

Preparation Guide

Level 5 Module 2

Ecosystems

with Spotlight Lessons on Weather and Climate

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.

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.
- **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 lesson sets 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
5	6 days†	Teacher Plant Growth Investigation	Leave 50 g potting soil out to dry. (See Lesson 5 Resource A.)
5	5 days†		Prepare green onion plants. (See Lesson 5 Resource A.)


13	10 days	Mold Growth on Raspberries Investigation	Purchase 1 carton of raspberries, and transfer them to a sealed container. (See Lesson 13 Resource B.)
13	6 days		Purchase 2 cartons of raspberries. Transfer 1 carton to a sealed container. (See Lesson 13 Resource B.) Prepare the other carton for Lesson 15. (See Lesson 15 Resource B.)
13	2 days		Purchase 1 carton of raspberries, and transfer them to a sealed container. (See Lesson 13 Resource B.)
15	8 days	Decomposing Raspberries in Sand and Soil Investigation	Transfer raspberries to containers filled with sand and soil. (See Lesson 15 Resource B.) Note: This preparation is concurrent with the preparation for Lesson 13.
16	1 day	Nutrient Testing	Prepare sand and soil water mixtures. (See Lesson 16 Resource A.)
21	2 weeks	Radish Growth Investigation	Plant radish seeds. (See Lesson 21 Resource.)

[Spotlight Lessons on Weather and Sky](#)

Lesson	Time in Advance	Investigation	Description
1	1 day†	Plan to Record Weather Data	Build the rain gauge (Lesson 1 Resource A) at least a day before the lesson. The day before the lesson place it on an uncovered, level area outside.
2	1 day†	Radish Growth Investigation	Make or obtain ice cubes.

Lesson Materials and Preparation


Lesson 1

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Scissors (1)
Preparation 	Resources <input type="checkbox"/> Lesson 1 Resource A: Tree Photograph (optional) <input type="checkbox"/> Lesson 1 Resource B: Mangrove Tree Ecosystem Organism Cards <input type="checkbox"/> <i>The Mangrove Tree</i> by Susan L. Roth and Cindy Trumbore (2011)	
	Setup <input type="checkbox"/> Select an outdoor tree for student observation. Alternatively, project or print color copies of Lesson 1 Resource A. <input type="checkbox"/> Copy and cut out organism cards (Lesson 1 Resource B, 1 card per student).	
	Advance Preparation for Lesson 5 6 or More Days Before: Leave 50 g potting soil out to dry for teacher plant growth investigation. (See Lesson 5 Resource A.) 5 or More Days Before: Prepare green onion plants for teacher plant growth investigation. (See Lesson 5 Resource A.) Reveal results to students in Lesson 5.	
	Advance Preparation for Lesson 13 10 Days Before: Purchase 1 carton of raspberries, and transfer them to a sealed container. (See Lesson 13 Resource B.)	


Lesson 2

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Glue sticks (6) <input type="checkbox"/> Scissors (24)
Preparation	Resources <input type="checkbox"/> <i>The Mangrove Tree</i> by Susan L. Roth and Cindy Trumbore (2011)	
	Setup <input type="checkbox"/> Copy organism cards (Lesson 1 Resource B, 1 page per student).	


Lesson 3

<p>Materials</p>	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Ball, table tennis (1) <input type="checkbox"/> Ball, tennis (1) <input type="checkbox"/> Gloves, disposable (6 pairs, optional) <input type="checkbox"/> Graduated cylinders, plastic, 50 mL (6) <p>Module 1 Kit</p> <ul style="list-style-type: none"> <input type="checkbox"/> Safety goggles, student (24) <input type="checkbox"/> Safety goggles, teacher (1) <input type="checkbox"/> Scales, digital, ± 0.1 g (6) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bottles, clear plastic, 16.9 oz (12) <input type="checkbox"/> Green onion plants (with bulbs) (12) <input type="checkbox"/> Meter sticks (2) <input type="checkbox"/> Paper towels (1 roll) <input type="checkbox"/> Potting soil (600 g) <input type="checkbox"/> Rulers, metric (6) <input type="checkbox"/> Spoons, plastic (6) <input type="checkbox"/> Tape, masking (1 roll) <input type="checkbox"/> Water (500 mL)
<p>Preparation</p>	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 3 Resource: Sequoia Tree and Cone Photographs  <p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Measure 2 m above the floor and 1 m above a desktop. Mark the wall at each location with masking tape to prepare for fair test ball drop. <p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 4 requires the prepared student plant growth investigation materials. <input type="checkbox"/> Lesson 5 requires one each of the graduated cylinders and digital scales. Save all the digital scales for Lesson 13. <input type="checkbox"/> Lesson 8 requires the prepared fair test criteria chart. 	

Lesson 4

Materials	Kit Items None	School Supplied Items None
	Prepared Items from Previous Lessons <input type="checkbox"/> Student plant growth investigation materials from Lesson 3 (6 sets)	
Preparation 	Resources <input type="checkbox"/> Lesson 4 Resource: Sample Student Plant Growth Investigation Plans	
	Setup None	
	Item Reuse <input type="checkbox"/> Lesson 5 requires the prepared student plant growth investigation materials.	
	Advance Preparation for Lessons 13 and 15 6 Days Before Lesson 13 (8 days before Lesson 15): Purchase 2 cartons of raspberries. Transfer 1 carton to a sealed container. (See Lesson 13 Resource B.) Prepare the other carton for Lesson 15 by transferring the raspberries to containers filled with sand and soil. (See Lesson 15 Resource B.)	


Lesson 5

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Graduated cylinder, plastic, 50 mL (1) <input type="checkbox"/> Skewers, wooden, 12" (4) Module 1 Kit <ul style="list-style-type: none"> <input type="checkbox"/> Gloves, disposable (1 pair, optional) <input type="checkbox"/> Scale, digital, ± 0.1 g (1) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Bottles, clear plastic, 16.9 oz (4) <input type="checkbox"/> Green onions (with bulbs) (4) <input type="checkbox"/> Paper towels (1 roll) <input type="checkbox"/> Potting soil (150 g) <input type="checkbox"/> Ruler, metric (1) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Spoon, plastic (1) <input type="checkbox"/> Water (75 mL)
	Prepared Items from Previous Lessons <ul style="list-style-type: none"> <input type="checkbox"/> Student plant growth investigation materials from Lesson 3 (6 sets) 	
Preparation	Resources <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 5 Resource A: Teacher Plant Growth Investigation Setup Instructions <input type="checkbox"/> Lesson 5 Resource B: Sample Plant Growth Investigation Results (optional) <input type="checkbox"/> Lesson 5 Resource C: Wawona Tunnel Tree Images  	
	Setup None Item Reuse <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 13 requires the digital scale. <input type="checkbox"/> Lesson 15 requires the 6 plastic spoons from the student plant growth investigation materials. <input type="checkbox"/> Lesson 21 requires the prepared student plant growth investigation plants. 	








Lesson 6

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Bingo chips, blue, red, yellow (30 each color) 	School Supplied Items None
Preparation	Resources <ul style="list-style-type: none"> <input type="checkbox"/> <i>The Mangrove Tree</i> by Susan L. Roth and Cindy Trumbore (2011) <input type="checkbox"/> <i>Living Sunlight</i> by Molly Bang and Penny Chisholm (2009) 	
	Setup None Item Reuse <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 9 requires the blue and yellow bingo chips. 	

Lesson 7

<p>Materials</p>	<p>Kit Items</p> <p>None</p> <p>Module 1 Kit</p> <p>Syringe, 60 mL (1)</p>	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bowl, microwaveable, 1 qt (1) <input type="checkbox"/> Cups, clear plastic, 9 oz (3) <input type="checkbox"/> Red cabbage leaves (3) <input type="checkbox"/> Sieve (1) <input type="checkbox"/> Straw, plastic (1) <input type="checkbox"/> Sparkling water, clear unopened bottle (1) <input type="checkbox"/> Water (200 mL)
<p>Preparation</p>	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 7 Resource A: Red Cabbage Juice Indicator Preparation <input type="checkbox"/> Lesson 7 Resource B: Conceptual Checkpoint  <input type="checkbox"/> <i>The Mangrove Tree</i> by Susan L. Roth and Cindy Trumbore (2011) <input type="checkbox"/> <i>Living Sunlight</i> by Molly Bang and Penny Chisholm (2009) <p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepare red cabbage juice indicator for animal breathing demonstration (see Lesson 7 Resource A). 	




Lesson 8

Materials	Kit Items None	School Supplied Items None
	Prepared Items from Previous Lessons <input type="checkbox"/> Fair test criteria chart from Lesson 3 (1)	
Preparation 	Resources <input type="checkbox"/> Lesson 8 Resource A: Grizzly Bear Photographs  <input type="checkbox"/> Lesson 8 Resource B: Yellowstone Garbage Dump Photograph  <input type="checkbox"/> Lesson 8 Resource C: Yellowstone Average Annual Precipitation  <input type="checkbox"/> Lesson 8 Resource D: Yellowstone Adult Grizzly Bear Weight  <input type="checkbox"/> Lesson 8 Resource E: Lizard Photographs 	
	Setup <input type="checkbox"/> Cue the video of bears preparing for winter (Clemens 2018): http://phdsci.link/1189 . 	
	Item Reuse <input type="checkbox"/> Lesson 18 requires the prepared fair test criteria chart.	
	Advance Preparation for Lesson 10 2 Days Before: Purchase 1 carton of raspberries, and transfer them to a sealed container. (See Lesson 13 Resource B.) Advance Preparation for Lesson 18 2 Weeks Before: Plant radish seeds for radish growth investigation. (See Lesson 21 Resource.)	



Lesson 9

Materials	Kit Items <input type="checkbox"/> Bingo chips, blue, yellow (90 each color)	School Supplied Items None
	Preparation	
	Resources <input type="checkbox"/> Lesson 9 Resource: Food Sources of Small Aquatic Animals	
	Setup None	
	Item Reuse <input type="checkbox"/> Lesson 17 requires 60 of the blue bingo chips and 60 of the yellow bingo chips.	







Lesson 10

<p>Materials</p>	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Clay, modeling, nonhardening (1 lb) <input type="checkbox"/> Ladles (4) <input type="checkbox"/> Marbles (12) <input type="checkbox"/> Pie tins (4) <input type="checkbox"/> Pipettes, disposable (4) <input type="checkbox"/> Sand (4 cups) <input type="checkbox"/> Tongs, kitchen (4) <input type="checkbox"/> Tweezers (4) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bottles, clear plastic, 16.9 oz (4) <input type="checkbox"/> Bowls, 1 qt or larger (8) <input type="checkbox"/> Corks, cylindrical (12) <input type="checkbox"/> Rice, uncooked (4 cups) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Scissors, blunt tip (4) <input type="checkbox"/> Water (access)
<p>Preparation</p>	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 10 Resource A: Whooping Crane and Northern Harrier Photographs  <input type="checkbox"/> Lesson 10 Resource B: Bird Photographs  <input type="checkbox"/> Lesson 10 Resource C: Model Bird Beaks Procedure Sheet <input type="checkbox"/> Lesson 10 Resource D: Model Bird Beaks Setup Instructions <input type="checkbox"/> Lesson 10 Resource E: Wildlife Photographs <hr/> <p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Cue video of whooping crane: http://phdsci.link/1859.  <input type="checkbox"/> Copy Whooping Crane and Northern Harrier Photographs (Lesson 10 Resource A, 1 copy per station) and Bird Photographs (Lesson 10 Resource B, 1 copy per station). <input type="checkbox"/> Copy Model Bird Beaks Procedure Sheet (Lesson 10 Resource C, 1 sheet per station). <input type="checkbox"/> Set up four identical model bird beaks stations. (See Lesson 10 Resource D.) <p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 21 requires the digital scales. 	


Lesson 11

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Computer or tablets with internet access (4) <input type="checkbox"/> Scissors (1)
Preparation	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 11 Resource A: Black Mangrove Photograph  <input type="checkbox"/> Lesson 11 Resource B: Plant Diagram <input type="checkbox"/> Lesson 11 Resource C: Plant Cards <input type="checkbox"/> Lesson 11 Resource D: Map of Texas Coastline  <input type="checkbox"/> Lesson 11 Resource E: Plant Stations Setup Instructions <input type="checkbox"/> Lesson 11 Resource F: Plant Challenge Cards <p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Copy and cut out plant cards (Lesson 11 Resource C, 1 set for the modified Jigsaw activity and 1 set for display in a class chart). <input type="checkbox"/> Set up four different plant stations. (See Lesson 11 Resource E.) <input type="checkbox"/> Copy and cut out plant challenge cards (Lesson 11 Resource F, 1 set for the plant stations and 1 set for display in a class chart). 	


Lesson 12

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Scissors (1)
Preparation 	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 10 Resource A: Whooping Crane and Northern Harrier Photographs <input type="checkbox"/> Lesson 12 Resource A: Hummingbirds Photograph  <input type="checkbox"/> Lesson 12 Resource B: Animal Cards <p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Copy and cut out animal cards (Lesson 12 Resource B, 1 card per group) <input type="checkbox"/> Cue baby yawning video: http://phdsci.link/1860.  <input type="checkbox"/> Cue tying shoelaces video: http://phdsci.link/1861.  <input type="checkbox"/> Cue coyote pups video: http://phdsci.link/1801.  <input type="checkbox"/> Cue coyote hunting video: http://phdsci.link/1802.  <p>Advance Preparation for Lesson 13</p> <p>1 Day Before: Prepare sand and soil water mixtures. (See Lesson 13 Resource A.)</p>	




Lesson 13

Materials	Kit Items None Module 1 Kit <input type="checkbox"/> Scales, digital, ± 0.1 g (3)	School Supplied Items <input type="checkbox"/> Bags, resealable plastic, 1 qt (3) <input type="checkbox"/> Raspberries, 6 oz containers (3)
	Preparation Resources <input type="checkbox"/> Lesson 13 Resource A: Raspberry Bush Photograph  <input type="checkbox"/> Lesson 13 Resource B: Mold Growth on Raspberries Investigation Setup Instructions	
	Setup None	



Lesson 14

Materials	Kit Items None	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 14 Resource A: “Looking at Mushrooms” Excerpts <input type="checkbox"/> Lesson 14 Resource B: “Recycling the Dead” <input type="checkbox"/> Lesson 14 Resource C: Bacteria Illustration 	
	Setup None	


Lesson 15

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Magnifiers, handheld, plastic (6) <input type="checkbox"/> Sand (460 g) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Bags, resealable plastic, 1 qt (2) <input type="checkbox"/> Containers, small, for sand and soil (12) <input type="checkbox"/> Paper towels (6 sheets) <input type="checkbox"/> Potting soil (330 g) <input type="checkbox"/> Raspberries, 6 oz container (1) <input type="checkbox"/> Spoons, plastic (6)
	Prepared Items from Previous Lessons <ul style="list-style-type: none"> <input type="checkbox"/> Fair test criteria chart from Lesson 3 (1) 	
Preparation	Resources <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 15 Resource A: Human Mummy Photograph  <input type="checkbox"/> Lesson 15 Resource B: Decomposing Raspberries in Sand and Soil Investigation Setup Instructions <input type="checkbox"/> Lesson 15 Resource C: Sand and Soil Photographs  	
	Setup <ul style="list-style-type: none"> <input type="checkbox"/> Cue time-lapse composting video (van Egmond 2017): http://phdsci.link/1190.  <input type="checkbox"/> Prepare containers for sand and soil observation. 	


Lesson 16

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Gloves, disposable (24 pairs) <input type="checkbox"/> Jars with lids, plastic, 16 oz (2) <input type="checkbox"/> Pipettes, disposable (2) <input type="checkbox"/> Sand (13 g) <input type="checkbox"/> Custom soil test kits <ul style="list-style-type: none"> <input type="checkbox"/> Test tubes, color coded, blue, orange, purple (4 each color) <input type="checkbox"/> Blue capsules for phosphorous (4) <input type="checkbox"/> Orange capsules for potassium (4) <input type="checkbox"/> Purple capsules for nitrogen (4) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Markers, permanent (2) <input type="checkbox"/> Potting soil (13 g) <input type="checkbox"/> Water (150 mL)
	Preparation	Resources <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 14 Resource B: “Recycling the Dead” <input type="checkbox"/> Lesson 15 Resource A: Human Mummy Photograph  <input type="checkbox"/> Lesson 16 Resource A: Nutrient Testing Setup Instructions <input type="checkbox"/> Lesson 16 Resource B: Nutrient Testing Procedure Sheet <input type="checkbox"/> Lesson 16 Resource C: Plant Nutrient Comparison Photographs 
Setup <p>None</p>		

Lesson 17

Materials	Kit Items <input type="checkbox"/> Bingo chips, blue, yellow (60 each color)	School Supplied Items <input type="checkbox"/> Pencils, colored (6 sets)
	Preparation	
	Resources <input type="checkbox"/> Lesson 17 Resource: Conceptual Checkpoint  <input type="checkbox"/> <i>The Mangrove Tree</i> by Susan L. Roth and Cindy Trumbore (2011)	
	Setup None	




Lesson 18

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Pencils, colored (48)
	Prepared Items from Previous Lessons <input type="checkbox"/> Student plant growth investigation plants from Lesson 5 (2 per group)	
Preparation	Resources <input type="checkbox"/> Lesson 18 Resource A: Mouse Investigation Description <input type="checkbox"/> Lesson 18 Resource B: Mouse Investigation Results  <input type="checkbox"/> Fair test criteria chart (from Lesson 3)	
	Setup <input type="checkbox"/> Print a copy of Lesson 18 Resource A for each student.	

Lesson 19

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Scissors (1)
Preparation	Resources <input type="checkbox"/> Lesson 19 Resource: Animal Cards	
	Setup <input type="checkbox"/> Print and cut out animal cards (Lesson 19 Resource).	


Lesson 20

Materials	Kit Items None	School Supplied Items None
Preparation	Resources <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 8 Resource A: Grizzly Bear Photographs  <input type="checkbox"/> Lesson 20 Resource A: Atlas Moth Photographs  <input type="checkbox"/> Lesson 20 Resource B: <i>Atlas Moth Information</i> <input type="checkbox"/> Lesson 20 Resource C: Grizzly Bear Information <input type="checkbox"/> Lesson 20 Resource D: Grizzly Bear Weight by Season  <input type="checkbox"/> Lesson 20 Resource E: Life Cycle Sequence Cards Setup <ul style="list-style-type: none"> <input type="checkbox"/> Print a copy of Lesson 20 Resource B for each student. <input type="checkbox"/> Print a copy of Lesson 20 Resource C for each student pair. 	


Lesson 21

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Radish seed packet (1) Module 1 Kit <ul style="list-style-type: none"> <input type="checkbox"/> Scales, digital, ± 0.1 g (6) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Cups, clear plastic, 3 oz (2) <input type="checkbox"/> Potting soil (170 g) <input type="checkbox"/> Rulers, metric (6) <input type="checkbox"/> Water (50 mL)
Preparation	Prepared Items from Previous Lessons <ul style="list-style-type: none"> <input type="checkbox"/> Student plant growth investigation plants from Lesson 5 (2 per group) 	
Preparation	Resources <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 21 Resource: Radish Growth Investigation Setup Instructions <input type="checkbox"/> <i>Living Sunlight</i> by Molly Bang and Penny Chisholm (2009) Setup None	


Lesson 22

Materials	Kit Items None	School Supplied Items None
Preparation	Resources <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 22 Resource: Conceptual Checkpoint  <input type="checkbox"/> <i>The Mangrove Tree</i> by Susan L. Roth and Cindy Trumbore (2011) 	

Lesson 23

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Name tags, adhesive (24) <input type="checkbox"/> Yarn balls (6)
Preparation	Resources <input type="checkbox"/> Lesson 23 Resource A: Emerald Ash Borer Photograph  <input type="checkbox"/> Lesson 23 Resource B: Emerald Ash Borer Invasion of North American Forests Excerpts <input type="checkbox"/> <i>The Mangrove Tree</i> by Susan L. Roth and Cindy Trumbore (2011)	
	Setup <input type="checkbox"/> Prepare name tags for ecosystem modeling.	


Lesson 24

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Computers or tablets with internet access (4)
Preparation	Resources <input type="checkbox"/> Lesson 24 Resource A: Engineering Design Process  <input type="checkbox"/> Lesson 24 Resource B: Emerald Ash Borer Resources <input type="checkbox"/> <i>The Mangrove Tree</i> by Susan L. Roth and Cindy Trumbore (2011)	
	Setup <input type="checkbox"/> Prepare research materials for students (see Lesson 24 Resource B).	

Lesson 25

No materials or preparation required.

Lesson 26

Materials	Kit Items None	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 24 Resource A: Engineering Design Process  <input type="checkbox"/> <i>The Mangrove Tree</i> by Susan L. Roth and Cindy Trumbore (2011)	
	Setup None	


Lesson 27

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Glue sticks (12) <input type="checkbox"/> Scissors (24)
	Preparation	Resources None Setup None

Lesson 28

No materials or preparation required.

Lesson 29



Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Pencils, colored (24)
	Preparation 	Resources <input type="checkbox"/> Lesson 29 Resource: Content Standards Setup <input type="checkbox"/> Score End-of-Module Assessment 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). Advance Preparation for Spotlight Lesson 1 1 Day Before: Build the rain gauge. (See Lesson 1 Resource A.) Place the rain gauge in an uncovered, level area outside 1 day before the lesson.

Spotlight Lessons on Weather and Climate

Lesson 1


Materials	Kit Items <input type="checkbox"/> Bottle, clear plastic, 2 L (1) <input type="checkbox"/> Pole, telescoping (1) <input type="checkbox"/> Ruler, plastic (1) <input type="checkbox"/> Thermometers, Fahrenheit (12) <input type="checkbox"/> Windsock (1)	School Supplied Items <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"/> Gravel (1 cup) ety goggles, student (24) <input type="checkbox"/> Safety goggles, teacher (1)	
Preparation	Resources <input type="checkbox"/> Lesson 1 Resource A: Rain Gauge Building Instructions <input type="checkbox"/> Lesson 1 Resource B: Weather Condition Categories (optional)	
	Setup None	

Lesson 2

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Glue sticks (24) <input type="checkbox"/> Scissors (1)
Preparation	Resources <input type="checkbox"/> Lesson 2 Resource A: Using the NOAA Climate at a Glance Website: City Time Series <input type="checkbox"/> Lesson 2 Resource B: Seasonal Weather Conditions Chart  <input type="checkbox"/> Lesson 2 Resource C: Historical Weather Conditions Graphs Preparation Instructions <input type="checkbox"/> Lesson 2 Resource D: Sample Weather Data: Dallas, Texas  <input type="checkbox"/> Lesson 2 Resource E: Weather and Climate Cards	
	Setup <input type="checkbox"/> Prepare seasonal weather conditions chart. (See Lesson 2 Resources A and B.) <input type="checkbox"/> Prepare historical weather data graphs for each student pair. (See Lesson 2 Resources A and C.) <input type="checkbox"/> Prepare to distribute weather and climate cards. (See Lesson 2 Resource E.)	
Advance Preparation for Spotlight Lesson 3		

	1 Day Before: Make or obtain ice cubes.
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Lesson 3

Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Heat lamp with 125 W bulb (1) <input type="checkbox"/> Measuring cup, 1L (1) <p>Module 1 Kit</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bin, clear plastic 6 qt (1) <input type="checkbox"/> Scale, digital, ± 0.1 g (1) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bag, resealable plastic, 1 qt (1) <input type="checkbox"/> Ice cubes (6) <input type="checkbox"/> Plastic wrap (1 roll) <input type="checkbox"/> Table salt (35 g) <input type="checkbox"/> Tape, masking (1 roll) <input type="checkbox"/> Water (1 L)
Preparation	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 3 Resource A: Ocean Model Setup Instructions <input type="checkbox"/> Lesson 3 Resource B: Statue of Liberty Photographs  <input type="checkbox"/> Lesson 3 Resource C: Evaporation Investigation Photographs <p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepare ocean model. (See Lesson 3 Resource A.) 	

Works Cited

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Clemens, Danny. 2018. "Fat Bear Week: Katmai National Park & Preserve Names Fattest Bear Ahead of Winter Hibernation." ABC 11 News, video, 0:43, posted October 11, 2018 <https://abc11.com/pets-animals/fat-bear-week-watch-these-burly-bears-eat-their-way-to-hibernation/4421356>.

Kowalski, Kathiann. 2014. "Recycling the Dead." *Science News for Students*, September 27, 2014. <https://www.sciencenewsforstudents.org/article/recycling-dead>.

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