



Science

Hands-on projects

FULLY REPRODUCIBLE



MARK & OLGA FOX

Contents

Introduction

4

Section 1: Matter 5

Water cycle – möbius strip	6
Uses of materials – the art of paper making	7
Gases and the greenhouse effect – heat balance model	10
Pollution – the life span of polluting gases	12
Air – testing how clean the air really is	15
Soil types – know your soil to survive	16
Soil properties – separating sediments	18

Section 2: Energy and force 19

Flight and aerodynamic forces – pelican plane and kite	20
Gravity and energy – dolphin pendulum	22
Potential energy – bathtub bug	25
Centripetal force – spinning roundabout	26
Wheels – wibbly-wobbly dragon wagon	28
Light – a lighthouse playhouse	30
Moving images – movie machines	32
Highways in the air – suspension bridges	33

Section 3: Living things 35

Vision – what do minibeasts see?	36
Camouflage – tiger diorama	38
Symbiosis – clown fish and sea anemone model	40
Life cycles – the life of a frog	42
Animal diets – humpback whale mobile	44
Flower power – the parts of a flower	47
Flower power – life-like blossoming flowers	48

Section 4: Earth and space 50

The solar system – solar system mobile	51
Mapping Earth – time zone capsule	54
Wind speed – Beaufort scale chart	56
Wind power – flamingo windmill	58
Eclipses – lunar eclipse observatory	60
Space exploration – Mars Rovercraft	62
Path of light – telescopic pinhole viewer	63

introduction

The study of science provides students with an opportunity to explore, question and respond to the world around them. Students begin to understand more about scientific curiosity and their own attitudes to what affects us – including what can't be seen, felt, heard or touched but can be imagined.

Science: Hands-on projects features a wide variety of creative experiences to enhance the study of science. This hands-on approach offers an easy and accessible way to teach science and allows students to become actively involved in focused and powerful learning. Scientific explorations in matter, energy and force, living things and Earth and space can be used as springboards to further inquiry across the learning domains.

The four topic areas feature a number of activities that use an investigative approach focusing on:

- ◆ **Engagement:** instant stimulation of curiosity and raising questions for further inquiry
- ◆ **Exploration:** hands-on experience of phenomena and concepts
- ◆ **Explanation:** interpreting and modelling investigative skills and conceptual understandings
- ◆ **Elaboration:** reconstruction and extension of explanations and understandings through different modes of representing science ideas and findings
- ◆ **Evaluation:** evidence of revision and reflection on new understandings and skills.

Each activity has clear and easy-to-follow instructions with plenty of scope for expanding thinking and individual interpretation.

Teacher tips

This fully reproducible resource presents a practical and varied approach to investigating science in the classroom. The activities can be used to incorporate the study of specific scientific phenomena or as standalone investigations.

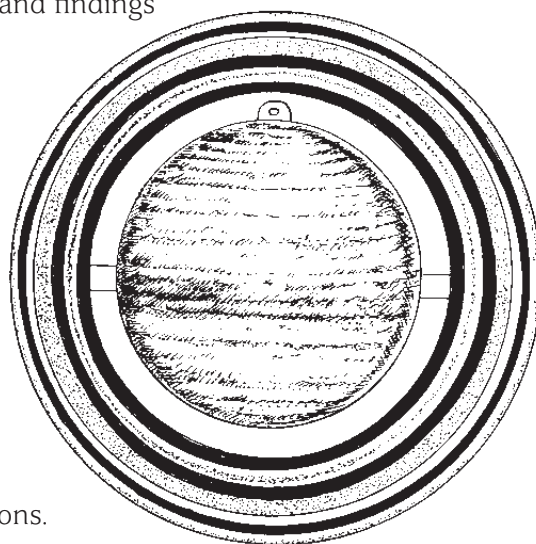
Investigations link to students' prior knowledge. By associating the investigations with other units of study and encouraging students to actively participate, the learning will be more focused, relevant and powerful.

A short overview of each activity is provided, which can serve as background information for the investigations or as a springboard from which students may conduct further research.

While the activities require minimal materials, some preparation is beneficial. Organising a work space that is accessible and engaging will encourage and inspire students. Requirements for templates, materials and space should be determined before the class begins so that the sessions are focused and run smoothly.

Safety guidelines

Choose activities that are appropriate to the skill level of students, and ensure students are well supervised. Particular care should be taken if students are using materials such as sharp implements, chemicals or electrical appliances.



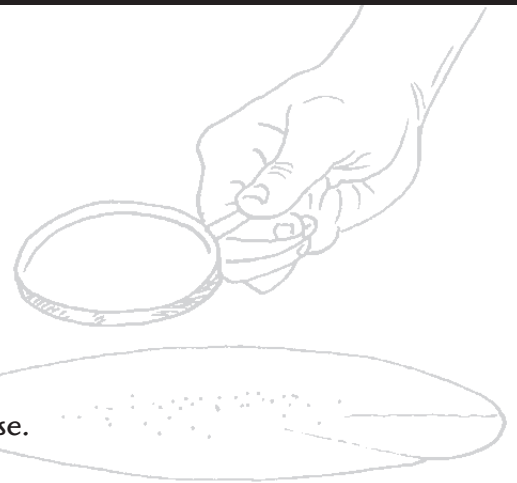
section 1

Matter

Matter is anything that takes up space and has a mass. Along with energy, matter makes up everything in the universe.

To better understand matter we must investigate the properties of objects and materials, and the different states of matter.

When we change materials we actually change their properties.



Teaching and learning opportunities

- Students explore different states of matter: solid, liquid and gas.
- Students learn about the changes that materials may undergo.
- Model-building activities allow students to see scientific principles in action.
- Students are encouraged to experiment with activity parameters to increase their understanding of the underlying scientific theories and concepts.
- Activities appeal to kinesthetic and visual learners.

The activities in this section focus on:



Water cycle – möbius strip

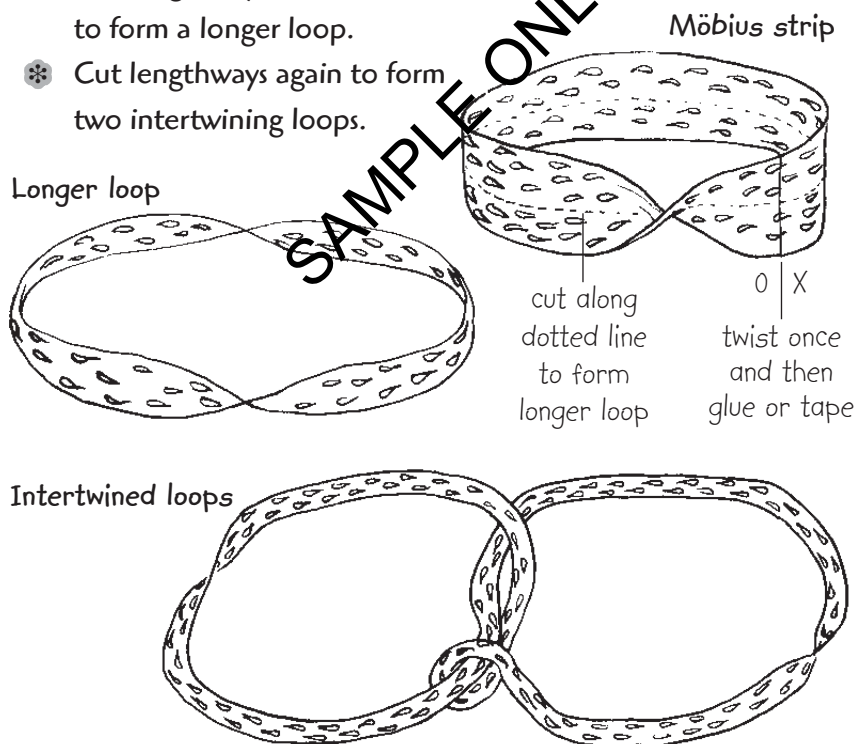
The möbius strip illustrates the interdependence and continuity of the water cycle. Water is never lost; it only changes its form. A möbius strip is a continuous loop which has only one side and one edge. If you cut along the middle of the strip, you will not make two strips, but one long one. If you cut again, you will have two intertwined loops.

You will need

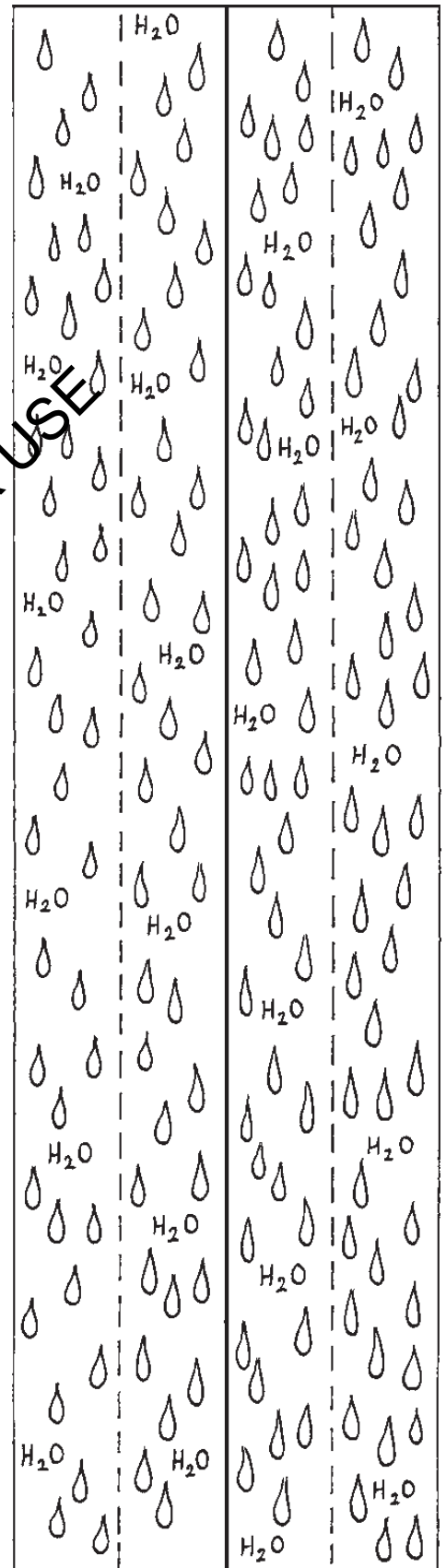
- * a copy of the möbius strip template
- * glue or tape
- * scissors

Instructions

- * Cut out the strip, then fold and glue it back to back down the centre line.
- * Bring the ends together, twisting one end once only, and glue or tape both ends (O-X).
- * Cut lengthways down the dotted line to form a longer loop.
- * Cut lengthways again to form two intertwining loops.



fold along bold line



Consider

Research the different states of water: solid, liquid, gas, vapour. Examine water in all its different forms in your home.