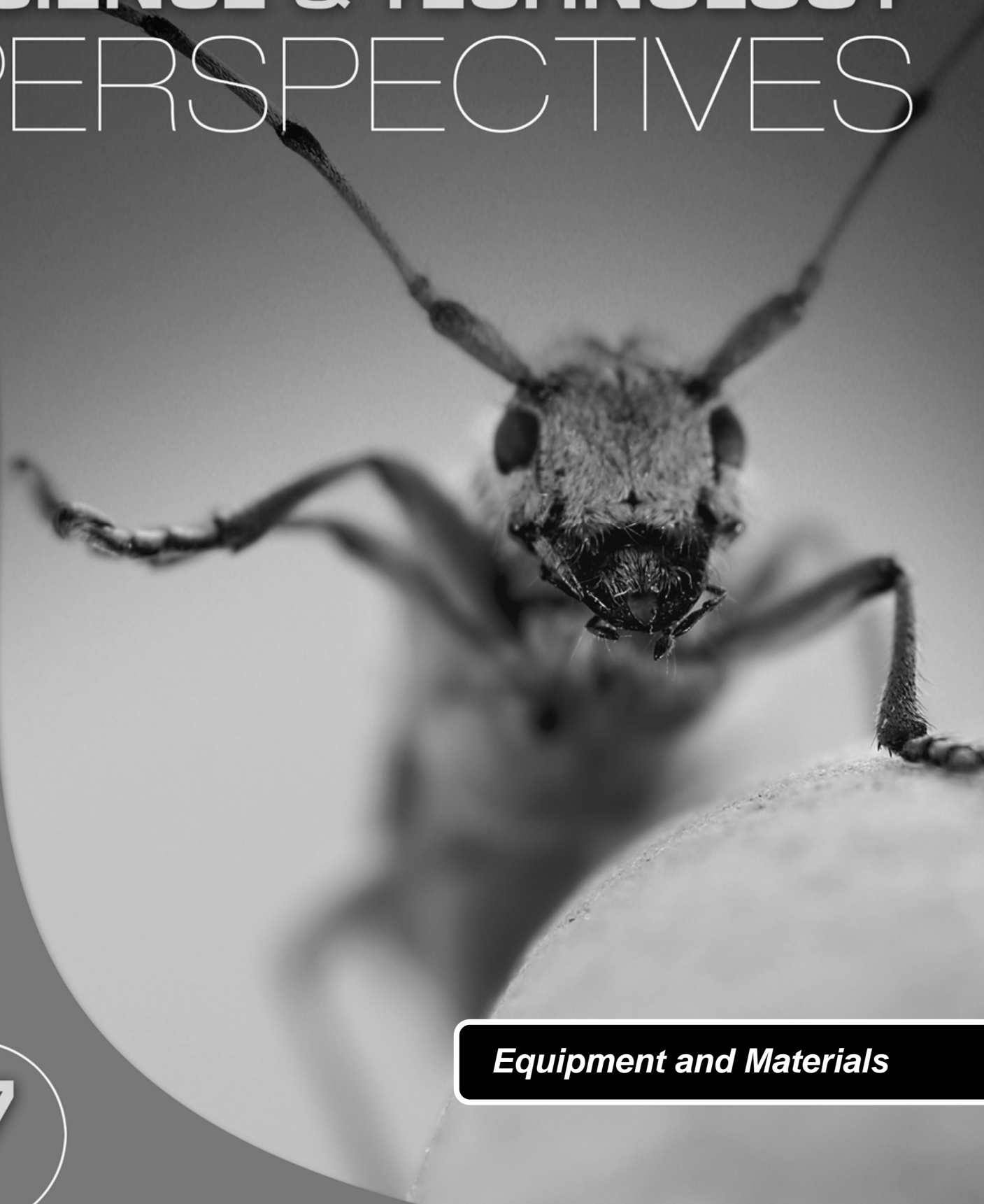


NELSON

SCIENCE & TECHNOLOGY PERSPECTIVES



Equipment and Materials

7

EQUIPMENT AND MATERIALS

The quantity of equipment and materials required for Activities and Investigations is based on the groupings suggested in the specific sections. The quantities listed are based on a standard class size of 32 students per class, broken down into pairs of students or groupings of four students. Where the term “quantity” is inappropriate, such as for a piece of tubing, masking tape, and so on, you will have to check the individual activity or investigation to obtain appropriate quantities. In the table below, “Equipment” refers to actual equipment or hardware (such as microscopes, metre sticks, glassware, etc.), and “Materials” refers to consumable items (such as chemicals, tape, water, or paper).

Most of the equipment and materials included in this list may be ordered from **Boreal Northwest Ltd.**, www.boreal.com (phone 1-800-387-9393 or fax 1-800-668-9106).

Investigation/Activity	Quantity	Equipment	Materials
1.1 Try This: Explain Observations Using the Particle Theory Student groupings: 8 groups of 4 students	8 8 8 1 — — —	<ul style="list-style-type: none"> • tablespoon • ceramic coffee mug • timing device 	<ul style="list-style-type: none"> • sugar, 0.5 kg bag • room-temperature water • cold water • ice • hot water
1.2 Try This: Changes in State Student groupings: 8 groups of 4 students	1 1 8 —	<ul style="list-style-type: none"> • microwave oven 	<ul style="list-style-type: none"> • plastic sandwich bags, box • rubber band • ice
1.3 Conduct an Investigation: Testing the Particle Theory Student groupings: 8 groups of 4 students	32 32 1 8 8 8 1 8 8 48 — 1 1	<ul style="list-style-type: none"> • safety goggles • apron • beaker, Pyrex student grade, 100 mL, low form, double scale, package of 12 units • triple beam balance • hot plate • beaker tongs • stirring rod • cylinder, polypropylene, 100 mL × 1 mL, single scale • watch glass, Pyrex, 75 mm, package of 12 units 	<ul style="list-style-type: none"> • weighing paper, 79 mm diameter, .12 mm thick, package of 1000 • ice cubes • water • salt, 0.5 kg box
1.4 Try This: Test a Sample of Matter Student groupings: 8 groups of 4 students	8 8 1 —	<ul style="list-style-type: none"> • colourless drinking glass (or beaker) 	<ul style="list-style-type: none"> • water-soluble black marker • chromatography paper, 100 cm L × 2 cm W × .16 cm T, roll • tap water

Investigation/Activity	Quantity	Equipment	Materials
1.5 Perform an Activity: Identifying and Classifying Matter Student groupings: 8 groups of 4 students	32 32 1 1 2 8 8 1 8 1 2 1 1 —	<ul style="list-style-type: none"> • safety goggles • apron • test tube, Pyrex, 13 mm × 100 mm, 9 mL, package of 72 units • stopper, rubber, size 5, solid, 1 lb (454 g) bag • test-tube rack • spoon • beaker, Pyrex student grade, 250 mL, low form, double scale, package of 12 units • magnifying glass 	<ul style="list-style-type: none"> • latex-free disposable gloves, medium, box of 100 • distilled water, 1 L bottle • rubbing alcohol, 500 mL bottle • glycerol, laboratory grade, 1 L bottle • castor oil, 500 mL bottle • sugar, 0.5 kg bag • flour, 0.5 kg bag • water
1.6 Try This: Make a Mixture Student groupings: 8 groups of 4 students	32 8 8 — 1 2 1	<ul style="list-style-type: none"> • apron • clear drinking glass (or beaker) • spoon 	<ul style="list-style-type: none"> • water • cooking oil, 1 L bottle • food colouring, 2 boxes of 4 colours • liquid dish detergent, 1 L
2.2 Try This: Where Does the Sugar Go? Student groupings: 16 pairs	16 16 16 16 1 — 1 1	<ul style="list-style-type: none"> • cylinder, polypropylene, 100 mL × 1 mL, single scale • cylinder, polypropylene, 250 mL × 2 mL, single scale • spoon, measuring, set/6 1/8 tsp (.6mL), 1/4 tsp (1.2mL), 1/2 tsp (2.5mL), 1 tsp (5mL), 1/2tbsp (7.5mL), 1tbsp (15mL) • stirring rod • marbles, 1 kg bag 	<ul style="list-style-type: none"> • sugar, 1 kg bag • water • sand, 5 kg bag
2.2 Try This: Compare Different Solvents Student groupings: 8 groups of 4 students	32 8 8 2 1 — 1	<ul style="list-style-type: none"> • apron • small clear glass (or beaker) • tablespoon 	<ul style="list-style-type: none"> • rubbing alcohol, 500 mL bottle • vegetable oil, 1 L bottle • water • sugar, 0.5 kg bag

Investigation/Activity	Quantity	Equipment	Materials
2.3 Try This: Make a Saturated Solution Student groupings: 32 individual students	32 32 32 32 1 —	<ul style="list-style-type: none"> apron cylinder, polypropylene, 100 mL × 1 mL, single scale clear drinking glass (or beaker) spoon, measuring, set/6 1/8 tsp (.6mL), 1/4 tsp (1.2mL), 1/2 tsp (2.5mL), 1 tsp (5mL), 1/2tbsp (7.5mL), 1tbsp (15mL) 	<ul style="list-style-type: none"> drink-mix crystals, 100 g container room-temperature water
2.4 Perform an Activity: Solubility Student groupings: 8 groups of 4 students	32 32 2 8 8 8 1 8 8 1 1 1 — —	<ul style="list-style-type: none"> apron safety goggles beaker, Pyrex student grade, 600 mL, low form, double scale, package of 6 units glass stirring rod thermometer, -20 °C to 110 °C, total immersion, Enviro-Safe, 30cm cylinder, polypropylene, 50 mL × 1 mL, single scale beaker, Pyrex student grade, 100 mL, low form, double scale, package of 12 units balance (electronic or triple beam) spoon, measuring, set/6 1/8 tsp (.6mL), 1/4 tsp (1.2mL), 1/2 tsp (2.5mL), 1 tsp (5mL), 1/2 tbsp (7.5mL), 1tbsp (15mL) electric kettle 	<ul style="list-style-type: none"> weighing paper, 79 mm diameter, .12 mm thick, package of 1000 Epsom salts, 0.5 kg box table salt (NaCl), 0.5 kg box water ice cubes

Investigation/Activity	Quantity	Equipment	Materials
3.1 Perform and Activity: Separating Mechanical Mixtures Student groupings: 8 groups of 4 students	32 32 8 5 2 1 8 8 8 2 1 1 2 1 1 — 1	<ul style="list-style-type: none"> • apron • safety goggles • teaspoon • beaker, Pyrex student grade, 250 mL, low form, double scale, package of 12 units • watch glass, Pyrex, 75 mm, package of 12 units • magnet, small bar, set/8 • sifter, set/4, 12.5 cm dia × 5 cm h mesh sizes: 10 mm, 5 mm, 3 mm & 1 mm holes, nesting, with lid • funnel • plastic container (such as 1 kg margarine tub) • bottle, wash, 250 mL, polyethylene narrow mouth, package of 6 units 	<ul style="list-style-type: none"> • potting soil, 5 kg bag • iron metal, laboratory, fine (50 Mesh), 500 g bottle • coarse salt, 1 kg box • sand, 5 kg bag • gravel, 5 kg bag • paper towels • filter paper, medium flow, 11 cm diameter, package of 100
3.2 Try This: Separate a Mixture by Dissolving Student groupings: 8 groups of 4 students	32 1 8 1 1 1 —	<ul style="list-style-type: none"> • apron • tablespoon 	<ul style="list-style-type: none"> • clear plastic drinking cups, 1 package, 100 count • salt, 500 g box • ground black pepper, 500 g box • coffee filters, 100-count pack • warm water
3.4 Try This: Clean Up an Oil Spill Student groupings: 8 groups of 4 students	32 8 8 8 1 1 1 1 — —	<ul style="list-style-type: none"> • apron • cake pans or plastic tubs, approximately 30 cm × 20 cm × 5 cm • teaspoon • eyedropper 	<ul style="list-style-type: none"> • cooking oil, 1 L bottle • paper plate, 25-count pack • cotton balls, 100-count bag • plastic straws, package of 250 • liquid dish detergent, 1 L bottle • water • paper towels
3.5 Try This: Make a Stalactite Student groupings: 8 groups of 4 students	32 8 8 8 1 1 1 —	<ul style="list-style-type: none"> • apron • large bowl • teaspoon 	<ul style="list-style-type: none"> • piece of cardboard, approximately 15 cm × 30 cm • clear plastic drinking cups, 1 package, 100 count • Epsom salts, 0.5 kg box • cotton string, 200 ft • warm water

Investigation/Activity	Quantity	Equipment	Materials
3.6 Conduct an Investigation: Separating a Solution Student groupings: 8 groups of 4 students	32 32 16 8 1 2 8 8 8 1 1 —	<ul style="list-style-type: none"> • safety goggles • apron • oven mitts • balance, electronic or triple beam • beaker, Pyrex student grade, 600 mL, low form, double scale, package of 6 units • cylinder, polypropylene, 100 mL × 1 mL, single scale • stirring rod • hot plate • wire gauze w/ceramic centre, 10 cm × 10 cm (4" × 4"), package of 12 units 	<ul style="list-style-type: none"> • weighing paper, 79 mm diameter, .12 mm thick, package of 1000 • salt, 500 g box • warm water
3.8 Perform an Activity: Separating a Complex Mixture Student groupings: 8 groups of 4 students	32 32 2 8 1 8 8 1 2 1	<ul style="list-style-type: none"> • safety goggles • apron • beaker, Pyrex student grade, 100 mL, low form, double scale, package of 12 units • plastic container (such as 1 kg margarine tub) • magnet, small bar, set/8 • teaspoon • sifter, set/4, 12.5cm dia × 5 cm h mesh sizes: 10 mm, 5 mm, 3 mm & 1 mm holes, nesting, with lid • bottle, wash, 250 mL, polyethylene narrow mouth, package of 6 units 	<ul style="list-style-type: none"> • pre-mixed mechanical mixtures • filter paper, medium flow, 11 cm diameter, package of 100

EQUIPMENT AND MATERIALS

The quantity of equipment and materials required for Activities and Investigations is based on the groupings suggested in the specific sections. The quantities listed are based on a standard class size of 32 students per class, broken down into pairs of students or groupings of four students. Where the term “quantity” is inappropriate, such as for a piece of tubing, masking tape, and so on, you will have to check the individual activity or investigation to obtain appropriate quantities. In the table below, “Equipment” refers to actual equipment or hardware (such as microscopes, metre sticks, glassware, etc.), and “Materials” refers to consumable items (such as chemicals, tape, water, or paper).

Most of the equipment and materials included in this list may be ordered from **Boreal Northwest Ltd.**, www.boreal.com (phone 1-800-387-9393 or fax 1-800-668-9106).

Investigation/Activity	Quantity	Equipment	Materials
4.2 Try This: Identify the Best Living Conditions Student groupings: 8 groups of 4 students	8 8 8	<ul style="list-style-type: none"> scissors 	<ul style="list-style-type: none"> coloured markers, package bristol board, pad
4.3 Perform an Activity: Designing Your Own Model Ecosystem Student groupings: 8 groups of 4 students	8 8 32 8 1 2 2 16 3 3 —	<ul style="list-style-type: none"> clear plastic containers, such as an aquarium, large jar, or 2 L plastic drink bottle bright light source hand lens thermometer, $-20\text{ }^{\circ}\text{C}$ to $110\text{ }^{\circ}\text{C}$, total immersion, Enviro-Safe, 30 cm 	<ul style="list-style-type: none"> gravel, 5 kg bag charcoal, aquarium (activated carbon) 454 g soil, garden, 8 lb bag small plants (shade tolerant) live earthworms (<i>Lumbricus terrestris</i>), package of 12 (double quantity if large terrariums set up) live pill or sow bugs, package of 12 (double quantity if large terrariums set up) dry leaves
4.4 Try This: Counting Populations Student groupings: 8 groups of 4 students	8 8	<ul style="list-style-type: none"> metre stick identification guide, plants of Ontario (optional) 	
5.3 Perform an Activity: The Great Web of Life Student groupings: 32 students	1 1 —		<ul style="list-style-type: none"> coloured cards, 6 colours, unlined, package of 100 tape, transparent dispenser roll, or safety pins, box string or yarn

Investigation/Activity	Quantity	Equipment	Materials
5.4 Try This: Dealing Out a Pyramid of Numbers Student groupings: 8 groups of 4 students	8 8 — 32	<ul style="list-style-type: none"> • playing cards, pack • field guide (optional) 	<ul style="list-style-type: none"> • paper • pencil
5.5 Try This: Discovering Interactions in a Rotting Log Student groupings: 8 groups of 4 students	1 1 32 8 8 1 8 8	<ul style="list-style-type: none"> • hand lens • dissecting set, basic (forceps) • bottle, trigger spray, 0.5 L • shovel, collapsible • clear plastic containers with lids • field guide (optional) 	<ul style="list-style-type: none"> • rotting log • latex-free disposable gloves, medium, box of 100
5.6 Conduct an Investigation: Breaking Down the Waste Barrier Student groupings: 8 groups of 4 students	8 8 1 8 48 2 — — 1 1 8 1	<ul style="list-style-type: none"> • scissors • bottle, trigger spray, 0.5 L • window screening, 1.5 m × 1.5 m sheet 	<ul style="list-style-type: none"> • coloured markers, package • rubber bands, 5" 1/4 lb box approx. 80/box (Size #36) • bottoms of clear 2 L plastic bottles • soil, garden, 8 lb bag • garden waste (such as dead leaves, straw, pine needles) • raw vegetables and fruit peels (banana, orange, potato, lettuce) • paper • aluminum foil, roll • plastic wrap, roll • masking tape
6.2 Try This: Protecting Our Natural Heritage for Future Generations Student groupings: 8 groups of 4 students	8	<ul style="list-style-type: none"> • computer with Internet access 	
6.3 Perform an Activity: The Trouble with Invasive Species Student groupings: 8 groups of 4 students	8 8 8	<ul style="list-style-type: none"> • map of Ontario • computer with Internet access • field guide to invasive species (optional) 	
6.4 Try This: Determining Your Ecological Footprint Student groupings: 8 groups of 4 students	8 — 8	<ul style="list-style-type: none"> • computer with Internet access 	<ul style="list-style-type: none"> • chart paper • coloured markers, package

EQUIPMENT AND MATERIALS

The quantity of equipment and materials required for Activities and Investigations is based on the groupings suggested in the specific sections. The quantities listed are based on a standard class size of 32 students per class, broken down into pairs of students or groupings of four students. Where the term “quantity” is inappropriate, such as for a piece of tubing, masking tape, and so on, you will have to check the individual activity or investigation to obtain appropriate quantities. In the table below, “Equipment” refers to actual equipment or hardware (such as microscopes, metre sticks, glassware, etc.), and “Materials” refers to consumable items (such as chemicals, tape, water, or paper).

Most of the equipment and materials included in this list may be ordered from **Boreal Northwest Ltd.**, www.boreal.com (phone 1-800-387-9393 or fax 1-800-668-9106).

Investigation/Activity	Quantity	Equipment	Materials
7.4 Conduct an Investigation: Expanding and Contracting Student groupings: 8 groups of 4 students	32 32 1 1 2 8 3 1 1 1 2 — —	<ul style="list-style-type: none"> • eye protection • apron • package of 72 units of test tube, Pyrex, 15 mm × 125 mm, 14 mL • stopper, rubber, size 0, 1 hole (3 mm diam), 1 lb (454 g) bag • tubing, Pyrex, 3 mm OD × 0.6 mm wall, 122 cm length, package of 50 pieces • pen, marking, assorted colours of water soluble ink, set of 8 • beaker, Pyrex student grade, 600 mL low form, package of 6 units • bottle, flint glass, 237 mL, w/ narrow mouth & screw cap, package of 12 units • balloon, round 5”, package of 35 pieces • ball & ring apparatus 	<ul style="list-style-type: none"> • food colouring, box of four bottles • water • ice
7.5 Try This: Hot and Cold Balloons Student groupings: 8 groups of 4 students	1 8 1 1	<ul style="list-style-type: none"> • balloon, round 5”, package of 35 pieces • tape measure, vinyl, metric scale in cm with 1 mm divisions, 100 cm, package of 12 units 	<ul style="list-style-type: none"> • black markers • refrigerator/freezer
8.1 Try This: Make a Mini Windmill	32 1 —		<ul style="list-style-type: none"> • scissors • large paper clips, box • paper

Investigation/Activity	Quantity	Equipment	Materials
8.2 Conduct an Investigation: The Transfer of Energy Through a Substance Student groupings: 8 groups of 4 students	32 32 1 8 8 8 16 16 8 8 8 1	<ul style="list-style-type: none"> • eye protection • apron • stirring rod, glass, 5 mm × 150 mm (6"), package of 10 units • metal rod, 5 mm × 150 mm • wood dowel, 5 mm × 150 mm • plastic rod, 5 mm × 150 mm • support stand w/ 9.5 mm diam, 51 cm long rod, 13 cm × 20 cm base • holder, clamp, right angle • hot plate • stopwatch 	<ul style="list-style-type: none"> • candle • safety matches, package of 10 boxes
8.5 Try This: Investigate Convection Currents Student groupings: 8 groups of 4 students	1 8 8 8 2 — 1 1 1 1	<ul style="list-style-type: none"> • beaker, Pyrex student grade, 100 mL low form, pkg of 12 units • support stand w/ 9.5 mm diam, 51 cm long rod, 13 cm × 20 cm base • ring, support, w/ clamp, 6.5 cm ID, 8 cm OD • hot plate • gas convection apparatus • touch paper (smoke paper), 20 × 25 cm, package of 12 pieces 	<ul style="list-style-type: none"> • food colouring, box of four bottles • water • candle • safety matches package of 10 boxes
8.7 Try This: Radiant Energy and Colour Student groupings: 8 groups of 4 students	8 32 32 —	<ul style="list-style-type: none"> • paint brush • thermometer 	<ul style="list-style-type: none"> • coffee cups with lids or pop cans • source of radiant energy, e.g., the Sun • tempera paint, 4 colours

EQUIPMENT AND MATERIALS

The quantity of equipment and materials required for Activities and Investigations is based on the groupings suggested in the specific sections. The quantities listed are based on a standard class size of 32 students per class, broken down into pairs of students or groupings of four students. Where the term “quantity” is inappropriate, such as for a piece of tubing, masking tape, and so on, you will have to check the individual activity or investigation to obtain appropriate quantities. In the table below, “Equipment” refers to actual equipment or hardware (such as microscopes, metre sticks, glassware, etc.), and “Materials” refers to consumable items (such as chemicals, tape, water, or paper).

Most of the equipment and materials included in this list may be ordered from **Boreal Northwest Ltd.**, www.boreal.com (phone 1-800-387-9393 or fax 1-800-668-9106).

Investigation/Activity	Quantity	Equipment	Materials
10.5 Perform an Activity: Modelling Internal Forces Student groupings: 8 groups of 4 students	8 8 16–24	<ul style="list-style-type: none"> scissors (optional) 	<ul style="list-style-type: none"> permanent markers cellulose or synthetic sponges
11.1 Try This: Finding the Centre of Gravity Student groupings: 16 pairs	16 — 16 — 16 16 1 2 —	<ul style="list-style-type: none"> metre stick large rubber stopper various long, thin, rigid objects scissors pins, box of 100 metal washers, package of 10 	<ul style="list-style-type: none"> tape cardboard pencil 216 × 279 mm (8½ × 11 in.) piece of scrap paper string
11.1 Try This: Centre of Gravity and Stability Student groupings: 16 pairs	16		<ul style="list-style-type: none"> object that can be lifted with one hand (e.g., dumbbell, textbook)
11.3 Conduct an Investigation: Factors Affecting a Structure’s Ability to Support a Load Student groupings: 8 groups of 4 students	8 8 8 16 64 8 —	<ul style="list-style-type: none"> ruler or metre stick scissors spring scale grams/newtons stools or movable desks 	<ul style="list-style-type: none"> pieces of file-folder cardboard masking tape, roll string
11.4 Try This: Building and Testing Trusses Student groupings: 8 groups of 4 students	1 4 —		<ul style="list-style-type: none"> craft sticks, box of 500 paper fasteners (brads), package of 50 string

Investigation/Activity	Quantity	Equipment	Materials
11.5 Solve a Technological Problem: Design a Scaffold Student groupings: 8 groups of 4 students	32 32 8 1 8 8 8 8 8 — —	<ul style="list-style-type: none"> • safety goggles • apron • scissors • hand drill • screwdriver • 4 kg mass • 500 g mass • spring scale, grams/newtons • ruler 	<ul style="list-style-type: none"> • construction materials • fastening materials
11.6 Try This: Observe the Effect of Temperature Student groupings: 8 groups of 4 students	1 1 16 — —	<ul style="list-style-type: none"> • bulldog paperclips, package of 20 • small bowls or glasses 	<ul style="list-style-type: none"> • elastic bands of a single size, package of 100 • warm water • ice water
11.7 Solve a Technological Problem: Preventing Structural Failure Student groupings: 16 pairs	2 16 16 48 4 4	<ul style="list-style-type: none"> • electric fan • calculator • scissors 	<ul style="list-style-type: none"> • sheets of newspaper • masking tape, roll • party streamers, roll