

Thank you for choosing the Oregon Zoo for your field trip destination and helping us make a better future for wildlife. We look forward to seeing you and hope you enjoy your visit.

The activities in this guide explore how animals adapt to seasonal changes in weather. They are designed to help you maximize your students' education experience during and following their zoo field trip. All activities are aligned to core academic standards and address the following Essential and Guiding questions:

- How are animals affected by seasonal changes in weather?
  - What are some ways animals adapt to winter weather?
  - How are animals like the polar bear impacted by seasonal temperatures that are hotter or colder than expected?
  - How can you reduce the impact people have on animals like the polar bear?

The Oregon Zoo hopes that as a result of this program students will be able to:

- Define an adaptation as a physical or behavior trait that helps an animal survive in its environment.
- Identify the adaptations animals use to cope with seasonal changes in weather.
- Explain what happens to animals when seasonal temperatures are hotter or colder than normal.
- Describe how people can reduce their impact on the natural world.

The program is correlated to the following academic standards:

**Next Generation Science Standards:**

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

**Oregon Social Science Standards:**

1.11. Explain how seasonal changes influence activities in school and community.

**Background for Teachers:**

Animals have some amazing adaptations to help them cope with the weather. Adaptations can be either structural or behavioral. A structural adaptation is any physical feature on an animal. The super thick fur on a sea otter is an example. Behavioral adaptations are something an animal does usually in response to an external stimulus. Migration and hibernation are examples of behavioral adaptations.

Wildlife depends on healthy habitats. Warming temperatures are changing key habitat elements that animals need to survive. For example, melting arctic ice removes the polar bears hunting grounds; severe droughts stress and kill plants that animals depend on for food and shelter; and milder winters affects the availability of food for migratory species. Unfortunately, many species cannot adapt fast enough to warming temperature or move quickly enough to more suitable areas.

Although warming temperatures is a growing concern, we can make a big difference by just taking a few small actions. Encourage students to turn off the lights when leaving a room; conserve water by turning off the faucet; ride their bike or walk instead of using a car when travelling short distances; and, as always, reduce, reuse and recycle.

### **At the Zoo Activity:**

Download and print the student version of *Eco Explorers: Adaptations at*

<https://www.oregonzoo.org/discover/field-trips-and-school-programs/teacher-resources>

In this activity, chaperones help students use the numbered map and clues provided to find animals that have special physical or behavioral adaptations to help cope with hot, dry or cold weather.

### **Animal 1**

I live in the African rain forest. I start my life as a tadpole. I spend lots of time in water even as an adult but when it gets really hot out I coat myself in mucus and hide in my burrow. I am an **African burrowing frog**.

### **Animal 2**

I am a rodent that lives in the hot African savannah. I spend all my time living in tunnels below ground because my pink, wrinkly and almost hairless body doesn't like the heat. I am a **Naked mole rat**.

### **Animal 3**

I am a reptile that also lives in the African savannah. You will recognize me by the shell I carry on my back. I cope with dry hot weather by going underground and reducing my activity. I am an **African spurred tortoise**.

### **Animal 4**

I am a bird that lives in the ocean along the coast of Southern Peru. I carry around a nice thick layer of blubber under my tuxedo-colored feathers to keep me warm. I am a **Humboldt penguin**.

### **Animal 5**

I am a large mammal that lives in forested areas in the Pacific Northwest. When the weather turns cold, I retreat to my den where I take a long nap. I am a **Black bear**.

### **Animal 6**

I live on steep, rocky, mountains in the Pacific Northwest. I have really thick white fur that helps keep me warm during the cold winter months. You might even see patches of hair on rocks in the exhibit. I am a **Mountain goat**.

How do you cope when the weather turns hot? Which animal are you most like?

How do you cope when the weather turns cold? Which animal are you most like?

## ***Post-Field Trip Activity***

### **Materials**

- Classroom set of carpet squares (or sheets of construction paper) to represent polar ice caps
- Large playing area
- CD player and weather-related music

### **Lesson**

- Review with students the information they collected during their field trip. Summarize by making a list of adaptations animals have to cold verses hot weather. Examples:
  - African burrowing frog – coats self in mucus and hides in burrow
  - Naked mole rate – lives underground
  - African spurred tortoise – goes underground and limits activity
  - Humboldt penguin - thick layer of blubber
  - Black bear - hibernation
  - Mountain goat – thick fur
- Ask students to imagine what it might be like to be an animal adapted to the cold. Use guiding questions about polar bears to facilitate discussion:
  - One animal that is adapted to very cold temperature is the polar bear. Where do polar bears live? (*They live in the arctic*)
  - Ice makes up a big part of the polar bear’s habitat. As we all know, ice is cold. How do polar bears cope with the cold temperatures? (*Thick fur and layer of fat helps to keep them warm*) Click on <https://educators.brainpop.com/lesson-plan/hibernation-lesson-plan-inquiry-science-and-blubber-experiment/> for a simple experiment that demonstrates the effect of blubber in helping to keep polar bears warm.
- Explain that polar bears depend on their icy world in other ways too. Polar bears actually spend most of their time on ice. The ice serves a diving platform when hunting for seals and other marine animals.
- Place carpet squares (ice caps) in close proximity to each other in an open area. Tell students they are going to play a game in which they become polar bears finding food to eat. Explain that the game is similar is musical chairs. Instead of using chairs however, they will be using carpet squares. Each chair represents an ice cap. When the music stops, each “polar bear” must be on an ice cap to catch the food it needs to survive. *Demonstrate*

- Play music and have students “swim” (walk) from ice cap to ice cap. Stop music and have everyone find a square. (There should be enough carpet squares for everyone during the first round.) Have students raise their hand if they found a carpet square and was able to survive.
- Explain that scientists know that temperatures in the arctic are rising. Ask students what happens to ice when it heats up? (*It melts*) Walk out to the sea and one or two carpet squares. If polar bears need ice to capture their food, what do you think will happen to the bears if there are fewer ice caps? Begin music and have students walk from ice cap to ice cap. Stop the music and have students find an ice cap. Did all the bears survive in this round? Tell student that the melting of ice in the arctic is creating a big problem for the polar bear. The loss of ice makes it difficult for polar bears to find the food it needs to survive.
- Summarize by telling students that polar bears aren’t the only animals impacted by warming temperatures. Many others are too. Even though warming temperatures is a big problem, we can help these animals with a few simple actions. Brainstorm list. (*Any action that reduces energy consumption will make a difference. For example, turning off lights, reducing water use, reducing, reusing and recycling materials, riding bikes/taking public transportation*)
- Pick one or two actions to implement into your classroom curriculum.