

# The Science Toolbox

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The Science and Mathematics Task Force recommended that a science toolbox be developed to support primary school teachers in their delivery of *Science in the New Zealand Curriculum*. This curriculum can be delivered effectively only if students are provided with practical experiences. Practical work enables students to develop the essential skills of the curriculum, especially their problem-solving and investigative skills, and it is an essential component of a classroom science programme.

This publication will enable teachers to identify materials for use in their science programmes. Schools will not need to buy every item listed – nor do the lists include everything needed for science programmes. However, the lists will help teachers identify gaps in a school’s current provision for a science programme. They also suggest other ways to use existing materials and promote the cross-curricular use of materials.

The equipment list does not include the safety equipment that every board of trustees must provide to ensure that science teaching takes place in a safe and healthy learning environment. (A list of suggested minimum safety equipment is provided in Appendix One on page 35).

# Planning for Science Programmes

## Using *The Science Toolbox*

*The Science Toolbox* lists materials for a variety of science activities in the classroom, identifies some sources of equipment and consumables, and gives some approximate prices at the time of publication.

Teachers with responsibility for science can use the lists provided to help make decisions about buying science materials. The checklist column on the far right is left blank for use in recording existing equipment and materials. Such a record provides information needed for regular stocktaking and for planning new purchases. Teachers can adapt these lists to suit their school's particular needs.

Because both prices and supply can fluctuate, this publication will be updated regularly on the Internet in the Ministry of Education's science website:  
[www.minedu.govt.nz/curriculum/science/scicont.htm](http://www.minedu.govt.nz/curriculum/science/scicont.htm)

## Budgeting

It is essential that the science curriculum area is allocated an adequate budget each year to cover the cost of new purchases, maintenance, and consumables. Some primary and intermediate schools budget up to \$35 per student per year for science. The teacher in charge of science is responsible for making a strong, realistic case for budget allocation to the principal and board of trustees. Teachers should not have to provide incidental classroom resources themselves. Some schools allocate each teacher a discretionary budget of \$50–\$100 for this purpose.

Planning for purchasing should be carried out when long-term teaching plans are formulated. At this stage, lists of required resources can be made. The teacher responsible for science can then work from these lists to prepare, for the year's programme, a budget and a purchase plan that meet the needs of all staff. It may be necessary to prioritise some purchasing or spread payment over a period of time.

Various organisations, such as the school's parent-teacher association, businesses, or other local community organisations may be able to help provide resources. Preparing a long-term plan (3–5 years) may be helpful for buying more expensive capital items. These may include microscopes, Lego Technic®, meters, and sophisticated measuring instruments such as barometers, anemometers, and balances. Small schools may find it useful to pool resources for buying more expensive capital items and establishing a local science resource library.

The school budget also needs to allow for the purchase of learning materials for students and curriculum materials for teachers, including subscriptions to magazines and science teacher associations.

## Sources of Equipment and Consumables

An active science programme will involve using materials that cannot be recovered for future use; these are listed as consumables. Consumables such as chemicals can be obtained in a variety of qualities or grades, which are reflected in the price. A school science programme does not usually require high-grade (Analar grade) chemicals. Many substances of a suitable quality can be bought from a supermarket or garden centre.

Consumable items and equipment need to be bought from appropriate suppliers (see Appendix Two on pages 36–37). The lists provide approximate costs (as at 1 June 1998) for many items, and teachers are encouraged to “shop around” to find the best value. Many materials are common household items and can be provided by parents at the start of the year or unit of work. A sample request letter is given in Appendix Three on page 38. Other useful items can be collected over the years as opportunities arise. Suggested items for collection are included in Appendix Four on page 39.

Low-cost alternatives can be used for some items, such as spring pegs for alligator clips. Sources of materials can also be obtained through liaison with local intermediate and secondary schools and tertiary institutions, who may also be prepared to lend equipment and materials. The Science Teachers’ Association committee is another source of information.

## Storage

Many items listed here can be used in more than one curriculum area. It is important to have a central storage area (a clean, dry, cool place) so that equipment can be easily found and replaced.

Each school needs to decide how to store science equipment and materials. Some schools organise alphabetically, some use a thematic approach, others use the contextual strands of *Science in the New Zealand Curriculum*, and others use a combination of these. You could consider the following points when you are organising storage for your school.

- Plastic tote trays, storage cubes, or large cardboard boxes are useful containers for sets of equipment for topics such as electricity or weather. Accompany each of these with a subject-based colour-coded card. This could include a list of contents, a list of required items that are not stored in the resource room, and a list of extra items that might be required and their location. It is easier to check the contents of such containers if they do not have lids.
- Tote trolleys make it easier to store tote trays and to transport equipment and materials.
- It is useful to have small boxes, such as ice cream containers, that are sized to contain only a set quantity of equipment and that are labelled with the number (for example, 10 scissors, 10 thermometers) because it is immediately obvious when equipment is missing.
- Arranging items alphabetically in the central storage area makes them easier to locate.

- It is essential to label shelves and boxes. Use removable labels on trays.
- Keep tools in a separate, labelled toolbox (see Appendix Five on page 39 for a selection of suggested tools).
- Keep heavy items on low shelves.
- When selecting containers, consider who will need to carry the equipment.
- Always clean and dry equipment before storing it. Wash glassware in soapy water and leave it to drip dry. A bucket of warm water can be used as a portable sink.

### **Special storage notes**

- Store magnets with “keepers” on to protect the magnetism.
- Store lenses and magnifying glasses in a covered container.
- Store chemicals in clearly labelled jars or bottles on a shelf with a retaining rail and in a cool place that is not easily accessible to students. Store hydrochloric acid and other corrosive chemicals separately from any metals, tools, instruments, or electrical equipment. Poisons must be stored in a locked cupboard. Do not use food or drink containers for storing chemicals. See Storage on pages 16–17 and Chemicals on pages 61–63 of *Safety and Science: A Guidance Manual for New Zealand Schools*.

## **Issue and Retrieval of Materials**

A system should be established for issuing and retrieving materials. Many schools use a reservations book and/or library cards to keep track of materials. Teacher aides or parent helpers could be delegated responsibility for monitoring the issue and retrieval of materials as well as for monitoring the level of stock. A whiteboard or sheet of poster paper on the door of the storage area can be used for teachers to note items that need replenishing or repair. Resources should be checked regularly to ensure that enough stocks are held and that equipment is in good repair. Chemicals may need to be checked for expiry dates. (See page 40 of *Safety and Science: A Guidance Manual for New Zealand Schools*.) This task can often be delegated.

Students can be trained as monitors to be responsible for the daily management of materials in classrooms.

Each classroom should have a secure cabinet or cupboard where materials or ongoing activities can be kept. Teachers must have ready access to replacement items (in case of breakage or loss) without their having to leave the classroom.

# Equipment List

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Safety and Science: A Guidance Manual for New Zealand Schools</b>	Learning Media Limited, Box 3293, Wellington	Free to schools		All schools have been issued with a copy for every teacher of science.	
<b>Alligator/crocodile clips</b>	<ul style="list-style-type: none"> <li>• Electrical suppliers</li> <li>• Scientific suppliers</li> </ul>	\$1.20 each	<ul style="list-style-type: none"> <li>• Electrical circuits</li> </ul>	The use of screw terminal clips is recommended. Spring pegs can be used as an alternative.	
<b>Aquarium accessories</b>	<ul style="list-style-type: none"> <li>• Pet shops</li> <li>• Scientific suppliers</li> <li>• Hardware shops</li> <li>• Budget retail stores</li> </ul>				
Net or plastic strainer		\$5			
Air pump		\$30			
<b>Aquarium or plastic tank</b>	<ul style="list-style-type: none"> <li>• Pet shops</li> <li>• Scientific suppliers</li> <li>• Glass merchants</li> <li>• Budget retail stores</li> </ul>	\$20–\$80	<ul style="list-style-type: none"> <li>• Pond and stream life</li> <li>• Stream life habitat</li> <li>• Terrariums</li> <li>• Mini glasshouse</li> <li>• Ripple tank</li> <li>• Sedimentation experiments</li> </ul>	Pressed plastic aquariums are often easily damaged at the corners. Glass merchants will make aquariums to size.	
<b>Bags, feely</b>	<ul style="list-style-type: none"> <li>• Make your own.</li> </ul>		<ul style="list-style-type: none"> <li>• Sensory perception</li> <li>• Mystery games</li> </ul>	Feely bags can also be made from brown paper, wine bags, or old socks.	

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Balances, spring</b> 0–20 N (Newtons)	<ul style="list-style-type: none"> <li>Scientific suppliers</li> </ul>	\$6.30	<ul style="list-style-type: none"> <li>Measurement of force (including weight)</li> </ul>	Spring balances can be made from rubber bands and a ruler.	
<b>Ball and chain</b>	<ul style="list-style-type: none"> <li>Scientific suppliers</li> </ul>	\$15	<ul style="list-style-type: none"> <li>Demonstrating expansion of metals by heat</li> </ul>		
<b>Balls</b> (a selection)	<ul style="list-style-type: none"> <li>Bargain bins</li> <li>Sports shops</li> <li>Supermarkets</li> <li>Budget retail stores</li> </ul>	\$1.99 pkt of 3 tennis balls \$1.99 pkt of 6 table tennis balls	<ul style="list-style-type: none"> <li>Motion</li> <li>Making models (astronomy)</li> <li>Fair tests</li> <li>Forces</li> <li>Friction</li> </ul>		
<b>Batteries</b>	<ul style="list-style-type: none"> <li>Electrical suppliers</li> <li>Supermarkets</li> <li>Budget retail stores</li> </ul>		<ul style="list-style-type: none"> <li>Electricity</li> <li>Electronics</li> </ul>	Consider purchasing chargeable cells and a charger. Discharged dry cells are a useful source of zinc metal (casing) and carbon rod (central rod).	
AAA _____		\$3.99 pkt 4			
AA _____		\$3.99 pkt 4			
C _____		\$2.99 pkt 2			
D _____		\$3.35 pkt 3			
9 V _____		\$1.99			
<b>Beakers, glass</b> (various sizes)	<ul style="list-style-type: none"> <li>Scientific suppliers</li> </ul>	Price varies according to size.	<ul style="list-style-type: none"> <li>Necessary if heating with a naked flame</li> </ul>	Jam jars often make good substitutes and can be heated in a microwave oven. Clear film canisters can be used as small beakers. Glass beakers are easily broken.	
250 mL _____		\$4			
<b>Beakers, plastic</b> (various sizes)	<ul style="list-style-type: none"> <li>Scientific suppliers</li> </ul>	Price varies according to size.	<ul style="list-style-type: none"> <li>Making sense of the material world (chemistry)</li> </ul>	Consider plastic tumblers from supermarkets. Heat only by hot water.	
250 mL _____		\$2.80			

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Bicycle pumps</b>	<ul style="list-style-type: none"> <li>• Sports shops</li> <li>• Budget retail stores</li> </ul>	\$3–\$8	<ul style="list-style-type: none"> <li>• Water rockets</li> <li>• Expansion and compression of gases</li> <li>• Forces</li> </ul>	An inflatable-mattress pump or an electric tyre pump can also be used.	
<b>Bimetallic strips</b> (Compound bars) Brass-iron	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• The switch inside a pop-up toaster</li> </ul>	\$8	<ul style="list-style-type: none"> <li>• Expansion of metals</li> </ul>	Bimetallic strips could be borrowed from a secondary school.	
<b>Binoculars</b> (8 x 30 magnification)	<ul style="list-style-type: none"> <li>• Budget retail stores</li> <li>• Sports shops</li> </ul>	\$50–\$80	<ul style="list-style-type: none"> <li>• Stargazing, especially at the Moon and planets</li> <li>• Birdwatching</li> </ul>	Binoculars can be hired in some areas. They are better than a telescope. DO NOT allow students to use them to look at the sun.	
<b>Bones and skeletons</b>	<ul style="list-style-type: none"> <li>• Butchers</li> <li>• Museums</li> <li>• Farms</li> </ul>		<ul style="list-style-type: none"> <li>• Looking at adaptive features and structures</li> </ul>	X-ray negatives can also be used.	
<b>Bottles</b> (clear, with screw top)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Pharmaceutical suppliers</li> </ul>	\$38 per 100	<ul style="list-style-type: none"> <li>• Storing solutions</li> <li>• Observing small animals</li> </ul>	Substances must NOT be stored in beverage bottles.	
<b>BSM items</b>	<ul style="list-style-type: none"> <li>• Learning Media Limited, Box 3293, Wellington</li> </ul>		<ul style="list-style-type: none"> <li>• Modelling, grouping, and classifying activities</li> </ul>		
<b>Buckets</b>	<ul style="list-style-type: none"> <li>• Plastic-goods retailers</li> <li>• Supermarkets</li> </ul>	\$1–\$3	<ul style="list-style-type: none"> <li>• See Aquarium</li> <li>• Field trips</li> <li>• Washing-up</li> </ul>	Alternatives are 2-litre ice cream containers or 4-litre margarine pails.	
<b>Bulb holders</b> MES (socket on plastic base)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Car wreckers</li> <li>• Electrical suppliers</li> </ul>	\$13.50 per 10 negotiable		Make sure light bulbs are compatible with the holder.	

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Bulbs</b>  MES 2.5 V _____ MES 3.5 V _____	<ul style="list-style-type: none"> <li>• Electrical suppliers</li> <li>• Scientific suppliers</li> </ul>	 \$10.50 per 10 \$10.80 per 10	<ul style="list-style-type: none"> <li>• Electric circuits</li> </ul>	Ensure that the voltage of the bulb(s) is equal to the total voltage of the cells in the circuit. Consider using bi-directional LEDs as an alternative.	
<b>Burners, spirit</b>  Aluminium _____ Glass _____	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	 \$6.40 \$15.90	<ul style="list-style-type: none"> <li>• Heat source</li> </ul>	It is advisable to embed the burner in a container of sand (such as an ice cream container) when in use. A HOT PLATE, ELECTRIC FRYPAN, OR WATER BATH IS USUALLY A SAFER ALTERNATIVE.	
<b>Canisters with lid</b>	<ul style="list-style-type: none"> <li>• Photo processors (film canisters)</li> </ul>	Free	<ul style="list-style-type: none"> <li>• Specimens</li> <li>• Mixing</li> <li>• Storage</li> <li>• Model rockets</li> </ul>		
<b>Carbon rods</b>	<ul style="list-style-type: none"> <li>• Old telephone cells or other discharged dry cells</li> <li>• D cells</li> </ul>	Free	<ul style="list-style-type: none"> <li>• Electrolysis</li> <li>• Electric plating</li> </ul>	Do not cut open nicad or mercury cells.	
<b>Chopping boards</b>	<ul style="list-style-type: none"> <li>• Budget retail stores</li> </ul>	\$6.95 (plastic, small) \$10.95 (large)	<ul style="list-style-type: none"> <li>• For protection of surfaces in construction and dissection activities</li> </ul>	Use plastic or cork tiles as an alternative.	
<b>Clinometer</b>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$39.90	<ul style="list-style-type: none"> <li>• Measuring heights and angles</li> </ul>	A clinometer can be made from a protractor and a plumb-bob.	
<b>Coins</b> (5c)			<ul style="list-style-type: none"> <li>• Sample of metals</li> </ul>		

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Compasses</b>  Plotting or charm _____ Pocket _____ (as used in orienteering)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Sports shops</li> </ul>	\$2.95 \$39	<ul style="list-style-type: none"> <li>• Magnetic fields</li> </ul>	Compasses can be hired from some advisory or resource centres.	
<b>Conductivity rings</b>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$19.80	<ul style="list-style-type: none"> <li>• Conduction of heat energy</li> </ul>	Conductivity rings could be borrowed from a secondary school	
<b>Dishes, Petri</b>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$5.50 per 20 \$34 per 200	<ul style="list-style-type: none"> <li>• Growing micro-organisms</li> <li>• Displaying things</li> <li>• Studies of small animals and micro-organisms</li> </ul>	Petri dishes can be re-used. Cheese containers could be used instead.	
<b>Electric frypans</b>	<ul style="list-style-type: none"> <li>• Appliance stores</li> <li>• Second-hand shops</li> </ul>		<ul style="list-style-type: none"> <li>• Use as a heat source or as an incubator for cultures.</li> </ul>		
<b>Electric jugs</b>	<ul style="list-style-type: none"> <li>• Appliance stores</li> <li>• Second-hand shops</li> </ul>	\$30	<ul style="list-style-type: none"> <li>• For heating purposes</li> </ul>		
<b>Eyedroppers / Pasteur pipettes</b>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$6.30 per 10		Pasteur pipettes are plastic, graduated, and inexpensive droppers.	
<b>Filter funnels</b> (plastic, polypropylene, 25 mm)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Plastic-goods retailers</li> </ul>	\$1.70	<ul style="list-style-type: none"> <li>• Separation by filtering</li> </ul>	The top third of PET (polyethylene terephthalate) soft drink bottles are a satisfactory alternative.	
<b>Glass samples</b>	<ul style="list-style-type: none"> <li>• Glass suppliers</li> </ul>		<ul style="list-style-type: none"> <li>• Investigations of light and colour</li> </ul>	Ensure that edges of samples are filed or fired.	

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Goggles</b> (Polycarbonate construction)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Engineering or construction suppliers</li> <li>• Hardware shops</li> </ul>	\$9.20	<ul style="list-style-type: none"> <li>• For safety when heating chemicals</li> <li>• For safety in any impact solutions, such as breaking rocks or collision activities.</li> </ul>		
<b>Hairdryer</b>	<ul style="list-style-type: none"> <li>• Appliance stores</li> </ul>		<ul style="list-style-type: none"> <li>• As a source of heat or wind</li> </ul>		
<b>Hotplate or bench oven</b> Single-hob cooker (solid top)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Appliance stores</li> </ul>	\$190	<ul style="list-style-type: none"> <li>• Heat source</li> </ul>		
<b>Jars</b>	<ul style="list-style-type: none"> <li>• Home</li> </ul>	Free	<ul style="list-style-type: none"> <li>• Storage</li> <li>• Display</li> <li>• Mixing</li> </ul>	Some jars, such as those containing pasta sauce, often show a measuring scale.	
<b>Knives, craft</b>	<ul style="list-style-type: none"> <li>• Educational suppliers</li> <li>• Hardware stores</li> <li>• Hobby and craft shops</li> </ul>	\$13.40		Do not use for cutting PET bottles.	
<b>Lab coats</b>  100% cotton drill (all sizes) Polycotton	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Industrial suppliers</li> </ul>	\$46.80 \$45.90	<ul style="list-style-type: none"> <li>• Protective clothing</li> </ul>	Alternatively, use old shirts.	
<b>Lenses</b> (See also Magnifiers)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Opticians</li> </ul>	\$21.40 set of 6	<ul style="list-style-type: none"> <li>• Investigations of light</li> <li>• Looking at small objects such as plants, animals, or rocks</li> <li>• Telescope</li> </ul>	A magnifying glass is a biconvex lens. Lenses could be borrowed from a secondary school.	

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<p><b>Magnets</b></p> <p>Bar magnets (plastic coated, ceramic 80 x 20 x 10 mm)</p> <p>Block magnets (ceramic, high field strength, 80 x 22 x 10 mm)</p> <p>Horseshoe magnets (100 mm long)</p> <p>Magnetic strip</p> <p>Ring</p>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Electrical repair shops</li> </ul>	<p>\$8.50 each</p> <p>\$9.50</p> <p>\$11</p> <p>\$12.60</p> <p>\$1.65 (small)</p> <p>\$5.50 (large)</p>	<ul style="list-style-type: none"> <li>• Magnetism</li> <li>• Earth science – model of Earth</li> <li>• Electromagnets and motors</li> </ul>	<p>Store away from computers and computer disks.</p> <p>Store with the keepers provided to protect the magnetism.</p> <p>Magnets can be obtained from fridge doors, microwave ovens, and old speakers.</p>	
<p><b>Magnifiers</b></p> <p>Folding</p> <p>Single lens with handle</p>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Scientific suppliers</li> <li>• Budget retail stores</li> </ul>	<p>\$4.50</p> <p>\$9.80</p>		<p>Store in a closed box to prevent them causing fire.</p>	
<p><b>Maps</b></p> <p>(geological, star)</p>	<ul style="list-style-type: none"> <li>• Observatory</li> <li>• Geological society</li> </ul>	<p>\$5–\$15</p>	<ul style="list-style-type: none"> <li>• Identification of: <ul style="list-style-type: none"> <li>– land forms</li> <li>– rock types</li> <li>– stars</li> <li>– constellations.</li> </ul> </li> <li>• Field trips</li> </ul>		
<p><b>Marbles</b></p>	<ul style="list-style-type: none"> <li>• Toyshops</li> <li>• Budget retail stores</li> </ul>	<p>\$2 per bag</p>	<ul style="list-style-type: none"> <li>• Projectiles</li> <li>• Pinball-type experiments</li> <li>• Fair testing</li> </ul>		
<p><b>Material Safety Data Sheets</b></p>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>		<p>These sheets contain safety information and properties of substances.</p>	<p>Request data sheets when purchasing chemicals. The supply companies are obliged by law to supply them (refer to <i>Safety and Science</i>, pages 38 and 39).</p>	

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Measuring cylinders</b> (plastic)  100 mL polypropylene _____ 100 mL TPX/PMP _____ 250 mL polypropylene _____	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$7.25 \$11.30 \$10.50	<ul style="list-style-type: none"> <li>• Measurement of liquids</li> <li>• Making solutions</li> <li>• Cartesian divers</li> <li>• Density measurements</li> <li>• Fair testing</li> </ul>	Measuring jugs will do the same job.	
<b>Measuring jugs</b>	<ul style="list-style-type: none"> <li>• Plastic-goods retailers</li> <li>• Supermarkets</li> </ul>	\$3.50–\$15.75			
<b>Measuring spoons</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Pharmacies</li> <li>• Plastic-goods retailers</li> <li>• Budget retail stores</li> </ul>	\$1.99–\$3.99	<ul style="list-style-type: none"> <li>• Measuring liquids and solids</li> <li>• Fair testing</li> </ul>		
<b>Metal</b> (scrap)	<ul style="list-style-type: none"> <li>• Scrap metal dealers</li> <li>• Sheet metal workshops</li> <li>• Science resource centres</li> </ul>		<ul style="list-style-type: none"> <li>• Heat expansion</li> <li>• Rusting</li> <li>• Oxidation</li> <li>• Mass</li> <li>• Weight</li> <li>• Plumb-bobs for pendulums</li> <li>• Electroplating</li> <li>• Making batteries</li> </ul>		
<b>Meteorological instruments</b>  Barometer _____ Hygrometer _____ Maximum-minimum thermometer _____ Rain gauge _____ Wind speed meter _____ (in km/h, with conversion table)	<ul style="list-style-type: none"> <li>• Garden suppliers</li> <li>• Ship chandlers</li> <li>• Stock and station agents</li> </ul>	\$80 \$34 \$21.50 \$28.50 \$50	<ul style="list-style-type: none"> <li>• Weather</li> <li>• Air pressure</li> <li>• Humidity</li> <li>• Temperature</li> <li>• Rainfall</li> <li>• Wind speed</li> </ul>	Meteorological instruments can be borrowed from a secondary school or from people in the community.  A rain gauge can be made from a PET bottle.	
<b>Metre rulers</b>	<ul style="list-style-type: none"> <li>• Hardware shops</li> <li>• Scientific suppliers</li> </ul>	\$3–\$7	<ul style="list-style-type: none"> <li>• For measuring length</li> </ul>	Metal tape-measures can also be used and are often more robust.	

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Microscopes</b>  Binocular (stereo)  Monocular	<ul style="list-style-type: none"> <li>Scientific suppliers</li> <li>Universities or secondary schools</li> </ul>	\$250–\$900  \$250–\$900	<ul style="list-style-type: none"> <li>Binocular microscopes (low magnification) are most useful for looking at small animals, plants, fabrics, crystals, paper, etc.</li> <li>Monocular microscopes (high magnification) are used for looking at thin sections and prepared slides.</li> </ul>	Microscopes can be borrowed. A class requires at least 2–3 microscopes for convenience. These should be low-powered binocular microscopes (up to 20X magnification is adequate), easy to use, and durable. Microscopes are a good project for PTA funding.	
<b>Microscope slides</b>	<ul style="list-style-type: none"> <li>Scientific suppliers</li> </ul>	\$2.50 (box 50)	<ul style="list-style-type: none"> <li>Holding specimens for examination</li> </ul>	Slides can be made using sticky tape instead of cover slips. Microscope slides are also useful for observing crystallisation.	
<b>Microwave</b> (access only)			<ul style="list-style-type: none"> <li>Heating, drying, and cooking</li> </ul>		
<b>Mirrors, plastic</b>  Plane (150 mm x 100 mm) Convex (100 mm)	<ul style="list-style-type: none"> <li>Signwriters</li> <li>Glass shops</li> <li>Scientific suppliers</li> </ul>	\$25.00 per 10	<ul style="list-style-type: none"> <li>Light investigations</li> <li>Reflection, translation, and rotation</li> <li>Periscopes</li> </ul>	Alternatively, use plastic mirror tiles and strips from bathroom supplies or signwriters.	
<b>Nails</b>	<ul style="list-style-type: none"> <li>Hardware stores</li> </ul>	Various	<ul style="list-style-type: none"> <li>Testing hardness of minerals</li> <li>Rusting and corrosion</li> <li>Metal testing (different types of metal)</li> </ul>	Use brass, steel, and galvanised nails.	
<b>Paint-mixing trays</b>	<ul style="list-style-type: none"> <li>Educational suppliers</li> </ul>		<ul style="list-style-type: none"> <li>Collecting</li> <li>Testing acidity or starch</li> <li>Small-scale experiments</li> </ul>	Ice cube trays are a suitable alternative.	

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Perfume bottles</b> (empty or full)	<ul style="list-style-type: none"> <li>• Homes</li> </ul>		<ul style="list-style-type: none"> <li>• Scent</li> <li>• Diffusion</li> <li>• Storage</li> </ul>		
<b>Photographs</b> (old)	<ul style="list-style-type: none"> <li>• Homes</li> <li>• Newspaper offices</li> <li>• Museums</li> </ul>		<ul style="list-style-type: none"> <li>• To show changes in land use</li> </ul>		
<b>Prisms, glass</b> (equilateral, 50 mm)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Display agents</li> <li>• Signwriters</li> </ul>	\$5.80	<ul style="list-style-type: none"> <li>• Light and colour</li> <li>• Refraction</li> </ul>		
<b>Probes</b>			<ul style="list-style-type: none"> <li>• Investigating rocks</li> <li>• Testing hardness of minerals</li> </ul>	Old dental probes may be obtained from dentists. Alternatively, use sharpened nails.	
<b>Pulleys</b>	<ul style="list-style-type: none"> <li>• Stock agents</li> <li>• Hardware shops</li> <li>• Ship chandlers</li> </ul>		<ul style="list-style-type: none"> <li>• Toys</li> <li>• Machines</li> <li>• Forces</li> <li>• Motion</li> <li>• Construction</li> <li>• Lego Technic®</li> </ul>	Sturdy pulleys are required for primary students. These can be hired from some advisory or resource centres.	
<b>Rock and mineral kits</b>	<ul style="list-style-type: none"> <li>• Geology Department at Otago University</li> <li>• Science Resource Centre at Dunedin College of Education</li> </ul>	\$50–\$100	<ul style="list-style-type: none"> <li>• Growing crystals</li> <li>• Fossils</li> <li>• Jewellery</li> <li>• Earth Science, e.g., volcanos, erosion, weathering, stones, history of the Earth</li> </ul>	Rock and mineral kits can be hired from some advisory or resource centres.	
<b>Rocks</b>	<ul style="list-style-type: none"> <li>• Geology Department at Otago University</li> <li>• Science Resource Centre at Dunedin College of Education</li> </ul>		<ul style="list-style-type: none"> <li>• Classification and grouping</li> <li>• Making comparisons and observations</li> </ul>		

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Rulers and tape measure</b>	<ul style="list-style-type: none"> <li>• Stationers</li> <li>• Budget retail stores</li> <li>• Educational suppliers</li> </ul>	69c–\$1.50	<ul style="list-style-type: none"> <li>• Measuring</li> <li>• Making telescopes</li> </ul>	Use tape measures or graduated bamboo stakes.	
<b>Scales</b> (kitchen, diet)	<ul style="list-style-type: none"> <li>• Sports shops</li> <li>• Budget retail stores</li> </ul>	\$2.99–\$9.99	<ul style="list-style-type: none"> <li>• Measuring mass</li> <li>• Cooking and making food</li> <li>• Predicting and estimating</li> </ul>		
<b>Scissors</b>	<ul style="list-style-type: none"> <li>• Stationers</li> <li>• Budget retail stores</li> </ul>	\$1– \$2.50	<ul style="list-style-type: none"> <li>• Construction</li> </ul>		
<b>Sieves</b>	<ul style="list-style-type: none"> <li>• Plastic goods retailers</li> <li>• Budget retail stores</li> </ul>	\$6.99 (large) \$3.99 (medium)	<ul style="list-style-type: none"> <li>• Straining</li> <li>• Filtering</li> <li>• Separating mixtures</li> </ul>	Use net curtains or pantyhose.	
<b>Skateboard</b>	<ul style="list-style-type: none"> <li>• Sports shops</li> <li>• Budget retail stores</li> </ul>		<ul style="list-style-type: none"> <li>• Friction</li> <li>• Safety</li> <li>• Motion</li> <li>• Fair tests</li> </ul>	Students can provide their own.	
<b>Slag hammers</b>	<ul style="list-style-type: none"> <li>• Hardware shops</li> </ul>	\$10.45	<ul style="list-style-type: none"> <li>• Breaking soft rocks</li> </ul>	Wear safety goggles. Do not allow mass destruction of geological samples or sites. For safety reasons, do not use carpentry hammers for breaking rocks.	
<b>Spoons</b> (wooden spoons and teaspoons)	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Budget retail stores</li> </ul>		<ul style="list-style-type: none"> <li>• Stirring</li> </ul>		
<b>Stoppers</b> (rubber, cork)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Supermarkets</li> </ul>			Stoppers can be rubber or cork. Wine-bottle corks may be used.	

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Stopwatches</b>	<ul style="list-style-type: none"> <li>• Electrical suppliers</li> <li>• Sports shops</li> </ul>	\$30	<ul style="list-style-type: none"> <li>• Timing, e.g., animal studies, pulse rates, fair tests, speed</li> </ul>	Stopwatches could be borrowed from secondary schools.	
<b>Tarpaulin</b>	<ul style="list-style-type: none"> <li>• Budget retail stores</li> <li>• Garden centres</li> <li>• Paint shops</li> </ul>	\$19.99–\$29.99	<ul style="list-style-type: none"> <li>• Use for all science activities.</li> </ul>	Spread on floor to protect carpet. Plastic sheeting can also be used.	
<b>Telescope</b>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Camera shops</li> </ul>	\$800-\$2000	<ul style="list-style-type: none"> <li>• Astronomy</li> <li>• Lenses</li> </ul>	Binoculars are more useful for stargazing. Make your own telescope or binoculars with a ruler and lenses.	
<b>Test tube holders</b>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$2.75 each	<ul style="list-style-type: none"> <li>• For holding hot test tubes</li> </ul>	Alternatively, use a folded paper strip or bent wire.	
<b>Test tube racks</b>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$7.10	<ul style="list-style-type: none"> <li>• For storing test tubes safely</li> </ul>		
<b>Test tube brushes</b>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$2.75 each (medium size)	<ul style="list-style-type: none"> <li>• For cleaning test tubes</li> </ul>		
<b>Test tubes</b> (25 mm x 150 mm with rim)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$55 pkt 100	<ul style="list-style-type: none"> <li>• Holding substances</li> <li>• Heating and mixing</li> </ul>	Test tubes are available from a university glass blower. Polypropylene test tubes may also be available.	
<b>Thermometers</b> (red spirit, 300 mm)	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$3.30 each	<ul style="list-style-type: none"> <li>• Measuring temperature</li> </ul>	Do not use for stirring. Do not use over a naked flame.	
<b>Torch</b>	<ul style="list-style-type: none"> <li>• Budget retail stores</li> <li>• Appliance stores</li> </ul>	\$8.99 with batteries	<ul style="list-style-type: none"> <li>• Light</li> <li>• Shadows</li> <li>• Electric circuits</li> <li>• Models of the sun</li> </ul>		

Equipment	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Tubing</b> (PVC non-toxic, black, thin wall-tube)  30-m coil, 3.2-mm internal diameter _____ 30-m coil, 5.5-mm internal diameter _____	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Hospitality industry suppliers</li> <li>• Pet shops</li> <li>• Garden suppliers</li> </ul>	\$9	<ul style="list-style-type: none"> <li>• Construction</li> <li>• Models</li> <li>• Animal studies</li> </ul>		
		\$16.60			
<b>Tuning forks</b>	<ul style="list-style-type: none"> <li>• Music shops</li> <li>• Scientific suppliers</li> </ul>	\$47.60	<ul style="list-style-type: none"> <li>• Sound</li> </ul>	Use a length of metal rod held at the centre instead.	
<b>Tweezers and forceps</b>	<ul style="list-style-type: none"> <li>• Pharmacists</li> <li>• Scientific suppliers</li> </ul>	\$3.35	<ul style="list-style-type: none"> <li>• Examining things</li> <li>• Dissections</li> <li>• Picking up small objects</li> </ul>		
<b>Vacuum cleaner</b>	<ul style="list-style-type: none"> <li>• Homes</li> </ul>		<ul style="list-style-type: none"> <li>• Source of an air current</li> </ul>	Use school vacuum cleaner. Check that the vacuum cleaner will actually blow out air.	
<b>Wheels, plastic</b>	<ul style="list-style-type: none"> <li>• Educational suppliers</li> </ul>		<ul style="list-style-type: none"> <li>• Motion</li> <li>• Friction</li> <li>• Forces</li> <li>• Fair tests</li> <li>• Construction</li> </ul>	Use 4.5-mm cane skewers as axles. Kebab sticks and plastic milk bottle lids are an effective substitute.	
<b>Wires</b> (plain, nichrome, copper, fuse, florist's)	<ul style="list-style-type: none"> <li>• Budget retail stores</li> <li>• Electrical suppliers</li> <li>• Science suppliers</li> <li>• Radio wholesalers</li> <li>• Auto electricians</li> <li>• Electrical suppliers</li> <li>• Electricians</li> </ul>		<ul style="list-style-type: none"> <li>• Electricity</li> <li>• Cutting ice</li> </ul>	Do not allow children to strip wire with their teeth.	

# Consumables List

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Alum</b> [Aluminium potassium sulfate, $\text{AlK}(\text{SO}_4)_2$ ]	<ul style="list-style-type: none"> <li>Pharmacists</li> <li>Scientific suppliers</li> </ul>	\$30.25 per 100 g	<ul style="list-style-type: none"> <li>Crystal growing</li> </ul>	Poisonous in large quantities	
<b>Aluminium foil</b> [Al]	<ul style="list-style-type: none"> <li>Supermarkets</li> </ul>	\$1.99–\$3 per roll	<ul style="list-style-type: none"> <li>Covering containers</li> <li>Electricity</li> </ul>		
<b>Ammonia solution</b> [ $\text{NH}_3$ , (aqueous)] (cloudy ammonia)	<ul style="list-style-type: none"> <li>Supermarkets</li> <li>Scientific suppliers</li> </ul>	\$1.95 per 750 mL \$31 per 2.5 L	<ul style="list-style-type: none"> <li>An alkaline (base) solution</li> <li>Gas diffusion</li> </ul>	Poison – irritating gas DO NOT mix with bleach because chlorine gas is produced (refer to <i>Safety and Science</i> , pages 46–47).	
<b>Baking soda</b> [Sodium bicarbonate, $\text{NaHCO}_3$ ]	<ul style="list-style-type: none"> <li>Supermarkets</li> <li>Scientific suppliers</li> </ul>	\$1.22 per 210 g	<ul style="list-style-type: none"> <li>Dissolving – temporary and permanent change</li> </ul>	Alkaline solution It reacts with acids to produce carbon dioxide ( $\text{CO}_2$ ) gas.	
<b>Balloons</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> <li>Budget retail stores</li> </ul>	\$6.99 pkt 100 \$1.95 pkt 25	<ul style="list-style-type: none"> <li>Action/reaction for hovercraft (rockets)</li> <li>To model expanding universe theory</li> </ul>		
<b>Bamboo skewers</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> </ul>	\$2.75 pkt 100	<ul style="list-style-type: none"> <li>Use as axles.</li> </ul>		
<b>Benedict's solution</b>	<ul style="list-style-type: none"> <li>Scientific suppliers</li> <li>Secondary schools</li> </ul>	\$31.46 per 500 mL	<ul style="list-style-type: none"> <li>Testing for the presence of simple sugars</li> </ul>	Use container of hot water as source of heat. Solution contains copper sulfate (refer to <i>Safety and Science</i> , pages 48 and 61).	

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Bleach</b> (contains sodium hypochlorite, NaHClO)	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$1.29 per 750 mL	<ul style="list-style-type: none"> <li>• For whitening paper and cleaning</li> </ul>	Poison – irritating gas DO NOT mix with acids or ammonia because chlorine gas is produced (refer to <i>Safety and Science</i> , page 48).	
<b>Blu-tack</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$2.89 pkt			
<b>Borax</b> [Sodium borate, Na <sub>3</sub> BO <sub>3</sub> ]	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$9.35 per 500 g	<ul style="list-style-type: none"> <li>• Making slime</li> </ul>	Refer to page 66 of <i>Making Better Sense of the Material World</i> for handling.	
<b>Bottles, PET</b> (soft drink bottles)	<ul style="list-style-type: none"> <li>• Plastics retailers</li> <li>• Educational suppliers</li> </ul>		<ul style="list-style-type: none"> <li>• Making rockets</li> <li>• Funnels</li> </ul>	Use only a fine-toothed saw for cutting PET bottles, NOT a craft knife.	
<b>Bulbs, garden</b>	<ul style="list-style-type: none"> <li>• Garden centres</li> </ul>		<ul style="list-style-type: none"> <li>• Growing</li> </ul>		
<b>Bulbs, light</b>	<ul style="list-style-type: none"> <li>• Electrical suppliers</li> </ul>	99c–\$1.50	<ul style="list-style-type: none"> <li>• Electrical circuits</li> </ul>		
<b>Cabbage</b> (red)	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>		<ul style="list-style-type: none"> <li>• Red cabbage juice is an acid-base indicator.</li> </ul>	Other plants such as impatiens, hibiscus, or beetroot also provide coloured extracts that can be used as acid-base indicators.	
<b>Calcium chloride</b> [Ca(Cl) <sub>2</sub> ]	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$21.78 per 500 g	<ul style="list-style-type: none"> <li>• Moisture absorbent</li> </ul>		
<b>Candles</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Craft shops</li> <li>• Budget retail stores</li> </ul>	\$2.99 per 6 (large)	<ul style="list-style-type: none"> <li>• Properties of matter</li> <li>• Change of state</li> <li>• Energy conversion</li> <li>• Composition of air</li> </ul>	Birthday candles are often appropriate. Do not use candles for heating.	
<b>Cardboard tubes</b>	<ul style="list-style-type: none"> <li>• Homes</li> </ul>		<ul style="list-style-type: none"> <li>• Modelling</li> <li>• Sound activities</li> <li>• Light activities</li> </ul>		

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Cellophane</b>	<ul style="list-style-type: none"> <li>• Stationers</li> </ul>		<ul style="list-style-type: none"> <li>• Colours</li> <li>• Light</li> </ul>		
<b>Chalk</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Budget retail stores</li> </ul>	39c per 12 white sticks			
<b>Chocolate chippies</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$1.79 pkt	<ul style="list-style-type: none"> <li>• Mining activity (how to mine the chips from the bedrock)</li> <li>• Fair test (comparing chips in different brands)</li> </ul>		
<b>Cling film</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$3.99 per 45 m \$1.69 per 15 m	<ul style="list-style-type: none"> <li>• Covering</li> </ul>		
<b>Citric acid</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$1.48 per 100 g	<ul style="list-style-type: none"> <li>• An acid</li> <li>• Making sherbet</li> </ul>		
<b>Clay</b>	<ul style="list-style-type: none"> <li>• Educational suppliers</li> </ul>	\$25 per 10 kg	<ul style="list-style-type: none"> <li>• An alternative to plasticine for modelling and construction</li> <li>• Investigating properties</li> </ul>		
<b>Cobalt (II) nitrate</b> [Co(NO <sub>3</sub> ) <sub>2</sub> ]	<ul style="list-style-type: none"> <li>• Pharmacists</li> <li>• Scientific suppliers</li> </ul>	\$94.24 per 250 g	<ul style="list-style-type: none"> <li>• Crystal gardens</li> <li>• Coal gardens</li> <li>• Soak paper in solution, dry, and use as a humidity (water) indicator</li> </ul>	Refer to <i>Safety and Science</i> , page 62.	
<b>Coloured sweets and inks</b>			<ul style="list-style-type: none"> <li>• Chromatography</li> </ul>	Darker colours give better results.	

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Copper sulfate</b> [CuSO <sub>4</sub> ]	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Garden centres</li> <li>• Fertiliser works</li> </ul>	\$16.50 per kg \$8 per kg	<ul style="list-style-type: none"> <li>• Crystal growing</li> </ul>	Poison (1 teaspoon can kill a small child). Keep in locked cupboard. Refer to <i>Safety and Science</i> , pages 48, 61, and 62.	
<b>Cordial powders</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>		<ul style="list-style-type: none"> <li>• Dissolving</li> <li>• Fair testing (speed of dissolving; effect of temperature)</li> </ul>		
<b>Cornflour</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	80c pkt	<ul style="list-style-type: none"> <li>• Mixtures</li> <li>• Dissolving – temporary and permanent change</li> <li>• Making oobleck (see pages 64–65 of <i>Making Better Sense of the Material World</i> for recipes).</li> </ul>		
<b>Cotton buds</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$2 pkt 100	<ul style="list-style-type: none"> <li>• Taste testing</li> </ul>	Ensure that each bud is used by only one child.	
<b>Crayons</b>	<ul style="list-style-type: none"> <li>• Stationers</li> <li>• Budget retail stores</li> </ul>		<ul style="list-style-type: none"> <li>• Temporary and permanent change</li> </ul>		
<b>Detergent</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Scientific suppliers</li> </ul>	\$2.50	<ul style="list-style-type: none"> <li>• Cleaning</li> <li>• Making bubbles</li> </ul>		
<b>Epsom salts</b> [Magnesium sulfate, MgSO <sub>4</sub> ]	<ul style="list-style-type: none"> <li>• Garden suppliers</li> <li>• Scientific suppliers</li> </ul>	\$4 per kg \$17 per 500 g	<ul style="list-style-type: none"> <li>• Growing crystals</li> </ul>	Bitter tasting Poisonous in large quantities Powerful laxative	
<b>Fabric samples</b>	<ul style="list-style-type: none"> <li>• Fabric shops</li> <li>• Homes</li> </ul>		<ul style="list-style-type: none"> <li>• Sorting activities</li> <li>• Investigating properties</li> <li>• Electrostatics</li> </ul>		
<b>Felt pens</b>	<ul style="list-style-type: none"> <li>• Budget retail stores</li> <li>• Stationers</li> <li>• Supermarkets</li> </ul>	\$2–\$6	<ul style="list-style-type: none"> <li>• Chromatography</li> </ul>	Water-based pens are most convenient for chromatography.	

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Filter paper</b> (economy grade)	<ul style="list-style-type: none"> <li>Scientific suppliers</li> </ul>	\$6.15 pkt 100	<ul style="list-style-type: none"> <li>Chromatography</li> <li>Separation</li> <li>Making indicator paper</li> </ul>	Alternatively, use paper towels or coffee filters.	
<b>Flour</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> </ul>	\$2.10 per kg	<ul style="list-style-type: none"> <li>Dissolving – temporary and permanent change</li> <li>Mixtures</li> </ul>		
<b>Food colouring</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> </ul>	\$1.35 per 28 mL	<ul style="list-style-type: none"> <li>Surface tension</li> <li>Making oobleck and slime</li> </ul>		
<b>Gelatine or jelly crystals</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> </ul>	\$3 per 125 g	<ul style="list-style-type: none"> <li>Making jellies (fair testing)</li> </ul>		
<b>Gloves</b> (latex, disposable)	<ul style="list-style-type: none"> <li>Scientific suppliers</li> <li>Medical suppliers</li> <li>Supermarkets</li> </ul>	\$13.60 per 100	<ul style="list-style-type: none"> <li>For protection</li> </ul>		
<b>Glucose</b> [C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> ]	<ul style="list-style-type: none"> <li>Supermarkets</li> <li>Pharmacists</li> <li>Scientific suppliers</li> </ul>	\$3.55 per 450 g	<ul style="list-style-type: none"> <li>Dissolving – temporary and permanent change</li> <li>Demonstrating Benedict's test</li> </ul>		
<b>Glue</b> (PVA – polyvinyl acetate)	<ul style="list-style-type: none"> <li>Supermarkets</li> <li>Hardware stores</li> <li>Budget retail stores</li> </ul>	\$2.95 per 100 mL	<ul style="list-style-type: none"> <li>Making slime</li> <li>Fair testing</li> <li>Constructions</li> </ul>		
<b>Golden syrup</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> </ul>	\$2.35 per kg	<ul style="list-style-type: none"> <li>Making hokey-pokey</li> <li>Dissolving – temporary and permanent change</li> <li>Mixtures</li> </ul>		
<b>Glycerine</b> (glycerol)	<ul style="list-style-type: none"> <li>Pharmacists</li> <li>Scientific suppliers</li> <li>Stock and station agents</li> </ul>	\$13.20 per 500 mL	<ul style="list-style-type: none"> <li>Making bubbles</li> <li>Fair testing</li> </ul>		

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Ice</b>	<ul style="list-style-type: none"> <li>• Service stations</li> <li>• Liquor wholesalers</li> </ul>	\$2.50 per bag	<ul style="list-style-type: none"> <li>• Cooling</li> <li>• States of matter</li> <li>• Temporary and permanent change</li> </ul>		
<b>Iceblock sticks</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$1.70 pkt 50	<ul style="list-style-type: none"> <li>• Stirring</li> <li>• Mixing</li> <li>• Constructions</li> </ul>		
<b>Iodine</b> (I <sub>2</sub> ) Crystals	<ul style="list-style-type: none"> <li>• Pharmacists</li> <li>• Scientific suppliers</li> </ul>	\$24.20 per 100 g	<ul style="list-style-type: none"> <li>• States of matter</li> </ul>	Iodine is poisonous and stains. Stains can be removed if they are immediately treated with sodium thiosulphate solution. Refer to <i>Safety and Science</i> , pages 49, 51, and 58. Iodine solution can be made by dissolving iodine crystals in methylated spirits.	
<b>Iron (II) ammonium sulfate</b> [Ferrous ammonium sulfate, Fe(NH <sub>4</sub> ) <sub>2</sub> (SO <sub>4</sub> ) <sub>2</sub> ]	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$13.90 per 250 g	<ul style="list-style-type: none"> <li>• Growing crystals, crystal gardens, and coal flowers</li> </ul>	Refer to <i>Safety and Science</i> , page 62.	
<b>Iron (II) sulfate</b> [FeSO <sub>4</sub> ]	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Garden centres</li> </ul>	\$15.30 per 500 g \$3 per 500 g	<ul style="list-style-type: none"> <li>• Growing crystals, crystal gardens, and coal flowers</li> </ul>	Refer to <i>Safety and Science</i> , page 62.	
<b>Iron filings</b> [Fe]	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$10 per 500 g	<ul style="list-style-type: none"> <li>• Demonstrating magnetic fields</li> </ul>	Keep dry, or else they will rust.	
<b>Labels</b>	<ul style="list-style-type: none"> <li>• Stationers</li> </ul>	\$1.50 pkt 200			
<b>Lemon juice</b> (citric acid)	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$1.70 per 250 mL	<ul style="list-style-type: none"> <li>• Acid</li> <li>• Invisible writing</li> <li>• Taste testing (sour taste)</li> </ul>		
<b>Lime water</b>	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> <li>• Secondary schools</li> </ul>	\$2.75 per 750 mL	<ul style="list-style-type: none"> <li>• Testing for carbon dioxide</li> </ul>		

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Litmus paper</b> (neutral)	<ul style="list-style-type: none"> <li>Scientific suppliers</li> </ul>	\$3.57 for 100 strips	<ul style="list-style-type: none"> <li>Acid-base indicator</li> </ul>		
<b>Manganese sulfate</b> [MnSO <sub>4</sub> ]	<ul style="list-style-type: none"> <li>Scientific suppliers</li> </ul>	\$15.50 per 250 g	<ul style="list-style-type: none"> <li>Growing crystals, crystal gardens, and coal flowers</li> </ul>		
<b>Marble chips</b> [Calcium carbonate CaCO <sub>3</sub> ]	<ul style="list-style-type: none"> <li>Scientific suppliers</li> <li>Stonemasons</li> </ul>	\$15.50 per 500 g	<ul style="list-style-type: none"> <li>Rock types</li> <li>Making carbon dioxide (add acid)</li> </ul>	Fossils can be seen in many marble panels in buildings.	
<b>Marshmallows</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> </ul>	\$2.99 per 400 g			
<b>Matches</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> </ul>	\$1.32 pkt 50 (extra long)			
<b>Methylated spirits</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> <li>Scientific suppliers</li> <li>Service stations</li> </ul>	\$3.99 per L \$14 per 2 L	<ul style="list-style-type: none"> <li>Dissolving – temporary and permanent change</li> <li>Chromatography</li> </ul>	Poisonous and flammable Store in a locked cupboard. Seek medical advice if swallowed. Refer to <i>Safety and Science</i> , page 46.	
<b>Milk cartons</b>	<ul style="list-style-type: none"> <li>Home</li> </ul>	Free	<ul style="list-style-type: none"> <li>Paper: plant pots, storage</li> <li>Plastic: funnels, jugs, storage</li> </ul>	Make sure these are well washed.	
<b>Newsprint</b>	<ul style="list-style-type: none"> <li>Stationers</li> <li>Budget retail stores</li> <li>Printing works</li> </ul>		<ul style="list-style-type: none"> <li>Display</li> <li>Brainstorming</li> <li>Protective covering</li> </ul>		
<b>Oil</b>  Vegetable _____ Machine _____	<ul style="list-style-type: none"> <li>Supermarkets</li> <li>Service stations</li> </ul>	\$5.92 per 2 L \$2.47 per 500 mL	<ul style="list-style-type: none"> <li>Dissolving – temporary and permanent change</li> <li>Friction activities</li> </ul>		

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Paper</b> (coloured)	<ul style="list-style-type: none"> <li>• Stationers</li> <li>• Budget retail stores</li> </ul>		<ul style="list-style-type: none"> <li>• Construction</li> <li>• Posters</li> <li>• Displays</li> </ul>		
<b>Paper clips</b>	<ul style="list-style-type: none"> <li>• Stationers</li> <li>• Budget retail stores</li> </ul>	75c-\$1 pkt of 100	<ul style="list-style-type: none"> <li>• Electrical circuits</li> <li>• Measuring mass</li> <li>• Magnetism</li> <li>• Model making</li> </ul>		
<b>Paper towels</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$3.40 (twin set)	<ul style="list-style-type: none"> <li>• Filtering</li> <li>• Chromatography</li> <li>• Cleaning up</li> <li>• Fair testing</li> </ul>		
<b>Peanuts</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Health shops</li> </ul>	\$1.79 per 500 g	<ul style="list-style-type: none"> <li>• Burning</li> </ul>	Raw peanuts (unshelled) can be successfully used to grow plants.	
<b>Pins or safety pins</b>	<ul style="list-style-type: none"> <li>• Fabric shops</li> </ul>		<ul style="list-style-type: none"> <li>• Construction</li> </ul>		
<b>Plaster</b> [Calcium sulfate, CaSO <sub>4</sub> ] (plaster of Paris)	<ul style="list-style-type: none"> <li>• Paint shops</li> <li>• Hardware shops</li> </ul>	\$12.30 per 20 kg	<ul style="list-style-type: none"> <li>• Modelling and constructions</li> <li>• Making fossils</li> </ul>	Gib-stopping compound could be used instead.	
<b>Plastic containers and bags</b>	<ul style="list-style-type: none"> <li>• Homes</li> </ul>		<ul style="list-style-type: none"> <li>• Plastics units</li> <li>• Storage</li> <li>• Construction</li> <li>• Investigating</li> <li>• Packaging</li> <li>• Fair testing</li> <li>• Raising seedlings</li> </ul>	Zip-lock plastic bags are an excellent way of displaying items such as birds' nests and fungi, which may be hazardous to some children. Chemical reactions can also be carried out inside the zip-lock plastic bags.	
<b>Plasticine</b>	<ul style="list-style-type: none"> <li>• Toyshops</li> </ul>	\$2.95 pkt	<ul style="list-style-type: none"> <li>• Modelling</li> </ul>		

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Popcorn</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>		<ul style="list-style-type: none"> <li>• Fair test (comparing different methods of heating)</li> <li>• Soak kernels for different periods of time to show seed structure.</li> </ul>		
<b>Potting mix</b>	<ul style="list-style-type: none"> <li>• Garden suppliers</li> <li>• Supermarkets</li> </ul>		<ul style="list-style-type: none"> <li>• Raising seeds and growing plants</li> <li>• Fair testing</li> </ul>	Different types and brands of potting mix have different compositions.	
<b>Raisins</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Health shops</li> </ul>	\$2.34 per 400 g	<ul style="list-style-type: none"> <li>• Reversible change by soaking in water and then drying</li> </ul>	Raisins are dried grapes.	
<b>Rubber bands</b>	<ul style="list-style-type: none"> <li>• Stationers</li> <li>• Budget retail stores</li> </ul>	\$1.20 pkt 100	<ul style="list-style-type: none"> <li>• Construction</li> <li>• Forces</li> <li>• Lego Technic®</li> <li>• Fair testing</li> </ul>		
<b>Salt</b> [Sodium chloride, NaCl] Non-iodised _____ Rock salt _____	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Scientific suppliers</li> </ul>	\$1.58 per 2 kg \$1.25 per 500 g	<ul style="list-style-type: none"> <li>• Dissolving – temporary and permanent change</li> <li>• Growing crystals, crystal gardens, and coal flowers</li> </ul>	Table salt contains additives that may affect its properties. Ensure that plain salt is purchased.	
<b>Sand</b>	<ul style="list-style-type: none"> <li>• Garden suppliers</li> <li>• Hardware stores</li> <li>• Beaches</li> <li>• Rivers</li> </ul>		<ul style="list-style-type: none"> <li>• Modelling</li> <li>• Observing under microscope</li> <li>• Showing sound vibrations</li> </ul>	Sands from different locations are excellent for observation and comparison.	
<b>Sandpaper</b>	<ul style="list-style-type: none"> <li>• Hardware shops</li> </ul>		<ul style="list-style-type: none"> <li>• Friction activities</li> </ul>		

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Seeds</b> (Broad bean, cress, mustard, etc.)	<ul style="list-style-type: none"> <li>Garden suppliers</li> <li>Supermarkets</li> </ul>	\$2 pkt	<ul style="list-style-type: none"> <li>Growing</li> <li>Broad beans are useful for demonstrating the structure of seeds.</li> </ul>	Most seeds sold for planting are coated with fungicide. Either ensure that children wash their hands after handling or wash seeds well before using them in seed structure investigations.	
<b>Sellotape</b>	<ul style="list-style-type: none"> <li>Stationers</li> <li>Supermarkets</li> <li>Budget retail stores</li> </ul>	12 mm x 66 mm, \$1.95 per roll Pkt of 4 rolls 15 mm x 10 m \$2.95	<ul style="list-style-type: none"> <li>Construction</li> <li>Microscope slides</li> <li>Collecting cells and fingerprints</li> </ul>	Adhesive dries out on old stock.	
<b>Shells</b>	<ul style="list-style-type: none"> <li>Beaches</li> <li>Homes</li> </ul>		<ul style="list-style-type: none"> <li>Animal study</li> <li>Classification and grouping</li> <li>Adaptation</li> <li>Study of environment or habitat</li> </ul>		
<b>Soap</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> <li>Pharmacists</li> </ul>	70c per cake	<ul style="list-style-type: none"> <li>Reducing friction</li> <li>Personal hygiene</li> </ul>		
<b>Sodium carbonate</b> [Washing soda, $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ ]	<ul style="list-style-type: none"> <li>Scientific suppliers</li> <li>Supermarkets</li> </ul>	<ul style="list-style-type: none"> <li>\$18.65 per 500 g</li> <li>\$2.69 per kg</li> </ul>	<ul style="list-style-type: none"> <li>Dissolving – temporary and permanent change</li> <li>Growing crystals, crystal gardens, and coal flowers</li> </ul>		
<b>Sodium silicate</b> [ $\text{Na}_2\text{SiO}_3$ ] (water glass)	<ul style="list-style-type: none"> <li>Scientific suppliers</li> </ul>	\$17.30 per L	<ul style="list-style-type: none"> <li>Crystal gardens</li> </ul>	Egg preserver Sodium silicate is used as the solution in which to grow crystal gardens.	
<b>Spaghetti, dried</b>	<ul style="list-style-type: none"> <li>Supermarkets</li> <li>Health shops</li> </ul>	\$1.50 per 400 g	<ul style="list-style-type: none"> <li>Temporary and permanent change</li> </ul>		
<b>Starch</b>	<ul style="list-style-type: none"> <li>Scientific suppliers</li> </ul>	\$17.05 per 500 g	<ul style="list-style-type: none"> <li>Dissolving – temporary and permanent change</li> </ul>		

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Steel wool cleaning pads</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Paint shops</li> </ul>	\$2.50 pkt 10	<ul style="list-style-type: none"> <li>• Temporary and permanent change</li> <li>• Individual strands can be used as fuses in electrical circuits</li> </ul>	Use non-soapy rather than soapy pads.	
<b>Straws</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Catering wholesalers</li> </ul>	\$1.27 pkt 50	<ul style="list-style-type: none"> <li>• Construction</li> <li>• Bubbling carbon dioxide</li> <li>• Making pipettes</li> </ul>		
<b>String/cotton</b>	<ul style="list-style-type: none"> <li>• Fabric shops</li> <li>• Supermarkets</li> </ul>	Polystring: \$2.40 per 150 m Jute: \$1.84 per 65 m	<ul style="list-style-type: none"> <li>• Crystal growing</li> <li>• Construction</li> </ul>		
<b>Sugar</b> [C <sub>12</sub> H <sub>22</sub> O <sub>11</sub> ]	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$3.88 per 3 kg \$2.01 per 1.5 kg	<ul style="list-style-type: none"> <li>• Dissolving</li> <li>• Crystal growing</li> <li>• Temporary and permanent change</li> <li>• Sorting</li> <li>• Fair testing</li> </ul>	A range of sugars (coffee crystals, cubes, white, brown, raw, castor, icing) can be used.	
<b>Talc</b> (climber's talc)	<ul style="list-style-type: none"> <li>• Sports shops</li> </ul>	\$15.95 per 500 g	<ul style="list-style-type: none"> <li>• Fingerprinting</li> </ul>		
<b>Tape, masking</b>	<ul style="list-style-type: none"> <li>• Stationery shops</li> <li>• Budget retail stores</li> <li>• Paint shops</li> </ul>	\$1.90 per 20 m roll	<ul style="list-style-type: none"> <li>• Construction</li> <li>• Fair tests</li> <li>• Marking out floor areas</li> </ul>	Adhesive dries out on old stock; store in plastic bags.	
<b>Tartaric acid</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Scientific suppliers</li> </ul>	\$3.40 per 100 g	<ul style="list-style-type: none"> <li>• Acid</li> </ul>		
<b>Tissue paper</b>	<ul style="list-style-type: none"> <li>• Newsagents</li> <li>• Supermarkets</li> <li>• Educational suppliers</li> </ul>	\$1 per 5 sheets	<ul style="list-style-type: none"> <li>• Hot air balloons</li> <li>• Kites</li> <li>• Modelling</li> </ul>		

Consumables	Sources	Approximate cost	Suggestions for use	Special notes	Checklist
<b>Toothpicks</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	95c pkt 50	<ul style="list-style-type: none"> <li>• Construction</li> </ul>		
<b>Universal indicator</b> solution paper	<ul style="list-style-type: none"> <li>• Scientific suppliers</li> </ul>	\$30.70 per 100 mL \$14.10 for 10 packs of 20 leaves in a booklet	<ul style="list-style-type: none"> <li>• Acid-base indicator</li> </ul>	Universal indicator give a range of colours indicating different pH.	
<b>Vinegar</b> [acetic acid CH <sub>3</sub> COOH] (white)	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$5.22 per 2 L \$2.25 per 750 mL	<ul style="list-style-type: none"> <li>• Acid</li> <li>• Making carbon dioxide (add to a carbonate, e.g., marble)</li> </ul>	Vinegar contains acetic acid. White vinegar is preferable to malt. Refer to <i>Safety and Science</i> , page 61.	
<b>Wallpaper paste</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Paint and hardware shops</li> </ul>	\$5.99 – makes 8 L	<ul style="list-style-type: none"> <li>• Constructions</li> </ul>		
<b>Wax, paraffin</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	\$2.29 per 100 g tin	<ul style="list-style-type: none"> <li>• States of matter</li> <li>• Temporary and permanent change</li> </ul>	Beeswax can also be used.	
<b>Yeast</b>	<ul style="list-style-type: none"> <li>• Supermarkets</li> </ul>	Active yeast: \$3.55 per 150 g Dried yeast: \$3.60 per 130 g	<ul style="list-style-type: none"> <li>• Fair testing between dried and compressed yeast</li> </ul>	Yeast has a finite shelf-life.	

# Field Trip Kit

## Items could include:

- Beating sheets (for laying under bushes to catch animals shaken off)
- Bamboo stakes (graduated)
- Bottles for water samples
- Bowls
- Buckets
- Clipboard and plastic bags or plastic pockets
- Compass
- Forceps
- Funnel
- Girl Guide biscuit box (useful containers for kits)
- Gloves
- Hoops or quadrats (for population counts)
- Identification material, such as keys, posters, or pictures
- Knotted cord (knotted every 25 or 30 cm)
- Magnifying glasses
- Measuring tape
- Net (pantyhose)
- Paintbrushes
- Paint trays or palettes
- Paper towels or cotton wool
- Pattypan
- Pens and paper
- Pooter (apparatus for catching small animals)
- Pottles with lids
- Random number table
- Ruler
- Sieves
- Snips or scissors
- Stopwatch
- Thermometer
- Torch
- Towel
- Trowel or scoop
- Well trays, ice cube trays, or paint trays (for holding/sorting individual specimens)

## Appendix One: Suggested Minimum Safety Equipment

Relevant items from the following list must be readily accessible in a classroom during science activities. Most of them could be stored in a large plastic box so that they can be easily taken to the classroom when required.

- Fire extinguisher or bucket of sand (for smothering small fires)
- Fire blanket
- First-aid kit
- A source of water (e.g., bucket)
- Rubber-hose shower attachment (to use as a safety shower)
- Plastic jug (to use for washing eyes with clean water)
- Safety glasses or goggles
- Lab coats (old shirts)
- A container for broken glass and other sharp materials (see page 30 of *Safety and Science: A Guidance Manual for New Zealand Schools*).

It is advisable for children to wear some form of protective clothing, such as an old shirt, when carrying out chemical reactions or using biological materials.

Safety glasses or goggles should be worn if the particular activity involves a risk to eyes. Safety glasses require regular sterilisation, preferably by ultraviolet light (local hospitals, universities, or research institutes may be of assistance).

## Appendix Two: Suppliers and Servicers of Science Materials

### **Biolab Scientific Ltd**

29 Shakespeare Road  
Christchurch  
Ph: (03) 366 3663 Fax: (03) 366 3647

### **Blaxall & Stevens**

163 St Asaph St  
Christchurch  
Call free: 0508 898 898 Fax: (03) 365 2072

### **Crown Scientific Ltd**

PO Box 101 119  
North Shore Mail Centre  
Auckland  
Ph: (09) 415 4119 Fax: (09) 415 4120

### **Dominion Chemicals**

24 Andromeda Cres  
East Tamaki  
Auckland  
Call free: 0800 366 243 Fax: (09) 274 6164

### **Glassblowing Services Ltd**

7 Morgan Street  
Newmarket  
Auckland  
Ph: (09) 379 8249 Fax: (09) 379 5577

### **Gough Technology**

1 Jackson St  
Petone  
Ph: (04) 568 6675 Fax: (04) 568 4376

### **John Morris Scientific Ltd**

2/74–80 Wellesley St  
City  
Auckland  
Ph: (09) 366 3999 Fax: (09) 366 3060

### **Biolab Scientific Ltd**

410 Hutt Road  
Lower Hutt  
Ph: (04) 586 1200 Fax: (04) 569 7240

### **Carl Zeiss (NZ) Ltd**

2/7 Ward St  
Lower Hutt  
Ph: (04) 566 7601 Fax: (04) 566 7501

### **Delta Scientific Supplies**

PO Box 56420  
Auckland  
Ph: (09) 629 3234 Fax: (09) 620 5080

### **Education Support Consultants**

1 Grove Road  
Wellington  
Ph/fax: (04) 475 8827

### **Gough Technology**

245 St Asaph St  
Christchurch  
Ph: (03) 379 8740 Fax: (03) 379 6776

### **GPSE Ltd** (specialists in data loggers and weather stations)

PO Box 13047  
Christchurch  
Ph: (03) 379 3642 Fax: (03) 366 7799

### **John Morris Scientific Ltd**

352 Manchester St  
Christchurch  
Ph: (03) 365 3825 Fax: (03) 366 6975

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**Jonnell Agencies Ltd**

PO Box 29080  
Auckland  
Ph/fax: (09) 638 6785

**Medic Corporation Ltd**

14 Vulcan Place  
Christchurch  
Ph: (03) 338 1936 Fax: (03) 338 4741

**Nature Discoveries**

200 Antigua St  
Christchurch  
Ph: (03) 365 7100 Fax: (03) 377 2103

**Nature Discoveries**

The Meridan Mall  
George St  
Dunedin  
Ph: (03) 477 1515 Fax: (03) 477 1535

**Olympus NZ Ltd**

826 Columbo St  
Christchurch  
Ph: (03) 366 5986 Fax: (03) 379 2619

**Scientific Supplies**

PO Box 14454  
Panmure  
Auckland  
Ph: (09) 274 7579 Fax: (09) 274 0267

**TD Technologies Ltd**

124 Nelson St  
Auckland Central  
Ph: (09) 303 3522 Fax: (09) 303 3188

**Life Sciences NZ Ltd**

2 Fred Thomas Drive  
Takapuna  
Auckland  
Ph: (09) 486 0477 Fax: (09) 480 7757

**Nature Discoveries**

The Palms  
Shirley  
Christchurch  
Ph: (03) 385 1565 Fax: (03) 385 8220

**Nature Discoveries**

North City Plaza  
4 Titahi Bay Road  
Porirua  
Ph: (04) 237 0237 Fax: (04) 237 0236

**NIWA Instrument Systems**

21 Kainga Road  
Christchurch 9  
Ph: (03) 323 8199 Fax: (03) 323 7596

**Ross Mason Scientific & Laboratory  
Instrument Servicing**

PO Box 48149  
Silverstream  
Upper Hutt  
Ph: (04) 528 6889 Fax: (04) 528 6885

**Scott Technical Instruments**

14 Bandon Street  
Hamilton  
Ph: (07) 847 0646 Fax: (07) 847 0647

**The Met Shop**

Swan Lane (off Cuba St, Wellington)  
PO Box 9254  
Wellington  
Ph: (04) 384 7683 Fax: (04) 384 7689

## Appendix Three: A Sample Request Letter to Parents

Dear Parents/Caregivers

Each year we use a number of household items in our science programme. Please look at home to see if you could spare any of the items listed below.

- Aluminium foil and aluminium foil containers
- Balls
- Bubble-makers (loops of any sort)
- Cardboard tubes
- Coloured cellophane
- Corks
- Cotton
- Cotton reels
- Empty plastic soft drink (PET) bottles
- Fabric samples
- Feathers
- Glass jars with screw-top lids
- Household appliances that no longer work, such as toasters, hairdryers, electric kettles
- Ice cream containers
- Lenses (old spectacles)
- Newspapers, magazines
- Old cutlery
- Old perfume bottles
- Old toys
- Pipe (plastic or metal)
- Plastic bags and containers
- Plastic jars with screw-top lids
- Rags
- Shells
- Shoeboxes, wine cask boxes
- Wool
- Yoghurt pottles

Thank you for your help. We hope you enjoy discussing your child's work in science with him/her.

Yours sincerely

(name)

Teacher in Charge of Science

It may be helpful to quantify the items in the list above to ensure that unwanted quantities of a particular item are not received.

Note: Cutlery used in science activities must be clearly labelled at school and kept separate from cutlery used for eating.

## Appendix Four: Recommended Collectable Items

- Bones
- Feathers
- Birds' nests (preferably kept in zip-lock plastic bags. See page 32 of *Safety and Science: A Guidance Manual for New Zealand Schools* for precautions when handling bones, feathers, and birds' nests.)
- Shells
- Cones
- Stones, rocks, and minerals
- Leaf skeletons
- Sand
- Dried insects
- Fishing floats
- Pressed leaves and flowers
- Seeds
- Old appliances or toys
- Cross-sections of tree trunks.

Large, 4-litre, margarine or mayonnaise plastic containers are useful for storing collectables. They are often available from restaurants.

## Appendix Five: Suggested Tools

- Cordless drill
- Craft knives
- Glue gun
- Hacksaw
- Hammer
- Pliers
- Screwdriver
- Slag hammer – for breaking soft rocks (for safety reasons, carpentry hammers must not be used for breaking rocks)
- Wire-cutters
- Wire strippers.

# References

Ministry of Education. *Safety and Science: A Guidance Manual for New Zealand Schools*. Wellington: Learning Media, 1997.

Ministry of Education. *Making Better Sense of the Material World*. Wellington: Learning Media, 1998