Preparation Guide

Level 5 Module 1

EARTH PROCESSES

with Spotlight Lessons on Physical Properties of Matter

Materials: This section lists the quantity of each material necessary for the lesson. Lesson materials may be from a *PhD Science® Texas* materials kit, or the materials may be school-supplied items. In addition to having the listed materials, teachers should have access to the following common classroom items: sticky notes, chart paper, pencils, a whiteboard, and markers.

Resources: This section lists module resources (from the Module Resources section 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, digital slides. A symbol ( ) identifies resources that appear in the digital slides. Additional supports and Spanish resources are available in the Implementation Resources and Level Overview sections of the digital platform.

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

Earth Processes | Advance 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†	Ocean Model	Prepare ice cubes for ocean model. (See Lesson 3 Resource.)
7	1 Day†	Mountain Model and Stream Tables	Prepare mountain model and stream tables. (See Lesson 7 Resources C and D.)
9	1 Day†	Glacier Model	Prepare ice block for glacier model. (See Lesson 9 Resource C.)
10	1 Day†	Rio Grande Model	Prepare Rio Grande model stream tables. (See Lesson 10 Resource C.)
14	1 Day	Compaction and Cementation Model	Prepare sponges for compaction and cementation model observation. (See Lesson 13 Resource D.)

Earth Processes | Lesson Preparation

Lesson 1

Materials	**Kit Items** None **School-Supplied Items** ☐ Scissors (1) **Item Reuse** ☐ Lesson 2 requires the Chihuahuan Desert landscape cards.
Resources	☐ Lesson 1 Resource A: Chihuahuan Desert Map ☐ Lesson 1 Resource B: Chihuahuan Desert Landscape Cards ☐ *Earthshake: Poems from the Ground Up* (Peters and Felstead 2003) (6)
Preparation	☐ Prepare Chihuahuan Desert landscape cards. (See Lesson 1 Resource B.)

Lesson 2

Materials	**Kit Items** None **School-Supplied Items** ☐ Glue or tape **Prepared Items from Previous Lessons** ☐ Chihuahuan Desert landscape cards from Lesson 1
Resources	None
Preparation	None **Advance Preparation for Lesson 3** ☐ **1 Day Before:** Prepare ice cubes. (See Lesson 3 Resource C.)

Lesson 3

Materials	**Kit Items** ☐ Bag, resealable plastic, small (1) ☐ Bin with lid, clear plastic, 6 qt (1) ☐ Heat lamp with reflector (1) ☐ Heat light bulb (1) ☐ Measuring cup, 1 qt (1) ☐ Plastic wrap (partial roll) ☐ Salt, table (35 g) ☐ Scale, digital (1) **School-Supplied Items** ☐ Ice cubes (6) ☐ Tape, masking (partial roll) ☐ Water, hot (1 qt) **Item Reuse** ☐ Lesson 7 requires the measuring cup. ☐ Lesson 19 requires the plastic bin.
Resources	☐ Lesson 3 Resource A: Annual Precipitation Map of Mexico ☐ Lesson 3 Resource B: Chihuahuan Desert Area Relief Map ☐ Lesson 3 Resource C: Ocean Model Setup Instructions
Preparation	☐ Access Google Earth™ (http://phdsci.link/1310). ☐ Set up ocean model. (See Lesson 3 Resource C.)

Lesson 4

Materials	**Kit Items** None **School-Supplied Items** None
Resources	☐ Lesson 4 Resource A: Clouds Above the Chihuahuan Desert Photograph ☐ Lesson 4 Resource B: Clouds Reading ☐ Lesson 4 Resource C: States of Matter Diagram
Preparation	☐ Prepare to distribute a copy of Lesson 4 Resource B to each student.

Lesson 5

Materials	**Kit Items** None **School-Supplied Items** None
Resources	None
Preparation	☐ Access Google Earth™ (http://phdsci.link/1310). ☐ Cue clouds moving over North America video (NASA/Goddard Space Flight Center Scientific Visualization Studio 2010) (http://phdsci.link/1317) and water vapor video (NEO 2022) (http://phdsci.link/2466).

Lesson 6

Materials	**Kit Items** None **School-Supplied Items** ☐ Map of the United States (1)
Resources	☐ Lesson 6 Resource A: Lake Effect Snowfall Accumulation Map ☐ Lesson 6 Resource B: Conceptual Checkpoint ☐ Lesson 6 Resource C: Great Lakes Clouds Photograph
Preparation	☐ Access Google Earth™ (http://phdsci.link/1310). ☐ Prepare to distribute a copy of Lesson 6 Resource B to each student. **Advance Preparation for Lesson 7** ☐ **1 Day Before:** Prepare mountain model. (See Lesson 7 Resource C.) ☐ **1 Day Before:** Prepare stream tables. (See Lesson 7 Resource D.)

Lesson 7

Materials	**Kit Items** ☐ Aluminum foil (partial roll) ☐ Balloon pump, handheld (1, optional) ☐ Bag, resealable plastic, 1 gal ☐ Bins with lids, clear plastic, 6 qt (6) ☐ Bin with lid, clear plastic, 16 qt (1) ☐ Blocks, wooden, $\frac{3}{4}$″ (2) ☐ Bottles of water, 16.9 oz (6) ☐ Clay, powder, natural (12 tbsp) ☐ Containers, clear plastic, round, 16 oz (8) ☐ Craft stick, jumbo (1) ☐ Cups, plastic, 9 oz (2) ☐ Food coloring, blue (3 drops) ☐ Graduated cylinders, 100 mL (6) ☐ Measuring cup, 1 qt (1) ☐ Measuring spoon, 1 tbsp (1) ☐ Paint tray, plastic, 11″ (1) ☐ Putty knife, plastic (1) ☐ Ruler (1) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) **School-Supplied Items** ☐ Drill with $\frac{1}{8}$″, $\frac{1}{4}$″, and $\frac{3}{8}$″ bits ☐ Gloves, disposable (2 pairs for teacher) ☐ Marker, permanent (1) ☐ Paper towels (1 roll) ☐ Sand, fine (51 cups) ☐ Tape, masking (partial roll) ☐ Water (access) **Item Reuse** ☐ Lesson 8 requires the prepared stream tables, wooden blocks, 16 qt plastic bin, 4 of the prepared 16 oz round containers with $\frac{1}{8}$″ holes, and 2 of the prepared 16 oz round containers with $\frac{1}{4}$″ holes. ☐ Lesson 9 requires the prepared mountain model, balloon pump, and measuring spoon. ☐ Lesson 10 requires all the prepared 16 oz round containers with $\frac{1}{8}$″ holes, measuring cup, and putty knife. ☐ Lesson 19 requires the graduated cylinders.
Resources	☐ Lesson 7 Resource A: Rio Grande Map ☐ Lesson 7 Resource B: Rio Grande Source Photograph ☐ Lesson 7 Resource C: Mountain Model Setup Instructions and Procedure ☐ Lesson 7 Resource D: Stream Table Setup Instructions
Preparation	☐ Identify an outdoor area in or near the schoolyard where students can interact with a variety of different surfaces, such as pavement, grass, dirt, and sand.

Lesson 8

Materials	**Kit Items** ☐ Bin with lid, clear plastic, 16 qt (1) ☐ Blocks, wooden, $\frac{3}{4}$″ (8) ☐ Bowls or containers, large (6) ☐ Cups, plastic, 9 oz (6) ☐ Rulers (6) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) **School-Supplied Items** ☐ Scissors (1) **Prepared Items from Previous Lessons** ☐ Stream tables from Lesson 7 (6) ☐ 16 oz round containers with $\frac{1}{8}$″ holes from Lesson 7 (4) ☐ 16 oz round containers with $\frac{1}{4}$″ holes from Lesson 7 (2) **Item Reuse** ☐ Lesson 10 requires the prepared plastic bins, prepared 16 oz round containers with $\frac{1}{8}$″ holes, bowls or containers, plastic cups, 6 wooden blocks, and 16 qt bin with the sand and clay mixture.
Resources	☐ Lesson 8 Resource A: Desert Painting ☐ Lesson 8 Resource B: River Model Procedure Sheets ☐ Lesson 8 Resource C: Santa Elena Canyon Photograph (optional)
Preparation	☐ Prepare water cups for the river model investigation by filling six 9 oz cups with water. ☐ Prepare to distribute river model procedure sheets. (See Lesson 8 Resource B.) ☐ Prepare to distribute cups of water for river model activity. (See Lesson 7 Resource D.) ☐ Access Google Earth™ (http://phdsci.link/2558). **Advance Preparation for Lesson 9** ☐ **1 Day Before:** Prepare ice block for glacier model. (See Lesson 9 Resource C.)

Lesson 9

Materials	**Kit Items** ☐ Balloon pump, handheld (1) ☐ Container, food, plastic, 2″ × 3″ × 5″ (1) ☐ Gravel (1 tbsp) ☐ Measuring spoon, 1 tbsp (1) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) **School-Supplied Items** ☐ Gloves, disposable (1 pair for teacher) ☐ Freezer (access) ☐ Sand, fine (1 cup) ☐ Scissors (1) ☐ Water (access) **Prepared Items from Previous Lessons** ☐ Mountain model from Lesson 7 **Item Reuse** ☐ Lesson 10 requires the glacier model. ☐ Lesson 11 requires the balloon pump and measuring spoon.
Resources	☐ Lesson 9 Resource A: Valley Cards ☐ Lesson 9 Resource B: Valley Photographs ☐ Lesson 9 Resource C: Glacier Model Setup Instructions and Procedure ☐ *Earthshake* (6)
Preparation	☐ Prepare valley cards. (See Lesson 9 Resource A.) ☐ Prepare glacier model. (See Lesson 9 Resource C.)

Lesson 10

Materials	**Kit Items** ☐ Blocks, wooden, $\frac{3}{4}$″ (6) ☐ Bowls or containers, large (6) ☐ Craft stick, jumbo (1) ☐ Cups, plastic, 9 oz (6) ☐ Measuring cup, 1 qt (1) ☐ Putty knife, plastic (1) ☐ Rulers (6) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) **School-Supplied Items** ☐ Bag or container, large (1) ☐ Gloves, disposable (1 pair for teacher) ☐ Scissors (1) ☐ Water (access) **Prepared Items from Previous Lessons** ☐ 16 oz round containers with $\frac{1}{8}$″ holes from Lesson 7 (2) ☐ 16 oz round containers with $\frac{1}{8}$″ holes from Lesson 8 (4) ☐ 6 qt plastic bins with holes from Lesson 8 (6) ☐ 16 qt plastic bin with sand and clay mixture from Lesson 8 (1) ☐ Glacier model from Lesson 9 (1) **Item Reuse** ☐ Lesson 11 requires the prepared plastic bins. ☐ Lesson 19 requires the measuring cup.
Resources	☐ Lesson 10 Resource A: Glacier Model Photograph (optional) ☐ Lesson 10 Resource B: River Model Photograph ☐ Lesson 10 Resource C: Rio Grande Model Stream Table Setup Instructions ☐ Lesson 10 Resource D: Rio Grande Model Procedure Sheet ☐ Lesson 10 Resource E: Map of the Chihuahuan Desert with Rio Grande Delta
Preparation	☐ Access Google Earth™ (http://phdsci.link/1310). ☐ Prepare stream tables for Rio Grande models. (See Lesson 10 Resource C.) ☐ Prepare to distribute Rio Grande model procedure sheets. Prepare one extra copy to use during the lesson. (See Lesson 10 Resource D.)

Lesson 11

Materials	**Kit Items** ☐ Aluminum foil, 11″ × 12″ (6) ☐ Balloon pumps, handheld (6) ☐ Bag, resealable plastic, 1 qt (1) ☐ Cups with lids, plastic, small (18) ☐ Gravel (1 cup) ☐ Measuring cup, 1 cup (1) ☐ Measuring spoon, 1 tbsp (1) ☐ Rocks (18) ☐ Ruler (1) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) ☐ Shower caps, clear plastic (6) ☐ Tape, electrical (partial roll) **School-Supplied Items** ☐ Gloves, disposable (1 pair for teacher) ☐ Marker, permanent (1) ☐ Sand, fine (3 cups) ☐ Scissors (1) ☐ Water (access) **Prepared Items from Previous Lessons** ☐ 6 qt plastic bins with holes from Lesson 10 (6) **Item Reuse** ☐ Lesson 13 requires the measuring cup. ☐ Lesson 18 requires the electrical tape.
Resources	☐ Lesson 11 Resource A: Rio Grande Delta Photograph ☐ Lesson 11 Resource B: Delta Cards ☐ Lesson 11 Resource C: Chihuahuan Desert Sediment Photographs ☐ Lesson 11 Resource D: Wind and Sediment Models Setup Instructions ☐ Lesson 11 Resource E: Sediment Investigation Procedure Sheet ☐ Lesson 11 Resource F: Sand Dune Photographs ☐ Lesson 11 Resource G: Obstacle Investigation Procedure Sheet
Preparation	☐ Prepare delta cards. (See Lesson 11 Resource B.) ☐ Prepare wind and sediment models. (See Lesson 11 Resource D.) ☐ Prepare to distribute sediment investigation procedure sheets. (See Lesson 11 Resource E.) ☐ Prepare to distribute obstacle investigation procedure sheets. (See Lesson 11 Resource G.)

Lesson 12

Materials	**Kit Items** None **School-Supplied Items** ☐ Glue or tape ☐ Map of North America (1) ☐ Scissors (1)
Resources	☐ Lesson 12 Resource A: Rio Grande Delta Landscape Card ☐ Lesson 12 Resource B: Great Lakes Landform Photographs ☐ Lesson 12 Resource C: Conceptual Checkpoint
Preparation	☐ Prepare Rio Grande Delta landscape card. (See Lesson 12 Resource A.) ☐ Prepare to distribute a copy of Lesson 12 Resource C to each student.

Lesson 13

Materials	**Kit Items** ☐ Bags, resealable plastic, 1 qt (24) ☐ Bags, resealable plastic, snack (24) ☐ Bottle of water, 16.9 oz (1) ☐ Bowl, 2 qt or larger, microwave-safe (1) ☐ Container, clear plastic, rectangular (1) ☐ Flour, all-purpose (4 cups) ☐ Gravel (3 cups) ☐ Magnifiers, handheld, plastic (24) ☐ Measuring cup, 1 cup (1) ☐ Plates, paper (25) ☐ Potato masher (1) ☐ Rock samples: conglomerate, limestone, sandstone, shale (6 of each) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) ☐ Salt, Epsom (3 cups) ☐ Salt, table (1 cup) ☐ Sponges, 2 different colors (4 of each) **School-Supplied Items** ☐ Bowl, large, mixing (1) ☐ Marker, permanent (1) ☐ Microwave (access) ☐ Scissors (1) ☐ Spoon, mixing (1) ☐ Water (access) **Item Reuse** ☐ Lesson 14 requires the handheld magnifiers, prepared plates with sponges, and prepared sedimentary rock samples in bags.
Resources	☐ Lesson 13 Resource A: Sedimentary Rocks Photographs (optional) ☐ Lesson 13 Resource B: Sedimentary Rock Formation Model Setup Instructions ☐ Lesson 13 Resource C: Landscape Diagrams ☐ Lesson 13 Resource D: Compaction and Cementation Model Setup Instructions
Preparation	☐ Prepare four sedimentary rock samples per group. Place one each of the conglomerate, limestone, sandstone, and shale samples into four separate resealable bags. Seal the bags, and then use a permanent marker to label each bag with the name of the sample it contains. Note that the appearance of rock samples from different suppliers may vary even among samples of the same type of rock. If variation is significant, consider displaying the photographs in Lesson 13 Resource A during Lessons 13 and 14. ☐ Prepare materials for sedimentary rock formation models. (See Lesson 13 Resource B.) ☐ Prepare materials for compaction and cementation model. (See Lesson 13 Resource D.) **Advance Preparation for Lesson 14** ☐ **1 Day Before:** Prepare sponges for compaction and cementation model observation. (See Lesson 13 Resource D.)

Lesson 14

Materials	**Kit Items** ☐ Magnifiers, handheld, plastic (24) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) **School-Supplied Items** None **Prepared Items from Previous Lessons** ☐ Plates with sponges from Lesson 13 (12) ☐ Sedimentary rock samples in bags from Lesson 13 (6 sets)
Resources	☐ Lesson 13 Resource A: Sedimentary Rocks Photographs (optional) ☐ Lesson 14 Resource A: North America Map ☐ Lesson 14 Resource B: Sedimentary Rock Layers Photographs ☐ Lesson 14 Resource C: Western Interior Seaway Map ☐ *Earthshake*
Preparation	None

Lesson 15

Materials	**Kit Items** None **School-Supplied Items** None
Resources	☐ Lesson 15 Resource A: Coal Mine Photograph ☐ Lesson 15 Resource B: Fossil Fuel Texts ☐ Lesson 15 Resource C: Sedimentary Rock Layers Diagram
Preparation	☐ Prepare to distribute enough copies of the fossil fuel texts (Lesson 15 Resource B) so that one-third of the class receives "How Does Coal Form?" (*Odyssey* 2012), one-third receives "Nature's Spills" (Cox 2011), and one-third receives "Natural Gas Basics" (US Energy Information Administration 2022).

Lesson 16

Materials	**Kit Items** None **School-Supplied Items** ☐ Glue or tape ☐ Scissors (1)
Resources	☐ Lesson 16 Resource A: Coal and Sandstone Photographs ☐ Lesson 16 Resource B: Ernst Tinaja and Oil Well Landscape Cards ☐ Lesson 16 Resource C: Niagara Gorge Rock Layers Photograph ☐ Lesson 16 Resource D: Conceptual Checkpoint
Preparation	☐ Prepare Ernst Tinaja and Oil Well landscape cards. (See Lesson 16 Resource B.) ☐ Prepare to distribute a copy of Lesson 16 Resource D to each student.

Lesson 17

Materials	**Kit Items** None **School-Supplied Items** None **Item Reuse** ☐ Lesson 22 requires the Rio Grande system class chart.
Resources	☐ Lesson 17 Resource A: Engineering Challenge Rubric ☐ Lesson 17 Resource B: Rio Grande Photograph ☐ Lesson 17 Resource C: Engineering Design Process ☐ Lesson 17 Resource D: Changes to the Rio Grande System Resources ☐ Lesson 17 Resource E: Environmental Impacts on the Chihuahuan Desert Resources
Preparation	☐ Cue poultry litter video (National Science Foundation 2018) (http://phdsci.link/2476). ☐ Curate changes to the Rio Grande system resources and print copies for each group. (See Lesson 17 Resource D.) ☐ Curate environmental impacts on the Chihuahuan Desert resources and print copies for each group. (See Lesson 17 Resource E.)

Lesson 18

Materials	**Kit Items** ☐ Aluminum foil (partial roll) ☐ Chenille stems (40) ☐ Clay, modeling, nonhardening (2 lb) ☐ Cotton swab (1) ☐ Craft sticks (50) ☐ Cup, paper, 3 oz (51) ☐ Food coloring, blue (5 drops) ☐ Plastic wrap (1 roll) ☐ Scale, digital (1) ☐ Straws, bendable (50) ☐ String (1 spool) ☐ Tape, duct (1 roll) ☐ Tape, electrical (1 roll) ☐ Toothpicks (120) **School-Supplied Items** ☐ Paper clips (100) ☐ Scissors (1) ☐ Tape, masking (1 roll) ☐ Water (access) **Item Reuse** ☐ Lesson 19 requires the criteria and constraints class chart. ☐ Lesson 19 requires the prepared Engineering Challenge store materials.
Resources	☐ Lesson 17 Resource A: Engineering Challenge Rubric ☐ Lesson 18 Resource A: Farmer Observing Field Photograph ☐ Lesson 18 Resource B: Water Conservation Methods ☐ Lesson 18 Resource C: Sample Irrigation Prototypes (optional) ☐ Lesson 18 Resource D: Materials Price List
Preparation	☐ Prepare cotton swab and blue water for demonstration. Cut one cotton swab in half. Put 5 drops of blue food coloring into a 3 oz paper cup and add about 1 oz of water. ☐ Prepare Engineering Challenge materials store. Students will preview available materials in Lesson 18. In Lessons 19 and 20, students will gather materials and build their designs.

Lesson 19

Materials	**Kit Items** ☐ Beakers, plastic, 250 mL (6) ☐ Bins, clear plastic, 6 qt (6) ☐ Cotton swabs (72) ☐ Food coloring, blue (1 oz) ☐ Gloves, disposable (24 pairs, optional) ☐ Graduated cylinders, 100 mL (6) ☐ Measuring cup, 1 qt (1) ☐ Pushpins (6) ☐ Rulers (24) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) **School-Supplied Items** ☐ Paper towels (partial roll) ☐ Scissors (6) ☐ Soil, potting or locally sourced (36 cups) ☐ Water (access) **Prepared Items from Previous Lessons** ☐ Criteria and constraints class chart started in Lesson 18 ☐ Engineering Challenge store materials from Lesson 18 **Item Reuse** ☐ Lesson 20 requires the Engineering Challenge store materials, testing materials, and building tools. ☐ Lesson 21 requires the criteria and constraints class chart.
Resources	☐ Lesson 17 Resource A: Engineering Challenge Rubric ☐ Lesson 18 Resource D: Materials Price List ☐ Lesson 19 Resource: Engineering Challenge Money Template (optional)
Preparation	☐ (Optional) Prepare $100 of Engineering Challenge money for each group. (See Lesson 19 Resource.) ☐ Prepare Engineering Challenge testing materials. Cut enough cotton swabs in half to provide 12 halves per group for each test. Put about 50 drops of blue food coloring into a 1 qt measuring cup and add 1 qt of water. Add more food coloring as necessary to produce a dark blue color. Evenly distribute the blue water into six beakers. Prepare more blue water as necessary for Lesson 20. ☐ Prepare to distribute two copies of Lesson 18 Resource D to each group.

Lesson 20

Materials	**Kit Items** ☐ Gloves, disposable (24 pairs, optional) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) **School-Supplied Items** ☐ Water (access) **Prepared Items from Previous Lessons** ☐ Engineering Challenge store materials, testing materials, and building tools from Lesson 19
Resources	☐ Lesson 17 Resource A: Engineering Challenge Rubric ☐ Lesson 18 Resource D: Materials Price List ☐ Lesson 19 Resource: Engineering Challenge Money Template (optional)
Preparation	☐ (Optional) Prepare $100 of Engineering Challenge money for each group. (See Lesson 19 Resource.)

Lesson 21

Materials	**Kit Items** None **School-Supplied Items** None **Prepared Items from Previous Lessons** ☐ Criteria and constraints class chart started in Lesson 18
Resources	☐ Lesson 17 Resource A: Engineering Challenge Rubric ☐ Lesson 21 Resource: Water Conservation Resources
Preparation	☐ Curate water conservation resources and print copies for each group. (See Lesson 21 Resource.)

Lesson 22

Materials	**Kit Items** None **School-Supplied Items** ☐ Scissors (1) **Prepared Items from Previous Lessons** ☐ Rio Grande system class chart started in Lesson 17
Resources	☐ Lesson 22 Resource A: Texas Water Graph ☐ Lesson 22 Resource B: Water Conservation Method Cards ☐ Lesson 22 Resource C: Water Conservation Data Table
Preparation	☐ Prepare water conservation method cards. (See Lesson 22 Resource B.)

Lesson 23

Materials	**Kit Items** None **School-Supplied Items** ☐ Glue sticks (24) ☐ Scissors (24)
Resources	None
Preparation	None

Lesson 24

Materials	**Kit Items** None **School-Supplied Items** None
Resources	☐ Lesson 24 Resource A: Antarctica Map ☐ Lesson 24 Resource B: Antarctica and Chihuahuan Desert Photographs ☐ Lesson 24 Resource C: Precipitation Data Table ☐ Lesson 24 Resource D: McMurdo Station Photograph
Preparation	☐ Prepare to distribute a copy of the End-of-Module Assessment to each student.

Lesson 25

Materials	**Kit Items** None **School-Supplied Items** ☐ Pens or pencils, 2 different colors (24 of each) ☐ Scissors (1)
Resources	☐ Lesson 25 Resource A: Module Concept Statements ☐ Lesson 25 Resource B: Recurring Themes and Concepts ☐ End-of-Module Assessment Rubric
Preparation	☐ Prepare to distribute a copy of the End-of-Module Assessment rubric to each student. ☐ Score End-of-Module Assessments and write individual feedback. ☐ Select End-of-Module Assessment responses to share with students. If selecting student responses, remember to remove identifying information and to choose diverse student responses. ☐ Prepare visual for student connections between module learning and content standards. (See Lesson 25 Resource A.)

Physical Properties of Matter | Lesson Preparation

Lesson 1

Materials	**Kit Items** None **School-Supplied Items** ☐ Scissors (1) **Item Reuse** ☐ Lesson 2 requires the class chart of properties.
Resources	☐ Lesson 1 Resource: Pollution Photographs
Preparation	☐ Prepare to distribute color copies of the pollution photographs to each group. (See Lesson 1 Resource.)

Lesson 2

Materials	**Kit Items** ☐ Beakers, plastic, 250 mL (12) ☐ Dice (6) ☐ Graduated cylinders, 100 mL (6) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) ☐ Scales, digital (6) **School-Supplied Items** ☐ Water (432 mL) **Prepared Items from Previous Lessons** ☐ Class chart of properties started in Lesson 1 **Item Reuse** ☐ Lesson 3 requires the class chart of properties and 2 of the graduated cylinders. ☐ Lesson 4 requires the beakers and 1 of the digital scales.
Resources	☐ Lesson 1 Resource: Pollution Photographs ☐ Lesson 2 Resource: Piles of Tires Photograph
Preparation	☐ Prepare beakers of water for measure mass and volume investigation. Use the graduated cylinder to measure and add 72 mL of water to the 250 mL beaker. ☐ Cue measuring air mass video (http://phdsci.link/2352).

Lesson 3

Materials	**Kit Items** ☐ Cups, paper, 3 oz (2) ☐ Food coloring, blue (2 drops) ☐ Graduated cylinders, 100 mL (2) ☐ Oil, olive (30 mL) ☐ Safety goggles, teacher (1) ☐ Syrup, maple (30 mL) **School-Supplied Items** ☐ Grape (1) ☐ Penny (1) ☐ Water (30 mL) **Prepared Items from Previous Lessons** ☐ Revised class chart of properties started in Lesson 1 **Item Reuse** ☐ Lesson 4 requires the revised class chart of properties (properties of matter class chart) and 1 of the graduated cylinders.
Resources	☐ Lesson 1 Resource: Pollution Photographs ☐ Lesson 3 Resource A: Density Column Demonstration Setup Instructions ☐ Lesson 3 Resource B: Mr. Trash Wheel Photograph
Preparation	☐ Prepare materials for density column demonstration. (See Lesson 3 Resource A.) ☐ Cue Mr. Trash Wheel video (http://phdsci.link/2353).

Lesson 4

Materials	**Kit Items** ☐ Beakers, plastic, 250 mL (13) ☐ Black pepper, ground (6 tsp) ☐ Coffee powder, instant (6 tsp) ☐ Cups, paper, 3 oz (13) ☐ Graduated cylinder, 100 mL (1) ☐ Magnifiers, handheld, plastic (6) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) ☐ Scale, digital (1) ☐ Spoons, plastic (13) **School-Supplied Items** ☐ Calculators (6, optional) ☐ Water (access) **Prepared Items from Previous Lessons** ☐ Revised class chart of properties (properties of matter class chart) started in Lesson 1 **Item Reuse** ☐ Lesson 5 requires the revised class chart of properties (properties of matter class chart), 8 of the beakers, and 7 of the plastic spoons.
Resources	☐ Lesson 1 Resource: Pollution Photographs ☐ Lesson 4 Resource A: Before and After Mixing Investigation Setup Instructions ☐ Lesson 4 Resource B: Magnified Coffee Photograph
Preparation	☐ Prepare materials for before and after mixing investigation. (See Lesson 4 Resource A.)

Lesson 5

Materials	**Kit Items** ☐ Aluminum foil, 5″ × 5″ (1) ☐ Beakers, plastic, 250 mL (8) ☐ Cups, foam (2) ☐ Iron filings, fine (1 tsp) ☐ Magnets, bar (6) ☐ Oil, olive, dark green (2 tsp) ☐ Pie tins, aluminum (6) ☐ Safety goggles, student (24) ☐ Safety goggles, teacher (1) ☐ Spoons, plastic (7) ☐ Washers, steel (30) **School-Supplied Items** ☐ Can, food, steel (1) ☐ Can, beverage, aluminum (1) ☐ Gloves, disposable (1 pair for teacher) ☐ Paper towels (6 sheets) ☐ Scissors (1) ☐ Water (access) **Prepared Items from Previous Lessons** ☐ Revised class chart of properties (properties of matter class chart) started in Lesson 1
Resources	☐ Lesson 1 Resource: Pollution Photographs ☐ Lesson 5 Resource A: Compare Magnetism of Mixed Materials Setup Instructions ☐ Lesson 5 Resource B: Use Magnetism to Clean Up Pollution Investigation Setup Instructions ☐ Lesson 5 Resource C: Scientist Profile: Arden Warner
Preparation	☐ Prepare materials for compare magnetism of mixed materials investigation. (See Lesson 5 Resource A.) ☐ Prepare materials for use magnetism to clean up pollution investigation. (See Lesson 5 Resource B.)

Lesson 6

Materials	**Kit Items** ☐ Cup, foam (1) **School-Supplied Items** ☐ Glue sticks (24) ☐ Scissors (24)
Resources	☐ Lesson 1 Resource: Pollution Photographs ☐ Lesson 6 Resource A: Plastic Pieces Photograph ☐ Lesson 6 Resource B: Microplastics Photograph
Preparation	☐ Prepare to distribute copies of the End-of-Spotlight Assessment Parts A and B to each student. ☐ Cue ocean confetti video (http://phdsci.link/2410).

Lesson 7

Materials	**Kit Items** None **School-Supplied Items** ☐ Pens or pencils, 2 different colors (24 of each) ☐ Scissors (1)
Resources	☐ Lesson 7 Resource A: Scientist Profile: Fionn Ferreira ☐ Lesson 7 Resource B: Content Standards ☐ Lesson 7 Resource C: Recurring Themes and Concepts ☐ End-of-Spotlight Assessment Rubric Parts A and B
Preparation	☐ Score End-of-Spotlight Assessments and write individual feedback. ☐ Select End-of-Spotlight Assessment responses to share with students for additional support. If selecting student responses, remember to remove identifying information and to choose diverse student responses. ☐ Prepare visual for student connections between content standards and recurring themes and concepts.

Earth Processes | Works Cited

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