

Preparation Guide

Level 3 Module 2

Survival and Change 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® TEKS Edition* 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.

Preparation: This section identifies preparation teachers should complete before the lesson, including resources teachers should gather or cue. This section has two subsections:

- Resources:** This subsection 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>.
- Setup:** This subsection lists media teachers must cue before the lesson, activities that require setup, and 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. This subsection also describes advance preparation for upcoming lessons. For example, if teachers need to prepare one day in advance for an activity in Lesson 11, an advance preparation note appears in the Setup subsection 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
3	1 day†	Compare Fossil with Clay Fossil Model	Prepare clay fossil models for students to observe. (See Lesson 3 Resource A.)



Lesson	Time in Advance	Investigation	Description
9	2–3 weeks	Determine Needs of Caterpillars in an Artificial Habitat	Select, prepare for, and order live animals. (See Lesson 9 Resource A.)
10	5–7 days	Analyze Characteristics of Caterpillars and Plants	Prepare radish plants for observation. (See Lesson 10 Resource A.)
13	1 day†	Model Penguin Behavior	Make or obtain 8 cups of ice.
13	1 day†	Model Other Group Behaviors	If not using kit materials, collect 80 plant leaves for Leaf-Cutter Ant Station.
20	6–7 days	Observe Plants	Prepare radish plants for plant investigation. (See Lesson 20 Resource A.)

Spotlight Lessons on Weather



Lesson	Time in Advance	Investigation	Description
3	1 day†	Measure Temperature	Make or obtain 36 ice cubes.

Survival and Change Lesson Materials and Preparation




Lesson 1

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Pencils, 12 colors (6 sets)
Preparation 	Resources	
	<input type="checkbox"/> Lesson 1 Resource A: Rhinoceros Woodcut and Photograph  <input type="checkbox"/> Lesson 1 Resource B: Organism Cards <input type="checkbox"/> <i>A Butterfly Is Patient</i> by Dianna Hutts Aston and Sylvia Long (2015)	
	Setup	
	<input type="checkbox"/> Prepare Organism Cards. (See Lesson 1 Resource B.)	
	Advance Preparation for Lesson 9	
	2–3 Weeks Before: Select, prepare for, and order live animals. (See Lesson 9 Resource A.)	



Lesson 2

Materials	Kit Items <input type="checkbox"/> Clothespins (10) <input type="checkbox"/> Tape measure, 1.5 m (1)	School Supplied Items <input type="checkbox"/> Index cards, 3" × 5" (10) <input type="checkbox"/> Paper, printer, 8.5" × 11" (24 sheets, optional) <input type="checkbox"/> String (3 m) <input type="checkbox"/> Tape, masking (partial roll, optional) <input type="checkbox"/> Whiteboards, personal (24, optional)
Preparation 	Resources	
	<input type="checkbox"/> Lesson 2 Resource A: Timeline Instructions <input type="checkbox"/> Lesson 2 Resource B: Butterfly Fossil Photograph  <input type="checkbox"/> Lesson 2 Resource C: Event Cards	
	Setup	
	<input type="checkbox"/> Prepare string for class timeline. (See Lesson 2 Resource A.) <input type="checkbox"/> Prepare Event Cards. (See Lesson 2 Resource C.)	
	Advance Preparation for Lesson 3	
	1 Day Before: Prepare clay fossil models for students to observe. (See Lesson 3 Resource A.)	

Lesson 3

Materials	Kit Items <input type="checkbox"/> Butterflies, plastic (6) <input type="checkbox"/> Clay, modeling, air-dry (2 lb) <input type="checkbox"/> Clay, modeling, nonhardening (2 lb)	School Supplied Items <input type="checkbox"/> Bags, resealable plastic, 1 qt (6) <input type="checkbox"/> Books (6) <input type="checkbox"/> Rulers, metric (6)
	<div style="background-color: #e0e0e0; padding: 5px;">Preparation </div> Resources <input type="checkbox"/> Lesson 2 Resource B: Butterfly Fossil Photograph  <input type="checkbox"/> Lesson 3 Resource A: Clay Fossil Model Instructions <input type="checkbox"/> Lesson 3 Resource B: Butterfly Fossil Measurements 	
		Setup <input type="checkbox"/> Prepare bags of modeling clay and select plastic butterflies for students to use to make clay fossil models. (See Lesson 3 Resource A.) <input type="checkbox"/> Prepare Regional Fossil Cards. (See Lesson 4 Resource B.) Use Lesson 4 Resource A to determine the region where students live. Then choose a relevant regional fossil from Lesson 4 Resource B to show during the Land. Students will sort the cards in Lesson 4.
		Item Reuse Lesson 4 requires the prepared regional fossil cards. Lesson 13 requires 1 lb of the nonhardening modeling clay.
		Advance Preparation for Lesson 10 5–7 Days Before: Prepare radish plants for observation. (See Lesson 10 Resource A.)

Lesson 4

Materials	Kit Items None	School Supplied Items None
	Prepared Items from Previous Lessons <input type="checkbox"/> Regional fossil cards from Lesson 3 (6 sets)	
Preparation	Resources <input type="checkbox"/> Lesson 4 Resource A: United States Regional Map  <input type="checkbox"/> Lesson 4 Resource B: Regional Fossil Cards <input type="checkbox"/> Lesson 4 Resource C: Fossil Guide <input type="checkbox"/> Lesson 4 Resource D: Paleozoic Era Illustration 	
	Setup <input type="checkbox"/> Find a photograph that shows a location in the region where students live.	

Lesson 5

Materials	Kit Items None	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 5 Resource: Pedersen Glacier Photographs	
	Setup None	







Lesson 6

Materials	Kit Items <input type="checkbox"/> US map (1)	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 2 Resource B: Butterfly Fossil Photograph <input type="checkbox"/> Lesson 6 Resource A: Florissant Fossil Photographs <input type="checkbox"/> Lesson 6 Resource B: Past Environment of the Florissant Area Illustration	
	Setup <input type="checkbox"/> Print Florissant Fossil Photographs. (See Lesson 6 Resource A.) Each student pair will need a set of photographs.	


Lesson 7

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Highlighters (24, optional)
Preparation	Resources <input type="checkbox"/> Lesson 6 Resource B: Past Environment of the Florissant Area Illustration <input type="checkbox"/> Lesson 7 Resource A: Present-Day Florissant Area Photograph <input type="checkbox"/> Lesson 7 Resource B: Florissant Organism Photographs	
	Setup <input type="checkbox"/> Print Florissant Organism Photographs. (See Lesson 7 Resource B.) Each group will need a set of photographs.	


Lesson 8

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Paper, printer, 8.5" × 11" (24 sheets)
Preparation	Resources	
	<input type="checkbox"/> Lesson 8 Resource A: Tooth Fossil Photograph  <input type="checkbox"/> Lesson 8 Resource B: Mammoth Drawings  <input type="checkbox"/> Lesson 8 Resource C: Mammoth Distribution Maps  <input type="checkbox"/> Lesson 8 Resource D: Redwood Photographs and Distribution Map  <input type="checkbox"/> Lesson 8 Resource E: California versus Colorado Temperature and Precipitation Graphs  <input type="checkbox"/> Lesson 8 Resource F: Florissant Area Temperature and Precipitation Graphs <input type="checkbox"/> Lesson 8 Resource G: Conceptual Checkpoint Photographs 	
	Setup None	



Lesson 9

Materials	Kit Items <input type="checkbox"/> Painted lady butterfly 5-larvae culture (1)	School Supplied Items <input type="checkbox"/> Animal in artificial habitat (alternative to butterflies) (1, optional) <input type="checkbox"/> Equity sticks (class set)
Preparation	Resources	
	<input type="checkbox"/> Lesson 9 Resource A: Using Live Animals in the Classroom <input type="checkbox"/> Lesson 9 Resource B: Caterpillars and Plants Photograph  <input type="checkbox"/> <i>A Butterfly Is Patient</i>	
	Setup None	
	Item Reuse	
	<input type="checkbox"/> Lesson 10 requires the painted lady butterfly 5-larvae culture. <input type="checkbox"/> Lesson 14 requires the equity sticks.	





Lesson 10

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Butterfly habitat, netted (1, optional) <input type="checkbox"/> Magnifiers, handheld, plastic (4, optional) <input type="checkbox"/> Painted lady butterfly 5-larvae cultures (2) <input type="checkbox"/> Radish seed packet ($\frac{1}{2}$) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Animal in artificial habitats (alternative to butterflies) (2, optional) <input type="checkbox"/> Construction paper, white, 11" × 17" (5 sheets) <input type="checkbox"/> Cups, plastic, 9 oz (2) <input type="checkbox"/> Glue stick (1) <input type="checkbox"/> Measuring cup, dry, 1 cup (1) <input type="checkbox"/> Potting soil (2 cups) <input type="checkbox"/> Water (about 280 mL)
	Preparation	Resources <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 10 Resource A: Radish Seed Planting Instructions and Classroom Procedure <input type="checkbox"/> Lesson 10 Resource B: Prepare Organism Posters <input type="checkbox"/> Lesson 10 Resource C: Painted Lady Butterfly Photograph  <input type="checkbox"/> <i>A Butterfly Is Patient</i> Setup <ul style="list-style-type: none"> <input type="checkbox"/> Prepare organisms posters. (See Lesson 10 Resource B.) Item Reuse <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 11 requires the prepared organism posters. <input type="checkbox"/> Lesson 20 requires the radish seed packet.


Lesson 11

Materials	Kit Items None	School Supplied Items None
	Prepared Items from Previous Lessons <ul style="list-style-type: none"> <input type="checkbox"/> Organism posters from Lesson 10 (5) 	
Preparation	Resources <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 11 Resource: Mountain Environment Photograph  <input type="checkbox"/> <i>Amos & Boris</i> by William Steig (2009) 	
	Setup <ul style="list-style-type: none"> <input type="checkbox"/> Cue mouse video (http://phdsci.link/1204) and whale video (http://phdsci.link/1205).  	


Lesson 12

<p>Materials</p>	<p>Kit Items None</p>	<p>School Supplied Items <input type="checkbox"/> Construction paper, white, 11" × 17" (3 sheets)</p>
<p>Preparation </p>	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 12 Resource A: Ocean Photograph  <input type="checkbox"/> Lesson 12 Resource B: Organism List  <input type="checkbox"/> Lesson 12 Resource C: Environment Photographs  <input type="checkbox"/> <i>Amos & Boris</i> <hr/> <p>Setup None</p> <p>Advance Preparation for Lesson 13</p> <p>1 Day Before: Make or obtain 8 cups of ice.</p> <p>1 Day Before: If not using kit materials, collect 80 plant leaves for Leaf-Cutter Ant Station.</p>	



Lesson 13

Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bin, clear plastic, 13.5" × 8" × 4.5" (1) <input type="checkbox"/> Clay, modeling, nonhardening (1 lb) <input type="checkbox"/> Dot die (1) <input type="checkbox"/> Leaves, paper (80) <input type="checkbox"/> Scale, digital, ± 1 g (1) <input type="checkbox"/> Test tubes, plastic (8) <input type="checkbox"/> Timers, digital (2) <input type="checkbox"/> Thermometers, Fahrenheit, metal-backed (2) <p>Module 1 Kit</p> <ul style="list-style-type: none"> <input type="checkbox"/> Scale, digital, ± 1 g (1) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Craft sticks (24) <input type="checkbox"/> Cups for craft sticks (3) <input type="checkbox"/> Desks (6) <input type="checkbox"/> Glue sticks (3) <input type="checkbox"/> Ice (8 cups) <input type="checkbox"/> Leaves, plant (80, optional) <input type="checkbox"/> Paper, printer, 8.5" × 11" (9 sheets) <input type="checkbox"/> Rubber band (1) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, masking (partial roll, optional)
Preparation	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 13 Resource A: Model Penguin Behavior Setup Instructions and Classroom Procedure <input type="checkbox"/> Lesson 13 Resource B: Group Behavior Stations Setup Instructions <input type="checkbox"/> Lesson 13 Resource C: Animal Group Photographs <input type="checkbox"/> Lesson 13 Resource D: Group Behavior Stations Procedure Sheets and Printable Materials <p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepare materials to model penguin behavior. (See Lesson 13 Resource A.) <input type="checkbox"/> Set up group behavior stations. (See Lesson 13 Resource B.) <input type="checkbox"/> Print a copy of Animal Group Photographs. (See Lesson 13 Resource C.) <input type="checkbox"/> Cue penguin video (http://phdsci.link/1215).  <p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 15 requires 1 of the timers. <p>Advance Preparation for Lesson 19</p> <p>6–7 Days Before: Prepare radish plants for plant investigation. (See Lesson 20 Resource A).</p>	






Lesson 14

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Equity sticks (class set)
Preparation	Resources <input type="checkbox"/> Lesson 14 Resource: Animal Groups Text Assignments	
	Setup <input type="checkbox"/> Print a copy of each animal groups text. (See Lesson 14 Resource.) <input type="checkbox"/> Cue leaf-cutter ant video (http://phdsci.link/1216), lion and wildebeest video (http://phdsci.link/1217), musk ox and Artic wolf video (VID NOW 2017) (http://phdsci.link/1218), and butterfly video (http://phdsci.link/1219). 	



Lesson 15

Materials	Kit Items <input type="checkbox"/> Timer, digital (1)	School Supplied Items <input type="checkbox"/> Hand tissues (about 14) <input type="checkbox"/> Paper, small pieces (25–50) <input type="checkbox"/> Plates, paper (5)
Preparation	Resources <input type="checkbox"/> Lesson 15 Resource A: Classroom Change Scenarios <input type="checkbox"/> Lesson 15 Resource B: Meerkat Group Photograph  <input type="checkbox"/> Lesson 15 Resource C: Model Meerkat Behavior Setup Instructions and Classroom Procedure <input type="checkbox"/> Lesson 15 Resource D: Coping with Change Scenarios <input type="checkbox"/> Lesson 15 Resource E: Conceptual Checkpoint Photograph	
	Setup <input type="checkbox"/> Prepare materials to model meerkat behavior. (See Lesson 15 Resource C.) <input type="checkbox"/> Cue meerkat video (http://phdsci.link/1220), elephant video (http://phdsci.link/1221), and the butterfly video (http://phdsci.link/1219) from Lesson 14. 	


Lesson 16

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Markers or pencils, 12 colors (6 sets) <input type="checkbox"/> Scissors (1)
Preparation	Resources	
	<input type="checkbox"/> Lesson 16 Resource A: Monarch Butterfly Range Map  <input type="checkbox"/> Lesson 16 Resource B: North America Climate Zone Map  <input type="checkbox"/> Lesson 16 Resource C: Using the Journey North Website  <input type="checkbox"/> Lesson 16 Resource D: Flipbook Maps <input type="checkbox"/> Lesson 16 Resource E: Monarch Migration Map  <input type="checkbox"/> Lesson 16 Resource F: Migration Wall Labels <input type="checkbox"/> <i>A Butterfly Is Patient</i>	
Preparation	Setup	
	<input type="checkbox"/> Prepare flipbook maps. (See Lesson 16 Resource D.) <input type="checkbox"/> Prepare migration wall labels. (See Lesson 16 Resource F.) <input type="checkbox"/> Cue butterfly video from Lesson 14 (http://phdsci.link/1219) and “Masses of MONARCHS arriving at Cerro Pelon!” (Rosenblatt 2017) video (http://phdsci.link/1224) . 	


Lesson 17

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Scissors (1)
Preparation	Resources	
	<input type="checkbox"/> Lesson 17 Resource A: Butterfly in Snow Photograph  <input type="checkbox"/> Lesson 17 Resource B: Butterfly Life Cycle Cards <input type="checkbox"/> Lesson 17 Resource C: Organism Life Cycle Cards	
Preparation	Setup	
	<input type="checkbox"/> Prepare Butterfly Life Cycle Cards. (See Lesson 17 Resource B.) <input type="checkbox"/> Cue “Egg to Butterfly: The Life of a Monarch” (Belchamber 2018) video (http://phdsci.link/1225) .  Prepare Organism Life Cycle Cards. (See Lesson 17 Resource C.)	


Lesson 18

Materials	Kit Items None	School Supplied Items None
Preparation	Resources	
	<input type="checkbox"/> Lesson 18 Resource A: Monarch Butterfly Life Cycle  <input type="checkbox"/> Lesson 18 Resource B: Butterfly Life Cycle Stations Setup Instructions	
	Setup	
	<input type="checkbox"/> Prepare Butterfly Life Cycle Stations. (See Lesson 18 Resource B.)	



Lesson 19

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Scissors (1)
Preparation	Resources	
	<input type="checkbox"/> Lesson 19 Resource A: Forest Environment Photograph  <input type="checkbox"/> Lesson 19 Resource B: Category Headings and Animal Cards	
	Setup	
	<input type="checkbox"/> Prepare Category Headings and Animal Cards. (See Lesson 19 Resource B.)	





Lesson 20

Materials	Kit Items <input type="checkbox"/> Radish seed packet ($\frac{1}{2}$)	School Supplied Items <input type="checkbox"/> Box, cardboard (1, optional) <input type="checkbox"/> Cups, plastic, 9 oz (12) <input type="checkbox"/> Potting soil (12 cups) <input type="checkbox"/> Rulers, metric (6) <input type="checkbox"/> Water (about 1.5 L)
Preparation	Resources	
	<input type="checkbox"/> Lesson 20 Resource A: Radish Seed Planting and Growing Instructions for Plant Investigation <input type="checkbox"/> Lesson 20 Resource B: Birch Forest in Summer and Winter Photographs 	
	Setup	
	None	




Lesson 21

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Construction paper, black, 4" × 5" (24 sheets) <input type="checkbox"/> Glue sticks (24) <input type="checkbox"/> Crayons or pencils, 6 colors (6 sets) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Tape, clear (1 roll)
Preparation	Resources <input type="checkbox"/> Lesson 19 Resource A: Forest Environment Photograph  <input type="checkbox"/> Lesson 21 Resource A: Forest Animal Photographs <input type="checkbox"/> Lesson 21 Resource B: Parking Lot Photograph  <input type="checkbox"/> Lesson 21 Resource C: Parking Lot Animal Information	
	Setup <input type="checkbox"/> Prepare Forest Animal Photographs. (See Lesson 21 Resource A.) <input type="checkbox"/> Cut out a 4" × 5" piece of black construction paper for each student. <input type="checkbox"/> Print Parking Lot Animal Information for each student pair. (See Lesson 21 Resource C.)	

Lesson 22

Materials	Kit Items None	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 22 Resource A: Proposed Solution Photographs  <input type="checkbox"/> Lesson 22 Resource B: Proposed Solution Comparison Chart  <input type="checkbox"/> Lesson 22 Resource C: Conceptual Checkpoint Volcano Photographs  <input type="checkbox"/> Lesson 22 Resource D: Conceptual Checkpoint Animal Photographs and Information 	
	Setup None	


Lesson 23

Materials	Kit Items None	School Supplied Items None
Preparation	Resources	
	<input type="checkbox"/> Lesson 16 Resource C: Using the Journey North Website <input type="checkbox"/> Lesson 23 Resource A: Monarchs Graph  <input type="checkbox"/> Lesson 23 Resource B: Engineering Design Process  <input type="checkbox"/> Lesson 23 Resource C: Detailed Engineering Design Process  <input type="checkbox"/> Lesson 23 Resource D: “Winged Mysteries” (Adams 2003)	
	Setup None	

Lesson 24

Materials	Kit Items None	School Supplied Items
		<input type="checkbox"/> Crayons, markers, or pencils, 6–12 colors (6 sets) <input type="checkbox"/> Paper, grid or lined (24 sheets, optional) <input type="checkbox"/> Rulers, metric (24)
Preparation	Resources	
	<input type="checkbox"/> Lesson 24 Resource A: Monarch Butterfly Research <input type="checkbox"/> Lesson 24 Resource B: Plants that Attract Monarch Butterflies <input type="checkbox"/> <i>A Butterfly Is Patient</i>	
	Setup	
	<input type="checkbox"/> Print or open web pages or identify library books for students to use to research threats to monarch butterflies. (See Lesson 24 Resource A.) <input type="checkbox"/> Print or open web pages and print plant photographs for students to research plants that attract monarch butterflies. (See Lesson 24 Resource B.)	

Lesson 25

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Crayons, markers, or pencils, 6–12 colors (6 sets) <input type="checkbox"/> Paper, grid or lined (24 sheets, optional) <input type="checkbox"/> Rulers, metric (24)
	Preparation	
	Resources <input type="checkbox"/> Lesson 25 Resource: Monarch Butterfly Waystation Photograph 	
	Setup None	


Lesson 26

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Crayons, markers, or pencils, 6-12 colors (6 sets) <input type="checkbox"/> Rulers, metric (24)
	Preparation	
	Resources None	
	Setup None	

Lesson 27

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Glue sticks (12) <input type="checkbox"/> Scissors (12)
	Preparation	
	Resources None	
	Setup None	

Lesson 28

Materials	Kit Items None	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 1 Resource A: Rhinoceros Woodcut and Photograph 	
	Setup None	

Lesson 29



Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Pencils, 6-12 colors (6 sets)
Preparation	Resources <input type="checkbox"/> Lesson 29 Resource: Content Standards	
	Setup <input type="checkbox"/> Score End-of-Module Assessments and write individual feedback. <input type="checkbox"/> Select End-of-Module Assessment responses to share with students. <input type="checkbox"/> Prepare visual for student connections between module learning and content standards. (See Lesson 29 Resource.)	

Weather Lesson Materials and Preparation


Lesson 1

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Whiteboard, teacher’s (1, optional)
Preparation	Resources None	
	Setup None	

Lesson 2

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Blade of grass or small leaf (1) <input type="checkbox"/> Tape (12 rolls) <input type="checkbox"/> Whiteboard, teacher’s (1, optional)
Preparation 	Resources <input type="checkbox"/> Lesson 2 Resource A: Cloud Sort Photographs <input type="checkbox"/> Lesson 2 Resource B: Extension: Anemometer Building Instructions	
	Setup <input type="checkbox"/> Prepare to distribute cloud sort photographs. (See Lesson 2 Resource A.) <input type="checkbox"/> Cue wind videos: http://phdsci.link/1165 , http://phdsci.link/1166 , http://phdsci.link/1167 . 	
Advance Preparation for Lesson 3 1 Day Before: Make or obtain 36 ice cubes.		

Lesson 3

Materials	Kit Items <input type="checkbox"/> Bottle, clear plastic, 2 L (1) <input type="checkbox"/> Gravel (1 cup) <input type="checkbox"/> Ruler, plastic (1) <input type="checkbox"/> Thermometers, Fahrenheit (12)	School Supplied Items <input type="checkbox"/> Cups, 9 oz (12) <input type="checkbox"/> Ice cubes (36) <input type="checkbox"/> Marker, permanent (1) <input type="checkbox"/> Paper clips (3–4) <input type="checkbox"/> Rubber bands (2) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Water (access)
	Module 1 Kit <input type="checkbox"/> Safety goggles, student (24) <input type="checkbox"/> Safety goggles, teacher (1) <input type="checkbox"/> Thermometers, Fahrenheit (13)	
Preparation	Resources <input type="checkbox"/> Lesson 3 Resource A: Rain Falling in Flower Garden Photograph  <input type="checkbox"/> Lesson 3 Resource B: Rain Gauge Building Instructions	
	Setup <input type="checkbox"/> Cut plastic bottle for rain gauge. (See Lesson 3 Resource B.) <input type="checkbox"/> Prepare cups of ice water (1 per student pair): Fill a 9 oz cup halfway with water and add 3 ice cubes.	

Lesson 4

Materials	Kit Items <input type="checkbox"/> US map (1)	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 4 Resource A: Weather Data Setup Instructions <input type="checkbox"/> Lesson 4 Resource B: Weather Data Table	
	Setup <input type="checkbox"/> Prepare weather conditions data tables: weather data tables (Lesson 4 Resource B; 2), access to online weather data, map (United States or world). (See Lesson 4 Resources A and B.)	

Works Cited

- Adams, Jacqueline. 2003. "Winged Mysteries." *Odyssey*. October 2003, 32–36. Adapted with permission.
- Aston, Diana Hutts, and Sylvia Long (illustrator). 2015. *A Butterfly Is Patient*. San Francisco: Chronicle Books LLC. [All references to *A Butterfly Is Patient* are from this source.]
- BBC Earth. 2016. "Wolves vs Musk Ox." Facebook video, 0:55, posted October 15, 2016. www.facebook.com/bbcearth/videos/1311749815525238/.
- Belchamber, Mark. 2018. "Egg to Butterfly: The Life of a Monarch." YouTube video, 2:54, posted April 12, 2018. https://www.youtube.com/watch?v=wq5zW46t_sM.
- Rosenblatt, Lynn. 2017. "Masses of Monarchs arriving at Cerro Pelon!" YouTube video, 0:36, posted December 7, 2017. <https://www.youtube.com/watch?v=yJtPY5rTGr0>.
- Steig, William. 2009. *Amos & Boris*. New York: Square Fish. [All references to *Amos & Boris* are from this source.]

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