The *Planetary Science Course* kit contains

- **Teacher Toolkit: Planetary Science**
  1. *Teacher Resources: Planetary Science*
  1. *FOSS Science Resources: Planetary Science*
- **FOSS Science Resources: Planetary Science** (class set of student books)
- Equipment for five classes of 32 students

Each investigation in this course is divided into two or three parts. Each part has a Materials section that details the materials in the kit and the materials supplied by the teacher that will be used by each group of students and the class. The kit includes most of the learning equipment needed by students. There are enough consumable materials in the kit for five classes of 32 students each. Some of the teacher-supplied items can also be ordered through Delta Education.

For each investigation, you will need one computer with Internet access that can be displayed to the class, either by an LCD projector, interactive whiteboard, or a large screen.

For updates to information on materials used in this course and access to the Materials Safety Data Sheets (MSDS), go to www.FOSSweb.com. Links to replacement-part lists and customer service are also available on FOSSweb.

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**NOTE**
Delta Education Customer Service can be reached at 1-800-258-1302.
# PLANETARY SCIENCE — Materials

## KIT INVENTORY List

### Drawer 1 — print materials

1. **Teacher Toolkit: Planetary Science**
   - 1 *Investigations Guide,*
   - 1 *Teacher Resources,* and
   - 1 *FOSS Science Resources: Planetary Science*  

32. **FOSS Science Resources: Planetary Science,** student books *

### Drawer 2 — permanent equipment

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Basins, round</td>
<td></td>
</tr>
<tr>
<td>1 Beads, aqua, 1 mm</td>
<td></td>
</tr>
<tr>
<td>1 Beads, blue, 1 mm</td>
<td></td>
</tr>
<tr>
<td>5 Beads, green, 1 mm</td>
<td></td>
</tr>
<tr>
<td>7 Beads, orange, 1 mm</td>
<td></td>
</tr>
<tr>
<td>1 Book, <em>The Moon Book,</em> by Kim Long</td>
<td></td>
</tr>
<tr>
<td>4 Bottles, plastic, with flip-up shakers</td>
<td></td>
</tr>
<tr>
<td>9 Cardboard pieces, 30 × 45 cm (12” × 18”)</td>
<td></td>
</tr>
<tr>
<td>1 Container, 1/2 L</td>
<td></td>
</tr>
<tr>
<td>16 Cosmos card sets, 36 cards/set</td>
<td></td>
</tr>
<tr>
<td>25 Cups, plastic, 250 mL (9 oz.)</td>
<td></td>
</tr>
<tr>
<td>1 Map, <em>The Earth’s Moon,</em> National Geographic Society</td>
<td></td>
</tr>
<tr>
<td>9 Maps, <em>Earth,</em> laminated, 11” × 17”</td>
<td></td>
</tr>
<tr>
<td>16 Maps, <em>Lunar Landing Site Chart</em></td>
<td></td>
</tr>
<tr>
<td>16 Meter tapes</td>
<td></td>
</tr>
<tr>
<td>50 Marbles</td>
<td></td>
</tr>
<tr>
<td>1 Poster, <em>Moon Log,</em> laminated</td>
<td></td>
</tr>
<tr>
<td>1 Poster, <em>Moon Photo</em></td>
<td></td>
</tr>
<tr>
<td>2 Posters, <em>Science Safety and Outdoor Safety</em></td>
<td></td>
</tr>
<tr>
<td>1 Poster set, <em>Solar System Origin,</em> 10 posters/set</td>
<td></td>
</tr>
<tr>
<td>9 Puzzles, <em>Phases of the Moon Sequence</em></td>
<td></td>
</tr>
<tr>
<td>1 Rocks (20 each of 5 sizes)</td>
<td></td>
</tr>
<tr>
<td>8 <em>Solar System Origin</em> card sets, 10 cards/set</td>
<td></td>
</tr>
<tr>
<td>100 Straws, flex</td>
<td></td>
</tr>
<tr>
<td>250 Straws, slim, short</td>
<td></td>
</tr>
<tr>
<td>50 Straws, superjumbo</td>
<td></td>
</tr>
<tr>
<td>1 Syringe, 35 mL</td>
<td></td>
</tr>
<tr>
<td>32 Vials, clear, with caps, 0.5” × 1.5”</td>
<td></td>
</tr>
<tr>
<td>1 Video, <em>Asteroids: Deadly Impact</em> (DVD)</td>
<td></td>
</tr>
</tbody>
</table>

* The student books are shipped separately in two boxes of 16 hardbound books each.

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### Drawer 2—permanent equipment (continued)

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Video, <em>For All Mankind</em> (DVD)</td>
<td></td>
</tr>
<tr>
<td>1 Video, <em>Hubble’s Amazing Universe</em> (DVD)</td>
<td></td>
</tr>
</tbody>
</table>

### Drawer 2—consumable equipment

<table>
<thead>
<tr>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Thread, spool, carpet</td>
</tr>
<tr>
<td>1 Tape roll, transparent</td>
</tr>
</tbody>
</table>

### Drawer 3—permanent equipment

<table>
<thead>
<tr>
<th>Equipment</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Batteries, AA</td>
<td></td>
</tr>
<tr>
<td>2 Flashlights</td>
<td></td>
</tr>
<tr>
<td>8 Globe and base sets</td>
<td></td>
</tr>
<tr>
<td>1 Lamp, clip-on</td>
<td></td>
</tr>
<tr>
<td>1 Lightbulb, 75 watt</td>
<td></td>
</tr>
<tr>
<td>1 Lightbulb, blue, 60 watt</td>
<td></td>
</tr>
<tr>
<td>8 Marking pens, permanent, black, ultrafine</td>
<td></td>
</tr>
<tr>
<td>8 Marking pens, wet-erase, red</td>
<td></td>
</tr>
<tr>
<td>1 FOSS® orrery</td>
<td></td>
</tr>
<tr>
<td>45 Spectroscopes</td>
<td></td>
</tr>
<tr>
<td>32 Spheres, white, polystyrene, 3.5 cm (1 3/8&quot;)</td>
<td></td>
</tr>
<tr>
<td>1 Spoon, white, long handle, 2 mL</td>
<td></td>
</tr>
<tr>
<td>1 Spoon, mini, green</td>
<td></td>
</tr>
<tr>
<td>1 Spoon, midi, white, short handle</td>
<td></td>
</tr>
<tr>
<td>10 Zip bags, 1 L</td>
<td></td>
</tr>
<tr>
<td>10 Zip bags, freezer strength, 4 L</td>
<td></td>
</tr>
</tbody>
</table>
MATERIALS Supplied by the Teacher

Each part of each investigation has a Materials section that describes the materials required for that part. It lists materials needed for each student or group of students and for the class.

Be aware that you must supply some items. These are indicated in the materials list for each part of the investigation with an asterisk (*). Here is a summary list of those items. Some of the supplies and tools are available from Delta Education. Check the replacement-part list for the course on FOSSweb.

Technology equipment

1. Computer with Internet connection
1. DVD player/TV setup (optional)
   - Google Earth™
1. Light sensor (optional, see Investigation 10, Part 2)
1. Projection system

Measuring tools

1–2. Balances, electronic (0.1 g accuracy)
32. Calculators
1. Meterstick
32. Rulers

Paper

8. Cardboard pieces, 10 × 20 cm
   - Chart paper
1. Sheet of construction paper (optional)
   - Index cards (optional)
   - Newspaper
   - Paper towels
1. Sheet of poster board, 35 × 50 cm (14" × 20")
   - Science notebooks (composition books)
   - Self-stick notes (for review sessions)
   - Tagboard (optional)
   - White paper, 22 × 56 cm (8.5" × 11")
Resources

- Aerial photographs of your community (optional)

Supplies

- Aluminum foil (narrow roll) or toilet tissue
- 8 Brass fasteners (optional)
- Cocoa powder, about 1 lb. per class
- Colored pencils, marking pens, or highlighters
- 1 Dime
- Flour, 20 lb.
- Glue sticks
- Marking pen, wet-erase, black or blue
- Masking tape, 2.5 cm wide
- 1 Quarter
- 2 Rubber bands, stout (optional)
- 10 Sticky dots, colorful, 13 mm
- String, 4 m (optional)
- Super glue (optional)
- Transparencies (optional)
- Water
- Whiteboard marking pens (optional)

Other tools

- Additional light sources (optional)
- Binoculars, spotting scope, or telescope (optional)

32 Calculators

- 8 Compasses, pencil (optional)
- 1 Container, 1/2 L
- 1 Earth globe on a stand, 23–30 cm in diameter
- 1 Extension cord (optional)
- fluorescent lighting, ceiling lights or lamp
- 1 Hobby or craft knife
- 1 Knife or nail file
- 1 Oven mitt or towel
- 1 Overhead projector or other strong light source

16 Scissors

- Shim (tapered piece of wood, metal, or stone) (optional)
**PREPARING the Kit for Your Classroom**

Some preparation is required each time you use the kit. Doing things before beginning the course will make daily setup quicker and easier.

Each part of each investigation includes a section called Getting Ready, which describes what you need to do or consider to be prepared to conduct the part.

Note that a few items are consumable, but there should be enough in the kit for at least five classes before you need to restock.

**Science Notebooks**

You will need to make copies of science notebook sheets before each investigation. See Getting Ready for Investigation 1, Part 1, for ways to organize the science notebook sheets for this course. If you use a projection system, you can download electronic copies of the sheets from FOSSweb.

**One-Time Preparation**

Some of the preparation will need to be done only one time. Here are things that require one-time preparation:

**Investigation 1, Part 1**

Install Google Earth™ and check for the latest version of Flash® plug-ins for your browsers on computers for you and your students. Get aerial photos of your local area if students won’t be using computers. This investigation can be done with the photos provided in *FOSS Science Resources: Planetary Science*, but the experience will be much richer for students if it involves their own school, neighborhood, and community.

**Investigation 1, Part 2**

Cut out a paper Moon.

**Investigation 2, Part 1**

Make a sailing-ship model. Remove the globes from their boxes and place each one, along with its base, into a large zip bag. Tape each Earth map to an 12" × 18" piece of cardboard.
Investigation 2, Part 2
Plan the location of the light source, and rearrange furniture if necessary. Cut out a paper star, and tape it on the north side of the classroom, near the ceiling.

Investigation 3, Part 1
On a sheet of poster board, trace a quarter in the center and cut out the hole with a hobby knife.

Investigation 6, Part 1
Prepare millimeter rulers by copying teacher master M, *Millimeter Rulers*, and doing a rough cut apart. Students can finish by cutting on the solid lines and folding on the dotted line.

If you don’t have a pencil compass for each group, construct dividers, following the instructions on teacher master N, *Tagboard Divider Construction*.

Prepare the cardboard graders by cutting a piece of cardboard into 10 × 20 cm pieces for each group.

Investigation 8, Part 1
Prepare a scale model of the solar system for classroom demonstration. This model will include the Sun, Mercury, Venus, Earth, Mars, and possibly Jupiter.

Investigation 8, Part 2
Prepare atmosphere models using small, clear vials and beads of four colors, and place each set of four in a 1 L zip bag.

Investigation 9, Part 1
Assemble a spectroscope for each student. You could let your first class assemble them for use by all classes.
**Materials**

**Gather Tools and Supplies**

Some of the preparation involves gathering supplies. Here are some examples:

**Investigation 1, Part 2**

Get binoculars, a spotting scope, or a telescope for students to view the Moon.

**Investigation 6, Part 1**

Purchase 20 pounds of white flour for all the classes and about 1 pound of cocoa powder per class for the cratering simulation.

Provide one or two electronic balances for students to determine the mass of their rocks for the cratering investigations. Weighing can be done at a central station.

**Investigation 9, Part 1**

Collect several light sources for students to observe: bug light, black light, LED lights, overhead projector, LCD projector, computer flat screen, or CRT screen.

**Investigation 10, Part 2**

The FOSS orrery is used in this part to introduce planet transits. Read the information in Getting Ready for details on using a light sensor with the orrery. If you provide a light sensor, the data can be graphed using a computer.
**Review Safety Guidelines**

There is a safety poster in the kit. Consider how to introduce the class rules so that everyone has a safe science experience. When going outside to look for the Moon or when using the spectroscopes, caution students not to look directly into the Sun.

**Reserve Computer Lab**

In a number of investigations, students should have access to computers in pairs or individually. Plan ahead to use multiple computers at these times:

- Investigation 1, Part 1 (with Google Earth™)
- Investigation 3, Part 2
- Investigation 5, Part 3
- Investigation 8, Part 1 (with Google Earth™)
- Investigation 10, Part 2

**Consider Outdoor Observations**

Students go outside in Investigation 1 to search for the Moon. Plan how you will organize students to go outside, where they will go, and the guidelines for behavior while outdoors.

In Investigation 9, Part 1, students will view sunlight with spectroscopes. If the classroom does not have windows, you will need to move to a location where sunlight is visible.
Sequential Classes

The materials are designed to be used with sequential classes. Organize a materials station in a central location in the classroom. Organize the materials at the station before first period. Each period, the appropriate materials are picked up for each group by a Getter, used for the investigation, inventoried by students at the end of the period, and returned to the materials station by the Getter. You can quickly review the materials station to ensure that all the materials came back (and take appropriate action if they didn’t) and that the materials are ready for the next class.
CARE, Reuse, and Recycling

When you finish teaching the course, inventory the kit carefully. Note the items that were used up, lost, or broken, and immediately arrange to replace the items. Use a photocopy of the Kit Inventory List, and put your marks in the “Equipment Condition” column. Replacement parts are available for FOSS by calling Delta Education at 1-800-258-1302 or by using the online replacement-part catalog (www.DeltaEducation.com).

The items in the kit have been selected for their ease of use and durability. Make sure that items are clean and dry before putting them back in the kit. Small items should be inventoried (a good job for students under your supervision) and put into zip bags for storage. Any items that are no longer useful for science should be properly recycled.