

Grade 4

Pre-Tour Activity Checkpoints

This section describes what your students should know about winter, forests and adaptations *prior to* their snowshoe tour. For our purposes with this three-stage study unit, all guidelines for instruction are framed around Topics, Messages and Focus Questions. While the Focus Questions do vary between pre-tour, tour and post-tour stages, the Topics and Messages remain consistent throughout.

The table below summarizes your pre-tour instruction needs for the program. Details are provided on the pages that follow.

TOPIC & RELATED MESSAGE	FOCUS QUESTIONS
Heat & Light <i>The Sun is the main source of Heat and Light for life on Earth.</i>	<ol style="list-style-type: none">1. How do heat and light change with the seasons?2. How do these changes affect living things?3. What does it mean to “get cold?”
The Forest Environment <i>A Forest is a Community of Living and Nonliving parts.</i>	<ol style="list-style-type: none">1. What is a forest? How do we know when we’re in one?2. Where do we find forests in Utah?3. What, where and why is the Wasatch-Cache National Forest?
Adaptations <i>Plants and Animals have a variety of Adaptations to survive.</i>	<ol style="list-style-type: none">1. What is an animal?2. What is an adaptation?3. What is a plant?
Forest Interrelationships <i>The Living and Nonliving parts of a Forest are Interconnected.</i>	<ol style="list-style-type: none">1. Why is there so much snow in our mountains?2. Where does all the snow go?

To see of how these topics fit into the overall three-stage sequence for this study unit, consult the charts provided in the Introduction.

Preliminary Snowshoe Tour Information

Describe the upcoming snowshoe tour to frame your introduction to winter studies for your students. Briefly describe the adventure that awaits them and explain that their classroom science investigations will be preparing them for that experience.

Heat & Light

Key Message

“The sun is the main source of heat and light for life on earth.”

Essential Instruction

This topic and its primary message are important to set the stage for the season of winter, which itself wields so great an influence on all of the other topics. Because this topic is a prescribed core element for 3rd Grade and not for Grade 4, activity and discussion may be confined largely to a review, as described below in terms of matching focus questions.

1. *How do heat and light change with the seasons?*

Your students should understand why winter occurs, in terms of changes in the amounts of heat and light from the sun in the course of a year.

2. *How do these changes affect living things?*

Your students should understand important ways that the reduced heat and light of winter affects plant and animal growth, behavior and survival.

3. *What does it mean to “get cold?”*

Your students should understand that it is more accurate to say we “lose heat” instead of “get cold,” because it is the movement of heat energy from warmer places to cooler places that causes changes in temperature.

Our own bodies lose heat in four important ways: *Conduction*, *Convection*, *Evaporation* and *Radiation*. Understanding these forms of heat loss will have very practical benefits as your students prepare for their snowshoe tour.

Here are activities useful to demonstrate these four ways of losing heat.

- a. To demonstrate heat loss by *conduction*, have students place one bare foot on a concrete or linoleum floor and the other on a blanket or thick carpet. While thermometers placed on the surface of each location will confirm they are in fact the same temperature, the nerves in our feet cause us to perceive the hard surface as “colder.” Explain that the hard surface conducts heat faster, and therefore what we feel is the faster movement of heat from our foot to the floor. What we are really doing here is warming the floor with our foot!

This same effect can be experienced when we stand in snow. Poorly insulated boots allow more heat to be drawn into the snow, causing our feet to perceive cold.

- b. To demonstrate heat loss by *convection*, have students take turns placing a hand in front of a fan. Again, the temperature of the air in contact with the hand in front of and away from the fan remains the same. The cooling effect we feel is the result of moving air from the fan pulling heat away at a faster rate.

This same effect is experienced when we stand in a breeze on a winter day. A coat that is poorly insulated or not windproof will allow more heat to be drawn away from our bodies, causing us to lose heat— or “feel cold.”

- c. To demonstrate heat loss by *evaporation*, allow water in a plant mister or similar device to come to room temperature. Then have a volunteer extend both hands outward. Use the mister to spray the back of one hand, leaving the other hand dry. Both the air and the water are at the same temperature, but because water conducts heat better than dry air, the wet hand will lose heat faster and thus “feel colder.”

This same effect is experienced when our clothing becomes wet from rain or snow. On a winter day, wet clothing will conduct heat from our bodies much faster than dry clothing.

- d. Finally, to demonstrate heat loss from *radiation*, have the students each hold a hand closely over an illuminated light bulb, a radiator or even in the sunlight from a window. Each is an example of radiation. The light bulb, radiator and sun are each losing heat by radiation.

Our own bodies provide this same effect when we don't use hats or gloves on a winter day. Our heads or hands radiate heat away from our bodies and into the colder air.

Relevant Vocabulary

Conduction	Convection	Evaporation	Insulation
Radiation	Season	Winter	

The Forest Environment

Key Message

“A forest is a community of living and nonliving parts.”

Essential Instruction

This topic is an integral part of 4th Grade Science. Introducing forests in general and the Wasatch-Cache National Forest in particular before the snowshoe tour takes place will cause the students to recognize and reinforce familiar topics on the day of the tour, and allow the tour guides to advance learning even farther.

Important learning for this topic is outlined below according to matching focus questions. Depending on your overall instructional strategy for the academic year, you might choose to embed these discussions within your larger series of plant and animal-related instruction, or you might prefer to address them on an introductory level for the specific purposes of this program.

1. *What is a forest? How do we know when we're in one?*

Your students should be able to:

- a. Describe features that make up a forest.
- b. Distinguish forests from other important natural environments in Utah, such as deserts and wetlands.

2. *Where do we find forests in Utah?*

Your students should:

- a. Understand the conditions related to climate and elevation that cause forests to be found where they are in Utah.
- b. Use maps to identify where forests are found in Utah based on these conditions.

3. *What, where and why is the Wasatch-Cache National Forest?*

Your students should be able to:

- a. Explain what a National Forest is.
- b. Locate both the Wasatch-Cache National Forest and the specific location of their snowshoe tour on a map.

Relevant Vocabulary

Climate	Elevation	Forest	National Forest
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Resources

A map of the Wasatch-Cache National Forest and the tour location can be found on this Website:

[URL]

Adaptations

Key Message

“Plants and Animals have a variety of adaptations to survive.”

Essential Instruction

This topic is an integral part of 4th Grade Science. Introducing forest plants and animals and their adaptations before the snowshoe tour takes place will cause the students to recognize and reinforce familiar topics on the day of the tour, and allow the tour guides to advance learning even farther.

Important learning for this topic is outlined below according to matching focus questions. Depending on your overall instructional strategy for the academic year, you might choose to embed these discussions within your larger series of plant and animal-related instruction, or you might prefer to address them on an introductory level for the specific purposes of this program.

1. *What is an animal?*

Your students should be able to:

- a. Explain ways in which animals differ from other forms of life.
- b. Identify and distinguish major groups of animals, including invertebrates, reptiles, amphibians, birds and mammals.

2. *What is a plant?*

Your students should be able to

- a. Explain ways in which plants differ from other forms of life.
- b. Identify and distinguish major groups of plants, including trees, shrubs and herbaceous (nonwoody) plants.

3. *What is an adaptation?*

Your students should be able to:

- a. Define a biological adaptation (the noun)
(i.e., inherited traits that help a species survive, as opposed to the more complex *process* of adaptation that is too advanced for most in this age group.)
- b. Distinguish between an invention and a biological adaptation.
(Biological adaptations are passed on to offspring.)
- c. Explain why different species have different adaptations.
(Each species has different needs and is specially adapted to meet these needs where it lives.)

Relevant Vocabulary

Adaptation	Amphibian	Animal	Behavior
Bird	Conifer	Deciduous	Evergreen
Herb	Invertebrate	Mammal	Physical
Plant	Reptile	Shrub	Tree

Forest Interrelationships

Key Message

“The Living and Nonliving parts of a Forest are Interconnected.”

Essential Instruction

This topic is an integral part of 4th Grade Science. Introducing water, the water cycle and watersheds before the snowshoe tour takes place will cause the students to recognize and reinforce familiar topics on the day of the tour, and allow the tour guides to advance learning even farther.

Important learning for this topic is outlined below according to matching focus questions. Depending on your overall instructional strategy for the academic year, you might choose to embed these discussions within your larger series of plant and animal-related instruction, or you might prefer to address them on an introductory level for the specific purposes of this program.

1. *Why is there so much snow in our mountains?*

Your students should understand:

- a. The effect that mountains have on weather systems and precipitation.
- b. The Lake Effect; i.e., the effect that Great Salt Lake can have on local weather.

2. *Where does all the snow go?*

Your students should understand:

- a. The water cycle and water transformations.
- b. The various pathways through which water moves, such as through transpiration, evaporation, infiltration and runoff.
- c. What and where the Great Salt Lake Watershed is.
- d. That our local watersheds provide drinking water via Big and Little Cottonwood, Parley’s and City Creek Canyons.
- e. The location of their snowshoe tour site within the Great Salt Lake Watershed.

Relevant Vocabulary

Climate	Condensation	Evaporation	Infiltration
Lake Effect	Precipitation	Runoff	Transpiration
Watershed	Weather		

Resources

A map of both the Jordan River Watershed and the Great Salt Lake Watershed can be found on this Website: [\[URL\]](#)

