The Exploratory Interactive Science Centre

Exhibit List August 1999

3-D Vision

3-D from 2-D Dots
Each eye sees a random dot pattern. For one eye, a block of dots is shifted sideways. This produces a 3-D picture.

3-D Movement from a 2-D Pendulum
A dark glass slows down the response of one eye enough to produce different images of a straight swinging pendulum bob in each eye. This results in the bob appearing to follow a elliptical path.

3-D Pictures (red-green)
No description available.

3-D Shadows
A bit like the old 3-D movies: red and green shadows, viewed through red/green spectacles produce a different image in each eye resulting in 3-D vision.

3-D Views
View pairs of stereo pictures using mirror stereoscopes to see 3-D images.

3D Drawing Machine (RLG)
No description available.

Changing Depth Julesz Square
Random dot stereograms seen through a stereo viewer. When one pattern is shifted to one side, the depth of the 3-D image changes.

Leonardo's Window
An easy way to draw with the correct perspective. Also shows how our brain alters the image we see to make distant objects look larger.

Moving Depth Footballer
No description available.

The Deepest Colours You Ever Saw
See in 3-D when special glasses shift the colours in a picture.

Victorian Views
No description available.

Animation

Phenakistoscope
No description available.

Praxinoscope 1
No description available.

Praxinoscope 2
No description available.

Red-Green Pictures
No description available.

Spider Catcher
No description available.

Spinners
No description available.

Strobe Bike
No description available.

Thaumatrope

No description available.

Zoetrope
No description available.

Body

Body computer information station
What are you made of? Use the computer to find information and pictures of your body - a simple, successful CD-ROM program.

Colour Blind
A colour blindness test using Ishihara's coloured dots pictures.

Does choice slow you down?
Measure your reaction time and find out how it changes when your are faced with a choice. This exhibit uses coloured lights to present you with a choice of reactions. Linked to 'How fast can you predict' and 'How fast can you react' exhibits.

ECG - Your heart is electric
Measure the electricity from your heart using an electrocardiograph or ECG -as seen in all those hospital dramas.

How accurately can you predict?
Measure your reaction time and find out how prediction allows us to drive or play ball games, even with our relatively slow reactions. Linked to 'How fast can you react' and 'Does choice slow you down' exhibits.

How do you swallow?
Food and drink don't just drop into your stomach; they are pushed there. This simple exhibit demonstrates how 'peristalsis' works in your digestive system.

How Fast are Your Reactions? (Ruler)
Test your reaction time by catching a falling time scale.

How fast can you react?
Measure your reaction time. Linked to 'How fast can you predict' and 'Does choice slow you down' exhibits.

How long is your gut?
Just how long are the intestines that are coiled up in the body?

How strong is your grip?
Measure your hand grip strength and find out how it compares to other animals. You can also test how long you can maintain your grip.

How Unique are You?
No description available.

Human Jigsaw
Find out how the human organs fit together in the body.

Joints
No description available.

Listen to your heart
What does your heart sound like? Use an electronic stethoscope to hear heart sounds.

Making Faces
Try to make a 'photo-fit' picture on the computer screen look like you.

Pulse Step
Find out how your heart rate changes when you exercise. This exhibit includes pulse rate measuring equipment and a step for gentle exercise. There is also an anatomical heart model to take apart and investigate.

Sandpaper Illusion
Rub one hand on fine sandpaper, the other on coarse. When both then rub medium it feels different to each hand.

Skeleton Puzzle

No description available.

Skully Skeleton
Investigate the life-size skeleton in the chair.

Smell Mixture/Carvones
No description available.

Smelly Chemicals - Carvones
A small change in the shape of a molecule can affect its smell dramatically.

Stuffee
Stuffee is a 7-foot soft fabric doll with blue hair and a big smile. Unzip the big zipper on his front and see what's inside! Lots of colourful fabric reproductions of all the important 'bits' to be taken out and handled as you learn about what they all do and what we can do to keep our bodies healthy.

The first nine months - where did I come from?
How does a baby grow? See what you looked like in the nine months before you were born. This exhibit has one baby and womb model for each of the nine months of pregnancy.

Tireless Heart
How hard does your heart work? Pump 'blood' with this hand pump to find out how hard your heart muscle works. There are four different pulse rates to try, from sleeping to running.

What can x-rays tell us?
Match the real x-ray photographs to the bones in the body and spot the broken "bits".

What do cells look like?
What are you made of? Use an easy to operate microscope to look at some of the cells in your body.

Where did I come from? - skulls
Match the jawbone to the skull, for the members of the human evolutionary tree.

Chaos

Attracting Pendulum
Each of three magnets competes to attract a magnetic pendulum. Where the pendulum ends up is extremely sensitive to the starting point.

Chaotic Impacts
No description available.

Chaotic Reflections
A laser beam is reflected off three mirror cylinders and demonstrates chaotic behaviour.

Clockwise or Anti-Clockwise?
Comprises a simple pendulum linked by magnets to a freely-swinging arm. Start the pendulum weight swinging. After 5 swings which way is the `rotor' turning? How will it be turning after 10 swings? After 15 swings?

Coin Toss
Coin-tossing with this device is always predictable.

Fractals from Chaos
No description available.

Pinball Machine
Shows a predictable distribution of balls falling randomly through an array of nails.

Repelling Chaos
This simple magnetic pendulum swings chaotically when it is repelled by other magnets. The path is unpredictable as very small changes of starting point affect the result.

Rott's Pendulum
A T-shaped pendulum with swinging arms. The spin can be shared between the four parts (the main `T' and the three `branches') and the way the motion is shared is so sensitive to just how the spin is started, that the result is chaotic.

Spinning Magnets
Two bar magnets suspended next to each other show chaotic behaviour.

Video Feedback
No description available.

Weather Forecasts
No description available.

Chemistry

Bobbling Bubble Tank
Bubbles float on a sea of denser-than-air gas.

Elementary Changes
Find out about the properties of mercury and the effects of heating on iodine and mercury (II) iodide.

Flame Colours
A Bunsen burner flame burns with distinctive colours when different substances are heated in it. Salts of sodium, lithium, barium, strontium, calcium and caesium, in aqueous solution, are used in this experiment.

Frozen Shadows
Light makes phosphorescent wallpaper glow - here a flash freezes movement as a shadow!

Human Battery?
Compare the electric currents produced when touching different combinations of metal plates.

Inky Colours - paper chromatography,
Find out what is in a mixture of coloured substances using paper chromatography.

Invisible Light
See things glow under ultra-violet.

Molecular Lego
Make a molecule with model atoms then use a computer to find out what chemical you have made. Visitors assemble a molecule using single-bond links between two carbon, one oxygen and six hydrogen `atoms' (actually large wooden balls).

Periodic Table - elements
A large periodic table with examples of many of the real elements.

Periodic Table Computer
A computer giving information about the elements and the periodic table.

Powers of Ten Video
No description available.

Radioactivity
Uses a Geiger counter to measure the radioactivity of common materials.

Smelly Chemicals - Sense of smell
Clever chemical mimicry simulates natural odours.

TASTRAK
A special plastic material can be developed to show latent alpha particle tracks. This exhibit allowed vistors to view tracks and take part in a survey of natural radioactivity in their homes arising from radon gas.

Water with a Bang
Electricity is used to split water into hydrogen and oxygen.

Colour

After-Images

Looking at a bright colour produces an after-image in the complimentary colour: red produces a blue-green after-image.

Colour Activities Table
Make your own colour spinners and find out what happens when you spin them.

Colour Code
No description available.

Colour Contrast
No description available.

Colour Filters - light table
Overlapping coloured filters produces colours by subtracting colours from white light. In this exhibit, you can see what part of the spectrum is being absorbed.

Colour Mixing - Adding Coloured Lights
Control the brightness of overlapping red, blue and green light beams to produce all the colours of the spectrum and more. Shows how three colours are enough for colour television and colour films.

Colour Mixing - Colour Television
Shows how a colour T.V. picture is made with only red, green and blue dots.

Colour Mixing - Taking colours away from white
Experiment with colour filters on a light box - this is the opposite to mixing lights (additive mixing).

Colour Printing - light table
Shows how yellow, magenta, cyan and black transparencies or inks can produce a full-colour scene.

Coloured Shadows
Produce different coloured shadows and explore colour mixing.

Colours from black and white (Benham's Disc)
This rotating black and white pattern stimulates the colour receptor cells in your eye to see colours.

Goethe's Coloured Shadows
Shows that our brain can alter the colour balance of a scene to compensate for changes in the colour tint of the lighting.

Land Slides
No description available.

Mixing your own coloured lights
Mix red, green and blue light on a screen to produce not only any of the colours in the spectrum, but white, black and the magentas.

Spectrum from a Grating
A spectrum is produced using a diffraction grating. Coloured filters allow some colours to go through them.

The Stroop Effect (Confusing Colours)
It is difficult to read a list of colours when words and colours disagree.

White from a coloured disc (Maxwell's Disc)
When a three coloured disc spins round fast the `colour' you see depends on the width of the sectors - in this case it produces white.

White from a rainbow disc (Newton's Disc)
As Newton predicted, when a disc of rainbow-coloured sectors spins, the colours merge at the eye - with our choice of sectors to produce white.

Electricity and Magnetism

Arago's Speedometer
Eddy currents in a metal disc makes it temporarily a magnet which moves a compass needle nearby. Some speedometers work in a similar

way.

Artificial Lightning
This generator charges a metal dome up to a potential of 300,000 volts. Explore some of the effects this produces, including giant sparks.

Bending Water
No description available.

Circuits in Parallel
Investigate making a circuit in parallel.

Circuits in Series
Investigate making a circuit in series.

Eddy Currents
A magnet dropped down a copper tube slows down due to eddy currents.

Faraday's Coil
Electricity flows through a coil of wire when a magnet is moved through it.

Faraday's Motor
No description available.

Hand-Cranked Electromagnet
How does a scrapyard crane work? This shows that an electromagnet is only magnetic when electricity is flowing.

Jacob's Ladder
Strong electric forces cause air to conduct electricity (ionise it). This is seen as a spark that moves up the tube.

Jumping Coil
Shows how a loudspeaker works. A coil around a magnet moves when electricity flows through the coil.

Jumping Wire
A force is produced when an electric current flows through a wire placed in a magnetic field. This causes the wire to jump.

Levitating Disc
An aluminium disc floats above electromagnets.

Magnet Puzzle
How can you identify the magnet from the identical iron bar?

Magnet Springs
A big magnet floats above another showing magnetic repulsion.

Magnet Springs (Traveller)
A big magnet floats above another showing magnetic repulsion. (Built to travel.)

Magnetic Field Patterns
Investigate the field patterns around different shapes of magnet.

Maltese Cross
In this cathode ray tube electrons are revealed as they hit a fluorescent screen (as in a TV). You can experiment on the electrons with magnets and static charge.

Motors
Demonstrates how simple electric motors work

Moving Static Electricity
Static electricity is detected using an electroscope.

Ohm's Law
No description available.

Pedal Power
Pedal a bike to power lights, a TV, radio and fans. Shows 'muscle energy' being converted to electrical then to other forms of energy.

Plasma Globe
No description available.

Plasma Tube
Tendrils of glowing plasma stream out to where you touch the tube.

Radio Waves
No description available.

Rubbing Box
Bits of foam are attracted to a perspex cover when it is rubbed with a cloth.

See-saw Magnets
Suspended bar magnets demonstrate attraction and repulsion.

Solar Powered Wave Machine
Make waves in a tank of water. A float and electrical generator make electricity to power a lighthouse.

Switch Logic
Investigate using switches in circuits.

Transformers
No description available.

What Works in a Circuit?
Investigate making a conductors, insulators and resistance.

Wire Resistor
No description available.

Gas / Fluid

Air Cannon
Air leaving this 'cannon' flows like a smoke ring and travels for quite a distance before hitting a target of small 'flags'.

Bernoulli Beach Balls
No description available.

Bernoulli Blower (large)
A beach ball is suspended in the fast airflow from this blower.

Bernoulli Blower (small)
A beach ball is suspended in the fast airflow from this blower. (Built to travel.)

Hot Air Balloon
A model hot air balloon rises to the ceiling as visitors heat the air inside and sinks as it cools.

Rising Damp
No description available.

Settling Sand
Demonstrates the settling rates of different sized sand grains.

Tornado
Air flows create a miniature tornado.

Whirlpool Bottles
Shows the vortex formed in water as it spirals through a hole.

General

Cyber-Lumen
No description available.

Internet Stations
Four computers with a permanent connection to the Internet. Visitors can browse topics in the World Wide Web.

Light on Rocks
No description available.

Money Spinner
Coins spin around this horn-shaped well, getting faster as the radius of their orbit decreases.

Ned's `Fish'
No description available.

Newton's Railway
No description available.

Steel Pinball
No description available.

Illusions

Ames' Window
No description available.

Cafe Wall Distortion Illusion
Rows of light and dark tiles appear wedge-shaped, depending on the brightness of the mortar between the tiles. This tells us a lot about how we see edges.

Crescent Illusion
Identical crescent shapes appear to be different sizes.

Devil's Fork
A fork with two or sometimes three points.

Escher's Ladder
A reproduction of Escher's 'Belvedere' (Lithograph 1958)

Escher's Stairs
No description available.

Expanding Spiral After-effect
The opposite effect to Shrinking Spiral After-effect.

Ghostly Circles
As Ghostly Triangles above. We often interpret gaps in an object as a `real' object.

Ghostly Triangle
We often interpret gaps in an object as a `real' object. This illusion illustrates a useful visual mechanism for recognising objects when only part is visible.

Ghostly Triangle 2
We often interpret gaps in an object as a `real' object. This illusion illustrates a useful visual mechanism for recognising objects when only part is visible.

Grey Ring Illusion
A grey ring covers an area one half of which is black, the other white. The part of the grey ring seen against the black appears lighter than that against the white when the two halves are separated by a line.

Herman Grid
A grid of black squares shows ghostly grey patches at the intersections.

Hollow Faces
Hollow face-masks sticking in appear to be faces sticking out showing that the brain's assumption of `all noses stick out' is difficult to overcome.

I only have eyes for you
No description available.

Impossible Triangles
No description available.

Jumbo Mumbo
A curious drawing of an elephant which sometimes has an extra leg.

MacKay's Rays
No description available.

Magic Wand
Persistence of vision explains why you see a picture when a wand is waved in the beam of a projector.

Moving Dots After-effect
Shows how the eye adapts to a rotating image.

Muller-Lyer Illusion
Two same-length lines appear to be different lengths.

Ponzo's Figure
Objects placed on converging lines appear to be different sizes. (The railway lines illusion.)

Shrinking Spiral After-effect
Gives an illusion of an expanding image showing adaptation to a shrinking pattern.

Size-Weight Illusion
Have you ever picked up what you thought was a heavy bag of shopping, and nearly fallen over when it only contains light cereal packets? This exhibit shows that we anticipate that large objects will be heavier than small, and when this is not the case applied too much force.

Skeleton Cube
No description available.

Swirling Circles 1
No description available.

Swirling Circles 2
No description available.

Titchener's Circles
The size of circles surrounding a central circle affects our perception of its size.

Up-down Face
No description available.

Wall of Illusions 1
No description available.

Wall of Illusions 2
No description available.

What Do You See?- Vase or Face
This is the familiar illusion is the picture a vase or two silhouettes? When the same picture in the eye can be produced by different objects the brain has to decide which is correct.

When is a Square not a Square?
A square appears distorted when placed on a pattern of concentric circles.

Wobble Cone
No description available.

Young or Old - or Both?
A famous picture which can either be an old or young woman's face.

Light

Bubble Sheet
Pull a huge bubble film from a tank of bubble solution. Blow giant bubbles or watch as the colours in the film

change.

Focus on Lenses
Investigate focal length of lenses and how the focal length changes the size of the image.

Ghostly Lamp
A parabolic mirror focuses the reflection of a lamp so that it appears to be in front of the mirror - this is called a `real' image.

Holograms
Remarkable 3-D image from a flat picture.

Hum Drum - Mixing Waves
No description available.

Laser Interference Patterns
No description available.

Light House
The effect of different lenses, mirrors and prisms on beams of light can be explored.

Mirror-ball Game
This compares the law of reflection for light reflected from mirrors and balls that bounce off surfaces.

Newton's disc with a flashing light
No description available.

Polar Dome
No description available.

Ripple Tank
No description available.

See Stress
Polarizing sheets (as in sunglasses) allow the stress patterns in plastic objects to be seen.

See Stress (Traveller)
Polarizing sheets (as in sunglasses) allow the stress patterns in plastic objects to be seen. (Built to travel.)

Travelling Waves
Make waves travel up and down linked rods. Observe reflection and standing waves in the rods.

Try your own stress
Bend plastic between Polaroid sheets to reveal stress lines.

Mathematics

Cycloid Races
Cars race down two tracks - one straight, the other in the shape of a cycloid curve - which wins? You can also race two cars down the

cycloid track to find the link with a pendulum clock.

Drawing Ellipses
No description available.

Elliptical Snooker
Playing snooker on this special table demonstrates some properties of the ellipse.

Harmonograph
A pen is attached to the arm of a pendulum. It draws on a piece of paper attached to another moving arm, producing complex and stunning patterns.

Key Question
No description available.

Lissajous Figures

A laser beam traces a shape on a screen. The shape is produced by the mixture of an up and down motion and a side to side motion, each vibrating at a particular frequency. When the frequencies are in certain ratios we see beautiful patterns.

Probability (Ball Bearings)
No description available.

Wheels with Corners
Un-round wheels which roll well show why 50p and 20p coins work in slot machines.

Measurement

Break the beam
Break an infra-red beam with your hand. How many times can you do this in 10 seconds?

Giant Pliers
A giant set of pliers squeezes a giant spring.

How long is your hair?
Measure the length of one strand of your hair. Multiplying the length by 1.8 gives an estimate for the total

Measure this - laser lever
Measure four blocks which appear identical, with this measure which includes a long laser pointer.

Measure with Sound 1 - height
Use a simple ultrasonic 'tape measure' to measure heights.

Measure with Sound 2 - distance
Use a simple ultrasonic 'tape measure' to measure distance.

Powers of Ten - computer display
This computer display shows how we use powers of ten to write very big and very small units.

Standards display - metre, second, kilogram
This display explains how the standards for the metre, second and kilogram are defined.

Theodolite Height - height from angle
Use a simple theodolite to measure someone's height

What's a Watt?
Measure the current, voltage and power used by different mains light bulbs including a low-energy fluorescent lamp.

Wind Speed
What does it feel like when wind moves at 40 kilometres per hour?

Your body is the measurement - origins of measurements
With this exhibit, you can find out about these units by measuring your height in cubits, spans or hands.

Mechanics

Artificial Gravity Pendulum
Simulates the effect that different gravity strengths (Moon, Jupiter and the Earth) have on the pendulum's rate of swing.

Balancing the Palette
No description available.

Bouncing Balls
No description available.

Coupled Pendulums
Shows the transfer of energy between two identical linked pendulums.

Enigma Scales
These scales do not work as you might expect - but demonstrate how practical scales are best constructed.

Gallileo's Pendulum
How does the length of a pendulum affect the rate at which it swings?

Gyroscope Chair
Demonstrates gyroscopic forces at work.

Hydraulics
No description available.

Just Scales
Experiment with a balance to find out how simple scales work.

Momentum Platform
Like an ice-skater you speed up when your weight is near the centre of rotation. This shows conservation of angular momentum.

Puck Race
Compare how things slide on surfaces of different friction.

Puck Table
Investigate motion when friction is reduced on this air table.

Pulleys
Find out about pulleys - and whether more or fewer pulley wheels make it easier to lift a heavy weight.

Weight/Mass Pendulum
Does the mass of a pendulum affect the time of swing?

Mirrors

A New Angle on Mirrors
A human sized variable angle kaleidoscope.

A New You
Bendy fairground mirrors.

Anamorph Drawings
Pictures that need to be viewed in a cylindrical mirror.

Corner Mirror
Three mirrors arranged at right angles reflect light back in the direction from which it came. This idea in used in bike reflectors.

Drawing in a Mirror
Try drawing whilst watching your hand in a mirror - it is very difficult.

Drawing in a Mirror (Traveller)
Try drawing whilst watching your hand in a mirror - it is very difficult. (Built to travel.)

Elliptical Mirror
No description available.

Focusing Heat
No description available.

Focusing on Mirrors
Compare your reflection image in flat, converse, concave and broken mirrors.

How Big Is Your Reflection?
If you draw round your reflection in a mirror - how big is the reflection?

Human Kaleidoscope
You can get inside this kaleidoscope to see your reflections vanish into infinity.

Images of Images
Find out how a kaleidoscope works with these folding mirrors.

Infinity Mirror
Two huge parallel mirrors send your image into infinity!

Infinity Well
This well appears to be very deep, but stands on a solid floor.

Kaleidoscopic Cube
Mirrors on the inside three faces of a cube make a 3-D kaleidoscope.

Magic Reflections
No description available.

Mirrors at 60 degrees
A pair of mirrors held at 60 degrees to each other.

Mirrors at 90 degrees
A pair of mirrors held at 60 degrees to each other. What happens when the mirror rotate?

Parabolic Mirror
Depending on how far you stand from this mirror you can appear magnified, up-side down or distorted. At the focus of the mirror, your reflection does a somersault. Large convex mirrors are used in reflecting telescopes.

Polarized Reflections
Reflected glare from some surfaces can be reduced using polarizing filters (this is why anglers often wear sunglasses to see under water).

Reflecting in Depth
Shows the reversal of depth in a mirror.

Reflecting on Mirrors
Why do you look the wrong way round in a mirror? Can a mirror turn your image upside down? Try to work out the answers with these three rotating mirrors, one flat, one angled at 60 degrees, the other at 90 degrees.

Retro-reflectors
A large working set of bike reflectors so you can see how the light is reflected back to where it came from.

Shake hands with yourself
Reach into a large concave mirror and you reflection reaches out - but can you shake hands?

Spheroscope (large)
No description available.

Suck-blow Mirror
This flexible mirror surface can be adjusted with air blowers to be flat, convex or concave.

The Divided Self
Each hand slides a ring on opposite sides of a mirror. Looking in one side, you see your hand and its reflection. The confusion between what your hidden hand feels and what your eye sees is very strange.

Through the Looking Glass
Adjust the brightness of lights on either side of this semi-reflecting mirror. Reflections appear, combine and disappear. This is what happens when you look out of windows at night with room lights on then off. In the theatre, this effect is known as Pepper's Ghost.

Walk-in Kaleidoscope
A three mirror kaleidoscope you can walk inside.

Puzzles

3-D Noughts and Crosses
Play 3-D noughts and crosses on a 4 x 4 x 4 board.

Angle Tangle

Remove the rope from the interlocking hoops.

Black Cube
No description available.

Black Pyramid
No description available.

Block and Tackle
No description available.

Boil the Cauldron
Can you suspend the cauldron over the fire using just three supports?

Calculator Puzzle
No description available.

Circle, Square, Triangle Puzzle
What shape will pass through a circular, a square and a triangular hole, without leaving any gaps as it passes through?

Cluster
No description available.

Colour Maze
A large (4 metre square) floor maze.

Cooks Conundrum
Make an model cooker work with only two switches and some wire.

Cunning Cubes
No description available.

Down the Wires
A puzzle conveyor belt. Simply move the disc down the wires - but it is trickier than it seems.

Giant Soma Cube
Make the 1.5 metre high cube from the shapes.

Great Escapes Puzzles
A set of topological rope/shape puzzles.

Horse and Rider
Match the horse with its rider.

Impossible Dovetail
No description available.

Interlocking Wires
No description available.

Leprechaun Puzzle
Count the leprechauns, move the picture around and count again. Where has that leprechaun gone?

Loose Joints
Match the skeletal joint models - knee, elbow and hip - to their x-rays.

Magic Square
No description available.

Match the Dragons
A shape matching puzzle.

Matchstick Puzzles
No description available.

Mixed-up Lizard
A sliding squares puzzle.

Peasants' Portal

A puzzle lock and key based on an ancient egyptian lock.

Pentominos
Puzzle shapes made of arrangements of 5 squares. The task is to link them to make other shapes.

Pyramid Puzzle
No description available.

Rats in the Gutter
A 'shunting' puzzle. can you jump the teams of rats over each other to get them through the drainpipe?

Round the World
Complete a journey from point to point, without crossing over. Based on Hamiltonian Circuits.

Sense of Touch (Feely Box)
Can you tell what is in the box using sense of touch only?

Snake in a Circle
No description available.

Tangrams
The ancient puzzle based on division of a square.

Three Circles
No description available.

Tower of Hanoi
No description available.

Triangle on a Rope
A topological puzzle.

Two-Way Switch
How does a two-way switch work?

Unloop the Loop
No description available.

What's in the Box?
Try to work out the shape of a maze hidden in a box using only the clues you get by rolling a ball around inside the maze.

Wooden Cluster
Six wooden puzzle pieces are linked together - can you get them apart?

Wooden Knot
Three wooden puzzle pieces linked together, can you unknot them?

Senses

Ears on Tubes - Stereo Sound
Sounds made in the long tube held to each ear produce a stereo effect.

Hearing Range
How high or low can you hear?

Hot or Cold Hands?
An illusion of touch - touch one hand on hot,the other on cold - then each feels a room-temperature surface to be different temperatures.

Large Human Eyeball
A working model of the optics of the human eye.

Seeing Inside Out
No description available.

Shape from Movement (computer plore)

No description available.

Touch Chart/Braille Message
No description available.

Visual Noise (computer plore)
No description available.

Sound

Aeolian Harp
No description available.

Echo
An artificial echo device.

Echo Tube
A 30 metre tube which demonstrates that echos are reflections of sound

Message through the water
Messages are sent through a tank of water as sonar pulses

Sonar System
By moving a sonar transponder in a tank the outline of a model submarine can be seen on a computer screen

Sound Beats
No description available.

Sound Flames (Ruben's Tube)
No description available.

Wait and Hear
Shows how hearing your own speech delayed by about half a second can make it difficult to carry on speaking.

Whisper Dishes
Reflection and focusing of sound using large parabolic reflectors.

Space

Big Numbers - How many grains of sand?
An exhibit about estimating big numbers.

Big Numbers - How many is a million?
A million dots to count.

Build-it-yourself Telescope
A working telescope you can build for yourself.

Call Home ET
A simulation of the time delay for radio signals to spacecraft different distances away from Earth.

Constellations 1 The Plough
Constellations appear as they do only from Earth or nearby. As this model shows for The Plough, the stars in constellations are spread out in space, not in a fixed flat shape.

Constellations 2 Orion
Constellations appear as they do only from Earth or nearby. As this model shows for Orion, the stars in constellations are spread out in

space, not in a fixed flat shape.

Earth and Sun (Tellurium)
A model of the Earth and Sun showing why we have night and day and the seasons.

Gravity Well
A horn-shaped well represents the gravity field around the Sun. Balls (planets) orbit round as they roll into the well.

Radio Telescope
No description available.

Rainbows to the Stars
Different gases glow brightly in discharge tubes. Their spectrum colours are in lines giving a unique `fingerprint' which identifies each gas.

Astronomers can use this effect to identify the elements present in stars.

Solar System Way
The solar system, with fantastic detailed models of the planets and their moons, shrunk down to fit inside the Exploratory.

Sunsets
Shows why sunsets are red and the sky blue.

The Earth from Space (Meteosat)
Receives weather satellite images direct from Meteosat satellite.

The Virgo Cluster of Galaxies
An astronomical photograph which can be examined in detail to show the different galaxy shapes.

Stradivarium

A Wave With Words
Sound waves are displayed on an oscilloscope.

Air Columns and Pitch
A set of five pipes demonstrate how the pitch of an air column can be changed to enable a selection of pitches to be sounded. These relate

to any "Wind" instruments e.g. Recorder, trumpet, clarinet etc. There are also two pipes which demonstrate "beating".

Anechoic and Echoic Chambers
No description available.

Audio Spectrum Display
Shows what the haering ranges of different animals are.

Bar Constructor
A 3-D representation of musical time. This Strum shows how space can be divided into fractions of halves, quarters, eighths or thirds,

sixths and twelfths.

Chladni Plates
A way of looking at vibration - this pair of metal plates, a square and a hexagon, are sounded by bowing the edge. By sprinkling fine sand

on the surface it is possible to produce very beautiful patterns. These patterns show the way in which the plate is vibrating.

Giant Guitar
The guitar, which took three months to build and weighs 750kg (3/4 Tonne), is more than just a gimmick. It is a working instrument and by

getting inside it there is a unique opportunity to find out how a guitar is built, and how it works. The vibration

Giant Keyboard
A piano you play by walking on!

Giant Pop-Pipes
Pop-pipes are instruments played by pulling a stopper out of a tube.

Good Vibrations
An electric guitar string shows how string length controls the note produced.

Harmonic String
A long string vibrated by a motor. Pulling increases the tension and changes the pattern of vibration in the string. More or less waves are

seen in the vibration.

Longitudinal Wave Model
A working model showing how sound waves travel.

Louder Speaker
Place different objects on a vibrating button. Which makes the best loudspeaker?

Monochord
A large guitar is provided with one string to show how the pitch is related to length. For instance halving the length which can vibrate by "stopping" the string i.e. pressing it against a fret, will increase the pitch by an octave.

Musical Abacus
Making a pattern with pegs in a board will create a tune. This exhibit shows the connection between a visual shape and the "shape" of a tune.

Octave Pipes
Organ pipes sound octaves.

Pop Pipes
A set of musical pipes which can be played by pulling giant stoppers out of tubes.

Rhythmic Abacus
By inserting pegs in a pattern in a turntable, a cycle of rhythm is created, producing a series of percussive clicks.

Scales of the World
A single stretched string is provided with interchangeable fret-boards which enable different scales from around the world to be heard. This is like being able to take the neck off a stringed instrument and replace it with one from another country.

Shepard Tones
A musical illusion which gives the impression of scales playing up and up forever.

Sound Identification Chamber
Two identical sets of sound instruments are divided by a partition. Two players can listen and match the sounds they hear - or have a musical dialogue.

Structures

Arch Bridge
Build a small arch bridge which will support your weight.

Bridge over troubled waters
Make bridge from blocks to cross a river.

Bubble Shapes
Investigate the bubble shapes produced by different wire frames.

Catenary Arch
Shows that the best shape to build a thin arch is the same as a hanging chain - or that the shape of the chain must lie within the arch.

Crystal Cracks
No description available.

Fallen Arches
No description available.

Flat Arch
No description available.

Flying Buttress
Demonstrates why churches and cathedrals need buttresses for support.

Galloping Gertie (Tacoma Narrows)
No description available.

Stacking Shapes
No description available.

Suspension Bridge
Walk over the suspension bridge, notice the changes in shape. Feel where the forces are acting.

Under Stress
Polarized light reveals stress in a special plastic arch.

Wobbly Bridge
An arch bridge, built out of curved-sided blocks, moves to show forces in the bridge.

Water

Bermuda Triangle
A boat floats in a tank of water untill air bubbles are introduced into the tank and it sinks.

Bubble Race
Bubbles float up tubes containing different liquids. Bubble speed depends on the viscosity of the liquids.

Cartesian Diver
A tube floats in a closed tank of water. As the pressure in the tube is increased by squeezing a tube, the floating tube sinks. This is the

diver.

Curved Water
A thin container of water spins to display the curve of the spinning water surface.

Double Bubble
Compare the speeds and shapes of bubbles rising in tubes or oil and water.

Hydraulic Lift
A visitor is lifted by the pressure from a head of water. The head arises when a container of water is lifted with a winch.

Vortex
Water is spun in a large tube to make a vortex.