

Exploring

The

# BUILDING BLOCKS

of

# SCIENCE

Book 4

TEACHER'S MANUAL



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# Materials at a Glance

Experiment 1	Experiment 2	Experiment 3	Experiment 5	Experiment 6
<p>An old used cell phone that is no longer needed. If a used cell phone cannot be located, you can substitute any other electronic device, such as an old computer or electronic toy.</p> <p>a second electronic device to take apart</p> <p>rubber gloves, 1-2 pairs</p>	<p>colored pencils, crayons, or markers</p> <p>jelly beans of different colors:</p> <p>red</p> <p>gray (lavender can be used)</p> <p>blue</p> <p>black</p> <p>green</p> <p>white</p> <p>[or substitute objects such as those listed below]</p> <p><i>Just For Fun</i> section: objects of different colors—at least 10 of each color, it can be food (like M&amp;M's, jelly beans, etc., or objects like buttons, beads, or marbles); red and gray are the important colors</p>	<p>water</p> <p>1-2 ice cube trays or paper cups</p> <p>small frying pan or saucepan with lid</p> <p>pot holder</p> <p>2 Styrofoam cups</p> <p>freezer</p> <p>stove</p>	<p>2 raw eggs</p> <p>2 bowls</p> <p>fork</p> <p>2 plastic bags</p> <p>frying pan</p> <p>1 ice cube</p> <p>stove</p> <p>freezer</p>	<p>notebook for student to make into a biologist's field notebook</p> <p>pencil, pen</p> <p>colored pencils</p> <p><b>Optional</b></p> <p>camera</p> <p>backpack</p> <p>snack and bottle of water</p>
		<p><b>Experiment 4</b></p>		
		<p>8 Styrofoam cups</p> <p>360 ml (1 1/2 cups) boiling water</p> <p>240 ml (1 cup) cold tap water</p> <p>60 ml (4 Tbsp) baking soda</p> <p>120 ml (1/2 cup) apple cider vinegar</p> <p>120 ml (1/2 cup) balsamic vinegar</p> <p>measuring cup and spoons</p> <p>spoon</p> <p>stove</p>		

Experiment 7	Experiment 8	Experiment 9	Experiment 10	Experiment 11
<p>large tray or plastic box, at least .3 m (1 ft.) on each side, and cover garden dirt (with lots of organic material)</p> <p>spoon or garden trowel</p> <p>holding box for the snails/worms to keep them moist and dark</p> <p>12 snails/slugs and/or 20–40 worms *</p> <p>water</p> <p>experimental snail and worm barriers. Set the amount you are going to use in an open container in the sun for a few days.</p> <p>table or rock salt plus three of the following:</p> <p>cinnamon</p> <p>baking soda</p> <p>black pepper</p> <p>cornstarch</p> <p>flour</p> <p>borax</p> <p>an active anthill</p>	<p>butterfly kit</p> <p>small cage</p> <p>Butterfly kits can be purchased from a variety of different sources, such as:</p> <p>Home Science Tools: <a href="http://www.hometrainingtools.com">www.hometrainingtools.com</a></p> <p>Insect Lore: <a href="http://www.insectlore.com">www.insectlore.com</a></p>	<p>tadpole kit (or tadpoles or frog eggs collected locally)</p> <p>A tadpole kit can be purchased from Home Science Tools: <a href="http://www.hometrainingtools.com">www.hometrainingtools.com</a>.</p> <p>aquarium</p> <p>water</p> <p>tadpole food</p>	<p>chalk in different colors</p> <p>narrow rope or heavy string about .6 m (2 ft.) long - heavy enough to move along the ground when one end is wiggled</p>	<p>5 identical glass jars or drinking glasses</p> <p>water</p> <p>wooden drumstick, ruler, wooden spoon, or other wooden stick</p> <p>flat, unobstructed area for playing a game</p> <p><b>Optional</b></p> <p>blindfold</p>

\* Look for online or local sources of snails and/or earthworms. Or you and your students may be able to collect them yourselves.

Experiment 12	Experiment 13	Experiment 14	Experiment 15	Experiment 16
<p>two prisms (glass or plastic) flashlight sunlight white wall, whiteboard, or other white surface colored pencils</p>	<p>3 small jars 180 ml (3/4 cup) vegetable oil 120 ml (1/2 cup) water 120 ml (1/2 cup) acetone (nail polish remover) food coloring drinking glass (a square glass is preferred, but a round glass will work) thin wooden stick (e.g., a kebab skewer) marking pen (or paper and tape) to label jars</p>	<p>large balloon (may substitute plastic wrap) glass jar scissors rubber band plastic straw toothpick tape index card <b>Optional</b> piece of cardboard</p>	<p>scissors tape 2 small baskets, hats, or other containers to hold game pieces pair of dice <b>Optional</b> colored pencils</p>	<p>Two renewable resources model kits chosen from list provided. (See first page of Exper. 16)</p>

Experiment 17	Experiment 18	Experiment 19	Experiment 21	Experiment 22
<p><b>Optional</b> small notebook</p>	<p>model rocket kit (1 or more)—see list of suggested kits at beginning of experiment tools for assembly depending on kit selected  Note: Other kits may be substituted</p>	<p>tape scissors marking pen <b>Optional</b> 2-3 push pins or tacks</p>	<p>Robot kit —see list of suggested kits at beginning of experiment</p>	<p><i>Laboratory Notebook</i></p>
		<p><b>Experiment 20</b></p>		
		<p>computer with internet access</p>		

# Materials

## Quantities Needed for All Experiments

Equipment	Equipment (Continued)	Foods
aquarium bowls, 2 box to hold snails/worms to keep them moist and dark cage, small, for butterfly cell phone (old used) that is no longer needed. If a used cell phone cannot be located, you can substitute any other electronic device, such as an old computer or electronic toy. computer with internet access containers, 2 small (baskets, hats, or other containers to hold game pieces) dice, 1 pair electronic device to take apart flashlight fork freezer frying pan (small) or saucepan with lid garden trowel or spoon glass, drinking (a square glass is preferred, but a round glass will work) ice cube trays (1-2) or paper cups jars, 3 small jars (glass) or drinking glasses, 5 identical measuring cup measuring spoons oven mitt or pot holder prisms (glass or plastic), 2 scissors spoon stick, wooden (drumstick, ruler, wooden spoon, or other wooden stick) stick, wooden, thin (e.g., a kebab skewer) stove tray, large, or plastic box, at least .3 m (1 ft.) on each side, and cover	<p><b>Kits</b></p> kits, 2, renewable resources model kits chosen from list provided (See Experiment 16) kit, model rocket (1 or more)—see list of suggested kits - Experiment 18 kit, robot —see list of suggested kits - Experiment 21	baking soda, 60 ml (4 Tbsp) eggs, raw, 2 ice cube, 1 jelly beans of different colors: red gray (lavender can be used) blue black green white [or substitute other colored objects—see Experiment 2] snack and bottle of water vegetable oil, 180 ml (3/4 cup) vinegar, apple cider, 120 ml (1/2 cup) vinegar, balsamic, 120 ml (1/2 cup)
	<p><b>Misc.</b></p> tools for kit assembly, depending on kit	
	<p><b>Optional</b></p> backpack blindfold camera	

# Materials

## Quantities Needed for All Experiments

Materials	Materials (continued)	Other
<p>acetone (nail polish remover), 120 ml (1/2 cup)                      bags, plastic, 2                      balloon, large (may substitute plastic wrap)                      card, index, 1-2                      chalk, different colors                      cups, Styrofoam, 10                      dirt, garden (with lots of organic material)                      food coloring                      notebook for student to make into a biologist's field notebook                      pen                      pen, marking                      pencil                      pencils (colored)                      rope (narrow) or heavy string, about .6 m (2 ft.) long—heavy enough to move along the ground when one end is wiggled                      rubber band, 1                      rubber gloves, 1-2 pairs                      straw, plastic, 1                      tape                      toothpick, 1                      water                      water, boiling, 360 ml (1 1/2 cups)                      water, cold tap, 240 ml (1 cup)</p>	<p><b>Misc.</b>                      experimental snail and worm barriers.                      (Set the amount you are going to use in an open container in the sun for a few days.)                      table or rock salt plus 3 of the following:                      cinnamon                      baking soda                      black pepper                      cornstarch                      flour                      borax                      objects of different colors—at least 10 of each color, it can be food (like M&amp;M's, jelly beans, etc.) or objects like buttons, beads, or marbles; red and gray are the important colors</p> <p><b>Optional</b>                      cardboard, 1 piece                      crayons or markers                      notebook, small                      push pins or tacks, 2-3</p>	<p>anthill, active                      area (flat, unobstructed) for playing a game                      snails/slugs (12) and/or 20–40 worms *                      sunlight                      tadpole food                      wall (white), whiteboard, or other white surface</p> <p><b>Kits</b>                      butterfly kit (can be purchased from a variety of different sources, such as: Home Science Tools: <a href="http://www.hometrainingtools.com">www.hometrainingtools.com</a>)                      Insect Lore: <a href="http://www.insectlore.com">www.insectlore.com</a>                      tadpole kit (or tadpoles or frog eggs collected locally)                      A tadpole kit can be purchased from Home Science Tools: <a href="http://www.hometrainingtools.com">www.hometrainingtools.com</a></p>

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