

Teaching Activity Guide

The **Glaciers** are **Melting!**

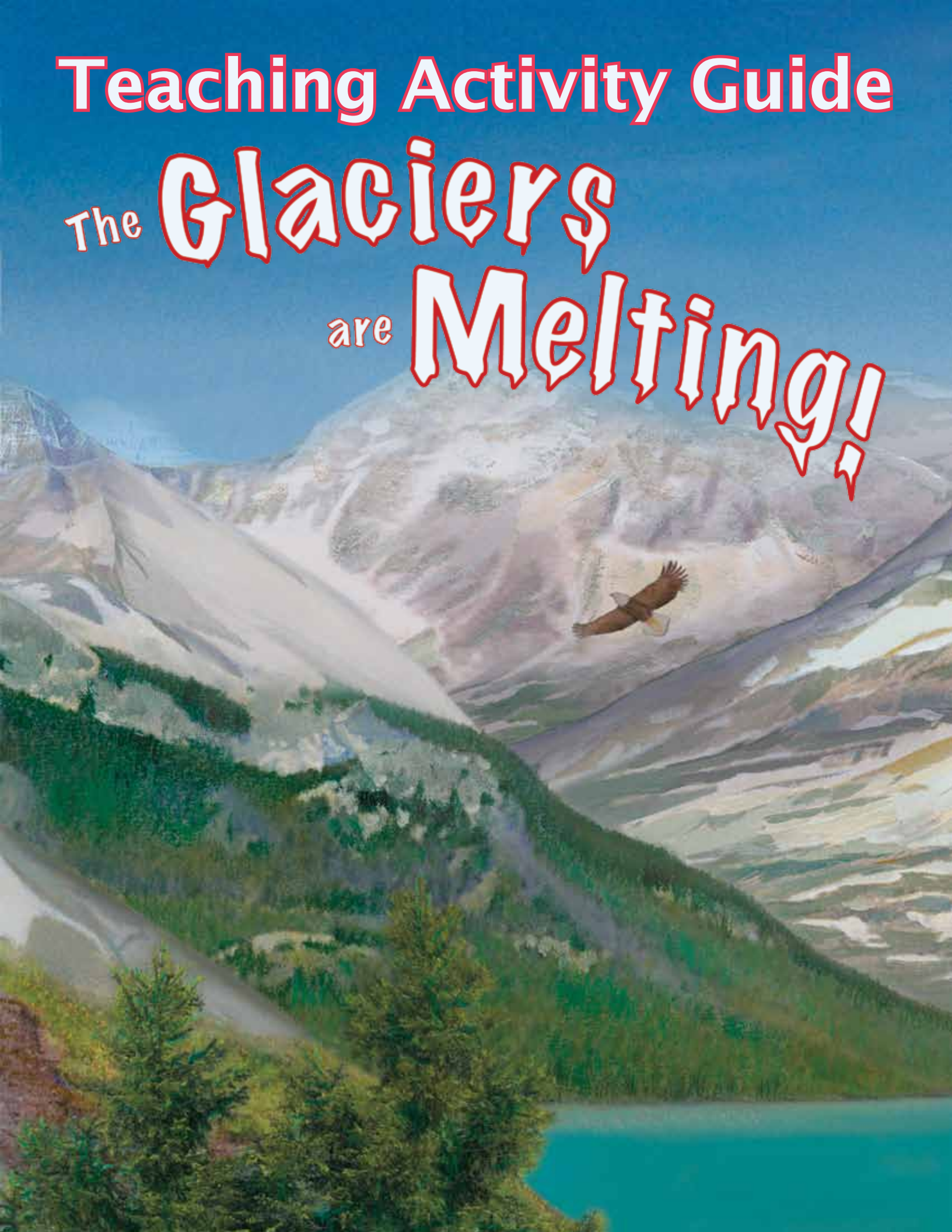


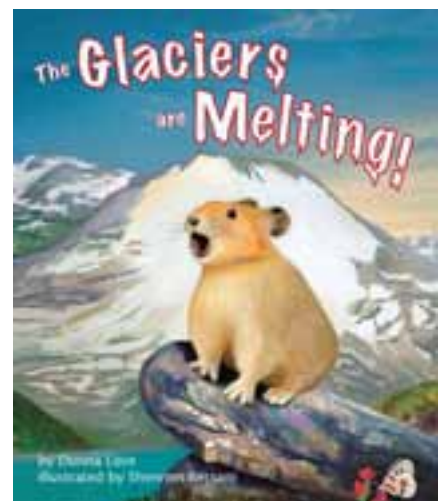
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www.ArbordalePublishing.com

Arbordale Publishing
formerly Sylvan Dell Publishing
Mt. Pleasant, SC 29464



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How to Use This Activity Guide

There are a wide variety of activities that teach or supplement all curricular areas. The activities are easily adapted up or down depending on the age and abilities of the children involved. And, it is easy to pick and choose what is appropriate for your setting and the time involved. Most activities can be done with an individual child or a group of children.

Glossary/Vocabulary words: Words may be written on index cards, a poster board, or on a chalkboard for a “word wall.” If writing on poster board or chalkboard, you might want to sort words into nouns, verbs, etc. right away to save a step later if using for Silly Sentences. Leaving the words posted (even on a refrigerator at home) allows the children to see and think about them frequently. The glossary has some high-level words. Feel free to use only those words as fit your situation.

Silly Sentence Structure Activity: Game develops both an understanding of sentence structure and the science subject. Use words from the “word wall” to fill in the blanks. After completing silly sentences for fun, have children try to fill in the proper words by looking for the information in the book.

Sequence Sentence Strips: Cut into sentence strips, laminate if desired, and place in a “center.” Have children put the events in order. Children may work alone or in small groups. Cards are in order but should be mixed up when cut apart.

Animal Card Games:

Sorting: Depending on the age of the children, have them sort cards by:

where the animals live (habitat)	tail, no tail
number of legs (if the animals have legs)	colors or skin patterns
how they move (walk, swim, jump, or fly)	animal class
type of skin covering (hair/fur, feathers, scales, moist skin)	
what they eat (plant eaters/herbivores, meat eaters/carnivores, both/omnivores)	

Memory Card Game: Make two copies of each of the sorting card pages and cut out the cards. Mix them up and place them face down on a table. Taking turns, each player should turn over two cards so that everyone can see. If the cards match, he or she keeps the pair and takes another turn. If they do not match, the player should turn the cards back over and it is another player’s turn. The player with the most pairs at the end of the game wins.

Who Am I? Copy and cut out the cards. Poke a hole through each one and tie onto a piece of yarn. Have each child put on a “card necklace” without looking at the animal pictured on it. The card hangs down the back. The children get to ask each person one “yes/no” question to try to guess their animals. If a child does not know the answer, they should say they don’t know. This is a great group activity and a great “ice-breaker” for children who don’t really know each other.

Charades: One child selects a card and must act out what the animal is so that the other children can guess. The actor may not speak but can move like the animal, can imitate body parts or behaviors. For very young children, you might let them make the animal sound. The child who guesses the animal becomes the next actor.

What Do Children Already Know?

Young children are naturally inquisitive and are sponges for information. The whole purpose of this activity is to help children verify the information they know (or think they know) and to get them thinking “beyond the box” about a particular subject.

Before reading the book, ask the children what they know about the subject. A list of suggested questions is below. The children should write down their “answers” (or adults for them if the children are not yet writing) on the chart found in Appendix A, index cards, or post-it notes.

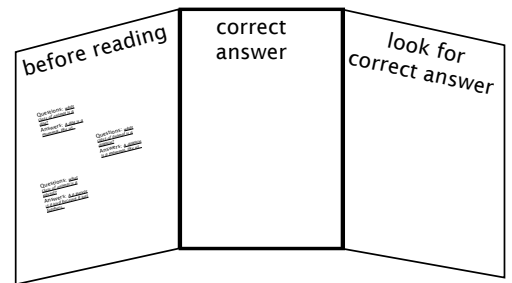
Their answers should be placed on a “before reading” panel. If doing this as a group, you could use a bulletin board or even a blackboard. If doing this with individual children, you can use a plain manila folder with the front cover the “before reading” panel. Either way, you will need two more panels or sections—one called “correct answer” and the other “look for correct answer.”

Do the children have any more questions about the subject? If so, write them down to see if they are answered in the book.

After reading the book, go back to the questions and answers and determine whether the children’s answers were correct or not.

If the answer was correct, move that card to the “correct answer” panel. If the answer was incorrect, go back to the book to find the correct information.

If the child/children have more questions that were not answered, they should look them up. When an answer has been found and corrected, the card can be moved to the “correct answer” panel.



Pre-Reading Questions

What do you think the story is about?

What kind of animals do you think rely on glaciers for a habitat (think arctic and high in the mountains)?

What is a glacier?

Do you think there is difference between ice found in a hockey rink and the ice found in a glacier?

How are glaciers made?

What makes glaciers melt?

What is climate change?

What are some things that we can do to help slow climate change?

Thinking It Through & Writing Prompts

Do you think everything in the story could be true? *Do animals really talk to each other or have human traits?*

If the author used talking animal or gave the animals human traits, could the story have been told differently? How?

Write a different ending to the story-

How would you keep the Glaciers from melting?

Glaciers store about 75% of the world's freshwater, what do you think would happen if it melted and the sea rose 230 feet?

Why do you think the glaciers are melting?

This story is an adaptation of "Henny Penny." How are the two stories alike and how are they different?

What would happen if a character did something different or if something different happened to the character? Would it/could it change the story?

Comprehension Questions

Who is the Mountain Monarch?

Where was Wiley Wolverine trying to take the five friends?

What do you think the wolverine eats?

Who do you think can help Peter Pika and all the animals?

What are some ways the animals rely on the cold, glacial habitat?

For Creative Mind's comprehension:

How do glaciers form or grow?

How do glaciers shrink?

How does Earth's climate affect a glacier?

To what type of rock is glacial ice similar and why?

Vocabulary Game

This activity is a very general idea and is designed to get children thinking of vocabulary words that will then be used as the beginning vocabulary list for a science lesson.

Select an illustration from the book and give the children a specific length of time (five minutes?) to write down all the words they can think of about the particular subject. If you do not have classroom sets of the book, it is helpful to project an illustration on a whiteboard. Check Web site (www.ArbordalePublishing.com) for book “previews” that may be used.

The children’s word list should include anything and everything that comes to mind, including nouns, verbs, and adjectives. At the end of the time, have each child take turns reading a word from his/her list. If anyone else has the word, the reader does nothing. However, if the reader is the only one with the word, he/she should circle it. While reading the list, one person should write the word on a flashcard or large index card and post it on a bulletin board or wall. At the end, the child with the most words circled “wins.” And you have a start to your science vocabulary list. Note: if a child uses an incorrect word, this is a good time to explain the proper word or the proper usage.

Using the Words

The following activities may be done all at once or over a period of several days.

- Continue to add words to the vocabulary list as children think of them.
- Sort vocabulary words into nouns, verbs, adjectives, adverbs, etc. and write what they are on the backs of the cards. When the cards are turned over, all you will see is “noun,” etc. (these can then be used to create silly sentences on the next page).
- Now sort the vocabulary words into more specific categories. For example, nouns can be divided into plants, animals, rocks, minerals, etc. They can be divided into living/non-living, or into habitat-related words.
- Have children create sentences using their vocabulary words. Each sentence could be written on a separate slip of paper.
- Have children (individually or in small groups) sort and put sentences into informative paragraphs or a story.
- Edit and re-write paragraphs into one informative paper or a story.

Silly Sentence Structure Activity

1. Some places have _____ all year long.
noun
2. By mid to late _____, you can see a line (called a firn line) where the _____ ice and _____ meet.
noun adjective noun
3. _____ the line, the snow _____ s.
adverb verb
4. Above the _____, the snow piles (_____ s) on top of the snow from earlier years.
5. The _____ of all the _____ snow turns the older snow into ice—like a _____ changed by _____.
noun adjective noun (two words together) noun
6. As the _____ builds and the _____ gets heavier, _____ pulls it down.
noun noun noun
7. Some glaciers move _____ and others move _____.
adverb adverb
8. Ice sheets or _____ glaciers move out from their edges on flat land.
noun (two words together)
9. _____ glaciers are on mountains and flow down.
adjective
10. Glaciers _____ if snow collects year after year.
verb
11. Glaciers stay the same size if ice _____ s at the same rate as the snow _____ s.
verb noun
12. Glaciers shrink if the ice melts _____ er than the snow _____ s.
adjective verb

Sequence Sentence Strips

A drop of water dripped on Peter Pika's head.

Peter Pika told Tammy Ptarmigan.

Tammy Ptarmigan told Sally Squirrel.

Sally Squirrel told Mandy Marmot.

Mandy Marmot told Harry Hare.

All five went to tell the Mountain Monarch.

All five stopped to rest.

Wiley Wolverine suggested they take a shortcut but led them into his den.

The Mountain Monarch stopped the five from going into Wiley Wolverine's den.

Mountain Monarch knocked Wiley Wolverine over the side of the mountain. Wiley Wolverine ran away.

The five friends told the Mountain Monarch that the glaciers are melting.

Mountain Monarch said there's nothing the animals can do. Peter Pika asked who can do something.

Word Search

Find the hidden words. Even non-reading children can match letters to letters to find the words! Easy—words go up to down or left to right (no diagonals). For older children, identify the coordinates of the first letter in each word (number, letter).

	A	B	C	D	E	F	G	H	I	J
1	M	O	U	N	T	A	I	N	I	M
2	A	K	S	Q	U	I	R	R	E	L
3	R	B	N	G	J	C	U	B	U	M
4	M	W	O	L	V	E	R	I	N	E
5	O	F	W	A	M	S	P	G	O	L
6	T	I	S	C	A	L	I	H	E	T
7	H	W	H	I	T	E	C	O	S	Y
8	E	A	O	E	K	R	A	R	A	T
9	E	C	E	R	I	D	O	N	S	U
10	N	O	P	E	X	S	T	U	V	G

GLACIER
MELT
PIKA
SQUIRREL
SNOWSHOE
WOLVERINE
BIGHORN
MARMOT
MOUNTAIN
ICE
WHITE

Compare and Contrast

Scientists are studying glaciers and how fast they are melting. Just as you use the scientific method in school, scientists use scientific methods too.

They have questions to answer. Can you think of any other questions they might want to answer about melting glaciers?

- What glaciers are melting?
- How fast are the glaciers melting?
- What do some of the melting glaciers have in common?
- Why are the glaciers melting?
- What, if anything, can we do to slow or prevent the glaciers from melting?
- How could melting glaciers affect plants and animals that live on earth?
- How could melting glaciers affect rising water levels (lakes, rivers, and the oceans).

They must be able to measure changes. But how can they measure something from years ago? They can't go back in time to measure the glaciers of old. Instead, they are using old photographs to compare and contrast the historical photos to the current conditions.

Pick one of glaciers documented with historical and recent photo (found on the next several pages or go to:

USGS Repeat Photography Project at Glacier National Park or
USGS Repeat Photography Project of Alaskaa Glaciers

Write (or tell for younger children) a description of the historical glacier comparing and contrast to the recent photo of the glacier. Remember to include the name of the glacier, where it is, and when the historical photo was taken.

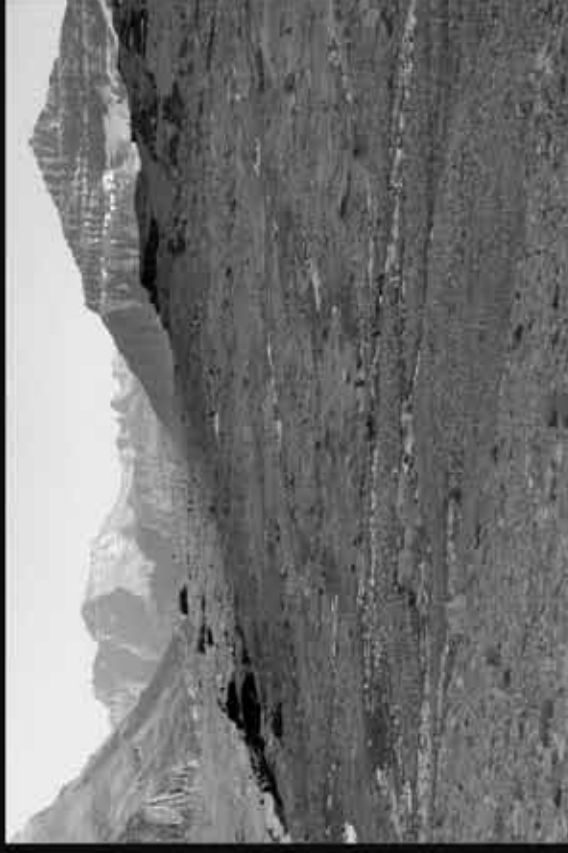
If you were a scientist studying glaciers today, can you think of other ways and tools you might use to explore the glaciers?

Boulder Glacier Glacier National Park, MT



1932

*T. J. Hileman photo
courtesy of GNP archives*



1988

*Jerry DeSanto photo
K. Ross Toole Archives
Mansfield Library, UM*

Grinnell Glacier

Glacier National Park, MT



circa **1940**

*Unknown photographer.
Courtesy of GNP Archives*



2006

*Karen Holzer photo
USGS*

Grinnell Glacier taken from the Grinnell Glacier Overlook off the Highline Trail, Glacier National Park. The view of Grinnell Glacier taken circa 1940 shows the early formation of Upper Grinnell Lake, a proglacial lake visible at the terminus of the glacier. The 2006 photo shows a dramatic increase in the size of the lake as a result of melting ice.

Jackson Glacier Glacier National Park, MT



1911

*M. Elrod photo
K. Ross Toole Archives
Mansfield Library, UIM*



2009

Lisa Mckean photo, USGS



USGS Repeat Photography Project
<http://nrm-sc.usgs.gov/repeatphoto/>



Shepard Glacier Glacier National Park, MT



1913

*W. C. Alden photo
USGS Photographic Library*



2005

*Blase Reardon photo
USGS*



USGS Repeat Photography Project
<http://nrm-sc.usgs.gov/repeatphoto/>



Sperry Glacier

Glacier National Park, MT



1913 W. C. Alden photo, courtesy GNP Archives



2008 Lisa McKeon photo, USGS

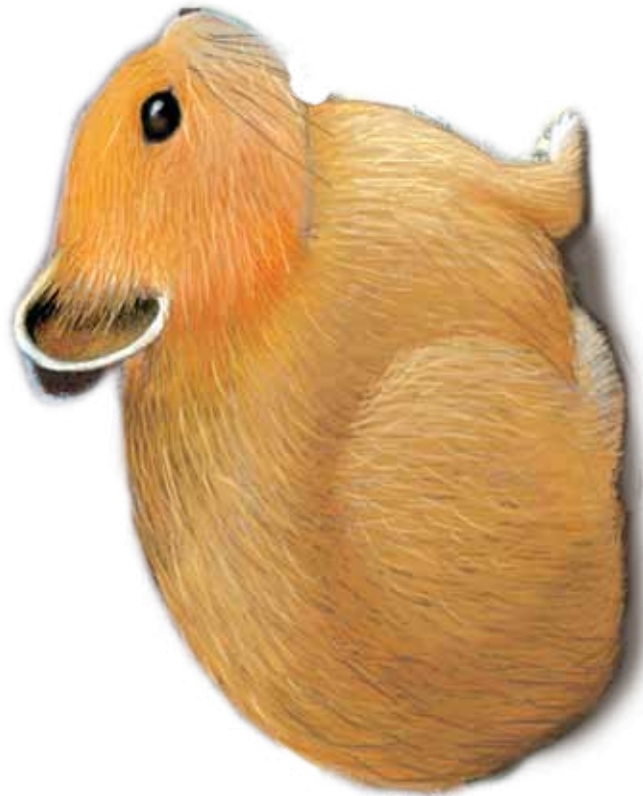
In 1913, Sperry Glacier's mass spanned across the entire basin and the glacier's terminus was recorded at over 150 ft. tall. Contemporary images show how the glacier has receded and separated into fragments.



USGS Repeat Photography Project
<http://nrm-sc.usgs.gov/repeatphoto/>



Animal Sorting Cards





Adaptations

Adaptations help animals to live in their habitat: to get food and water, to protect themselves from predators, to survive weather, and even to help them make their homes. Here are a few different types of adaptations.

Physical Adaptations

body parts

teeth—depends on type of food eaten
feet, flippers, fins—ability to move
placement of eyes
gills, lungs, or other—how does the animal get oxygen
ears—or how the animal hears/senses

body coverings

hair or fur
feathers
scales
moist skin

camouflage and protection

color of skin or pattern to blend into background
mimicry: pretending to be something else to fool predators
poisonous or stinky smells

Behavioral Adaptations

instinct: behaviors or traits that the animals are born with
learned behavior: traits that animals learn to improve their chances of survival or to make their life easier
social groups versus solitary living
communication with other animals
defense/camouflage
reaction to cycles (day/night, seasons, tides, etc.)
migration: the seasonal movement of animals from one location to another
hibernation: a long, deep sleep in which the animal's breathing and heartbeat are slower than usual

Pick an animal from the book and answer the following questions:
My animal is:

<p>Where (in what kind of habitat) does your animal live?</p>	<p>What is one of its physical adaptations and how does it help the animal live in its environment?</p>
<p>What is another of its physical adaptations and how does it help the animal live in its environment?</p>	<p>What is another of its physical adaptations and how does it help the animal live in its environment?</p>

What behavioral adaptations (if any) were mentioned in the story?

Science Journal

glacier

my definition

my drawing

melt

my definition

my drawing

ice sheet

my definition

my drawing

ice

my definition

my drawing

True or False?

Circle whether you think the statement is true or false:

1. T/F Glaciers are like a frozen lake and form over a few really cold nights.
2. T/F Glaciers are sometimes called rivers of ice because they form when rivers freeze.
3. T/F Rocks carried by glaciers caved out valleys.
4. T/F Rocks and sediment carried by glaciers built up some areas of land (moraines).
5. T/F The sea level could rise as glaciers melt.
6. T/F Most of the earth's fresh water (the water we drink and need to live) is frozen in glaciers.
7. T/F Most of the earth's fresh water (the water we drink and need to live) is in the ocean.
8. T/F Glaciers form anywhere it snows.
9. T/F Glacial ice is the same as ice cubes we get out of our freezers.
10. T/F Moving glaciers can make noises.

Answers: 1) False, glaciers form over many years. 2) False, they are sometimes called rivers of ice because the glaciers move. 3) True 4) True 5. True 6) True where snow does not melt during the summer and the pressure of all the weight of new snow on old snow makes an ice like a metamorphic rock 9) False, it is made by pressure, like a metamorphic rock. 10) True

Water: Basic Need & % of the Earth's Surface

Both plants and animals must have water to survive. Things that live in the ocean rely on salt water. Humans and other land-living animals must have freshwater to survive.

Humans can only live a few days without water. We also need water to cook, take showers or baths, and to grow crops for food.

Looking at lakes and rivers, one might think that we have an lots of freshwater, but do we?

Land covers about 28% of the Earth's surface. Pick a color to represent land and color the first 28 squares with that color.

The rest of the Earth is covered with water (about 72%).

Of that amount, 97% is saltwater (ocean water). Pick another color to represent saltwater and color the next 71 squares with that color.

How many squares out of the original 100 are left uncolored? That's how much of the Earth's surface is covered by fresh water—what we need to survive.

But, of that amount one third (about 33%) of freshwater is in the water cycle (rain and clouds), groundwater, (underground water), and surface water, such as lakes and rivers. Pick another color to represent the amount of water in the water cycle.

The rest of the water (about two thirds (66%) of the freshwater on earth is frozen in glaciers, making glaciers the largest reservoir of freshwater on earth.

	land		saltwater		freshwater in water cycle		freshwater in glaciers		
--	------	--	-----------	--	---------------------------	--	------------------------	--	--

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Map Activity

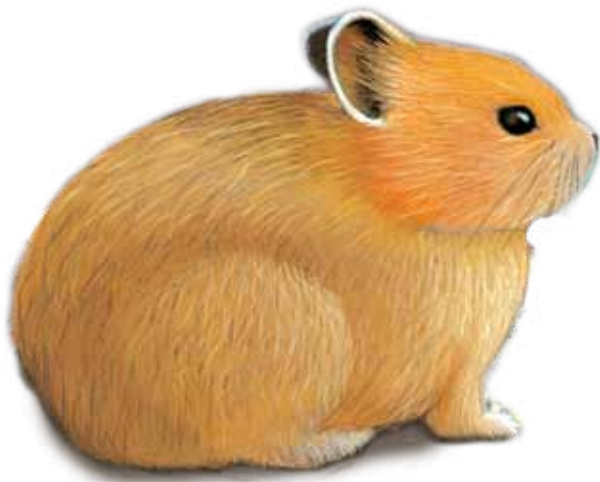
Using these maps as a reference, color the areas where these animals live on the blank map (in appendix) or circle areas on the map below.

What do you notice about where these animals live?

Would you expect to find one of these animals living in a desert? Why or why not?

Would you expect to find one of these animals living in a rainforest? Why or why not?

Could you see one of these animals around where you live? Why or why not?



Glacier Maps

Collared pika



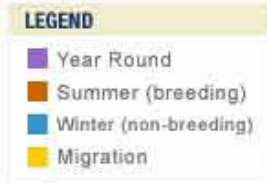
<http://www.discoverlife.org/mp/20q?search=Ochotona+collaris>

American pika



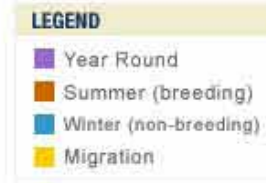
<http://www.wildlifnorthamerica.com/Mammal/American-Pika/Ochotona/princeps.html>

Willow Ptarmigan
Lagopus lagopus



Map by Cornell Lab of Ornithology
Range data by NatureServe

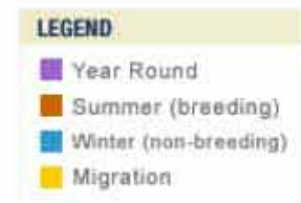
ptarmigan
White-tailed Ptarmigan
Lagopus leucurus



Map by Cornell Lab of Ornithology
Range data by NatureServe

http://www.allaboutbirds.org/guide/White-tailed_Ptarmigan/lifehistory

Rock Ptarmigan
Lagopus mutus



Map by Cornell Lab of Ornithology
Range data by NatureServe





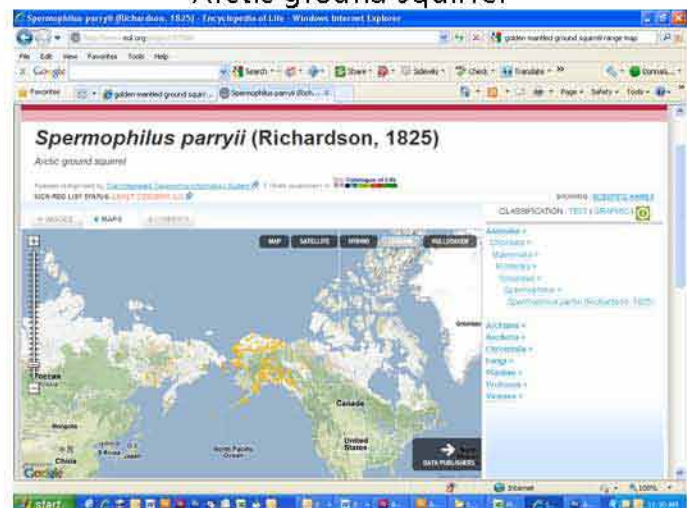
Colombian ground squirrel



<http://www.eol.org/pages/328002>
Golden-mantled ground squirrel



<http://www.eol.org/pages/328006>
Arctic ground squirrel



<http://www.eol.org/pages/327988>



hoary marmot



<http://www.wildlifenorthamerica.com/Mammal/Hoary-Marmot/Marmota/caligata.html>

Yellow-bellied marmot



<http://www.bio.davidson.edu/people/vecase/Behavior/Spring2003/Tyndall/hab.htm>



snow shoe hare



National Geographic

wolverine



<http://www.theanimalfiles.com/mammals/carnivores/wolverine.html>

mountain goat



<http://animals.nationalgeographic.com/animals/mammals/mountain-goat.html>

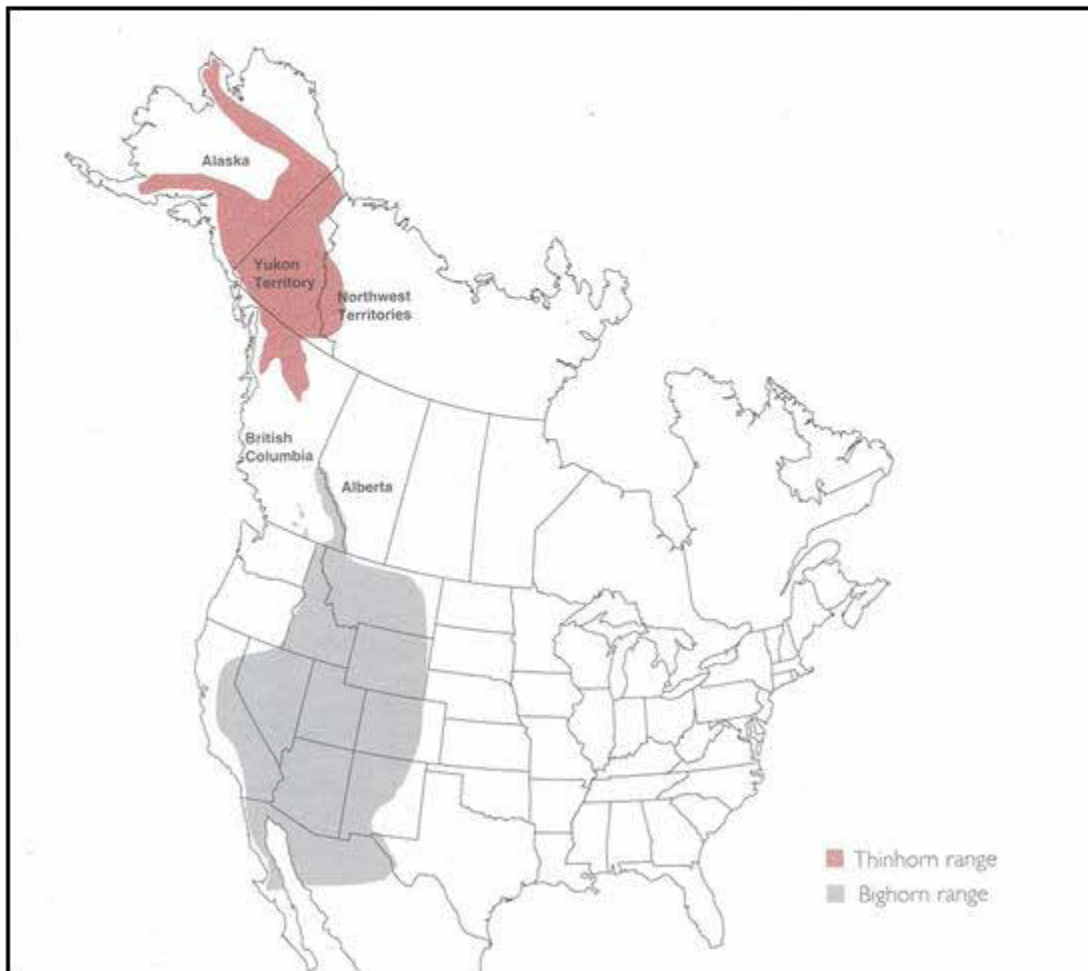




Bighorn Sheep

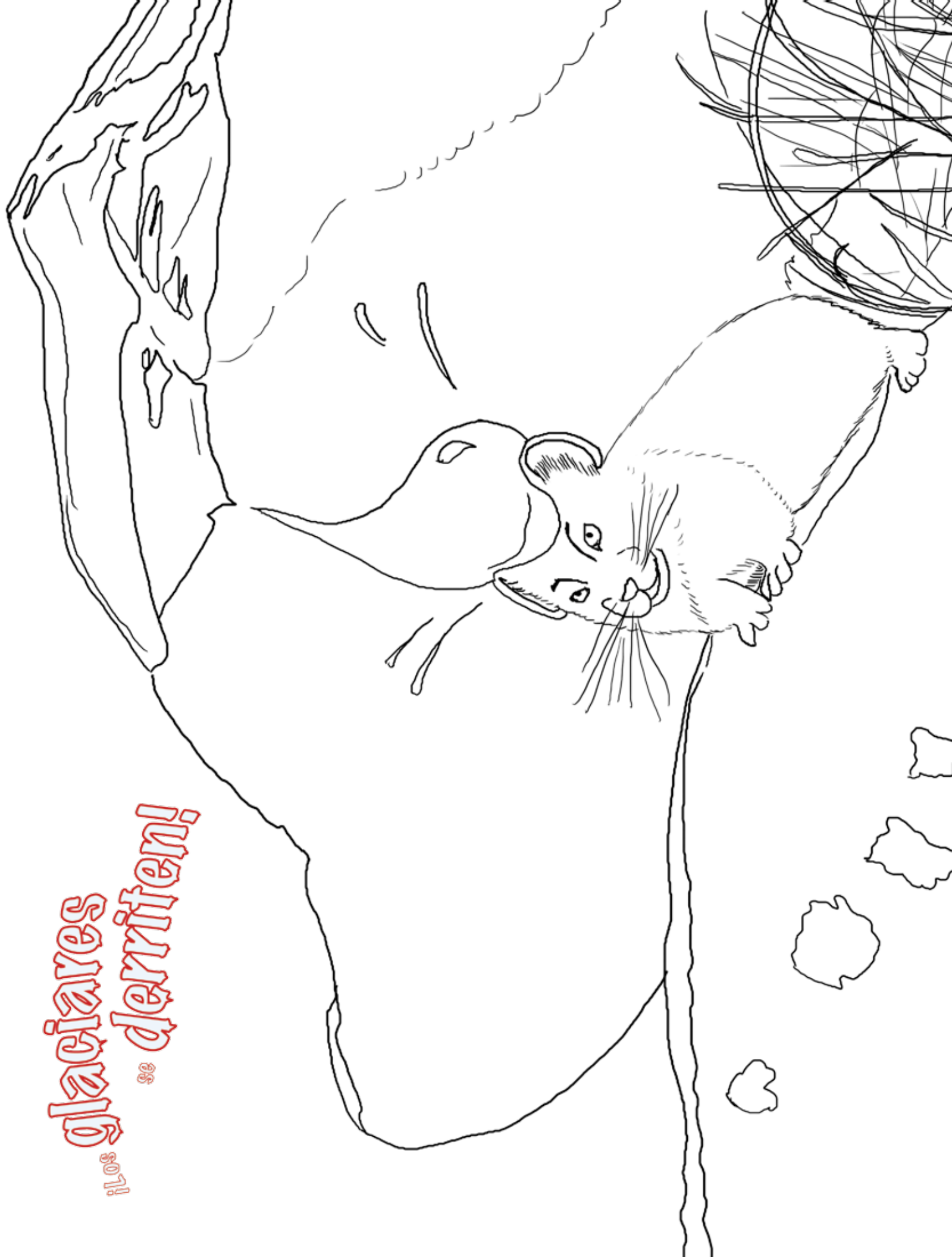


<http://animals.nationalgeographic.com/animals/mammals/rocky-mountain-bighorn-sheep.html>



<http://www.nps.gov/akso/ParkWise/Students/ReferenceLibrary/WEAR/DallSheepTaxonomy.htm>

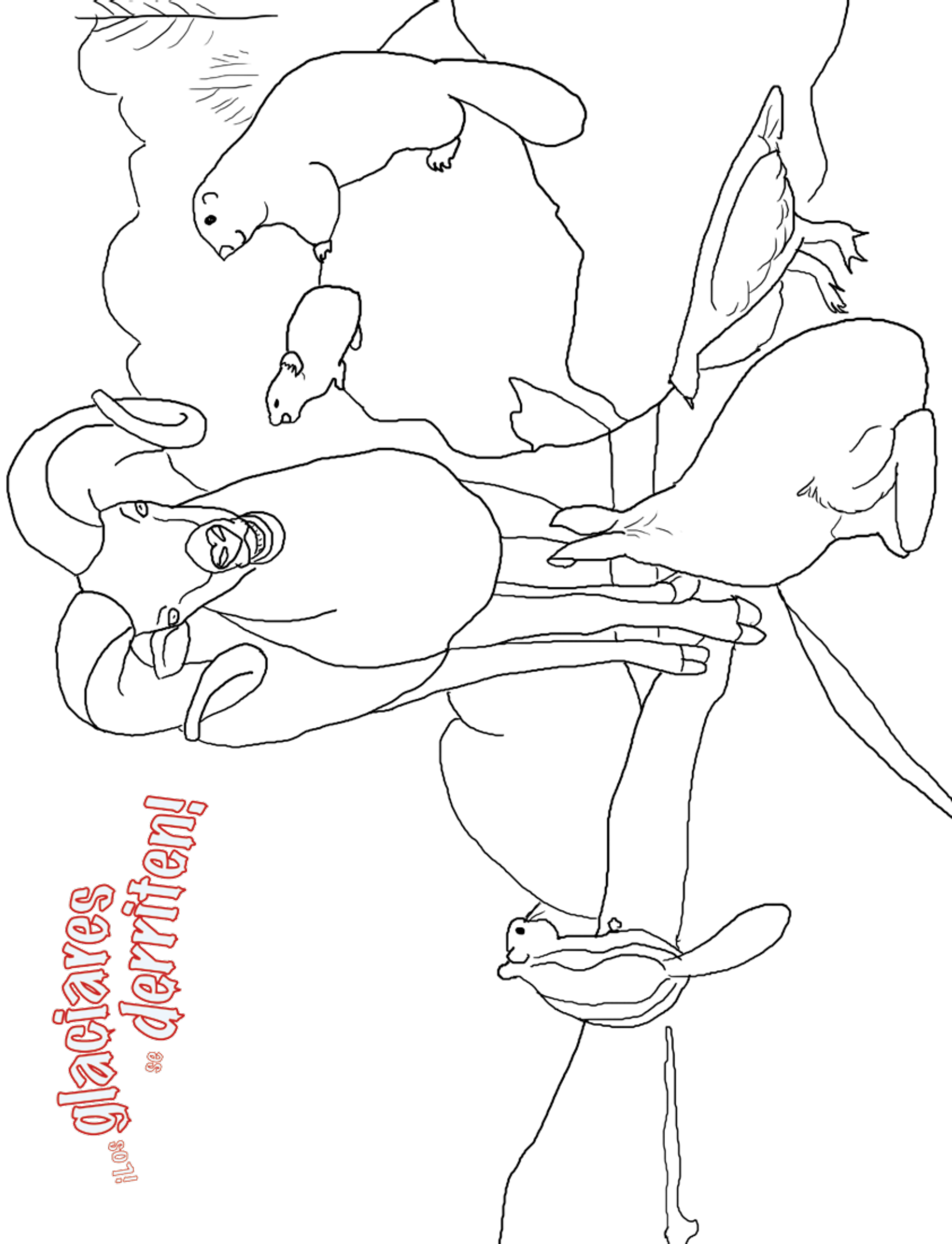
ilos
glaciares
se
derriten!



il^{os} glaciares se derriten!



il^{os} glaciares
se derriten
se



Glossary

Word	Definition	Part of Speech	Spanish
above	in or to a place that is higher	adverb	anteriormente, más allá, arriba, antes, encima, por encima, de arriba, sobre
accumulation area or zone	where snow falls on a glacier (also known as a snowfield or cirque).	noun	zona de acumulación
Africa	one of the seven continents	noun	África
alpine	living or growing above the timber line, extreme weather conditions make survival impossible for tall trees	adjective	zone alpino
Antarctica	one of the seven continents	noun	Antártica
arctic	land or water north of 60° N latitude	noun	Ártico
Australia	one of the seven continents	noun	Australia
below	under something	adverb	debajo
chirp	to make a short, high sound	verb	piar
collect	to gather and keep things together	verb	recoger, coleccionar
continent	any of the world's main continuous expanses of land (Africa, Antarctica, Asia, Australia, Europe, North America, South America)	noun	continente
continental glaciers and ice sheets	glaciers that cover continent size masses (Greenland & Antarctica)	noun	glaciares continentales
downstream	in a relative position closer to the sea as the river flows	adjective	aguas abajo, río abajo
equator	an imaginary circle around the Earth, halfway between the North and South Poles.	noun	ecuador

Word	Definition	Part of Speech	Spanish
erode	to wear away at something, as water erodes a rock	verb	erosionar
erratic	a boulder or other rock carried from its original location to another area by glacial ice	noun	errático
fast/faster	(Dolch) Sight word, grade 2	adjective	rápido/mas rápido
firn line	a line where the glacial ice and snow meet: below the line, the snow melts; above the line, the snow piles (accumulates) on top of the snow from earlier years	noun	línea firn
freeze	to turn from a liquid into a solid because of cold temperatures	verb	congelar
freshwater	water that is not salty, the water we drink and need to survive	noun	agua dulce
fur	the hairy coat of a mammal	noun: body part	pelaje, pieles
glacial (glaciation)	the period of time during an ice age when glaciers advance because of colder temperatures; 2) moving glacier ice	adjective	glaciación
glacial ice	ice found in glaciers, hard-packed, similar to a metamorphic rock	noun	hielo de los glaciares
glacial lake	lakes formed at the end or bottom of a glacier from melting glacial ice	noun	lago glaciar
glaciation	land surface changed by a massive movement of ice	noun	glaciación
glacier	a body of ice flowing on a land surface		glaciar
glaciovolcano	a glacier covered volcano; if/when the volcano erupts, the glacier melts	noun	glaciovolcanoes

Word	Definition	Part of Speech	Spanish
gravity	the force that pulls all objects towards the center of the earth	noun	gravedad
Greenland	the largest island in the world (between Atlantic & Arctic oceans)	noun	Groenlandia
ground squirrel	a type of North American squirrel that lives under ground	noun: animal	ardillas terrestres
grow	to get bigger in size (Dolch) Sight word, grade 3	verb	crecer
habitat	an address: a combination of the physical environment - the rocks and land and water - as well as all of the organisms that live in the same place	noun	hábitat
hibernate	to spend the winter in close quarters in a dormant condition	verb	hibernar
hiss	to make a sharp sound	verb	silbar
ice	frozen form of water	noun	hielo
ice sheet	an extremely large glacier covering a large land surface	noun	la capa de hielo
icebergs	pieces of floating ice that break (calve) off a glacier	noun	bola de hielo
mammal	a warm-blooded vertebrate that breathes with lungs and is covered with hair/fur (at some point in its life); females produce milk to feed their live offspring	noun: classification	mamífero
marmot	large ground squirrels that live in mountainous areas	noun: animal	marmota
melt	to change from a solid into a liquid	verb	derretirse
meltwater	water from melted snow or ice	noun	agua de deshielo

Word	Definition	Part of Speech	Spanish
metamorphic rock	one of the three main rock types: changed by great heat or pressure	noun	roca metamórfica
migrate	to travel over a distance with the change of season (or other cycle) or to find food, breed, or nurse young	verb	emigrar
moraine	material deposited beneath, along the sides, and/or at the end of a glacier		morrena
mountain	a landmass that projects above it's surroundings	noun: habitat	montaña
mountain or alpine glacier	glaciers that form in the mountains	noun	los glaciares de montaña
new	(Dolch) Sight word, Pre-K & K	adjective	nuevo
old	(Dolch) Sight word, grade 1	adjective	viejo
pika	short-eared mammals (related to rabbits) need cold climate and live at high elevations (mountains) or near the Arctic	noun: animal	pika
pipe	to speak in a very high voice	verb	decir con un pitido
pressure	force applied uniformly over a surface, measured as force per unit of area	noun	presión
ptarmigan	large arctic and subarctic bird that turns white and remains above treeline throughout winter.	noun: animal	lagópodo alpino
quickly	with speed, fast-moving	adverb	rápidamente
rate	a ratio that compares quantities of different units: the number of times or the speed at which something happens	noun	velocidad

Word	Definition	Part of Speech	Spanish
river	a large, natural body of running water that flows from its start (headwater) to the ocean	noun: habitat	rio
scour	to remove or sweep away material	verb	fregar
sea level	the level of the ocean's surface, usually measured from the middle of the high and low tide line	noun	nivel del mar
slowly	moving or happening at a slow rate, opposite of quickly	adverb	despacio
snow	frozen precipitation	noun	nieve
snow line	the lower limit of permanent snow cover, below which snow doesn't accumulate	noun	línea de nieve
snowfall	the amount of snow accumulated in a given period	noun	nevada
snowflake	an individual, six-pointed cluster of ice crystals that falls from a cloud	noun	copo de nieve
snowpack	the total amount of fresh or old ice and snow on the ground	noun	capa de nieve
snowshoe hare	a large rabbit with big feet that is white in the winter and brown in the summer	noun: animal	liebre americana
summer	the hottest season of the year, between spring and fall	noun: time/ week/month/ season	verano
terminus	where the glacier ends (also called glacial snout)	noun	término

Word	Definition	Part of Speech	Spanish
tundra	a treeless area north of the Arctic tree line or above the tree line on mountains, having a permanently frozen subsoil and supporting low-growing vegetation such as lichens, mosses, and stunted shrubs.	noun: habitat	tundra
weight	response of mass to the pull of gravity, the measurement of how heavy something is	noun	peso
whistle	to make a high, musical sound	verb	silbar, pitar
winter	the coldest season of the year, precipitation in some areas freezes to snow or ice	noun: time/ week/month/ season	invierno
wolverine	stocky, muscular, land-dwelling carnivore	noun: animal	glotón

Answers

Silly Sentences

1. Some areas have snow all year long.
2. By mid to late summer, you can see a line where the glacial ice and snow meet.
3. Below the line, the snow melts.
4. Above the line, the snow piles (accumulates) on top of the snow from earlier years.
5. The weight of all the new snow turns the older snow into ice—like a metamorphic rock changed by pressure.
6. As the ice builds and the glacier gets heavier, gravity pulls it down.
7. Some glaciers move slowly and others move quickly.
8. Ice sheets or continental glaciers move out from their edges on flat land.
9. Alpine glaciers are on mountains and flow down.
10. Moving glaciers pick up rocks and dirt, carrying them along with the ice.
11. Glaciers grow if snow collects year after year.
12. Glaciers stay the same size if ice melts at the same rate as the snow collects.
13. Glaciers shrink if the ice melts faster than the snow collect.

Word Search

	A	B	C	D	E	F	G	H	I	J
1	M	O	U	N	T	A	I	N		
2	A		S	Q	U	I	R	R	E	L
3	R		N	G		C		B		M
4	M	W	O	L	V	E	R	I	N	E
5	O		W	A			P	G		L
6	T		S	C			I	H		T
7		W	H	I	T	E	C	O		
8			O	E			A	R		
9			E	R				N		
10										

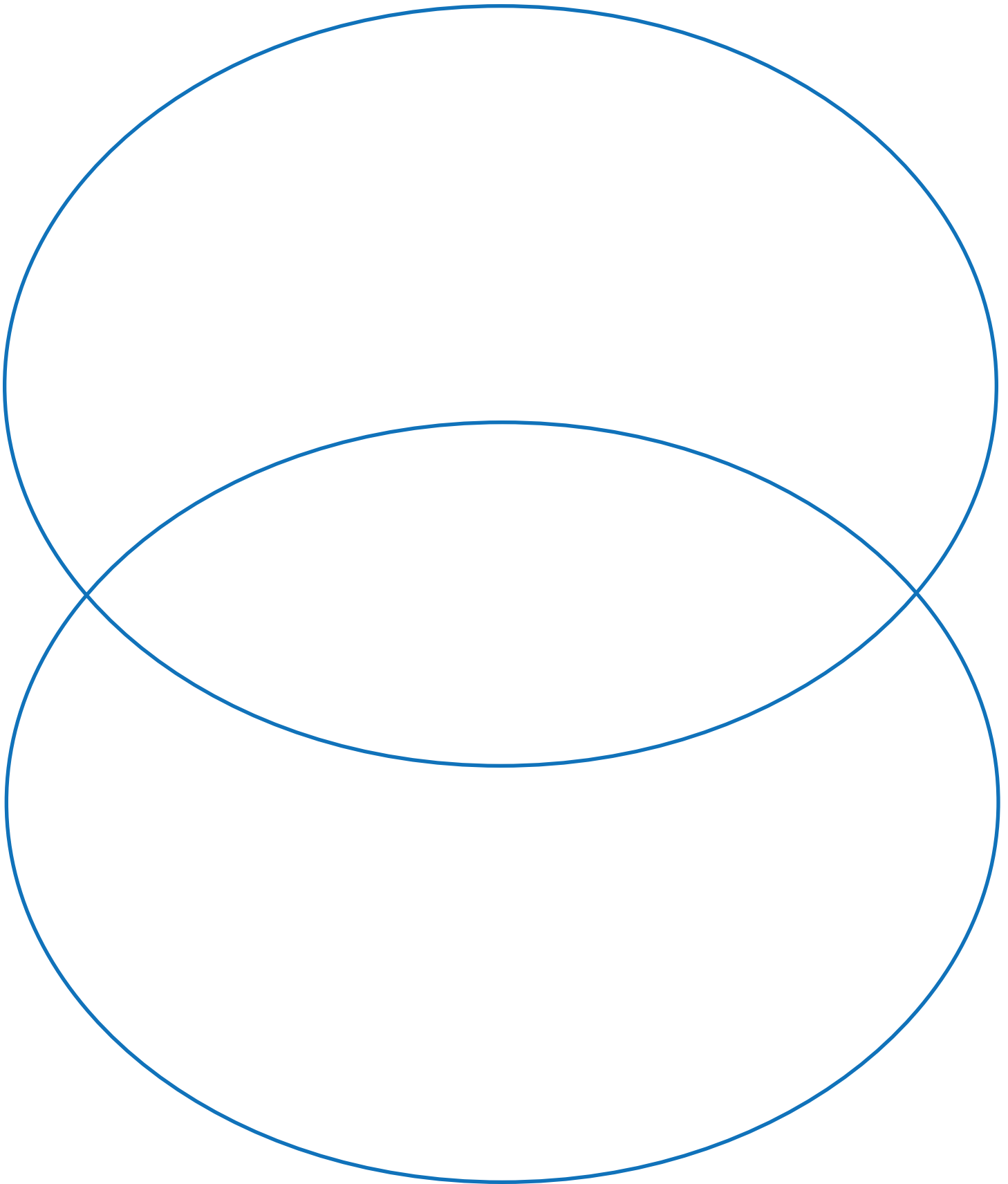
GLACIER	3D	MELT	3J	PIKA	5G
SQUIRREL	2C	SNOWSHOE	2C	WOLVERINE	4B
BIGHORN	3H	MARMOT	1A	MOUNTAIN	1A
ICE	2F	WHITE	7B		

	land		saltwater		freshwater in water cycle		freshwater in glaciers
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1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Appendix B—Venn Diagram

Pick two animals in the story and compare and contrast them.



Appendix C—North America Map



Appendix D—Vocabulary Cards

above

accumulate

below

collect

**continental
glacier**

faster

glacial

glacier

grow

ice

line

**metamorphic
rock**

melt

move

new

old

pressure

quickly

river

slowly

snow

summer

weight

winter