

# Materials at a Glance

Experiment 1	Experiment 3	Experiment 4	Experiment 5	Experiment 6
pencil, pen colored pencils small jar trowel or spoon <b>Optional</b> binoculars	known mineral samples: calcite, feldspar, quartz, hematite (from local rock and mineral store or order online) * several rocks from backyard or nearby	Students will select materials and use them to make a model of Earth's layers  <b>Chocolate Lava Cake</b> butter: 113 grams (1/2 cup) semi-sweet chocolate chips: 133 ml (1/2 cup + 1 Tbsp.) 2 whole eggs 2 egg yolks powdered sugar: 192 ml (3/4 cup + 1 Tbsp.) flour: 94 ml (1/3 cup + 1 Tbsp.)	student-made brittle candy (materials in Foods column on next page) 1 jar smooth peanut butter (for students with allergies to peanuts, whipped cream can be substituted) 118 ml (1/2 cup) crushed graham crackers plate or second cookie sheet materials to make a model volcano — student's choice	internet access (a program that unzips files may be needed) <b>Optional</b> printer and paper colored pencils
Experiment 2	pencil pen colored pencils compass small jar or container with a lid small items to place in jar (student selected) <b>Optional</b> garden trowel	streak plate (unglazed white ceramic tile) paper scissors marking pen tape vinegar (small amount) lemon juice (small amount) eyedropper or spoon		
Experiment 7	Experiment 9	Experiment 10	Experiment 11	Experiment 12
Some suggestions for student chosen model making materials:  modeling clay of different colors marble or steel ball ingredients to make various colored cakes materials for making paper maché Styrofoam balls	gravel, about 1-2 liters** sand, about 1-2 liters** dirt (soil), about 1-2 liters** pottery clay, about 1-2 liters** water (4) Styrofoam cups, about 355 ml (4) 16 oz. clear plastic cups, glasses, or other clear containers pencil marking pen measuring cups graduated cylinder, 100 ml large bowl scissors plastic wrap or plastic bags cardboard or other material to make a trough strong tape utility or X-Acto knife bucket and/or outdoor area <b>Optional</b> stopwatch or clock with a second hand small piece of screen or coarse cloth	field notebook, 1-2 (new or existing) pencil and colored pencils small backpack water bottle snacks binoculars (inexpensive ones are fine; small, lightweight ones are easier to carry) field guide to the birds book (for example, <i>The Young Birder's Guide to Birds of North America</i> , by Bill Thompson, III) <b>Optional</b> magnifying glass bird feeders and birdseed camera cellphone or tablet bird identification app (such as free app from Audubon Society, <a href="http://www.audubon.org/apps">http://www.audubon.org/apps</a> )	steel needle bar magnet piece of cork tape medium size bowl water compass small object of student's choice to use for treasure	pencil pen imagination <b>Optional</b> notebook
Experiment 8	2 liter (2 quart) plastic bottle with cap warm water matches blank paper			

\* A Mineral Scale of Hardness Set of Minerals is available from Home Science Tools: <http://www.hometrainingtools.com>

\*\* Quantities may vary. See Experiment 9, Just For Fun. Materials can be found where art, aquarium, or building supplies are sold.

# Materials

## Quantities Needed for All Experiments

Equipment	Materials	Foods
backpack, small binoculars (inexpensive ones are fine; small, lightweight ones are easier to carry) book, field guide to the birds (for example, <i>The Young Birder's Guide to Birds of North America</i> , by Bill Thompson, III) bowl, large bowl, medium bucket (and/or outdoor area) compass cookie sheet, 1-2, approx. 30x36 cm (12"x14") cups (4), plastic, clear, 16 oz.; or clear glasses or other clear containers eyedropper or spoon graduated cylinder, 100 ml jar, small jar, small (or container) with a lid knife, utility or X-Acto magnet, bar measuring cups needle, steel penny, copper plastic bottle with cap, 2 liter (2 quart) plate or second cookie sheet saucepan, 2 liter (2 qt) scissors spatula, 2 streak plate (unglazed white ceramic tile) thermometer, candy trowel or spoon water bottle  <b>Optional</b> bird feeders camera cellphone or tablet magnifying glass printer stopwatch or clock with a second hand	cardboard or other material to make a trough clay, pottery, about 1-2 liters (1-2 qts.)** cork cups (4), Styrofoam, about 355 ml (12 oz.) dirt (soil), about 1-2 liters (1-2 qts.)** gravel, about 1-2 liters (1-2 qts.)** items, small, (student selected) to place in jar matches materials, student selected, for making a model volcano materials, suggested, student selected for making model of Earth's layers: modeling clay of different colors marble or steel ball ingredients to make various colored cakes materials for making paper maché Styrofoam balls mineral samples (known): calcite, feldspar, quartz, and hematite (from local rock and mineral store or order online) * nail, steel notebook (field), 1-2 (new or existing) paper pen pen, marking pencil pencils, colored plastic wrap or plastic bags rocks, several, from backyard or nearby sand, about 1-2 liters (1-2 qts.)** tape tape, strong, such as duct tape  <b>Optional</b> birdseed notebook screen or coarse cloth, small piece	graham crackers, crushed, 118 ml (1/2 c.) lemon juice (small amount) peanut butter, 1 jar smooth (for students with allergies to peanuts, whipped cream can be substituted) snacks vinegar (small amount)  <b>Chocolate Lava Cake (Exper. 4)</b> butter: 113 grams (1/2 cup) semi-sweet chocolate chips: 133 ml (1/2 cup + 1 Tbsp.) 2 whole eggs 2 egg yolks powdered sugar: 192 ml (3/4 cup + 1 Tbsp.) flour: 94 ml (1/3 cup + 1 Tbsp.)  <b>Brittle Candy (Exper. 5)</b> white sugar: 237 ml (1 cup) light corn syrup: 118 ml (1/2 cup) salt: 1.25 ml (1/4 teaspoon) water: 59 ml (1/4 cup) butter: 28 grams (2 Tbsp) baking soda: 5 ml (1 teaspoon)
		<b>Other</b>
		internet access (a program that unzips files may be needed)  <b>Optional</b> bird identification app (such as free app from Audubon Society, <a href="http://www.audubon.org/apps">http://www.audubon.org/apps</a> )

\* A Mineral Scale of Hardness Set of Minerals is available from Home Science Tools: <http://www.hometrainingtools.com>

\*\* Quantities may vary. See Experiment 9, Just For Fun. Materials can be found where art, aquarium, or building supplies are sold.

# Contents

---

Experiment 1	<b>Observing Your World</b>	<b>1</b>
Experiment 2	<b>Hidden Treasure</b>	<b>5</b>
Experiment 3	<b>Mineral Properties</b>	<b>10</b>
Experiment 4	<b>Model Earth</b>	<b>15</b>
Experiment 5	<b>Dynamic Earth</b>	<b>19</b>
Experiment 6	<b>Using Satellite Images</b>	<b>23</b>
Experiment 7	<b>Modeling Shaky Ground</b>	<b>27</b>
Experiment 8	<b>Exploring Cloud Formation</b>	<b>31</b>
Experiment 9	<b>What Makes an Aquifer?</b>	<b>35</b>
Experiment 10	<b>My Biome</b>	<b>40</b>
Experiment 11	<b>Finding North</b>	<b>45</b>
Experiment 12	<b>Solve One Problem</b>	<b>50</b>