

# Materials at a Glance

Experiment 1	Experiment 2	Experiment 4	Experiment 5	Experiment 7
tennis ball paperclip yarn or string (about 3 meters [10 ft]) marble bouncing ball, 1 (or 2 or more of different sizes) <b>Optional</b> penknife, ice pick, awl, or other sharp tool pliers	electronic circuit kit (see next page <b>Other</b> ) <b>Experiment 3</b> Slinky several paperclips 1-2 apples 1-2 lemons or limes 1-2 oranges 1-2 bananas spring balance scale or food scale meterstick, yardstick, or tape measure tape	small to medium size toy car stiff cardboard wooden board, smooth and straight (more than 1 meter [3 feet] long) straight pin or tack, several small scale or balance one banana, sliced 10 pennies meterstick, yardstick or tape measure tape	student-selected materials several sheets of paper <b>Experiment 6</b> several glass marbles of different sizes several steel marbles of different sizes cardboard tube, .7-1 meter [2.5-3 ft] long scissors black marking pen ruler letter scale or other small scale or balance	stopwatch compass an open space large enough to run (park, schoolyard, playground, backyard, etc.) 5 markers of students' choice to mark distances blank paper a group of friends
Experiment 8	Experiment 9	Experiment 10	Experiment 11	Experiment 12
pencil or pen marking pen thumbtack or pushpin 3 pieces of string — approximate sizes: 10 cm [4 in.]; 15 cm [6 in.]; 20 cm [8 in.] tape ruler (metric) large piece of white paper (bigger than 30 cm [12 in.] square — students may need to tape several sheets of paper together) firm surface at least as large as the paper and that a thumbtack can be pinned into	10-20 copper pennies (pennies made before 1982 have more copper and work best) aluminum foil paper towels salt water: 30-45 ml (2-3 Tbsp.) salt per 240 ml (1 cup) water voltmeter* 2 plastic-coated copper wires, each 10-15 cm (4"-6") long duct tape (or other strong tape) scissors wire cutters fine steel wool, plain (no soap), 1 pad 9 volt battery ovenproof pan or dish heatproof pad or surface <b>Optional</b> wire stripping tool bucket of water	small glass jar with lid aluminum foil (small piece) paperclip duct tape (or other strong tape) plastic or rubber rod (or balloon) silk fabric (or can use hair with a balloon) scissors ruler awl or other tool to make a hole several thin, bendable plastic straws (thick straws may not work well) paper tissues (Kleenex) or cloth made of silk or wool small piece of paper small piece of aluminum foil 1 or more books — thin pages preferable 1-2 plastic combs plastic cup shallow bowl or a plate	(2) D cell batteries and battery holder (2) 3.7 volt light bulbs and sockets (1) switch (4) alligator clip connectors (2) 5 ohm, 1/4 watt resistors (1) DC motor with propeller  Materials are available as a kit from Home Science Tools (as of this writing): Product #: EL-KITBASC <a href="http://www.hometrainingtools.com/">http://www.hometrainingtools.com/</a>	metal rod (e.g., large nail 8.9 cm [3.5"] long, 16d flathead—or an unmagnetized screwdriver) electrical wire, .3-.6 meter (1'-2') 10-20 paperclips 6v or larger battery (12v battery if a screwdriver is used) electrical tape or 2 alligator clips scissors wire cutters bar magnet small plastic baggie small flat-bottomed clear plastic container with lid [about 5 cm x 8 cm x 1.5 cm (2" x 3" x 1/2") — a box straight pins come in would work) clear Karo syrup spoon 2 pencils or other props <b>Optional</b> wire stripping tool iron filings**

\* An inexpensive voltmeter can be purchased at any store that supplies electrical equipment. Make sure the voltage scale is low enough to detect small voltages. A typical penny-cell produces about 0.5v.

\*\* Available from Home Science Tools CH-IRON, <http://www.hometrainingtools.com/>

# Materials

## Quantities Needed for All Experiments

Equipment	Materials	Foods
alligator clip connector (2) <sup>1</sup> awl or other tool to make a hole ball, bouncing, 1 (or 2 or more of different sizes) ball, tennis battery, 6v or larger (12v battery used with a screwdriver) battery, 9 volt battery, D cell (2) and battery holder <sup>1</sup> bowl, shallow, or a plate compass container with lid, small flat-bottomed clear plastic [about 5 cm x 8 cm x 1.5 cm (2" x 3" x 1/2") — a box straight pins come in would work) jar, small, glass with lid light bulb, 3.7 volt (2), and sockets (2) <sup>1</sup> magnet, bar marble, glass, several of different sizes marble, steel, several of different sizes meterstick, yardstick, or tape measure motor, DC, with propeller <sup>1</sup> pad or surface, heatproof pan or dish, ovenproof pennies, 10 pennies, 10-20 copper (pennies made before 1982 have more copper and work best) resistor, 5 ohm, 1/4 watt, (2) <sup>1</sup> rod, metal (e.g., large nail 8.9 cm [3.5"] long, 16d flathead—or an unmagnetized screwdriver) ruler ruler (metric) scale, letter, or other small scale or balance scale, spring balance or food scissors Slinky spoon stopwatch switch, electric <sup>1</sup> toy car, small to medium size voltmeter* wire cutters <b>Optional</b> bucket penknife, ice pick, awl, or other sharp tool pliers wire stripping tool	aluminum foil baggie, small plastic board, wooden, smooth and straight (more than 1 meter [3 feet] long) book, 1 or more — thin pages preferable cardboard, stiff cardboard tube, .7-1 meter [2.5-3 ft] long comb, plastic, 1-2 cup, plastic fabric, silk (or hair and a balloon) markers of students' choice to mark distances, 5 materials, student-selected paper, large piece, white (bigger than 30 cm [12 in.] square — can tape several sheets of paper together) paper, several sheets paper towels paperclips, 10-20 pen, black marking pencil or pen pencil, (2) or other props rod, plastic or rubber (or balloon) salt water: 30-45 ml (2-3 Tbsp.) salt per 240 ml (1 cup) water steel wool, fine, plain (no soap), 1 pad straws, plastic, thin, bendable, several (thick straws may not work well) string, 3 pieces— approximate sizes: 10 cm [4 in.]; 15 cm [6 in.]; 20 cm [8 in.] tack or straight pin, several thumbtack or pushpin tissues, paper (Kleenex) or cloth made of silk or wool tape tape, duct (or other strong tape) wire, electrical, .3-.6 meter (1'-2') wire, plastic-coated copper wires, 2 pieces, each 10-15 cm (4"-6") long yarn or string (about 3 meters [10 ft]) <b>Optional</b> iron filings <sup>2</sup> tape, electrical	apple, 1-2 banana, 2-3 Karo syrup, clear lemon or lime, 1-2 orange, 1-2 <b>Other</b> electronic circuit kit (choose one): Snap Circuits: <a href="http://www.snapcircuits.net/">http://www.snapcircuits.net/</a> Snap Circuits Jr. 100 Kit Little Bits: <a href="http://littlebits.cc/intro">http://littlebits.cc/intro</a> Base Kit: <a href="http://littlebits.cc/kits/base-kit">http://littlebits.cc/kits/base-kit</a> Note: If these products are no longer available, do an internet search on children's electronic circuit kits to find a kit suitable for this experiment. group of friends open space large enough to run (park, schoolyard, playground, backyard, etc.) surface, firm, large, that a thumbtack can be pinned into

<sup>1</sup> Electrical materials are available as a kit from Home Science Tools (as of this writing): Product #: EL-KITBASC <http://www.hometrainingtools.com/>

<sup>2</sup> Available from Home Science Tools CH-IRON, <http://www.hometrainingtools.com/>

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