

Preparation Guide

Level K Module 1

Weather with Spotlight Lessons on Forces and Motion

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 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
2	1 day†	Anchor Model Setup	Collect materials for the anchor model and assemble boxes to use to develop the model during the lesson. (See Lesson 2 Resource C.)
5	1 day†	Thermometer Setup	Prepare indoor-outdoor thermometer, student thermometers, and demonstration thermometer. (See Lesson 5 Resources A, B, and C.)



6–7	2 days†	Wind Measuring Tool Activity	Arrange for an adult to operate the fan and hair dryer during Lessons 6 and 7.
9	2 days	Sunlight, Shade, and Temperature Investigation Planning	Lesson 9 requires a sunny day. Check the local weather forecast to identify a day when the weather will be sunny. If needed, teach Lesson 9 before Lesson 8. If it is not possible to teach Lesson 9 outside on a sunny day, use the alternative activity that appears in Lesson 9 Resource B. (See additional instructions in the Lesson 7 Preparation section.)
13	1 day†	Roof Materials Preparation	Prepare roof materials for student exploration and shelter building. Cut the aluminum foil, plastic mesh, lace, and screen into 3" × 5" pieces. Cut enough of the materials to create 70 pieces of aluminum foil and 40 pieces each of plastic mesh, lace, and screen. Also gather 120 jumbo craft sticks and 70 index cards. Then determine how students will retrieve roof materials during lesson activities. Either line up materials for students to access when needed or gather a set of materials for each student pair beforehand. (See additional instructions in the Lesson 12 Preparation section.)
18	1 month†	Monthly Temperature Data Analysis	Take a class photograph outside during the first week of school.

Weather Lesson Materials and Preparation

Lesson 1

<p>Materials</p>	<p>Kit Items</p> <p>None</p>	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Camera, digital (1) <input type="checkbox"/> Tent-building materials (e.g., blankets, cardboard, boxes, poster boards, sheets, tarps, towels) (6 sets)
<p>Preparation</p> 	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 1 Resource A: Tent in Rain Photograph  <input type="checkbox"/> Lesson 1 Resource B: Tent-Building Setup Instructions <hr/> <p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Gather tent-building materials and identify indoor or outdoor areas where student groups can build their tents. (See Lesson 1 Resource B.) <p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 8 requires the digital camera. <p>Advance Preparation for Lesson 2</p> <p>1 Day Before: Collect materials for the anchor model and assemble boxes to use to develop the model during the lesson. (See Lesson 2 Resource C.)</p> <p>Advance Preparation for Lesson 18</p> <p>1 Month Before: Take a class photograph outside during the first week of school.</p>	


Lesson 2

<p>Materials</p>	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Binder rings, 1" (24) <input type="checkbox"/> Box, cardboard, 12" × 12" × 12", unassembled (1) <input type="checkbox"/> Dolls, wooden (3) <input type="checkbox"/> Floor tiles, adhesive backing, 12" × 12" (2) <input type="checkbox"/> Knowledge Deck™ cards, Mesa Verde Long Ago (24) <input type="checkbox"/> Knowledge Deck poster, Mesa Verde Long Ago (1) <input type="checkbox"/> Sticky note arrows (48) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Cardboard box, 4" × 4" × 5" or smaller (1) <input type="checkbox"/> Marker, permanent (1) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Sheet or blanket (1) <input type="checkbox"/> Tape, packing, clear, 2" wide (partial roll) <input type="checkbox"/> US map (1, optional)
<p>Preparation</p>	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 1 Resource A: Tent in Rain Photograph <input type="checkbox"/> Lesson 2 Resource A: Mesa Verde National Park Photograph  <input type="checkbox"/> Lesson 2 Resource B: Mesa Verde Cliff Dwelling Photograph  <input type="checkbox"/> Lesson 2 Resource C: Anchor Model Setup Instructions <p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Identify two corners or areas of the classroom to use for a Question Corners routine. Prepare a copy of the photographs in Lesson 1 Resource A and Lesson 2 Resource B. During the lesson, post one photograph in each corner. <p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 11 requires the prepared anchor model and the Mesa Verde Long Ago Knowledge Deck poster. 	

Lesson 3

Materials	Kit Items <input type="checkbox"/> Sentence strips (2)	School Supplied Items <input type="checkbox"/> Pocket chart (1) <input type="checkbox"/> Scissors (1)
Preparation	Resources <input type="checkbox"/> Lesson 3 Resource A: Outdoor Activity Cards <input type="checkbox"/> Lesson 3 Resource B: Weather Symbols	
	Setup <input type="checkbox"/> Prepare outdoor activity cards. (See Lesson 3 Resource A.) <input type="checkbox"/> Select four outdoor activity cards and post them in different corners of the classroom for a Question Corners routine. At least one card should show an activity that students could do outside in today’s weather and at least one card should show an activity that students would have difficulty doing outside in today’s weather. <input type="checkbox"/> Prepare weather symbols. (See Lesson 3 Resource B.)	



Lesson 4

Materials	Kit Items <input type="checkbox"/> Calendar pocket chart (1) <ul style="list-style-type: none"> <input type="radio"/> Days of the week cards (7) <input type="radio"/> Month cards (12) <input type="radio"/> Number cards (31) <input type="checkbox"/> Sentence strip (1)	School Supplied Items <input type="checkbox"/> Construction paper, blue, green, orange, purple, red, yellow, 9" × 12" (3 sheets each color) <input type="checkbox"/> Glue stick (1) <input type="checkbox"/> Ruler (1) <input type="checkbox"/> Scissors (1)
Preparation 	Resources <input type="checkbox"/> Lesson 4 Resource A: Weather Cards <input type="checkbox"/> Lesson 4 Resource B: Weather Calendar Setup Instructions <input type="checkbox"/> Lesson 4 Resource C: Weather Calendar Suggestions	
	Setup <input type="checkbox"/> Prepare weather cards. (See Lesson 4 Resource A.) <input type="checkbox"/> Prepare weather calendar. (See Lesson 4 Resources B and C.)	
	Item Reuse <input type="checkbox"/> Lesson 5 requires the prepared weather calendar. <input type="checkbox"/> Lesson 21 requires 1 blue, 3 green, and 2 orange prepared construction paper squares.	
	Advance Preparation for Lesson 5 1 Day Before: Prepare indoor-outdoor thermometer, student thermometers, and demonstration thermometer. (See Lesson 5 Resources A, B, and C.)	
	Advance Preparation for Lesson 6 2 Days Before: Arrange for an adult to operate the fan and hair dryer during the wind measuring tool activity.	



Lesson 5

Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Safety goggles (24) <input type="checkbox"/> Thermometer, demonstration (1) <input type="checkbox"/> Thermometer, indoor-outdoor (1) <input type="checkbox"/> Thermometers, Fahrenheit, plastic back (12) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Construction paper, blue, green, orange, purple, red, yellow, 9" × 12" (1 sheet each color) <input type="checkbox"/> Containers, insulated, large (2) <input type="checkbox"/> Crayons, red (24) <input type="checkbox"/> Cups, disposable, insulated, 12 oz (27) <input type="checkbox"/> Ice cubes (about 52) <input type="checkbox"/> Paper towels (partial roll) <input type="checkbox"/> Plates, rimmed heavy paper, 7" (24) <input type="checkbox"/> Ruler (1) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Stapler (1) <input type="checkbox"/> Tape, packing, clear, 2" wide (partial roll) <input type="checkbox"/> Water (access)
	<p>Prepared Items from Previous Lessons</p> <ul style="list-style-type: none"> <input type="checkbox"/> Weather calendar from Lesson 4 (1) 	
Preparation	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 5 Resource A: Indoor-Outdoor Thermometer Setup Instructions <input type="checkbox"/> Lesson 5 Resource B: Student Thermometer Setup Instructions <input type="checkbox"/> Lesson 5 Resource C: Demonstration Thermometer Setup Instructions <input type="checkbox"/> Lesson 5 Resource D: Temperature Comparison Demonstration Setup Instructions and Procedure <input type="checkbox"/> Lesson 5 Resource E: Thermometer Exploration Setup Instructions and Classroom Procedure 	
	<p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepare materials for temperature comparison demonstration. (See Lesson 5 Resource D.) <input type="checkbox"/> Prepare materials for thermometer exploration. (See Lesson 5 Resource E.) 	
	<p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 6 requires the prepared indoor-outdoor thermometer and prepared weather calendar. <input type="checkbox"/> Lesson 9 requires the red crayons, prepared demonstration thermometer, and prepared student thermometers. 	


Lesson 6

Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Safety goggles (24) <input type="checkbox"/> Table fan (1) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Craft foam 9" × 12" (1 sheet) <input type="checkbox"/> Envelope, manila, 9" × 12" (1) <input type="checkbox"/> Felt, 9" × 12" (1 sheet) <input type="checkbox"/> Flagging tape, 1" thick (9 ft) <input type="checkbox"/> Hair dryer with cool setting (1) <input type="checkbox"/> Magnet (1, optional) <input type="checkbox"/> Paper, tissue, 9" × 12" (1 sheet) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Yarn (9 ft)
	<p>Prepared Items from Previous Lessons</p> <ul style="list-style-type: none"> <input type="checkbox"/> Indoor-outdoor thermometer from Lesson 5 (1) <input type="checkbox"/> Weather calendar from Lesson 4 (1) 	
Preparation	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 6 Resource A: Wind Measuring Tool Activity Setup Instructions <input type="checkbox"/> Lesson 6 Resource B: Engineering Design Process Visual  	
	<p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepare materials for wind measuring tool activity. (See Lesson 6 Resource A.) <input type="checkbox"/> Cue flag in wind and flag in weak wind videos: http://phdsci.link/1510 and http://phdsci.link/1511.  <p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 7 requires the table fan, prepared indoor-outdoor thermometer, prepared weather calendar, and prepared wind measuring tool materials. 	


Lesson 7

Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Clothespins, wooden, 3" (24) <input type="checkbox"/> Safety goggles (24) <input type="checkbox"/> Table fan (1) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Clipboard (1) <input type="checkbox"/> Hair dryer with cool setting (1) <input type="checkbox"/> Magnet (1, optional) <input type="checkbox"/> Marker, dry erase (1) <input type="checkbox"/> Paper, 11" × 17" or larger (4 sheets) <input type="checkbox"/> Rulers (12) <input type="checkbox"/> Sheet protector (1)
	<p>Prepared Items from Previous Lessons</p> <ul style="list-style-type: none"> <input type="checkbox"/> Indoor-outdoor thermometer from Lesson 5 (1) <input type="checkbox"/> Weather calendar from Lesson 4 (1) <input type="checkbox"/> Wind measuring tool materials from Lesson 6 (6 sets) 	
<p>Preparation</p> 	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 6 Resource B: Engineering Design Process Visual  <input type="checkbox"/> Lesson 7 Resource A: Daily Weather Report Setup Instructions and Procedure <input type="checkbox"/> Lesson 7 Resource B: Temperature and Weather Log Setup Instructions 	
	<p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepare materials for daily weather report. (See Lesson 7 Resources A and B.) 	
	<p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 11 requires the prepared daily weather report materials. <input type="checkbox"/> Lesson 18 requires the prepared weather calendar. <p>Advance Preparation for Lesson 9</p> <p>2 days Before: Lesson 9 requires a sunny day. Check the local weather forecast to identify a day when the weather will be sunny. If needed, teach Lesson 9 before Lesson 8. If it is not possible to teach Lesson 9 outside on a sunny day, use the alternative activity that appears in Lesson 9 Resource B.</p>	


Lesson 8

<p>Materials</p>	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Containers, clear plastic, round, 8 oz (8) <input type="checkbox"/> Flashlight with batteries (1) <input type="checkbox"/> Gravel/Small rocks (5 cups) <input type="checkbox"/> Pans, aluminum, 13" × 9" × 2" (7) <input type="checkbox"/> Safety goggles (24) <input type="checkbox"/> Sentence strip (1) <input type="checkbox"/> Spice shakers, 4 oz (6) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Cardboard, 6" × 6" (6) <input type="checkbox"/> Camera, digital (1) <input type="checkbox"/> Marker, permanent (1) <input type="checkbox"/> Measuring cup, dry, $\frac{1}{3}$ cup (1) <input type="checkbox"/> Newspapers (6 sheets) <input type="checkbox"/> Paper towels (partial roll) <input type="checkbox"/> Plants, small with leaves (or alternatives) (7) <input type="checkbox"/> Potting soil ($2\frac{1}{3}$ cups) <input type="checkbox"/> Scissors (1) <input type="checkbox"/> Water (access)
<p>Preparation</p>	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 8 Resource A: Playground Photograph  <input type="checkbox"/> Lesson 8 Resource B: Wind and Rain Investigation and Sunlight Investigation Setup Instructions <input type="checkbox"/> Lesson 8 Resource C: Investigate the Effects of Sunlight Alternative Activities <hr/> <p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Take a photograph of the school's playground (or other outdoor play area) before the lesson. <input type="checkbox"/> Prepare materials for wind and rain investigation and sunlight investigation. (See Lesson 8 Resource B.) If the weather is cloudy on the day of the lesson and the small rocks cannot be warmed in the sunlight, conduct the sunlight investigation during Lesson 9 or use an alternative activity. (For alternative activities, see Lesson 8 Resource C.) <p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 11 requires 1 of the 6" × 6" pieces of cardboard, the flashlight with batteries, and 1 of the spice shakers. 	





Lesson 9

Materials	Kit Items <input type="checkbox"/> Sentence strip (1)	School Supplied Items <input type="checkbox"/> Crayons, red (24) <input type="checkbox"/> Cups, disposable, insulated, 12 oz (2) <input type="checkbox"/> Index card (1, optional) <input type="checkbox"/> Water (12 oz)
	Prepared Items from Previous Lessons <input type="checkbox"/> Demonstration thermometer from Lesson 5 (1) <input type="checkbox"/> Student thermometers from Lesson 5 (2)	
Preparation	Resources <input type="checkbox"/> Lesson 9 Resource A: Covered Playground Photograph  <input type="checkbox"/> Lesson 9 Resource B: Investigate Sunlight, Shade, and Temperature Alternative Activity	
	Setup <input type="checkbox"/> Lesson 9 requires a sunny day. Check the local weather forecast to identify a day when the weather will be sunny. If needed, teach Lesson 9 before Lesson 8. If it is not possible to teach Lesson 9 outside on a sunny day, use the alternative activity that appears in Lesson 9 Resource B. <input type="checkbox"/> Locate a safe, outdoor location (such as a playground or other outdoor play area) to take students to during Lesson 9 for the sunlight, shade, and temperature investigation. The location should have areas of sunlight and shade. <input type="checkbox"/> Prepare materials for sunlight, shade, and temperature investigation. Fill two 12 oz disposable insulated cups halfway with room temperature water. At least one hour before Lesson 9, take the cups to the outdoor location selected for the investigation. Place one cup in direct sunlight and place the other cup in the shade. When students go outside during the lesson, bring along the other materials for the investigation (pencil, sticky note or index card, student thermometers). Item Reuse <input type="checkbox"/> Lesson 11 requires the prepared demonstration thermometer.	




Lesson 10

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Glue sticks (6) <input type="checkbox"/> Paper, 11" × 17" or larger (6 sheets) <input type="checkbox"/> Scissors (1)
Preparation	Resources <input type="checkbox"/> Lesson 10 Resource: Shelter Posters Setup Instructions	
	Setup <input type="checkbox"/> Cue yurt video, apartment building video, and cave dwelling video: http://phdsci.link/1515 , http://phdsci.link/1516 , and http://phdsci.link/1517 .  <input type="checkbox"/> Prepare shelter posters and weather symbol cards. (See Lesson 10 Resource.)	


Lesson 11

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Flashlight with batteries (1) <input type="checkbox"/> Gravel/Small rocks ($\frac{1}{2}$ cup) <input type="checkbox"/> Knowledge Deck poster, Mesa Verde Long Ago (1) <input type="checkbox"/> Labels, removable, $2 \frac{5}{8}'' \times 1''$ (6) <input type="checkbox"/> Spice shaker, 4 oz (1) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Cardboard, 6" × 6" (1) <input type="checkbox"/> Marker, permanent (1) <input type="checkbox"/> Water (4 oz)
	Prepared Items from Previous Lessons <ul style="list-style-type: none"> <input type="checkbox"/> Daily weather report materials from Lesson 7 (1 set) <input type="checkbox"/> Anchor model from Lesson 2 (1) <input type="checkbox"/> Demonstration thermometer from Lesson 5 (1) 	
Preparation	Resources <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 11 Resource A: Weather Recording Sheet  <input type="checkbox"/> Lesson 11 Resource B: Conceptual Checkpoint  	
	Setup <ul style="list-style-type: none"> <input type="checkbox"/> Prepare two color copies of Lesson 11 Resource A to use during the lesson. Label a sketch of the school on one copy and a photograph or another image of Spruce Tree House on the other copy. <input type="checkbox"/> Cue Spruce Tree House webcam (NPS 2020): http://phdsci.link/1518.  <input type="checkbox"/> Prepare to distribute a copy of Lesson 11 Resource B to each student. <input type="checkbox"/> Place small rocks inside and on top of the anchor model. <input type="checkbox"/> Open Street View of Spruce Tree House on Google Maps™ mapping service: http://phdsci.link/1471.  Item Reuse <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 12 requires the prepared anchor model and the flashlight with batteries. <input type="checkbox"/> Lesson 17 requires the prepared demonstration thermometer. <input type="checkbox"/> Lesson 21 requires the Mesa Verde Long Ago Knowledge Deck poster. 	


Lesson 12

Materials	Kit Items	School Supplied Items
	<input type="checkbox"/> Flashlight with batteries (1) <input type="checkbox"/> Gravel/Small rocks ($\frac{1}{2}$ cup)	<input type="checkbox"/> Equity sticks (class set) <input type="checkbox"/> Magnet (1, optional)
	Prepared Items from Previous Lessons	
	<input type="checkbox"/> Anchor model from Lesson 2 (1)	
Preparation 	Resources	
	<input type="checkbox"/> Lesson 6 Resource B: Engineering Design Process Visual  <input type="checkbox"/> Lesson 12 Resource A: Engineering Challenge Rubric <input type="checkbox"/> Lesson 12 Resource B: Mesa Verde Dig Site Template	
	Setup	
	<input type="checkbox"/> Cue “Native American Ruins near Durango” video (<i>Durango Herald</i> 2019): http://phdsci.link/1520 .  <input type="checkbox"/> Prepare a copy of Lesson 12 Resource B and place it on top of the anchor model. Then use the template as a guide to construct a model dig site. Make three rings of small rocks on the circles to represent dig sites, and position three wooden dolls on the crosshairs to represent archaeologists.	
	Item Reuse	
	<input type="checkbox"/> Lesson 13 requires the flashlight with batteries and prepared Mesa Verde dig site model. <input type="checkbox"/> Lesson 21 requires the prepared anchor model.	
	Advance Preparation for Lesson 13	
	1 Day Before: Prepare roof materials for student exploration and shelter building. Cut the aluminum foil, plastic mesh, lace, and screen into 3” × 5” pieces. Cut enough of the materials to create 70 pieces of aluminum foil and 40 pieces each of plastic mesh, lace, and screen. Also gather 120 jumbo craft sticks and 70 index cards. Then determine how students will retrieve roof materials during lesson activities. Either line up materials for students to access when needed or gather a set of materials for each student pair beforehand.	


Lesson 13

Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Craft sticks, jumbo (120) <input type="checkbox"/> Flashlights with batteries (6) <input type="checkbox"/> Lace (6 sq ft) <input type="checkbox"/> Plastic mesh (6 sq ft) <input type="checkbox"/> Safety goggles (24) <input type="checkbox"/> Screen (6 sq ft) <input type="checkbox"/> Straw connector set (1) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Aluminum foil (1 roll) <input type="checkbox"/> Index cards 3" × 5" (70) <input type="checkbox"/> Magnet (1, optional) <input type="checkbox"/> Ruler (1) <input type="checkbox"/> Tape, clear (1 roll)
	<p>Prepared Items from Previous Lessons</p> <ul style="list-style-type: none"> <input type="checkbox"/> Mesa Verde dig site model from Lesson 12 (1) 	
Preparation	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 6 Resource B: Engineering Design Process Visual  <input type="checkbox"/> Lesson 12 Resource A: Engineering Challenge Rubric <input type="checkbox"/> Lesson 12 Resource B: Mesa Verde Dig Site Template <input type="checkbox"/> Lesson 13 Resource: Shelter Frame Setup Instructions 	
	<p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepare shelter frames. (See Lesson 13 Resource.) <p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 14 requires the prepared Mesa Verde dig site model, prepared roof materials, and prepared shelter frames. <input type="checkbox"/> Lesson 15 requires the flashlights with batteries. 	



Lesson 14

Materials	Kit Items <input type="checkbox"/> Dolls, wooden (36) <input type="checkbox"/> Safety goggles (24) <input type="checkbox"/> Tape, painter’s (partial roll)	School Supplied Items <input type="checkbox"/> Equity sticks (class set) <input type="checkbox"/> Magnet (1, optional)
	Prepared Items from Previous Lessons <input type="checkbox"/> Mesa Verde dig site model from Lesson 12 (1) <input type="checkbox"/> Roof materials from Lesson 13 (6 sets) <input type="checkbox"/> Shelter frames from Lesson 13 (12)	
Preparation	Resources <input type="checkbox"/> Lesson 6 Resource B: Engineering Design Process Visual  <input type="checkbox"/> Lesson 12 Resource A: Engineering Challenge Rubric <input type="checkbox"/> Lesson 12 Resource B: Mesa Verde Dig Site Template	
	Setup <input type="checkbox"/> Prepare to distribute a copy of Lesson 12 Resource B to each student pair.	
	Item Reuse <input type="checkbox"/> Lesson 15 requires the wooden dolls, prepared Mesa Verde dig site model, prepared roof materials, and prepared shelter frames.	


Lesson 15

Materials	Kit Items <input type="checkbox"/> Dolls, wooden (36) <input type="checkbox"/> Flashlights with batteries from Lesson 13 (6) <input type="checkbox"/> Safety goggles (24) <input type="checkbox"/> Tape, painter’s (partial roll)	School Supplied Items <input type="checkbox"/> Magnet (1, optional)
	Prepared Items from Previous Lessons <input type="checkbox"/> Mesa Verde dig site model from Lesson 12 (1) <input type="checkbox"/> Roof materials from Lesson 13 (6 sets) <input type="checkbox"/> Shelter frames from Lesson 13 (12)	
Preparation	Resources <input type="checkbox"/> Lesson 6 Resource B: Engineering Design Process Visual  <input type="checkbox"/> Lesson 12 Resource A: Engineering Challenge Rubric	
	Setup None	

Lesson 16

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Magnet (1, optional)
Preparation	Resources <input type="checkbox"/> Lesson 6 Resource B: Engineering Design Process Visual  <input type="checkbox"/> Lesson 12 Resource A: Engineering Challenge Rubric <input type="checkbox"/> Lesson 16 Resource: Casa Batlló Photographs 	
	Setup None	


Lesson 17

Materials	Kit Items <input type="checkbox"/> Sentence strips (2)	School Supplied Items <input type="checkbox"/> Construction paper, blue, green, orange, purple, red, yellow, 9" × 12" (1 sheet each color) <input type="checkbox"/> Glue stick (1) <input type="checkbox"/> Stickers, small dot (5)
	Prepared Items from Previous Lessons <input type="checkbox"/> Demonstration thermometer from Lesson 5 (1)	
Preparation	Resources <input type="checkbox"/> Lesson 17 Resource A: Times of Day Photographs  <input type="checkbox"/> Lesson 17 Resource B: Daily Temperature Chart Setup Instructions	
	Setup <input type="checkbox"/> Identify three corners or areas of the classroom to use for a Question Corners routine. Prepare a color copy of each photograph in Lesson 17 Resource A. During the lesson, post one photograph in each corner. <input type="checkbox"/> Prepare daily temperature chart. (See Lesson 17 Resource B.)	
Item Reuse <input type="checkbox"/> Lesson 18 requires the prepared demonstration thermometer.		


Lesson 18

Materials	<p>Kit Items</p> <p>None</p>	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bags, resealable plastic, 1 gal (12) <input type="checkbox"/> Construction paper, blue, green, orange, purple, red, yellow, 9" × 12" (1 sheet each color) <input type="checkbox"/> Glue stick (1) <input type="checkbox"/> Linking cubes, blue, green, orange, purple, red, yellow (12 sets) <input type="checkbox"/> Paper, 11" × 17" or larger (1 sheet)
	<p>Prepared Items from Previous Lessons</p> <ul style="list-style-type: none"> <input type="checkbox"/> Demonstration thermometer from Lesson 5 (1) <input type="checkbox"/> Weather calendar from Lesson 4 (1) 	
Preparation	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Photograph of students outside during the first week of school 	
	<p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> On the weather calendar, identify a 3- to 5-day span during which the temperature remained in the same color band (e.g., five green squares in a row). Cover the rest of the weather calendar before Lesson 18 so that only the selected days are visible. <input type="checkbox"/> Prepare bags of linking cubes for temperature data analysis. For each student pair, prepare 1 bag of cubes that correspond in color and quantity to the temperature squares on the weather calendar for the first month of school. 	
	<p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 19 requires the plastic bags, linking cubes, prepared weather calendar, and prepared monthly weather poster. 	




Lesson 19

Materials	Kit Items None	School Supplied Items <input type="checkbox"/> Bags, resealable plastic, 1 gal (12) <input type="checkbox"/> Linking cubes, blue, green, orange, purple, red, yellow (12 sets) <input type="checkbox"/> Paper, printer, 8.5" × 11" (1 sheet) <input type="checkbox"/> Stickers, small dot (5)
	Prepared Items from Previous Lessons <input type="checkbox"/> Weather calendar from Lesson 4 (1) <input type="checkbox"/> Monthly weather poster from Lesson 18 (1)	
Preparation	Resources <input type="checkbox"/> Lesson 19 Resource: Cloud Cover Photographs 	
	Setup <input type="checkbox"/> Prepare a copy of the completed weather log for the first month of school for each student pair. <input type="checkbox"/> Prepare bags of linking cubes for weather data analysis. For each student pair, prepare 1 bag with enough linking cubes to represent the data on the first month of school's weather log for each part of weather. Consider using a different color linking cube for each part of weather.	
	Item Reuse <input type="checkbox"/> Lesson 21 requires the plastic bags and linking cubes. <input type="checkbox"/> Lesson 22 requires the prepared weather calendar.	




Lesson 20

Materials	Kit Items <input type="checkbox"/> Sentence strips (2)	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 20 Resource: Weather Forecasts	
	Setup <input type="checkbox"/> Identify and cue a video of a local weather forecast from a television broadcast or online resource. If possible, use a video that shows the forecast for the upcoming weekend. <input type="checkbox"/> Cue meteorologist video: http://phdsci.link/1557 .  <input type="checkbox"/> Prepare weather forecasts. (See Lesson 20 Resource.)	


Lesson 21

Materials	<p>Kit Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Gravel/Small rocks ($\frac{1}{4}$ cup) <input type="checkbox"/> Knowledge Deck cards, Farming at Mesa Verde (24) <input type="checkbox"/> Knowledge Deck posters <ul style="list-style-type: none"> ○ Farming at Mesa Verde (1) ○ Mesa Verde Long Ago (1) 	<p>School Supplied Items</p> <ul style="list-style-type: none"> <input type="checkbox"/> Bags, resealable plastic, 1 gal (18) <input type="checkbox"/> Crayon, black (1) <input type="checkbox"/> Marker, permanent (1) <input type="checkbox"/> Linking cubes, blue (54), green (258), orange (54), yellow (174) <input type="checkbox"/> Glue stick (1)
	<p>Prepared Items from Previous Lessons</p> <ul style="list-style-type: none"> <input type="checkbox"/> Construction paper squares, 3" × 3", blue (1), green (3), orange (2) from Lesson 4 <input type="checkbox"/> Anchor model from Lesson 12 (1) 	
Preparation	<p>Resources</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 21 Resource A: Linking Cube Bag Setup Instructions <input type="checkbox"/> Lesson 21 Resource B: Mesa Verde Temperature Logs  <input type="checkbox"/> Lesson 21 Resource C: Conceptual Checkpoint  	
	<p>Setup</p> <ul style="list-style-type: none"> <input type="checkbox"/> Prepare linking cube bags. (See Lesson 21 Resource A.) <input type="checkbox"/> Prepare Mesa Verde daily temperature chart. Use a marker to recreate on chart paper the chart in the Conceptual Checkpoint Part B section of Lesson 21. Each cell should be large enough to fit a 3" × 3" construction paper square. Populate the Saturday row by attaching temperature color squares for morning (blue), afternoon (orange), and night (green). Label each square with its numerical temperature. Prepare two more green squares and one more orange square to add to the Sunday row during the lesson. <input type="checkbox"/> Prepare to distribute a color copy of Lesson 21 Resource C to each student. <input type="checkbox"/> Cue Mesa Verde Balcony House virtual tour (CyArk 2020): http://phdsci.link/1558.  <p>Item Reuse</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lesson 27 requires the prepared anchor model and the Mesa Verde Long Ago Knowledge Deck poster. 	



Lesson 22

Materials	Kit Items None	School Supplied Items None
	Prepared Items from Previous Lessons <input type="checkbox"/> Weather calendar from Lesson 4 (1)	
Preparation	Resources <input type="checkbox"/> Lesson 22 Resource A: Fallen Branches Photograph  <input type="checkbox"/> Lesson 22 Resource B: Thunderstorm Photographs  <input type="checkbox"/> Lesson 22 Resource C: Severe Weather Symbols <input type="checkbox"/> Lesson 22 Resource D: Severe Weather Photographs	
	Setup <input type="checkbox"/> Identify several consecutive days of mild weather (e.g., sunny, partly sunny, not windy, a little windy) on the weather calendar. <input type="checkbox"/> Cue thunderstorm video, typhoon video, tornado video, and blizzard video: http://phdsci.link/1526 , http://phdsci.link/1528 , http://phdsci.link/1529 , and http://phdsci.link/1527 .  <input type="checkbox"/> Prepare severe weather symbols. (See Lesson 22 Resource C.) <input type="checkbox"/> Prepare to distribute a copy of Lesson 22 Resource D to students. During the lesson, each group will receive photographs for one kind of severe weather.	


Lesson 23

Materials	Kit Items <input type="checkbox"/> Sentence strips (2)	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 22 Resource C: Severe Weather Symbols <input type="checkbox"/> Lesson 23 Resource: Effects of Drought on Plants Photograph 	
	Setup None	



Lesson 24

Materials	Kit Items <input type="checkbox"/> Sentence strip (1)	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 23 Resource: Effects of Drought on Plants Photograph  <input type="checkbox"/> Lesson 24 Resource: Effects of Severe Weather Photographs 	
	Setup None	



Lesson 25

Materials	Kit Items <input type="checkbox"/> Sentence strips (2)	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 25 Resource A: Severe Weather Forecast  <input type="checkbox"/> Lesson 25 Resource B: Severe Weather Maps and Cards <input type="checkbox"/> Lesson 25 Resource C: Local Severe Weather Chart Setup Instructions	
	Setup <input type="checkbox"/> Prepare severe weather maps and cards. (See Lesson 25 Resource B.) <input type="checkbox"/> Prepare local severe weather chart. (See Lesson 25 Resource C.)	
	Item Reuse <input type="checkbox"/> Lesson 26 requires the prepared local severe weather chart.	

Lesson 26

Materials	Kit Items <input type="checkbox"/> Sentence strip (1)	School Supplied Items None
	Prepared Items from Previous Lessons <input type="checkbox"/> Local severe weather chart from Lesson 25 (1)	
Preparation	Resources None	
	Setup <input type="checkbox"/> Cue warning siren video: http://phdsci.link/1530 .  <input type="checkbox"/> Choose the kind of severe weather (tornado, hurricane, blizzard, or thunderstorm) that is most likely to occur locally, and cue the corresponding video. Cue either “How to Talk to Youngsters about Tornadoes” (The Weather Channel 2019b): http://phdsci.link/1533  , “Getting Youngsters Ready for Hurricanes” (The Weather Channel 2019c): http://phdsci.link/1531 , “Talking to Your Kids about Blizzards” (The Weather Channel 2020): http://phdsci.link/1562 , or “How to Talk to Youngsters about Thunder and Lightning” (The Weather Channel 2019a): http://phdsci.link/1532 . <input type="checkbox"/> Acquire the school’s severe weather response plan for the selected kind of severe weather (tornado, hurricane, blizzard, or thunderstorm).	


Lesson 27

Materials	Kit Items <input type="checkbox"/> Labels, removable, $2\frac{5}{8}'' \times 1''$ (3) <input type="checkbox"/> Knowledge Deck cards, Ancient Clues (24) <input type="checkbox"/> Knowledge Deck posters <ul style="list-style-type: none"> ○ Ancient Clues (1) ○ Mesa Verde Long Ago (1) 	School Supplied Items <input type="checkbox"/> Marker, permanent (1)
	Prepared Items from Previous Lessons <input type="checkbox"/> Anchor model from Lesson 21 (1)	
Preparation	Resources <input type="checkbox"/> Lesson 27 Resource A: Mesa Verde Severe Weather Chart  <input type="checkbox"/> Lesson 27 Resource B: Conceptual Checkpoint 	
	Setup <input type="checkbox"/> Prepare to distribute a copy of Lesson 27 Resource A and a copy of Lesson 27 Resource B to each student.	
	Item Reuse <input type="checkbox"/> Lesson 28 requires the Mesa Verde Long Ago Knowledge Deck poster.	


Lesson 28

Materials	Kit Items <input type="checkbox"/> Knowledge Deck poster, Mesa Verde Long Ago (1)	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 28 Resource: Key Term Cards	
	Setup <input type="checkbox"/> Prepare key term cards. (See Lesson 28 Resource.)	

Lesson 29

Materials	Kit Items None	School Supplied Items None
Preparation	Resources <input type="checkbox"/> <i>Snow Day!</i> (Laminack and Gustavson 2007)	
	Setup <input type="checkbox"/> Cue “Blizzard of 1978” video (WGBH 2013): http://phdsci.link/1542 . 	

Lesson 30

Materials	Kit Items None	School Supplied Items None
Preparation	Resources <input type="checkbox"/> Lesson 30 Resource: Patterns Cards	
	Setup <input type="checkbox"/> Cue “Blizzard of 1978” video: http://phdsci.link/1542 .  <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 Patterns card. (See Lesson 30 Resource.) <input type="checkbox"/> Select student work products that show evidence of three-dimensional learning, and display them in different areas of the classroom. Student work products may include the anchor model, class charts, selected Science Logbook pages, and Engineering Challenge designs.	

Forces and Motion Lesson Materials and Preparation

Lesson 1

Materials	Kit Items	School Supplied Items
	<input type="checkbox"/> Ball, table tennis (1) <input type="checkbox"/> Building Blocks, plastic, blue, red (48 each color) <input type="checkbox"/> Spinning top (1) <input type="checkbox"/> Toy car (1)	<input type="checkbox"/> Folders or other visual barriers (12)
Preparation	Resources	
	None	
	Setup	
	<input type="checkbox"/> Place the ball, spinning top, and toy car throughout the classroom in visible locations that will elicit a variety of location word responses from students. Consider hanging an item to elicit a response of above or below.	

Lesson 2

Materials	Kit Items	School Supplied Items
	<input type="checkbox"/> Ball, table tennis (1) <input type="checkbox"/> Spinning top (1) Toy car (1)	<input type="checkbox"/> Chart paper (1 sheet) <input type="checkbox"/> Computers or tablets with internet access (5)
Preparation	Resources	
	None	
	Setup	
	<input type="checkbox"/> Cue Ferris wheel video, swing set video, motorcycle video, basketball video, and train video at each video station: http://phdsci.link/1623 , http://phdsci.link/1624 , http://phdsci.link/1625 , http://phdsci.link/1626 , and http://phdsci.link/1627 .	
	<input type="checkbox"/> Cue children playing soccer video: http://phdsci.link/1622 .	

Lesson 3

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Craft sticks, jumbo (12) <input type="checkbox"/> Bingo chips, blue (1) <input type="checkbox"/> Bottle caps, plastic, white (12) <input type="checkbox"/> Brads, brass (12) <input type="checkbox"/> Jar lids, steel, white (12) <input type="checkbox"/> Magnetic wands (12) <input type="checkbox"/> Nuts, steel (12) <input type="checkbox"/> Paper clips, steel, medium (20) <input type="checkbox"/> Safety goggles (24) <input type="checkbox"/> Teaspoons, steel (12) <input type="checkbox"/> Timer, digital (1) <input type="checkbox"/> Washer, steel (1) 	School Supplied Items <ul style="list-style-type: none"> <input type="checkbox"/> Dime coins (12) <input type="checkbox"/> Index cards, 3" × 5" (12)
	Preparation	Resources None
	Setup <ul style="list-style-type: none"> <input type="checkbox"/> Ensure that the magnetic wand attracts the steel paper clips for the paper clip demonstration, the metal objects (steel jar lid, steel nut, and steel spoon) for the magnet and objects investigation, and the steel washer for the magnet attraction demonstration. 	

Lesson 4

Materials	Kit Items <ul style="list-style-type: none"> <input type="checkbox"/> Magnets, bar, with red and blue ends (12) <input type="checkbox"/> Ceramic ring, coated (12) <input type="checkbox"/> Safety goggles (24) 	School Supplied Items None
	Preparation	Resources None
	Setup None	

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