ **State:** _____ **ZIP:** _____
Phone: _____ **Email:** _____

Here's how it works: Call our office! Schedule the dates for your fundraiser. We send you a 'fundraising kit' and during your fundraiser, students take product orders and collect money for those orders from friends and family! Send us your order and the cost of the products and we will ship you the products for distribution. Keep the remaining money from sales for your own school project or club. You can also plan an evening or day event—like a parent night or snow leopard event and sell products at the event. Either way, it is an easy and fun way to raise funds for your school and for conservation of the snow leopard. We'll send you a certificate and place your school on our website.

Sample Order:

If you have three classrooms with thirty students in each classroom. If you book and event for one week and each student is able to sell 5 items to friends and family, here is what a sample order sheet might look like. Your students could sell 5 items each and make a total of \$1230 for snow leopard conservation and an additional \$1230 for your own school project or club.

Item Description	Quantity Sold	Suggested Retail Price	Total Sales	Wholesale Prices to be paid to SLT	Total to SLT for Snow Leopard Conservation
Mini mice	120	\$5.00	\$600	\$ 2.50	\$300
Large mice	120	\$5.00	\$600	\$ 2.50	\$300
Snow leopard ornaments	120	\$6.00	\$720	\$ 3.00	\$360
Ibex ornaments	30	\$6.00	\$180	\$ 3.00	\$90
Camel ornaments	30	\$6.00	\$180	\$ 3.00	\$90
Yak ornament	30	\$6.00	\$180	\$ 3.00	\$90
Subtotal			\$2460		\$1230
Shipping					
AMOUNT DUE TO SLT (less shipping costs)					\$1230
Total Amount Remaining For School Fundraiser (Total above subtracted from total sales)					\$1230



Product Photos by Kathryn Barnard

Sample Project Assessment Rubric

	3 Very Successful	2 Moderately Successful	1 Not Successful
Preparation			
Plan Development	Student fully contributes ideas for developing a viable plan and timeline.	Student somewhat contributes ideas, or contributes unrealistic ideas.	Student does not contribute to the development of a project plan or timeline.
Consensus	Student participates in all class discussions and the voting process to achieve consensus on final plan.	Student participates in some but not all class discussion and voting.	Student does not try to participate in any class discussion and voting.
Action			
Product Sales	Student sells a minimum of 5 items.	Student sells 1-4 items.	Student does not sell any items.
Significance of Project	Student informs all purchasers about how purchasing items contributes to snow leopard conservation.	Student incompletely educates purchasers about how the items sold relate to snow leopard conservation.	Student makes no attempt to educate purchasers about significance of items.
Reflection			
Completion	Student completes an individual reflection encompassing all components of the project.	Student completes part of an individual reflection, but does not reflect on all parts of the project.	Student does not attempt to complete an individual reflection on project.
Thoroughness	In his/her individual reflection, student identifies skills and knowledge gained, as well as components of the project that went well and others that could be improved.	In his/her individual reflection, student insufficiently identifies skills and knowledge gained, components of the project that went well, and others that could be improved.	In his/her individual reflection, student does not identify any skills or knowledge gained, nor identifies components of the project that went well or could be improved.
Demonstration			
Understanding Interconnections	In a finished piece (poem, skit, poster, etc.), student articulates relationships among snow leopards, poverty, and the service learning project.	Student is able to partially articulate how snow leopards, poverty, and the service learning project are interrelated.	Student does not demonstrate understanding of links among snow leopards, poverty, and the service learning project.
Participation	Student actively takes part in group demonstration or celebration of learning.	Student somewhat contributes to/participates in group demonstration.	Student does not contribute to group demonstration.
Total Points/24			



Snow
Leopard
Trust

Snow Leopard Enterprises Mongolia Community Conservation Contract Project of the Snow Leopard Trust

Contract between: Snow Leopard Trust (SLT) and:

_____ Community Group
_____ Local Government
_____ Anti Poaching Brigade or Protected Area's Administration

Validity of contract: from September 200____ until September ____.

Snow Leopard Trust Responsibilities:

- Will purchase products, which meet quality specifications according to the order from producer groups.
- Make a bonus contribution of 20% of base price value to the individual producers, in addition to the purchase value of the products if no conditions in the contract have been broken.
- Pay a contribution of 10% of the base purchase value of the products into a snow leopard conservation fund for National Park for conservation activities.
- Provide training in wool processing and manufacturing quality handicraft production.
- Conduct awareness raising activities for local communities about wildlife conservation.
- Monitor the effects of SLE on the snow leopard conservation in _____ region through SLIMS research, conservation report analysis – documenting livestock loss, poaching and other related wildlife issues.

Community Producer Group Responsibilities:

- Produce products which meet quality and size specifications as ordered.
- Organise with other producers in area for self training and sharing of skills
- Produce and provide finished products to the local coordinator on agreed date. _____
- Protect snow leopard, ensuring no poaching of snow leopards, ibex, argali, red-deer, wild camel occurs in this region.
- Document and turn in report on snow leopard and other wildlife sightings, illegal hunting and conservation activities.

Protected Area Responsibilities:

- To collaborate with the Snow Leopard Trust to assist with SLE to implement activities and awareness
- Conduct public awareness raising activities for SLE herders about wildlife conservation
- Spend Conservation Fund finances on snow leopard conservation activities for region.
- Provide mid year and end of year annual reports according to agreed format with information on contract violations on illegal hunting activities
- Provide an annual financial report with receipts on how Snow Leopard Conservation Fund contributions have been spent (accounting forms provided by Snow Leopard Trust)

Local Government Responsibilities:

- Provide copy of any reports and data on illegal hunting activities.
- Conduct public awareness raising activities among local people of importance of conservation and strictly enforce law on illegal hunting.

Bonus Payment Conditions:

The bonus will be withheld from all producers if:

- Snow Leopard, Ibex, Argali, Red deer, or Wild camel has been poached that year

Other conditions will be set by communities and Protected Areas as appropriate

Process of monitoring agreements:

- 1) Access data from protected area administration and local government reports on illegal hunting in each area.
- 2) Wildlife surveys in and around SLE sights and SLIMS research data analysis.
- 3) Interviews with local people in surrounding communities.

- 4) Formal and informal reports with participating producers and families.

General Order and Schedule:

Order Date:

Purchase Date:

Total Number of Participants:

Local Coordinator:

Location:

Product Name	Unit Price	Number	Total

Signed by representative of Snow Leopard Enterprises

Signed by representative of herder community

Signed by representative of National Park

Signed by representative of Anti-Poaching Brigade

Signed by representative of Local Government

Education and Awareness Objectives:

- SLT will demonstrate clearly that all things are connected. Teach the interdependence of all living things. Demonstrate the importance for a healthy population of snow cock and marmot as well as ibex, argali, red-deer, wild-camel, and snow leopard for the overall health of the ecosystem.
- SLT will teach the importance of sustainable hunting. SLT will lead discussions about the effects over-hunting of any single species has on everything in the ecosystem, including people.
- SLT will provide information about how the health of livestock is connected to adequate grazing and how overgrazing directly leads to the lack of health in livestock, teaching the concept that "There is no vaccine for under-nourishment." SLT will demonstrate that if you increase herd sizes, you overgraze the landscape and then livestock are under-nourished. This causes disease, lack of productivity and increases vulnerability to depredation.
- SLT will provide the understanding that if communities increase their herd sizes above the carrying capacity, then they increase the risk of disease, even when providing vaccines. When herds are not getting adequate nourishment they are susceptible to disease and new diseases may occur with over-crowding.
- SLT will discuss and enhance community knowledge about livestock management practices related to predator behavior, territory, cubbing seasons and behaviors associated with cub rearing, including local areas and times of day to avoid pastures and other ways to limit predator/ livestock conflicts.

Sales Flyer

Organic Cat Toys from Mongolia

.....*Little Cats Helping Big Cats*



A happy customer! Fuji enjoys her mouse. Photo by: Joan Fahlgren

Handmade in Mongolia, these mice drive cats wild (in a good way!) using the power of natural lanolin oils from sheep wool.

Testimonials....

"My cat loves her mouse, she crawled into the bag to get it before I could even open it! **I think they are the perfect gift for my friends with cats**, and I think the owners will appreciate them being for a good cause as much as the cats will enjoy playing with them." ~Kelsi S.

"**My cats love the smell of the mice...**they especially love the tails, made of Yak hair..."Jack" puts the mouse in his teeth, carries it upstairs, and enjoys flinging it down the stairs. I always know when he has "deposited" it in a place that he cannot reach...he sits at the edge of the couch, or piece of furniture where the mouse was last seen...and stares at it, until one of his people retrieves it. Then it starts all over...." ~Norma C.

"Our cats liked the felt mice so much that **we bought them for everyone we know with cats including our vet!**" ~John & Vanessa S.



Kathryn Barnard

Kathryn Barnard

RETAIL PRICE:



Steve Tracy

How does your purchase help Snow Leopards?

Your purchase supports nomadic herders living in remote mountains in Mongolia, providing much needed food, medicine and clothing for their families.

As part of our program, participants protect snow leopards, in their region, making a huge difference in the survival of these beautiful, elusive cats.



Snow
Leopard
Trust

4649 Sunnyside Avenue N. Suite #325
Seattle, WA 98103
USA



Dennis Connor



Shawna Pechman

Making Felt Balls

People have been turning wool into felt for hats, clothes, and many other things since ancient times. Now you can practice this ancient art. Making felt is easy to do. All you need is some wool, water, and dishwashing soap. Then the fun begins as you roll the wool around in your hands and watch it transform into a ball that can be used as a toy or an ornament.

Follow the instructions on this page to make your own felt balls.

Materials and Preparation

- **Felting wool** (pre washed and carded—can be found at your local craft supply store)
- **Liquid dishwashing detergent** (choose a brand without scents and dyes)
- **One-quart pitcher**
- **Measuring cup and spoon**
- **(Optional)** Decorative accessories such as ribbons, beads, buttons, or straight pins
- **(Optional)** Thick rubber dishwashing gloves

Note: *This activity involves hot water. You should be especially careful not to burn yourself. You may want to use thick rubber dishwashing gloves for this reason.*

Instructions

Step 1: Making the Basic Felt Ball

1. Beginning with a small wad of wool, wrap lengths of wool tightly around it. Keep adding layers until your ball is twice the size you want it to be.
2. Pour 6 cups of hot water into the pitcher, and add 4 tablespoons of dishwashing detergent.
3. Dunk the ball in the hot soapy water and then gently roll it from hand to hand without squeezing. Keep doing this for about 10 minutes, dipping the ball in the hot water when it cools. The wool will initially be a wet mess, but the ball will soon begin to harden.



Step 2: Adding Designs to Your Ball

1. If you wish, you can now add designs such as stripes or dots. To make stripes, work wool strips of a different color into the ball with your fingertips. To make dots, wind some wool of a different color into a small circle, dip it into the soapy water, and work it into the ball with your fingertips.
2. After adding the designs, roll the ball in your palms, dipping it into the hot soapy water if it cools.
3. Once the ball has reached the desired size, rinse it with cool water.
4. Let the ball dry completely.

Step 3: Turning Your Ball into Art

1. One way to turn your ball into an ornament is by using a decorative straight pin to tack a ribbon to it. Make the ribbon into a loop for hanging the ball.
2. Another option is to glue together three balls of different sizes to create a snowman. Decorate your snowman with beads or buttons for the eyes.

Endnotes

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- 2 Snow Leopard Network News, “Snow Leopard Hunted to the Edge of Extinction,” October 16, 2006, www.snowleopardnetwork.org/newsblog/?p=21.

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- 1 Mrs. Bayarmaa, “What Is a Ger? And Other Mongolian Cultural Traditions,” www.mongoluls.net/ger/ger.shtml (accessed February 27, 2009).
- 2 Mongolia Today, “Traditional Clothes,” www.mongoliatoday.com/issue/7/clothes.html (accessed December 8, 2008).

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- 2 Snow Leopard Trust.
- 3 Leif Blomqvist and Birga Dixel, "In Focus: Declining Numbers of Wild Snow Leopards," European Association of Zoos and Aquaria, February 20, 2005, www.eaza.net/magazine/download/Cons53_helsinki_snowleopard.pdf.
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Engaging Students in Conservation:

Protecting the Endangered Snow Leopard