



Education Kit

Acknowledgements

This education kit is based on materials developed by staff at Scienceworks, Museum Victoria.

The support of the Department of Education and Early Childhood Development and the Catholic Education Office is acknowledged.

Writers: Peter Pentland, Pennie Stoyles, Andrea Horvath, Geoff Moore

Designer: Lenna Angelovska

Illustrator: Anne Newnham

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Teachers may copy material in this kit for classroom use.

Scienceworks
2 Booker Street,
Spotswood, VIC 3015



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Teacher notes

Introduction

This education kit has been written for students in Years 3-10, to support an excursion to the *House Secrets* exhibition at Scienceworks.

The kit includes three Pathways that contain activities to be completed during a visit to the exhibition. Teachers should review these pathways before the excursion, and select the one that is most suited to each group of students. Enough copies should be printed and the contents of the pathway discussed with students prior to the excursion.

- **Pathway A:** may suit students in Years 3-6
- **Pathway B:** may suit students in Years 5-8
- **Pathway C:** may suit students in Years 9-10

The kit also contains a range of school-based activities that can be adapted to suit various learning styles and levels. These activities may be completed before or after visiting the exhibition. Some school based activities require an understanding of forces, energy, materials and living things, while others are designed to introduce these themes.

The science concepts explored in this education kit are forces, energy transformations, simple machines, acids and bases, indicators, materials, simple chemical reactions and classification of animals.



The Bathroom

Essential preparation

What to do before the excursion

Please check your confirmation letter to ensure that the details for your excursion are correct. If there is a problem with your booking, please call Scienceworks Bookings on 9392 4819.

Research has shown that setting objectives for a museum visit is extremely important for students.

Making the purpose of the excursion clear to them assists students' ability to focus and cooperate.

Creating interest in the subject is vital to a successful and enjoyable visit to Scienceworks. This education kit includes a range of activities to prepare students for their visit.

What to bring on your excursion

- the confirmation letter
- **photocopy of the exhibition map, page 10**
- **teachers should review the pathways and provide each student or group of students with a photocopy of the one that is appropriate for them.**
 - Pathway A: may suit students in Years 3-6
 - Pathway B: may suit students in Years 5-8
 - Pathway C: may suit students in Years 9-10
- students should bring their own pencils and clipboards



The Kitchen

Exhibition information

Our homes can be the location for countless adventures in science and engineering.

The *House Secrets* exhibition explores the science of domestic products, foodstuffs and materials, how some appliances and gadgets work, and the non-human inhabitants in your home.

The exhibition is divided into seven sections: Entrance Hall, The Kitchen, The Lounge Room, The Bedroom, The Bathroom, The Laundry and The Porch. Each section consists of a number of interactive displays. A description of the main displays appears below.

Section 1: Entrance Hall

Ding...Dong: Find out how an electromagnetic doorbell works.

It's for you: Telephone facts: Who 'invented' it? How does it work?

Hickory dickory dock: See how a pendulum clock operates.

In the attic: Use the periscope to look into the attic. What can you see?

Moving side to side or round and round?: This illusion uses a polaroid lens to create a 'depth illusion' where a clock pendulum appears to go round and round.

Rotating illusions: Optical illusions can play tricks because sometimes you see only what your brain expects to see.

Different Eyes: How do flies and bees see the world?



Section 2: The Kitchen

The electric kitchen: See inside electric appliances and find out about energy transformations.

Electrical appliances – heat: Electrical appliances can convert electricity into heat, movement or electromagnetic waves.

Electrical appliances – mechanical: Motors use magnets to turn electricity into the movement of mechanical parts.

Electricity to electromagnetic waves: Microwave ovens generate electromagnetic waves. How do they work?

Kitchen tools, look at all the machinery: Discover how simple machines are used in the kitchen.

Fridge flow: Find out how a fridge works. Feel what happens to the temperature of a refrigerant as it changes state from a liquid to a gas and from a gas to a liquid.

Mouldy food models: See food before and after it is affected by moulds.

Grubs in your grub!: Meet the animals that invade and eat our food. Weevils and maggots and ants, oh my!

Pop goes the toaster: Look inside to find which parts make the toast pop up.

Cranky the toaster - create energy & make toast: Have you got enough energy to cook toast? Crank the handle and find out.

Bacteria made visible: Match the kitchen activity to the bacteria it leaves on a hand.

Surprise facts about food: What is it used for? Where does it come from?

Good enough to eat: Why do we cook food? What foods go in the fridge? Find out how we can look after ourselves by looking after our food.

Kitchen materials - feely box: These natural and manufactured materials have special properties that make them useful in the kitchen.

Microwave meals: See what happens when eggs, metals, grapes, popcorn, pappadams and marshmallows are zapped in a microwave.

Going off: Watch food go rotten with time-lapse photography.

Demonstration area: Live presentations of physical forces and chemical reactions that occur in the house.

As a part of your school excursion visit to the *House Secrets* exhibition you may be given a demonstration of household science. Scienceworks will determine the topic presented on the day.

Section 3: The Lounge Room

House music - see how a CD player works: A CD spins at different speeds, depending on the position of the laser.

Suction and Cyclone: Compare the suction of different vacuum cleaners.

Chandelier challenge: Can you pedal fast enough to light up the chandelier? Get some friends to help you light it up even more.

Record grooves: See how sound is recorded in vinyl records.

Television - Behind the Screen: See how a standard colour television works.

Get the picture: Find out how colour television sets produce images.

Loud and clear: Discover how loudspeakers turn electric signals into sound.

Vacuum cleaners - a gallery of dust suckers: See how a standard vacuum cleaner works.

Flea feats: Make the fleas jump using compressed air. Find fun flea facts.

Dust bag creatures and fibres: See what a vacuum cleaner sucks up.

3D Bugs in boxes: If a shrinking machine could make you 10,000 times smaller, you might meet these creatures.

Make waves: Crank the handle to make long and short waves. Which take more energy to create?

Back of couch: Find out what is down the back of our couch.

Section 4: The Bedroom

Dresser mirror: See yourself as others see you! Compare images created by a plane mirror with a trough mirror.

Fashion secrets: Microscopic views of natural weaves and synthetic fibres in your clothes reveal some amazing landscapes.

Wiggle time: The light emitting diodes on a clock radio are flashing too quickly for us to see. Blowing a raspberry makes your head vibrate and the numbers seem to wiggle.

What do you sleep on?: Compare different types of mattress springs.

Number maker: Calculators, clocks and timers use electronic displays based on this simple pattern. What numbers and letters can you make?

Can you make a calculator talk?: Nerdy calculator tricks, but we do them in a safe environment.

Mystery of the flashing fluoro: A stroboscope enables us to see that a fluorescent light blinks about 50 times a second.

Sliding puzzles: Slide the tiles to complete the picture.

Shadow animals: Light travels in straight lines. Small lights make sharp shadows. Wide light sources make fuzzy shadows.

Good night dust mite: Meet the dust mites that live in your mattress.

Hide and seek: Can you find the mozzie before the mozzie finds you? Find out how mosquitoes locate food.

You must remember this - Memory drawers: The old memory game. There are six pairs of matching objects. One of the pair is old. The other is new. Can you match them up?

Section 5: The Bathroom

Slime world #1: Slimy bacteria and fungi grow in your drain.

Slime world #2: Bioslime grows well in the dark. It can be white, grey, clear or pink.

Hair flow: Explore the forces that keep a ball floating on air.

Shower water use: How much water do you use in the shower?

Create a stir: Gravity pulls the water down into the drain. Water near the centre moves faster. This creates a funnel shaped vortex.

Flush with success - the cut-away toilet: See what happens when you push the button.

The great tile temperature surprise: These tiles are the same temperature, but some feel cool. Materials that feel cool are better at carrying heat away from your skin.

Getting a big head: The curved surface of an enlarging mirror reflects light at angles that make these images.

Mmmmm... What is that scent?: Which scent would you wear?

Section 6: The Laundry

Mouse nest: What do mice need to survive?

Its a clean machine: Spin the washing machine drum. See what happens.

Tumble dry: Watch how the clothes move around inside the dryer.

Clothes that glow: Some laundry detergents contain fluorescent chemicals. These chemicals absorb ultra-violet light and give out visible light, making clothes appear whiter and brighter.

Big Tap Little Tap: See how taps operate.

Dripping tap: A dripping tap wastes 30 litres a day – that's over 10,000 litres a year!

Grey water: Grey water is waste water from washing. If you use low-phosphate detergents it can go onto the garden rather than down the drain.



The Laundry

Section 7: The Porch

Fly: Have a close look at a fly's eating gear.

Moth: Why are moths attracted to light?

Rainbow maker: Prove that white light is made up of all the colours of the rainbow.

Lock 1 and 2: See how a simple locks operates.

Insulation box: Insulation is a barrier to the flow of heat.

Ceiling insulation keeps a house cool in summer and warm in winter.

Exhibition themes

Appliances and gadgets

There are lots of appliances and gadgets featured in the *House Secrets* exhibition. Here are a few:

electric motor	refrigerator	pepper grinder
telephone	loudspeaker	egg beater
hairdryer	CD	whisk
doorbell	television	knife
tap	make-up mirror	scissors
clothes iron	meat cleaver	nutcracker
washing machine	grater	toilet
vacuum cleaner	vegetable peeler	
toaster	lever-type can opener	

Animals and microbes

Here are the creatures featured in the *House Secrets* exhibition:

spiders	dust mite	maggot
slime	flea	weevil
mosquito	bacteria	louse
moth	mould	millipede
fly	ant	

Heroic inventions

There are twenty portraits of the following inventions scattered throughout the *House Secrets* exhibition.

thermos flask	lava lamp	paperclip
sliced bread	bean bag	bandaid
splayd	video game	rubber duck
pedal rubbish bin	tissues	roll on deodorant
milk carton	teddy bear	toilet paper
tea bag	Lego	toothbrush
coffee powder	zipper	

Audiovisual displays

Microwave oven: See what happens when the following things are zapped in a microwave:

eggs	grapes	marshmallows
metal	popcorn	
teaspoons	pappadams	

You can also find out how colour television sets produce images, how bathroom fog is formed, the best ways to store foods and watch food rot (its more exciting than you think).

Audio displays

Find out about telephones, CD players and loudspeakers.

House Secrets exhibition map



Curriculum links

Victorian Essential Learning Standards

This table shows the links between the school-based education activities in the *House Secrets* education kit and the strands and domains of the Victorian Essential Learning Standards.

VELS Victorian Essential Learning Standards School-based education activities 1-6 Simple machines, tools and gadgets 7-11 Energy 12-20 Kitchen chemistry 21-23 Living things	Physical, Personal & Social Learning				Discipline-based Learning						Interdisciplinary Learning			
	Health & Physical Education	Interpersonal Development	Personal Learning	Civics & Citizenship	The Arts	English	Languages Other Than English	Humanities	Mathematics	Science	Communication	Design, Creativity & Technology	Information & Communications Technology (ICT)	Thinking
Activity 1 Written reports						●			●	●	●	●	●	●
Activity 2 Build a force measurer									●	●	●	●	●	●
Activity 3 Friction		●			●	●			●	●	●		●	
Activity 4 Inclined planes					●				●	●			●	●
Activity 5 Getting into gear	●	●							●	●			●	●
Activity 6 Levers around the house							●			●	●		●	●
Activity 7 Hair-raising balloons (static electricity)	●	●								●			●	●
Activity 8 Reflections from a soup spoon (light)		●								●	●			●
Activity 9 Clucking hen (sound)					●					●		●		
Activity 10 Cooling effects of evaporation (heating and cooling)		●				●			●	●	●	●	●	●
Activity 11 Make a Coolgardie Safe (heating and cooling)					●				●	●		●	●	
Activity 12 Ice block and toothpick										●				
Activity 13 Ice and water										●				
Activity 14 Chocolate crackles (states of matter)		●								●				
Activity 15 Make a lava lamp (density of liquids)		●			●	●				●	●	●	●	●
Activity 16 Cabbage indicator (acids and bases)		●				●				●	●	●	●	
Activity 17 Fizzy sherbet (acids and bases)										●			●	
Activity 18 Bath salts	●	●				●				●	●	●	●	
Activity 19 Bubble mix		●								●	●	●	●	
Activity 20 Dancing currants		●				●				●	●		●	●
Activity 21 From minibeasts to arthropods		●			●	●				●	●		●	●
Activity 22 Arthropods					●	●				●	●	●	●	●
Activity 23 Do you have 'Spiderphobia'?	●	●	●		●	●			●	●	●			●

Gardner's Multiple Intelligences and Bloom's Taxonomy

This table shows the links between the school-based education activities in the *House Secrets* education kit, Howard Gardner's Multiple Intelligences and Bloom's Taxonomy.

School-based education activities 1-6 Simple machines, tools and gadgets 7-11 Energy 12-20 Kitchen chemistry 21-23 Living things	Gardner's Multiple Intelligences							Bloom's Taxonomy (First three levels of Cognitive Domain)		
	Verbal - Linguistic	Logical - Mathematical	Picture - Spatial	Body - Kinesthetic	Music - Auditory	Interpersonal	Intrapersonal	Knowledge	Comprehension	Application
Activity 1 Written reports	●	●	●			●				●
Activity 2 Build a force measurer	●	●	●			●			●	
Activity 3 Friction	●	●	●			●				●
Activity 4 Inclined planes		●	●							●
Activity 5 Getting into gear		●	●	●		●			●	
Activity 6 Levers around the house	●	●								●
Activity 7 Hair-raising balloons (static electricity)		●		●		●		●		
Activity 8 Reflections from a soup spoon (light)	●	●	●			●		●		
Activity 9 Clucking hen (sound)		●							●	
Activity 10 Cooling effects of evaporation (heating and cooling)	●	●				●				●
Activity 11 Make a Coolgardie Safe (heating and cooling)		●	●							●
Activity 12 Ice block and toothpick		●							●	
Activity 13 Ice and water		●								●
Activity 14 Chocolate crackles (states of matter)	●	●	●			●			●	
Activity 15 Make a lava lamp (density of liquids)	●	●	●			●				●
Activity 16 Cabbage indicator (acids and bases)	●	●				●				●
Activity 17 Fizzy sherbet (acids and bases)		●							●	
Activity 18 Bath salts	●	●		●		●			●	
Activity 19 Bubble mix	●	●		●		●				●
Activity 20 Dancing currants	●	●	●			●			●	
Activity 21 From minibeasts to arthropods	●	●	●			●		●		
Activity 22 Arthropods	●	●	●							●
Activity 23 Do you have 'Spiderphobia'?	●	●		●		●	●		●	