

Preparation Guide

Level 2 Module 2

Biomes with Spotlight Lessons on Weather

Materials: This section lists the quantity of each material necessary for the lesson. Lesson materials may be from a *PhD Science*® materials kit or they may be school supplied. In addition to the listed materials, teachers should have access to the following common classroom items: sticky notes, chart paper, pencils, a whiteboard, and markers. This section also lists items in the current lesson that are reused in future lessons. Note that items found in a typical elementary classroom (e.g., glue, tape, scissors) are not listed for reuse.

Resources: This section lists module resources (from Appendix A in the Teacher Edition) and core texts used in the lesson. Classrooms also need daily access to the module’s Teacher Edition, Science Logbooks, and, if applicable, PhD Projected. A symbol (☐) identifies resources that appear in PhD Projected. The Teacher Resource Pack provides additional supports and directions for some investigations as well as Spanish support resources with alternatives for Spanish-speaking students. The Teacher Resource Pack is available at <https://greatminds.org/resources>.

Preparation: This section identifies preparation teachers should complete before the lesson, including media teachers must cue before the lesson and activities that require setup. This section also describes advance preparation for upcoming lessons. For example, if teachers need to prepare 1 day in advance for an activity in Lesson 11, an advance preparation note appears in the Preparation section for Lesson 10. A symbol (⌚) identifies lessons with advance preparation notes.



Advance Materials Preparation

Several activities in this module require advance preparation. A version of this list appears in the Module Overview of the Teacher Edition. The expanded version in this guide identifies all lessons for which preparation may take longer than a planning period. A symbol (†) identifies preparation that can be done earlier than the suggested time.


Lesson	Time in Advance	Investigation	Description
6	1 day†	Glacier Model Demonstration	Prepare materials for glacier model demonstration. (See Lesson 6 Resource B.)
18	4 days	Water Stations Observation	Prepare salt water and evaporation containers for observing water stations. (See Lesson 18 Resource B.)
22	2 days†	Science Challenge	Consider arranging for an adult to help supervise students as they conduct their schoolyard investigations.

Biomes Lesson Materials and Preparation


Lesson 1

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> World map (1) <input type="checkbox"/> Knowledge Deck™ cards, Norgay and Hillary (24) <input type="checkbox"/> Knowledge Deck poster, Norgay and Hillary (1) <input type="checkbox"/> Postcard, Mount Everest (1) <input type="checkbox"/> Yarn (partial skein) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, clear (partial roll)
	Item Reuse <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 2 requires the prepared class elevation diagram. <input type="checkbox"/> Lesson 10 requires the prepared class world map. <input type="checkbox"/> Lesson 27 requires the Norgay and Hillary Knowledge Deck poster. 	
Resources	<ul style="list-style-type: none"> <input type="checkbox"/> Lesson 1 Resource A: Mount Everest and Tengboche Monastery Photographs  <input type="checkbox"/> Lesson 1 Resource B: Map of Nepal with Photographs  <input type="checkbox"/> Lesson 1 Resource C: Elevation Diagram Cards 	
Preparation	<ul style="list-style-type: none"> <input type="checkbox"/> Obtain a photograph that captures the landscape of a local area, approximately 14 miles from the school. If a photograph is not available, access Google Maps™ mapping service: http://phdsci.link/2087. Enter the area's name in the top left Search box. Toggle from Map to Satellite by clicking the thumbnail in the bottom left corner. Then zoom in on a road by the area to enter Street View. Alternatively, click the 3D button in the bottom right corner, and use the zoom and tilt controls to customize the view until the landscape is visible. <input type="checkbox"/> If the class is not using the Module 4 kit, obtain a world map to use throughout the module. Ensure that it is a physical map and not a political map. Prepare a color copy of the Mount Everest photograph from Lesson 1 Resource A to add to this class world map instead of the postcard of Mount Everest. Label locations on the map as students encounter them throughout the module. <input type="checkbox"/> Prepare elevation diagram cards. (See Lesson 1 Resource C.) 	


Lesson 2

Materials	Kit Items None Module 1 Kit <input type="checkbox"/> Magnifiers, handheld, plastic (24)	School Supplied Items <input type="checkbox"/> Glue stick (1) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, clear (partial roll)
	Prepared Items from Previous Lessons <input type="checkbox"/> Class elevation diagram from Lesson 1 (1)	
	Item Reuse <input type="checkbox"/> Lesson 5 requires the prepared class elevation diagram. <input type="checkbox"/> Lesson 18 requires the handheld magnifiers. <input type="checkbox"/> Lesson 19 requires the prepared class plant and animal chart.	
Resources	<input type="checkbox"/> Lesson 2 Resource A: Base Camp Photograph  <input type="checkbox"/> Lesson 2 Resource B: Base Camp Elevation Card <input type="checkbox"/> Lesson 2 Resource C: Plant and Animal Cards <input type="checkbox"/> <i>World of Wonder: Mountains</i> (Guillain and Madden 2020)	
Preparation	<input type="checkbox"/> Prepare Base Camp elevation card. (See Lesson 2 Resource B.) <input type="checkbox"/> Prepare plant and animal cards. (See Lesson 2 Resource C.)	





Lesson 3

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Glue stick (1) <input type="checkbox"/> Tape, clear (partial roll)
	Prepared Items from Previous Lessons <input type="checkbox"/> Additional set of plant and animal cards from Lesson 2 (1)	
Resources	<input type="checkbox"/> Lesson 3 Resource A: Himalayan Jumping Spider Cards  <input type="checkbox"/> Lesson 3 Resource B: Kathmandu to Mount Everest Virtual Journey Setup Instructions and Procedure <input type="checkbox"/> <i>World of Wonder: Mountains</i> (Guillain and Madden 2020)	
Preparation	<input type="checkbox"/> Prepare plant and animal cards. (See Lesson 2 Resource C.) <input type="checkbox"/> Prepare Himalayan Jumping Spider cards. (See Lesson 3 Resource A.) <input type="checkbox"/> Prepare Kathmandu to Mount Everest virtual journey. (See Lesson 3 Resource B.)	



Lesson 4

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Compass (1, optional) <input type="checkbox"/> Pencils, regular (24) <input type="checkbox"/> Pencils, colored (12 sets)
	Item Reuse <input type="checkbox"/> Lesson 17 requires the prepared class schoolyard map.	
Resources	<input type="checkbox"/> Lesson 4 Resource: Map of 1953 Mount Everest Expedition 	
Preparation	<input type="checkbox"/> Identify an outdoor area in or near the schoolyard (e.g., garden, grassy area, playground, basketball court, other natural or play area) where students can map out prominent schoolyard features.	





Lesson 5

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Craft foam sheets, green, tan, white, yellow, 9" × 12" (6 each color) <input type="checkbox"/> Modeling dough (9 lb) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Dental floss (144") <input type="checkbox"/> Glue sticks (6) <input type="checkbox"/> Pencils (6) <input type="checkbox"/> Plates, paper, 10" (13) <input type="checkbox"/> Rulers (6) <input type="checkbox"/> Scissors, blunt tip (6) <input type="checkbox"/> Scissors, regular (1)
	Prepared Items from Previous Lessons <ul style="list-style-type: none"> <input type="checkbox"/> Class elevation diagram from Lesson 2 (1) 	
	Item Reuse <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 6 requires 3.3 lb of the modeling dough. <input type="checkbox"/> Lesson 7 requires the prepared class elevation diagram. 	
Resources	<ul style="list-style-type: none"> <input type="checkbox"/> Lesson 1 Resource B: Map of Nepal with Photographs  <input type="checkbox"/> Lesson 5 Resource A: Elevation Model Setup Instructions <input type="checkbox"/> Lesson 5 Resource B: Elevation Model Procedure Sheet <input type="checkbox"/> Lesson 5 Resource C: Engaging in a Scientific Argument <input type="checkbox"/> Lesson 5 Resource D: Argument Cards <input type="checkbox"/> Lesson 5 Resource E: Elevation Map of Mount Everest  	
Preparation 	<ul style="list-style-type: none"> <input type="checkbox"/> Access Google Earth™ mapping service: http://phdsci.link/1705. Select, and then use the Search box to navigate to Mount Everest. If necessary, select the 3D button in the bottom right corner of the screen to enable a three-dimensional view.  <input type="checkbox"/> Prepare materials for elevation model activity. (See Lesson 5 Resources A and B.) <input type="checkbox"/> Prepare argument cards. (See Lesson 5 Resource D.) 	
	Advance Preparation for Lesson 6 1 Day Before: Prepare materials for glacier model demonstration. (See Lesson 6 Resource B.)	





Lesson 6

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Food coloring, blue (1 oz) <input type="checkbox"/> Ice cube tray (1) <input type="checkbox"/> Modeling dough (3.3 lb) Module 2 Kit <ul style="list-style-type: none"> <input type="checkbox"/> Bin, clear plastic, 6 qt (1) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Freezer (access) <input type="checkbox"/> Pocket chart (1) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Water (access)
Resources	<ul style="list-style-type: none"> <input type="checkbox"/> Lesson 6 Resource A: Khumbu Glacier Photograph  <input type="checkbox"/> Lesson 6 Resource B: Glacier Model Demonstration Setup Instructions <input type="checkbox"/> Lesson 6 Resource C: Water Body Cards <input type="checkbox"/> Lesson 6 Resource D: <i>Principal Rivers and Mountains of the World</i>  	
Preparation	<ul style="list-style-type: none"> <input type="checkbox"/> Access ArcGIS National Geographic World Map Viewer: http://phdsci.link/1761. Use the Find address or place box and the Search icon in the top right corner to navigate to Mount Everest. Select the + icon once to zoom in and display rivers and lakes around the mountain. <input type="checkbox"/> Prepare water body cards. (See Lesson 6 Resource C.) 	



Lesson 7

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Rock samples, limestone, marble, schist (6 each type) Module 1 Kit <ul style="list-style-type: none"> <input type="checkbox"/> Magnifiers, handheld, plastic (24) <input type="checkbox"/> Safety goggles, student (24) <input type="checkbox"/> Safety goggles, teacher (1) <input type="checkbox"/> Sentence strips (3) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Marker, permanent (1) <input type="checkbox"/> Plates, paper, 10" (18)
Resources	Prepared Items from Previous Lessons <ul style="list-style-type: none"> <input type="checkbox"/> Class elevation diagram from Lesson 2 (1) <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 6 Resource A: Khumbu Glacier Photograph  <input type="checkbox"/> Lesson 7 Resource A: Mount Everest Summit Photograph  <input type="checkbox"/> Lesson 7 Resource B: Rock Investigation Setup Instructions <input type="checkbox"/> Lesson 7 Resource C: Mount Everest Rock Map  <input type="checkbox"/> Lesson 7 Resource D: Mount Everest Summit Photograph with Labels  	
Preparation	<ul style="list-style-type: none"> <input type="checkbox"/> Prepare materials for rock samples observation. (See Lesson 7 Resource B.) 	

Lesson 8





Materials	Kit Items None Module 1 Kit <input type="checkbox"/> Thermometer, indoor-outdoor (1)	School Supplied Items <input type="checkbox"/> Glue sticks (24) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, clear (partial roll) <input type="checkbox"/> Tape, packing, clear, 2" wide (partial roll)
	Prepared Items from Previous Lessons <input type="checkbox"/> Elevation diagram from Lesson 2	
Resources	<input type="checkbox"/> Lesson 8 Resource A: Red Panda Area Map  <input type="checkbox"/> Lesson 8 Resource B: January Weather Data  <input type="checkbox"/> Lesson 8 Resource C: Color Band Thermometer Preparation Instructions <input type="checkbox"/> Lesson 8 Resource D: Monthly Weather Charts <input type="checkbox"/> Lesson 8 Resource E: Forest Below Mount Everest Cards 	
Preparation	<input type="checkbox"/> Cue red panda climbing a tree video: http://phdsci.link/1780 .  <input type="checkbox"/> Prepare a color copy of both the temperature data table and the precipitation equation and data table in Lesson 8 Resource B to fill out during the lesson. <input type="checkbox"/> Prepare color band thermometer if the one from Module 1 is unavailable. (See Lesson 8 Resource C.) <input type="checkbox"/> Prepare a color copy of each monthly weather chart in Lesson 8 Resource D. During the lesson, distribute a different monthly weather chart to each group. <input type="checkbox"/> Prepare Forest Below Mount Everest cards. (See Lesson 8 Resource E.)	

Lesson 9




Materials	Kit Items <input type="checkbox"/> Plant and animal stickers (24 sets)	School Supplied Items <input type="checkbox"/> Scissors (1)
Resources	<input type="checkbox"/> Lesson 8 Resource A: Red Panda Area Map  <input type="checkbox"/> Lesson 9 Resource A: Red Panda and Ringal Bamboo Needs Cards  <input type="checkbox"/> Lesson 9 Resource B: Plant Needs Cards <input type="checkbox"/> Lesson 9 Resource C: Animal Needs Cards <input type="checkbox"/> Lesson 9 Resource D: Plant and Animal Cutouts	
Preparation	<input type="checkbox"/> Prepare plant and animal needs cards. (See Lesson 9 Resources B and C.) <input type="checkbox"/> If the class is not using the Module 2 kit, prepare plant and animal cutouts to use in place of the stickers. (See Lesson 9 Resource D.)	







Lesson 10

Materials	Kit Items None Module 1 Kit <input type="checkbox"/> Sentence strips (3)	School Supplied Items <input type="checkbox"/> Glue sticks (24) <input type="checkbox"/> Scissors (1)
	Prepared Items from Previous Lessons <input type="checkbox"/> Class world map from Lesson 1 (1)	
	Item Reuse <input type="checkbox"/> Lesson 11 requires the prepared class world map. <input type="checkbox"/> Lesson 16 requires the prepared environment comparison chart.	
Resources	<input type="checkbox"/> Lesson 10 Resource A: Indian Rhinoceros and Wild Yak Photographs  <input type="checkbox"/> Lesson 10 Resource B: Locations A and B Photographs  <input type="checkbox"/> Lesson 10 Resource C: Environment Data for Locations A and B  <input type="checkbox"/> Lesson 10 Resource D: Indian Rhinoceros and Wild Yak Needs Cards <input type="checkbox"/> Lesson 10 Resource E: Savanna and Alpine Tundra Cards 	
Preparation	<input type="checkbox"/> Prepare to distribute a color copy of the environment data for Locations A and B to each group. (See Lesson 10 Resource C.) <input type="checkbox"/> Prepare Indian Rhinoceros and Wild Yak needs cards. (See Lesson 10 Resource D.) <input type="checkbox"/> Prepare savanna and alpine tundra cards. (See Lesson 10 Resource E.)	


Lesson 11

Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Postcard, Barnum Pond (1) <input type="checkbox"/> Yarn (partial skein) <p>Module 1 Kit</p> <ul style="list-style-type: none"> <input type="checkbox"/> Sentence strips (3) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, clear (partial roll)
	<p>Prepared Items from Previous Lessons</p> <ul style="list-style-type: none"> <input type="checkbox"/> Class world map from Lesson 10 (1) 	
	<p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 13 requires the temperate forest overlay map, the prepared bottom maps, and the prepared class world map. To protect the overlay and bottom maps when not in use, store them inside the reusable storage box they are packaged in as part of the materials kit. 	
Resources	<ul style="list-style-type: none"> <input type="checkbox"/> Lesson 11 Resource A: Barnum Pond Photograph  <input type="checkbox"/> Lesson 11 Resource B: "What Lives in a Pond?" <input type="checkbox"/> Lesson 11 Resource C: Barnum Pond Information Sheet  <input type="checkbox"/> Lesson 11 Resource D: Conceptual Checkpoint  	
Preparation	<ul style="list-style-type: none"> <input type="checkbox"/> If the class is not using the Module 2 kit, prepare a color copy of the Barnum Pond photograph (Lesson 11 Resource A) to add to the class world map instead of the postcard of Barnum Pond. <input type="checkbox"/> Prepare to distribute a copy of Lesson 11 Resource B to each student pair. <input type="checkbox"/> Prepare to distribute a color copy of Lesson 11 Resources C and D to each student. 	



Lesson 12

Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bag clips (12) <input type="checkbox"/> Bottom maps (6) <input type="checkbox"/> Overlay maps, temperate forest (6) <input type="checkbox"/> Postcards <ul style="list-style-type: none"> <input type="checkbox"/> Alpine tundra (1) <input type="checkbox"/> Savanna (1) <input type="checkbox"/> Temperate forest (1) <input type="checkbox"/> Whiteboards, 11" × 17" (6) <input type="checkbox"/> Yarn (partial skein) <p>Module 2 Kit</p> <ul style="list-style-type: none"> <input type="checkbox"/> Hook and loop fastener (24") 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Glue sticks (24) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, clear (partial roll)
	<p>Prepared Items from Previous Lessons</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepared class world map from Lesson 11 	
Resources	<ul style="list-style-type: none"> <input type="checkbox"/> Lesson 12 Resource A: Environments Below Mount Everest Photographs  <input type="checkbox"/> Lesson 12 Resource B: Mesa Verde, Surtsey, and Mount St. Helens Photographs  <input type="checkbox"/> Lesson 12 Resource C: Forest Photographs  <input type="checkbox"/> Lesson 12 Resource D: Temperate Forest Environment Stations Procedure Sheets <input type="checkbox"/> Lesson 12 Resource E: Temperate Forest Plant and Animal Needs Cards <input type="checkbox"/> Lesson 12 Resource F: Temperate Forest Environment Stations Setup Instructions <input type="checkbox"/> Lesson 12 Resource G: Temperate Forest Cards  <input type="checkbox"/> Lesson 12 Resource H: Bottom Map Preparation Instructions <input type="checkbox"/> <i>Beastly Biomes</i> (Allen-Fletcher 2019) 	
Preparation	<ul style="list-style-type: none"> <input type="checkbox"/> If the class is not using the Module 2 kit, prepare color copies of the environments below Mount Everest photographs (Lesson 12 Resource A) to add to the class world map instead of the postcards. <input type="checkbox"/> Set up six temperate forest environment stations. (See Lesson 12 Resources D, E, and F.) <input type="checkbox"/> Prepare temperate forest cards. (See Lesson 12 Resource G.) <input type="checkbox"/> Prepare bottom maps for use with the overlay maps. (See Lesson 12 Resource H.) 	



Lesson 13

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Glue sticks (24) <input type="checkbox"/> Scissors, blunt tip (24) <input type="checkbox"/> Scissors (1)
	Prepared Items from Previous Lessons <input type="checkbox"/> Bottom maps from Lesson 11 (6) <input type="checkbox"/> Class world map from Lesson 11 (1)	
	Item Reuse <input type="checkbox"/> Lesson 14 requires the wet erase markers, overlay maps, prepared bottom maps, and prepared class world map.	
Resources	<input type="checkbox"/> Lesson 13 Resource A: Savanna and Alpine Tundra Photographs  <input type="checkbox"/> Lesson 13 Resource B: Savanna and Alpine Tundra Environment Stations Procedure Sheets <input type="checkbox"/> Lesson 13 Resource C: Savanna and Alpine Tundra Animal Needs Cards <input type="checkbox"/> Lesson 13 Resource D: Savanna and Alpine Tundra Environment Stations Setup Instructions <input type="checkbox"/> <i>Beastly Biomes</i> (Allen-Fletcher 2019)	
Preparation	<input type="checkbox"/> Set up six savanna and alpine tundra environment stations. (See Lesson 13 Resources B, C, and D.)	



Lesson 14

Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Markers, wet erase, black (6) <input type="checkbox"/> Overlay maps <ul style="list-style-type: none"> ○ Alpine tundra (6) ○ Savanna (6) ○ Temperate forest (6) <input type="checkbox"/> Postcards <ul style="list-style-type: none"> ○ Aconcagua Provincial Park (1) ○ Bavarian Forest National Park (1) ○ Emas National Park (1) ○ Great Smoky Mountains National Park (1) ○ Rocky Mountain National Park (1) ○ Serengeti National Park (1) <input type="checkbox"/> Yarn (partial skein) <p>Module 1 Kit</p> <ul style="list-style-type: none"> <input type="checkbox"/> Sentence strips (3) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, clear (partial roll)
	<p>Prepared Items from Previous Lessons</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bottom maps from Lesson 12 (6) <input type="checkbox"/> Class world map from Lesson 13 (1) 	
	<p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 15 requires the prepared class world map, the prepared bottom maps, the grassland and arctic tundra overlay map, and the tropical forest and desert overlay map. Save the alpine tundra, savanna, and temperate forest overlay maps for use in Lesson 21. 	
Resources	<ul style="list-style-type: none"> <input type="checkbox"/> Lesson 14 Resource A: Temperate Forest, Savanna, and Alpine Tundra Photographs  <input type="checkbox"/> Lesson 14 Resource B: Argumentation Cards <input type="checkbox"/> <i>Beastly Biomes</i> (Allen-Fletcher 2019) 	
<p>Preparation</p> 	<ul style="list-style-type: none"> <input type="checkbox"/> If the class is not using the Module 2 kit, prepare color copies of the temperate forest, savanna, and alpine tundra photographs (Lesson 14 Resource A) to add to the class world map instead of the postcards. <input type="checkbox"/> Prepare argumentation cards. (See Lesson 14 Resource B.) <p>Advance Preparation for Lesson 18</p> <p>3 to 4 Days Before: Prepare salt water and evaporation containers for observing water stations. (See Lesson 18 Resource B.)</p>	



Lesson 15



Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Markers, wet erase, black (6) <input type="checkbox"/> Overlay maps <ul style="list-style-type: none"> ○ Alpine tundra (6) ○ Grassland and arctic tundra (6) ○ Savanna (6) ○ Temperate forest (6) ○ Tropical forest and desert (6) ○ Vizcacha habitat (6) <p>Module 2 Kit</p> <ul style="list-style-type: none"> <input type="checkbox"/> Globe, inflatable, (1, optional) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Stickers, small (5, optional)
	<p>Prepared Items from Previous Lessons</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bottom maps from Lesson 12 (6) <input type="checkbox"/> Class world map from Lesson 14 (1) 	
	<p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 16 requires the prepared class world map. <input type="checkbox"/> Lesson 21 requires the overlay maps and the prepared bottom maps. 	
Resources	<ul style="list-style-type: none"> <input type="checkbox"/> Lesson 15 Resource: Mountain Vizcacha Needs Card  <input type="checkbox"/> <i>World of Wonder: Mountains</i> (Guillain and Madden 2020) 	
Preparation	<ul style="list-style-type: none"> <input type="checkbox"/> Cue mountain vizcacha video: http://phdsci.link/1808.  <input type="checkbox"/> Prepare mountain vizcacha needs cards. (See Lesson 15 Resource.) 	

Lesson 16



Materials	Kit Items <input type="checkbox"/> Overlay maps <ul style="list-style-type: none"> ○ Grassland and arctic tundra (6) ○ Tropical forest and desert (6) 	School Supplied Items <input type="checkbox"/> Crayons, red (6) <input type="checkbox"/> Glue sticks (6) <input type="checkbox"/> Scissors (1)
	Prepared Items from Previous Lessons <input type="checkbox"/> Class world map from Lesson 15 (1) <input type="checkbox"/> Prepared bottom maps from Lesson 12 (6) <input type="checkbox"/> Environment comparison chart from Lesson 10 (1)	
	Item Reuse <input type="checkbox"/> Lesson 17 requires the prepared class world map.	
Resources	<input type="checkbox"/> Lesson 16 Resource A: Biome Photographs  <input type="checkbox"/> Lesson 16 Resource B: Buffalo Gap National Grassland Card  <input type="checkbox"/> Lesson 16 Resource C: Grassland, Arctic Tundra, Tropical Forest, and Desert Cards <input type="checkbox"/> Lesson 16 Resource D: Biome Poster Activity Setup Instructions <input type="checkbox"/> <i>Beastly Biomes</i> (Allen-Fletcher 2019)	
Preparation	<input type="checkbox"/> Prepare grassland, arctic tundra, tropical forest, and desert cards. (See Lesson 16 Resource C.) <input type="checkbox"/> Prepare biome posters. (See Lesson 16 Resource D.)	

Lesson 17





Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Stickers, green, orange, red (4 each color)
	Module 1 Kit <input type="checkbox"/> Sentence strips (2)	
	Prepared Items from Previous Lessons <input type="checkbox"/> Class schoolyard map from Lesson 4 (1) <input type="checkbox"/> Class world map from Lesson 16 (1) <input type="checkbox"/> Biome posters from Lesson 16	
Item Reuse <input type="checkbox"/> Lesson 18 requires the handheld magnifiers and prepared class schoolyard map. <input type="checkbox"/> Lesson 20 requires the prepared class world map.		
Resources	<input type="checkbox"/> Lesson 15 Resource: Mountain Vizcacha Needs Card  <input type="checkbox"/> Lesson 17 Resource A: Blackbrush Photograph 	

	<input type="checkbox"/> Lesson 17 Resource B: Plant Diagrams  <input type="checkbox"/> Lesson 17 Resource C: Blackbrush Needs Card 
Preparation	<input type="checkbox"/> Prepare blackbrush needs cards. (See Lesson 17 Resource C.)







Lesson 18

Materials	<p>Kit Items</p> <input type="checkbox"/> Containers, clear plastic, round, 16 oz (4) <input type="checkbox"/> Graduated cylinder, 100 mL (1)	School Supplied Items
	<p>Module 1 Kit</p> <input type="checkbox"/> Balances, plastic (2) <input type="checkbox"/> Containers, clear plastic, round, 8 oz (4) <input type="checkbox"/> Jars with lids, clear plastic, 4 oz (8) <input type="checkbox"/> Magnifiers, handheld, plastic (4) <input type="checkbox"/> Measuring cup, 1 L (1) <input type="checkbox"/> Safety goggles, student (24) <input type="checkbox"/> Safety goggles, teacher (1)	
	<p>Prepared Items from Previous Lessons</p> <input type="checkbox"/> Class schoolyard map from Lesson 17 (1) <input type="checkbox"/> Prepared class world map from Lesson 17 (1) <input type="checkbox"/> Environment comparison chart from Lesson 11	
Resources	<input type="checkbox"/> Lesson 18 Resource A: Water Environment Photograph  <input type="checkbox"/> Lesson 18 Resource B: Water Stations Setup Instructions <input type="checkbox"/> Lesson 18 Resource C: Water Body Photographs  <input type="checkbox"/> Lesson 18 Resource D: Water Stations Procedure Sheets <input type="checkbox"/> <i>Beastly Biomes</i> (Allen-Fletcher 2019)	
Preparation	<input type="checkbox"/> Set up water stations. (See Lesson 18 Resource B.)	

Lesson 19

Materials	Kit Items <input type="checkbox"/> Postcard, water environment (1) <input type="checkbox"/> Yarn (partial skein) Module 1 Kit <input type="checkbox"/> Sentence strip (1)	School Supplied Items <input type="checkbox"/> Equity sticks (class set) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, clear (partial roll)
	Prepared Items from Previous Lessons <input type="checkbox"/> Class plant and animal chart from Lesson 2 (1) <input type="checkbox"/> Prepared class world map from Lesson 17 (1)	
Resources	<input type="checkbox"/> Lesson 18 Resource A: Water Environment Photograph  <input type="checkbox"/> Lesson 19 Resource A: Conceptual Checkpoint  <input type="checkbox"/> Lesson 19 Resource B: Environment Information Chart  <input type="checkbox"/> Lesson 19 Resource C: Water Environment Diagrams  <input type="checkbox"/> <i>Beastly Biomes</i> (Allen-Fletcher 2019)	
Preparation	<input type="checkbox"/> Prepare to distribute a color copy of Lesson 19 Resource A to each student. <input type="checkbox"/> Prepare to distribute one copy each of Lesson 19 Resources B and C to each student. <input type="checkbox"/> If the class is not using the Module 2 kit, prepare a color copy of the water environment photograph (Lesson 18 Resource A) to add to the class world map instead of the water environment postcard.	

Lesson 20

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Scissors (1)
	Prepared Items from Previous Lessons <input type="checkbox"/> Class world map from Lesson 16 (1)	
	Item Reuse <input type="checkbox"/> Lesson 22 requires the prepared class world map.	
Resources	<input type="checkbox"/> Lesson 20 Resource A: Map of Texas with Photographs  <input type="checkbox"/> Lesson 20 Resource B: Big Thicket National Preserve Animal Photographs  <input type="checkbox"/> Lesson 20 Resource C: Butterfly Life Cycle Cards <input type="checkbox"/> Lesson 20 Resource D: "A Butterfly's Life" <input type="checkbox"/> Lesson 20 Resource E: Gulf Fritillary Caterpillar and Butterfly Photographs  <input type="checkbox"/> Lesson 20 Resource F: Gulf Fritillary Needs Card 	
Preparation 	<input type="checkbox"/> Cue Gulf fritillary butterfly and caterpillar videos: http://phdsci.link/1895 and http://phdsci.link/1896 .  <input type="checkbox"/> Prepare butterfly life cycle cards. (See Lesson 20 Resource C.) <input type="checkbox"/> Prepare Gulf fritillary butterfly needs cards. (See Lesson 20 Resource F.)	

Advance Preparation for Lesson 22

2 Days Before: Consider arranging for an adult to help supervise students as they conduct their schoolyard investigations.


Lesson 21

Materials	Kit Items <input type="checkbox"/> Yarn (partial skein) Module 1 Kit <input type="checkbox"/> Magnifiers, handheld, plastic (24)	School Supplied Items <input type="checkbox"/> Schoolyard photograph (1) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, clear (partial roll) <input type="checkbox"/> Whiteboards, personal (6, optional)
	Prepared Items from Previous Lessons <input type="checkbox"/> Bottom maps from Lesson 11 <input type="checkbox"/> Class schoolyard map from Lesson 4 <input type="checkbox"/> Prepared class world map from Lesson 19 (1)	
	Item Reuse <input type="checkbox"/> Lesson 22 requires the prepared bottom maps and all the overlay maps except the high biodiversity overlay map.	
Resources	<input type="checkbox"/> Lesson 21 Resource A: Science Challenge Rubric <input type="checkbox"/> Lesson 21 Resource B: Science Challenge Alternative Activities	
Preparation	<input type="checkbox"/> Take a photograph of the schoolyard before the lesson. Print and cut out the photograph to add to the class world map. <input type="checkbox"/> Identify three safe outdoor areas in the schoolyard where students can observe plants and animals. Areas might include a garden, a grassy field, a playground, a basketball court, or another natural or play area. Areas must be free of poisonous plants and stinging insects, such as bees, wasps, and fire ants. If no safe outdoor areas are available, use one of the alternative activities in Lesson 21 Resource B.	


Lesson 22

Materials	Kit Items None	School Supplied Items None
	Module 1 Kit <input type="checkbox"/> Magnifiers, handheld, plastic (24)	
	Prepared Items from Previous Lessons <input type="checkbox"/> Bottom maps from Lesson 11 (6) <input type="checkbox"/> Class world map from Lesson 16 (1) <input type="checkbox"/> Class schoolyard map from Lesson 4	
	Item Reuse <input type="checkbox"/> Lesson 24 requires the prepared class world map.	
Resources	<input type="checkbox"/> Lesson 21 Resource A: Science Challenge Rubric	
Preparation	None	

Lesson 23

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Highlighters, 4 colors (1 each color) <input type="checkbox"/> Pencils, 4 colors (24 sets)
	Prepared Items from Previous Lessons <input type="checkbox"/> Class plant and animal chart from Lesson 2	
Resources	<input type="checkbox"/> Lesson 21 Resource A: Science Challenge Rubric <input type="checkbox"/> Lesson 23 Resource: Bar Graph Templates 	
Preparation	None	

Lesson 24


Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Scissors (1)
	Prepared Items from Previous Lessons <input type="checkbox"/> Class world map from Lesson 22 (1)	
	Item Reuse <input type="checkbox"/> Lesson 28 requires the Yellowstone National Park Knowledge Deck poster.	
Resources	<input type="checkbox"/> Lesson 24 Resource A: Temperate Forest Biodiversity Graph  <input type="checkbox"/> Lesson 24 Resource B: Biodiversity Graph Cards	



Preparation	<input type="checkbox"/> Prepare biodiversity graph cards. (See Lesson 24 Resource B.)
--------------------	--

Lesson 25

Materials	Kit Items <input type="checkbox"/> Overlay maps <ul style="list-style-type: none"> ○ Alpine tundra (6) ○ Grassland and arctic tundra (6) ○ High biodiversity (6) ○ Savanna (6) ○ Temperate forest (6) ○ Tropical forest and desert (6) 	School Supplied Items <input type="checkbox"/> Scissors (1)
	Module 1 Kit <input type="checkbox"/> Sentence strips (4)	
	Prepared Items from Previous Lessons <input type="checkbox"/> Prepared bottom maps from Lesson 11 (6)	
Resources	<input type="checkbox"/> Lesson 25 Resource: Biome Information Cards <input type="checkbox"/> <i>Beastly Biomes</i> (Allen-Fletcher 2019)	
Preparation	<input type="checkbox"/> Prepare biome information cards. (See Lesson 25 Resource.)	

Lesson 26





Materials	Kit Items <input type="checkbox"/> Overlay maps <ul style="list-style-type: none"> ○ Alpine tundra (6) ○ Grassland and arctic tundra (6) ○ Savanna (6) ○ Temperate forest (6) ○ Tropical forest and desert (6) ○ Water (6) 	School Supplied Items <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, clear (partial roll)
	<input type="checkbox"/> Postcards <ul style="list-style-type: none"> ○ Baffin Bay (1) ○ Laje de Santos Marine State Park (1) <input type="checkbox"/> Yarn (partial skein)	
	Prepared Items from Previous Lessons <input type="checkbox"/> Prepared bottom maps from Lesson 11 (6) <input type="checkbox"/> Prepared class world map from Lesson 21 (1)	
Resources	<input type="checkbox"/> Lesson 26 Resource A: Marine Biome Photographs 	

	<input type="checkbox"/> Lesson 26 Resource B: Conceptual Checkpoint 
Preparation	<input type="checkbox"/> Prepare to distribute a color copy of Lesson 26 Resource B to each student. <input type="checkbox"/> If the class is not using the Module 2 kit, prepare color copies of the marine biome photographs (Lesson 26 Resource A) to add to the class world map instead of the postcards. <input type="checkbox"/> Cue Baffin Bay video: http://phdsci.link/1836 . 

Lesson 27

Materials	Kit Items <input type="checkbox"/> Knowledge Deck poster, Norgay and Hillary (1)	School Supplied Items <input type="checkbox"/> Scissors (1)
Resources	<input type="checkbox"/> Lesson 27 Resource: Key Term Cards	
Preparation	<input type="checkbox"/> Prepare key term cards. (See Lesson 27 Resource.)	

Lesson 28


Materials	Kit Items <input type="checkbox"/> Knowledge Deck cards, Yellowstone National Park (24) <input type="checkbox"/> Knowledge Deck poster, Yellowstone National Park (1) <input type="checkbox"/> Postcard, Yellowstone National Park (1) <input type="checkbox"/> Yarn (partial skein)	School Supplied Items <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape (partial roll)
	Prepared Items from Previous Lessons <input type="checkbox"/> Prepared class world map from Lesson 26 (1)	
Resources	<input type="checkbox"/> Lesson 28 Resource A: Yellowstone National Park Photograph <input type="checkbox"/> Lesson 28 Resource B: Yellowstone National Park Maps  <input type="checkbox"/> Lesson 28 Resource C: Yellowstone National Park Charts 	
Preparation	<input type="checkbox"/> If the class is not using the Module 2 kit, prepare a color copy of the Yellowstone National Park photograph (Lesson 28 Resource A) to add to the class world map instead of the postcard of Yellowstone National Park. <input type="checkbox"/> Cue Yellowstone National Park video: http://phdsci.link/1856 .  <input type="checkbox"/> Prepare to distribute a color copy of the Yellowstone National Park maps and of the Yellowstone National Park charts to each student. (See Lesson 28 Resources B and C). <input type="checkbox"/> Cue bison eating grass and bison moving snow videos: http://phdsci.link/1904 and http://phdsci.link/1905 . 	

Lesson 29

Materials	Kit Items <input type="checkbox"/> Knowledge Deck poster, Yellowstone National Park (1)	School Supplied Items <input type="checkbox"/> Scissors (1)
Resources	<input type="checkbox"/> Lesson 29 Resource: Concept Card	
Preparation	<input type="checkbox"/> Score End-of-Module Assessment and write individual feedback. <input type="checkbox"/> Select at least one End-of-Module Assessment item for the class to debrief, and prepare a sample response for that item to share with students. <input type="checkbox"/> Prepare Concept Systems card. (See Lesson 29 Resource.) <input type="checkbox"/> Select student work products that show evidence of concept mastery, and display them in different areas of the classroom. Student work products may include the anchor model, other class charts, and selected Science Logbook pages.	

Weather Lesson Materials and Preparation



Lesson 1

Materials	Kit Items <input type="checkbox"/> Clipboards (12) <input type="checkbox"/> Clothespins (12)	School Supplied Items <input type="checkbox"/> Flagging tape, 1" (9 ft) <input type="checkbox"/> Rulers (12) <input type="checkbox"/> Scissors (1)
Resources	<input type="checkbox"/> Lesson 1 Resource A: Wind Observation Tool Instructions <input type="checkbox"/> Lesson 1 Resource B: Cloud Cover Cards <input type="checkbox"/> Lesson 1 Resource C: Precipitation Photographs  <input type="checkbox"/> Lesson 1 Resource D: Weather Photograph	
Preparation	<input type="checkbox"/> Prepare wind observation tools. (See Lesson 1 Resource A.) <input type="checkbox"/> Prepare to distribute cloud cover cards (Lesson 1 Resource B).	



Lesson 2

Materials	Kit Items <input type="checkbox"/> Thermometers, plastic back (12)	School Supplied Items <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Stapler (1) <input type="checkbox"/> Tape, packing, clear, 2" wide (2)
	Module 1 Kit <input type="checkbox"/> Safety goggles, student (24) <input type="checkbox"/> Safety goggles, teacher (1)	
	Prepared Items from Previous Lessons <input type="checkbox"/> Prepared wind observation tools from Lesson 1 (12)	
Resources	<input type="checkbox"/> Lesson 2 Resource: Thermometer Setup Instructions	
Preparation	<input type="checkbox"/> Prepare thermometers. (See Lesson 2 Resource A.)	

Lesson 3



Materials	Kit Items None	School Supplied Items None
Resources	<input type="checkbox"/> Lesson 3 Resource A: Amarillo, Texas, January 2017 Weather Data  <input type="checkbox"/> Lesson 3 Resource B: Amarillo, Texas, 2018–2020 Weather Data <input type="checkbox"/> Lesson 3 Resource C: Amarillo, Texas, 2018–2020 Temperature Data 	
Preparation	<input type="checkbox"/> Prepare to distribute one monthly weather calendar to each student pair. (See Lesson 3 Resource B.) Ensure that each monthly calendar is used at least once. Consider using card stock and laminating for multiple uses.	

Lesson 4

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Rulers (24)
Resources	<input type="checkbox"/> Lesson 3 Resource A: Amarillo, Texas, January 2017 Weather Data  <input type="checkbox"/> Lesson 4 Resource: Amarillo, Texas, 2017 Rain or Snow Data 	
Preparation	<input type="checkbox"/> Prepare to distribute yearly weather calendars to each pair. (See Lesson 3 Resource B.) Create calendar sets such that each set consists of four monthly calendars (January, April, July, and October) for a single year (2018, 2019, or 2020). Ensure that each student pair receives only one calendar set. Consider using card stock and laminating for multiple uses.	

Lesson 5

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Scissors (1)
------------------	--------------------------	---

Resources	<input type="checkbox"/> Lesson 5 Resource A: Outdoor Activity Photographs  <input type="checkbox"/> Lesson 5 Resource B: Amarillo, Texas, 2020 Weather Data  <input type="checkbox"/> Lesson 5 Resource C: Clothing, Transportation, and Activity Cards
Preparation	<input type="checkbox"/> Post the outdoor activity photographs in four distinct areas of the classroom. (See Lesson 5 Resource A.) <input type="checkbox"/> Prepare clothing, transportation, and activity cards. (See Lesson 5 Resource C.) <input type="checkbox"/> Prepare to display a weather forecast for the next week.

Works Cited

Allen-Fletcher, Carly. 2019. *Beastly Biomes*. Berkeley, CA: Creston Books. [All references to *Beastly Biomes* are from this source.]

Guillain, Charlotte, and Chris Madden (illustrator). 2020. *World of Wonder: Mountains*. Mission Viejo, CA: words & pictures. [All references to *Mountains* are from this source.]

Kreisman, Rachelle. 2014. "What Lives in a Pond?" ReadWorks passage. Accessed July 5, 2021.
<https://www.readworks.org/article/What-Lives-in-a-Pond/57d9e90e-a30c-4d51-a610-f96e6a6b638d#!questionsetsSection:1704/articleTab:content>.

Credits

Great Minds® has made every effort to obtain permission for the reprinting of all copyrighted material. If any owner of copyrighted material is not acknowledged herein, please contact Great Minds for proper acknowledgment in all future editions and reprints of this guide.

Page 5, Google Earth mapping service is a trademark of Google LLC.; Page 6, *Principal Rivers and Mountains of the World* from *A New Universal Atlas*, Philadelphia. Courtesy Library of Congress Geography and Map Division, Washington DC, Esri – ArcGIS; Page 7, Red Panda Climbing a Tree video by SVPhilon/Creatas Video/Getty Images; page 8, "What Lives in a Pond", adapted from "What Lives in a Pond" by Rachelle Kreisman/ReadWorks; page 12, Mountain Vizcacha video by Otter Films/Image Bank Film/Getty Images; page 18, Baffin Bay video by John and Janet Foster/Image Bank Film/Getty Image; Page 19, Yellowstone National Park video by VIA films/Shutterstock.com.