

Mini-interactives

These are 'off-the-shelf' designs

We also produce custom designs and larger items

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The concept

Mini-interactives are 'exploratory' exhibits

Our mini-interactives are designed to provide a special environment in which people feel free to *explore*.

Real science is about exploration and investigation, not merely about absorbing information. In this sense, such experiences support and balance the more formal science teaching that children experience in school.



Compact size

Our mini-interactives are cost-effective, scaled-down versions of the most appealing, engaging, 'exploratory', interactive exhibits.

No interactive exhibit stands alone: they should be displayed so they can function together in their diversity, in a balanced learning environment.

Appeal and engagement

Engagement-time is prolonged by carefully composed graphic texts, with plenty of thought-provoking, basic, open-ended, challenging questions to encourage exploration.

Circular bases

The clear acrylic base of each exhibit is normally 40cm diameter and 2cm thick. (Some are larger, and any can be specially ordered to any size.) Each base has four soft rubber feet.

The underside is coated with a cellulose paint finish or printed image, attractively visible from above through the clear acrylic, and protected underneath by a recessed layer of 10mm black acrylic. Any colours can be specified, with Pantone, BS, or RAL codes, for example.

If required, we can provide fixing holes for permanent or semi-permanent table mounting.

Pedestals

Any mini-interactive, including the electrically powered ones, can be pedestal mounted if required, with easily removable fixing screws to allow optional tabletop use.



Colours and graphics

Often, the mini-interactives are colour coded according to various subject-themes. We are happy to advise, but the bases can be any colour at all.

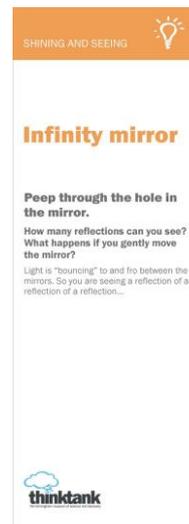
Graphics can incorporate client's and/or sponsors' logos, in printed artwork below the circular base, or in the hanging interpretive label.

Typically, the hanging interpretive labels are 11.5cm x 20.5cm, printed with any desktop colour printer, laminated in stiff 250-micron pouches, trimmed and a single hole made with an ordinary office hole-punch. The labels are then attached to the angled, 5mm diameter stainless steel hangers that we supply with each mini-interactive, using a miniature split 'key-ring'.

If required, mini-interactives can also be arranged around a 'centrepiece' graphic. For example, these might show a simple icon with no text. Each graphic is printed on a 400mm diameter Foamex plastic disc (to fit in our standard flight-cases) with dismountable stainless steel stem and colour-coded acrylic base-disc.



'Lollipop' sign



Hanging label

Mains power for several electrical exhibits

Only a few items require a mains electrical connection. This connects through a small, separate, low-voltage transformer for each item. Some others, with very low power consumption, have long-lasting interchangeable batteries. Any of these can be supplied with low-voltage plug-top mains power supplies if required.

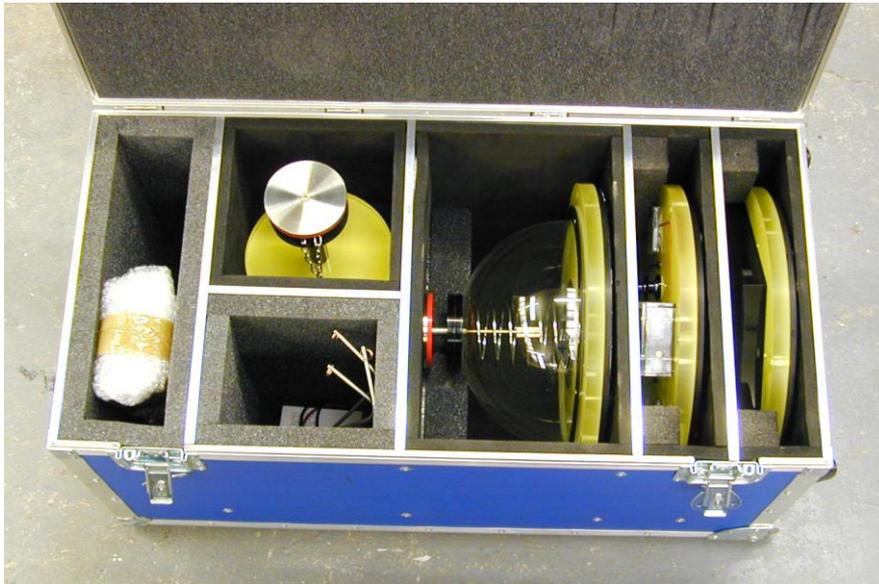
Special tables, designed to order



Please contact us for advice on table design, electrical power supply if required, and recommended mini-interactives for permanent displays.

Flight cases





We can supply specially designed, wheeled, lockable flight cases to fit any selection of mini-interactives. Any size is possible. For guidance, approximately 1m is a convenient length, with wheels at one end and lifting handles at both ends.

If flight cases are ordered, we do not need disposable wooden crates for export packing, which reduces the cost of delivery.

Included

A typical set of Mini-interactives might include:

- *Special tables, each displaying three mini-interactives*
- *Centrepiece 'lollipop-sign' graphics if required*
- *Pedestal-bases, if required*
- *Flight cases, as illustrated above, each case usually holding several items*
- *Steel label hangers*
- *Concise interpretive text for (translation and) printing by the client*
Examples of such text are shown below in italics for some of the exhibits.
- *Operation and maintenance documentation*
- *Information for obtaining any necessary spare parts*

Payment terms

40% with order, 50% after examination of goods and before despatch, 10% within 30 days of delivery.

Warranty

By their very nature, and according to normal practice in 'hands-on' exhibitions elsewhere, it is generally accepted that wear and tear resulting from public use happens even to the best interactive exhibits.

Therefore, the need for occasional repair work is to be considered normal and is the responsibility of the customer. Some spare parts will be included. Clear guidance and sources of additional spare parts will be detailed in the maintenance document.

Interactive Science Ltd will continue to provide advice and guidance relating to maintenance of the goods by fax, phone and/or email for at least twelve months from the date of delivery.

Interactive Science Ltd cannot accept responsibility for repairs arising from wear and tear. The term “wear and tear” includes occasional damage to exhibits caused by people handling them, whether such damage is wilful or accidental.

Interactive Science Ltd has an outstanding reputation in this specialised field and will use its long experience and best endeavours to work to designs and specifications which minimise wear and tear.

The customer shall arrange daily examination and appropriate supervision of the exhibits, also regular maintenance work following the written guidelines supplied with the exhibits.

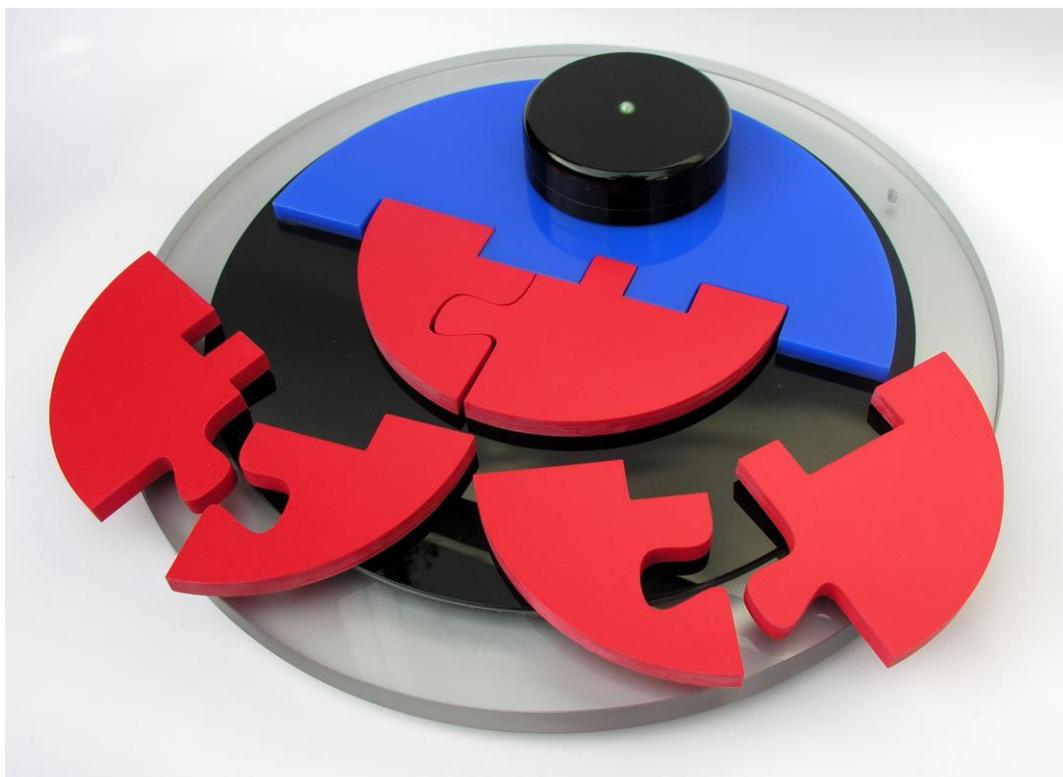
On condition that the customer agrees to the above terms, Interactive Science Ltd undertakes a ‘return-to-base’ warranty against defective design or workmanship for 12 months after the delivery date.

MINI-INTERACTIVES

‘Lock & key’ model of drug and enzyme action

Duration of visitor engagement ***

Robustness ****



The blue part is fixed to the base and represents the ‘active site’ of an enzyme protein. Each pair of red pieces represent two separate molecules which are assembled together when both are correctly ‘docked’ against the active site. Although various red components appear generally similar, only two of them will fit correctly. When these two pieces are in position, concealed magnets inside them cause a green LED lamp to illuminate on top of the round, black battery case.

Bernoulli blower

Duration of visitor engagement *****

Robustness ****



A balloon hovers above a low-voltage fan. Turbulence in the air stream is minimised by a 'straightener' unit above the fan. Turning the red knob adjusts the angle of a vane, deflecting the air flow and causing the balloon to hover to one side.

Black box



What colour is it inside?

Looking through the hole in the lid, the box seems dark-black inside. Pushing down the lide to open it, people are surprised to dicover that the inside of the box is actually white. This exhibit is superbly crafted in smooth black Corian. I am especially proud of my elegant design-solution for the opening lid, which swings closed because of a simple counterweight inside. This took a surprisingly long time to figure out!

Camera obscura

Duration of visitor engagement *****

Robustness *****

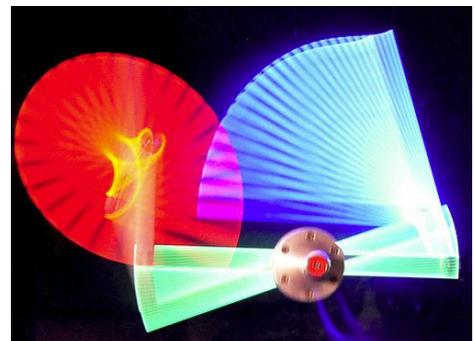


The mirror (which folds away for packing) reflects light downwards through a converging lens, forming an image on the horizontal screen inside the box. Using two red knobs, the screen can be raised and lowered to focus nearer or more distant objects. The whole unit can also be rotated on its base to 'scan' the view.

Chaos pendulum

Duration of visitor engagement *****

Robustness *****



Start the chaos by gently turning the red knob.

Each time, the pendulum does something completely different.

*However carefully you try, it is **impossible** to make it repeat exactly the same movements.*

This really is one of the very best chaos pendulums you have ever seen. Not only that, but it has fluorescent arms illuminated by high-intensity ultraviolet LEDs. The effect is totally stunning!

Chemical chirality

Duration of visitor engagement *****

Robustness **

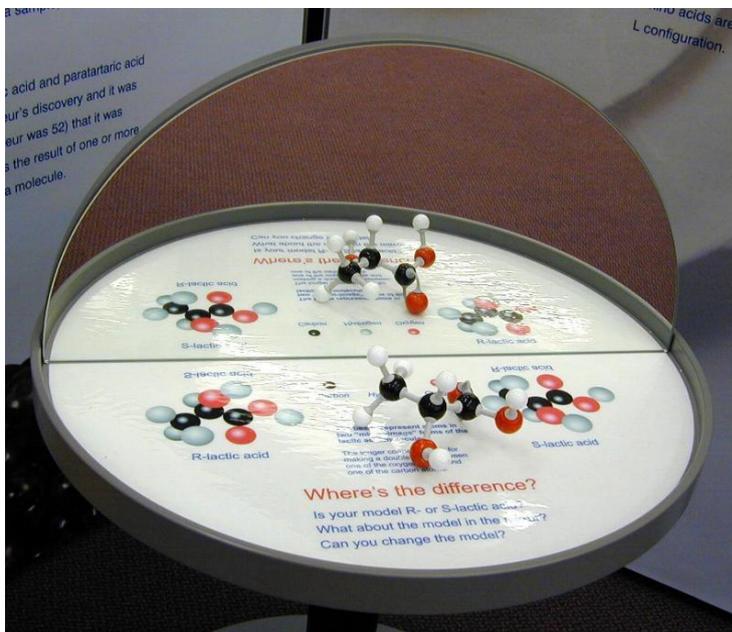


Photo of a simpler, early design

A proprietary 'Molymod' model of a simple molecule such as lactic acid, with two possible isomeric configurations, is placed on the graphic in front of the D-shaped mirror. The graphic illustrates both configurations. The reflection of the graphic in the mirror reverses each configuration into its opposite! The left-handed molecule becomes a right-handed molecule and vice versa. The captions to each picture are also written in reversed mirror-writing, so when seen in the mirror they are still correctly labelled.

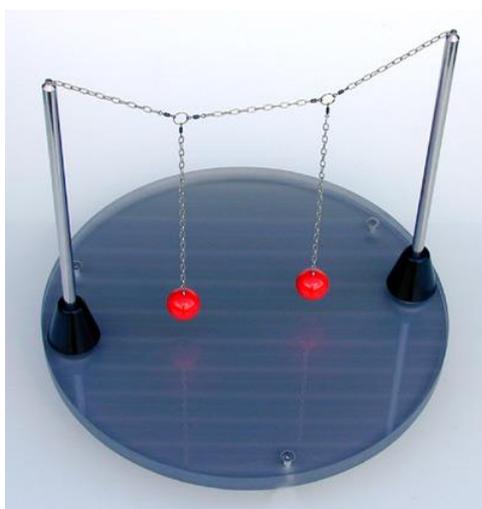
The challenge is to disassemble and reassemble the Molymod model in left-handed and right-handed configurations.

Behind the double-sided mirror on the opposite side of the circular base is a different molecule model with a different graphic.

Coupled pendulum

Duration of visitor engagement ***

Robustness ****



Make sure everything is still, then swing just one of the pendulums.

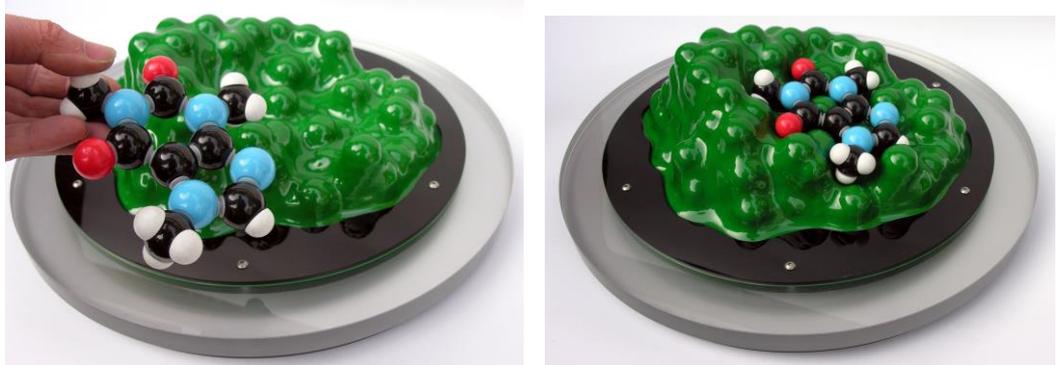
Now step back, wait and watch what happens. First one pendulum stops swinging, then the other.

Energy goes from one pendulum to the other.

Drug molecule and protein surface

Duration of visitor engagement **

Robustness **



When the correct orientation and position are found, a proprietary 'Molymod' model of a caffeine molecule fits perfectly into the surface of a schematic protein. This is not likely to engage visitors for very long, but is nevertheless a clear and memorable illustration of an extremely fundamental concept. The interpretive label asks you to remove the molecule, "...to make it harder for the next person".

Ear recognition

Duration of visitor engagement ***

Robustness *****



Lean forward and look into the lower of the two mirrors.

Look at the reflection of the higher mirror. Can you see the small lamp on the higher mirror? Move your head until the lamp shines onto your left ear. By looking into the lower mirror, now you can examine your own ear!

Notice the patterns in the folds of your ear. Nobody else in the whole world has exactly the same ear-folds as you. Your DNA has made you special.

Electric fleas

Duration of visitor engagement *****

Robustness *****



Rub the clear plastic cover with a dry hand.

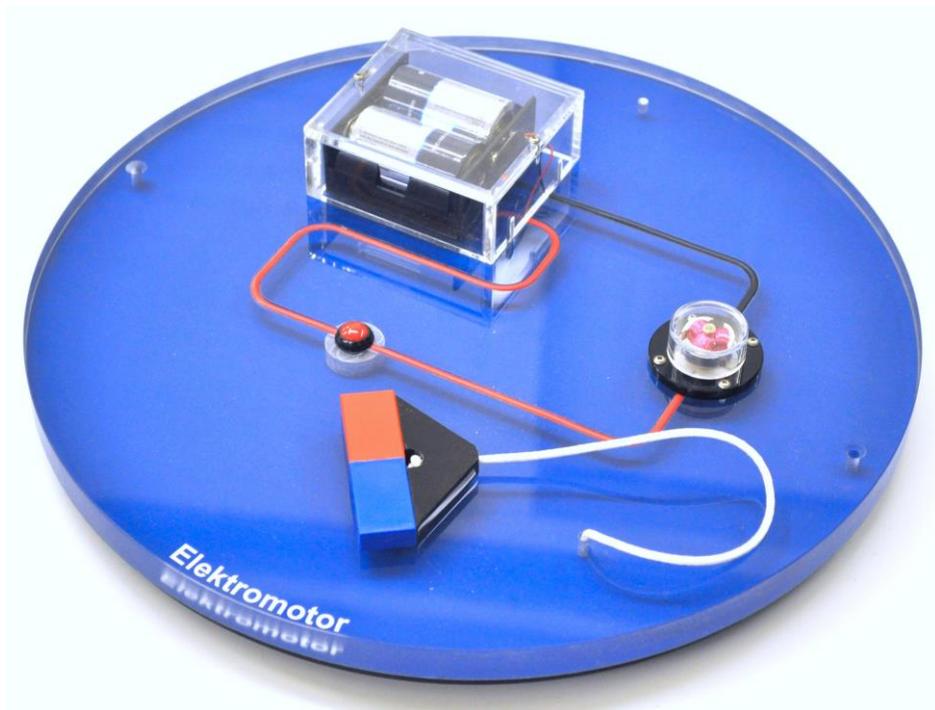
Or rub a balloon on your clothes and bring it near. How much can you discover about the way the pieces of paper move?

By rubbing, you separated positive and negative charges. Positive and negative charges attract each other, but similar charges are forced apart.

Electric motor

Duration of visitor engagement ****

Robustness ****



Press the button and hold the magnet close to the motor.

Notice that the motor will only spin if an electric current is flowing through it AND if a strong magnetic field is also present.

When the current flows the coiled wire becomes an 'electromagnet' producing its own magnetic field. Then it moves because of the bar magnet nearby.

Holding down the red button causes a green LED to flash in the battery box. The motor's internal magnets have been removed, so it does not rotate unless the bar magnet is brought close to the coil while the current is flowing. The direction of rotation can be reversed by reversing the magnet or by moving it to the opposite side of the coil-commutator assembly.

Electrical power

Duration of visitor engagement ****

Robustness *****



Press any of the red buttons while turning the handle.

Notice the extra effort needed when you switch the light bulbs on.

The energy that lights them has to come from somewhere. It comes from you. It is harder work to supply enough energy to light more lamps or lamps rated at a higher 'wattage'.

The high-efficiency LED lamp is dazzlingly bright, yet requires surprisingly little power input.

The ammeter shows how much current is flowing.

Electrical Power is one of our most popular exhibits.

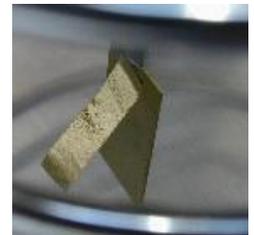
The first example has a printed image applied underneath the clear acrylic base. This option is also available for any of our other mini-interactives.

The second picture shows the new design with only three lamps: halogen, incandescent and LED.

Electroscope

Duration of visitor engagement *****

Robustness ****



Make sure the chain is not touching the table or anything else.

Rub a balloon on your clothes to produce an electric charge. Can you make the very thin "gold-leaf" move, in the middle of the electroscope?

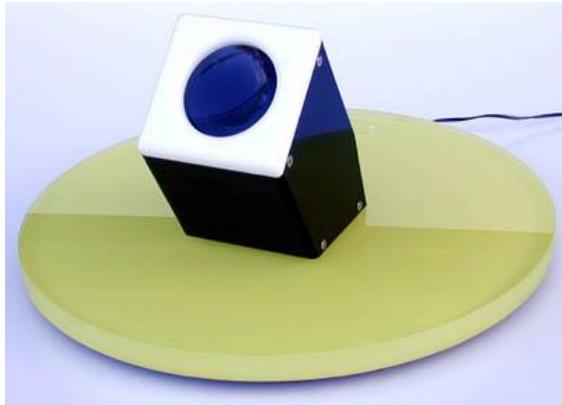
What happens if you touch the top of the electroscope or the chain while the "gold-leaf" is sticking out sideways?

This is a great exhibit for encouraging personal interaction with trained 'facilitators'. A whole routine of additional demonstrations can be performed with it.

Fingerprint

Duration of visitor engagement ****

Robustness *****



Find the red ring at the back of this exhibit. Now press the tip of one finger against the middle of the red ring.

Can you see your fingerprint when you look through the eyepiece?

Nobody else in the whole world has exactly the same fingerprint-pattern as you. Your DNA has made you special.

Flywheel

Duration of visitor engagement *****

Robustness ****



Carefully slide the red knob to-and-fro at just the right rate to turn the flywheel.

The knob is magnetically linked to the flywheel's connecting-rod for safety reasons, preventing children from spinning the heavy flywheel dangerously fast and possibly trapping fingers. This magnetic linkage also makes the experience more interesting, because it slips loose if the red knob is moved at the wrong speed.

Friction wheel

Duration of visitor engagement ****

Robustness *****



Spin the wheel, then stop it by letting the rubber edge rub against your hand.

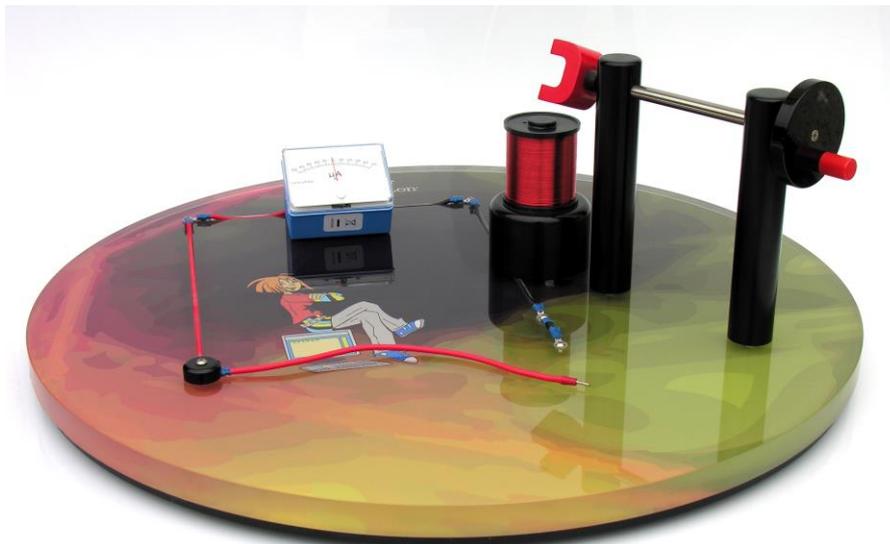
Can you feel the heat generated by friction?

Alternatively, you can continue to turn the disc using the red finger-hole. The 'movement-energy' of the wheel changes into heat energy when you use your hand as a brake.

Generator

Duration of visitor engagement ****

Robustness ****



Can you make an electric current by moving the magnet near the coil?

You will need to close the circuit, using the loose wire.

The small, black **diode** near the loose wire only lets current flow in one direction. What difference does it make if you touch the wire against the screws at either end of the diode?

If preferred, a more robust (but less tactile) version is available, with a push-button switch instead of the loose wire.

This example has a printed image applied underneath the clear acrylic base. This option is also available for any of our other mini-interactives.

Gyroscope

Duration of visitor engagement *****

Robustness *****



Hold the wheel up and spin it with your finger.

Let go.

The right-hand picture shows our new, alternative design for this exhibit.

Hanging magnets

Duration of visitor engagement ****

Robustness ***



Feel the different forces that are either pushing or pulling the magnets.

Try holding two red ends together. Also try holding two blue ends together.

Which ends attract each other?

Which ends repel (push each other apart)?

Heat pump

Duration of visitor engagement ***

Robustness *****



Put your hand on the metal 'hand' and turn the handle of the electrical generator.

Depending on which direction you turn the handle, one part of the hand-panel becomes warmer while the other becomes cooler.

The two white rectangles are Peltier cells, in which the electric current flows across the junction between two different metals.

Home insulation

Duration of visitor engagement ****

Robustness *****

Duration of visitor engagement *****



A simple model house with each of the four sides insulated differently: glass, stone, rock-wool, polystyrene foam. An internal electrical lamp provides a source of heat. The different temperature of each outside wall can be measured with a separate thermal camera or an inexpensive infrared thermometer.

Hovering and turning magnets

Duration of visitor engagement *****

Robustness *****



The hovering ring-magnets have red and blue coloured faces to indicate their north and south poles. Rotating one of the bar magnets by hand immediately causes the other one to flip round. This is a strangely appealing phenomenon to 'play' with.

Infinite reflections?

Duration of visitor engagement *****

Robustness *****



This is not an original idea, but provides plenty of scope for enjoyable experimentation. Each mirror has a central peep-hole giving an 'infinity tunnel' effect. Moving either mirror causes the 'tunnel' to 'bend'.

Iris recognition / pupil contraction

Duration of visitor engagement ****

Robustness *****



Put one eye as close as possible to the red eye-piece. Press the red button and look inside.

Can you see a magnified reflection of your eye?

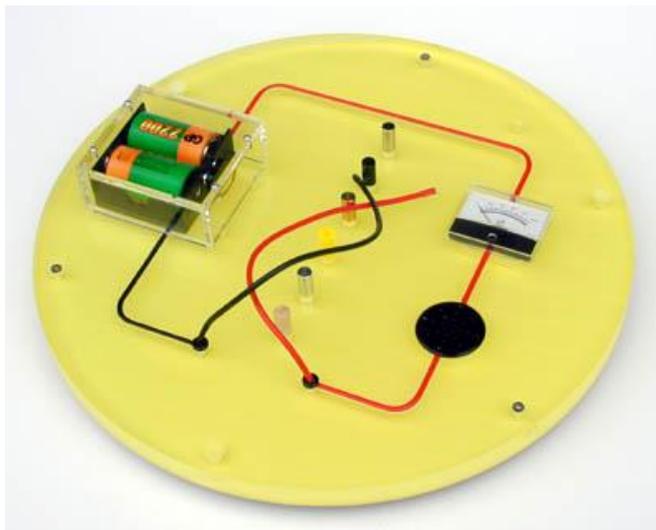
The iris is the ring around the black pupil in the centre. Do the muscles in the iris make the pupil bigger or smaller when you switch the light on? Notice the patterns in your iris. Nobody else in the whole world has exactly the same iris-pattern as you. Your DNA has made you special.

Is it a conductor?

Duration of visitor engagement ***

Robustness ****

Suitable for portable use, if battery powered.



Two loose leads are used to find out which of the various material samples allow current to pass through. Users are also prompted to search their pockets for more samples to test!

The meter even registers the small current passing through the user's skin.

Current is indicated by an ammeter and a buzzer. The arrangement of the circuit and its connection to the power supply are clear and obvious.

Kaleidoscope

Duration of visitor engagement *****

Robustness ****



Look at the reflections in the two mirrors.

How many reflections can you see? What happens if you change the angle between the mirrors?

Can you find something to put between the mirrors? A coin? A pencil? Try looking at the reflections of something written on paper. Is the writing back to front? But is it back to front after being reflected twice?...

How does the angle between the two hinged mirrors affect the number of bead-reflections that can be seen?

Shaped pieces of coloured paper can also be laid out between the mirrors to explore patterns and symmetry reversals.

Light rays

Duration of visitor engagement *****

Robustness *****



Press and hold down the small red button and slowly turn the large red knob until you can see the laser beam.

You can slide the knob as well as turn it.

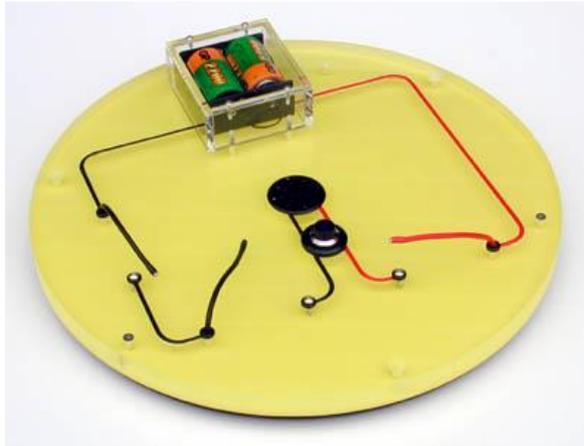
How many things can you discover about how a laser beam shines through triangular glass prisms?

[Extremely long battery life: many weeks of use.]

Light the lamp

Duration of visitor engagement ****

Robustness ****



The simple challenge is to figure out how to light the lamp and sound the buzzer, using the three loose leads. It may look too easy but this is soundly based on educational research. The 'naive notion' is that it should light if only one side of the circuit is connected. This is now the fourth time I have produced this kind of experience, and I know for a fact that a high proportion of primary school teachers find it far from obvious!

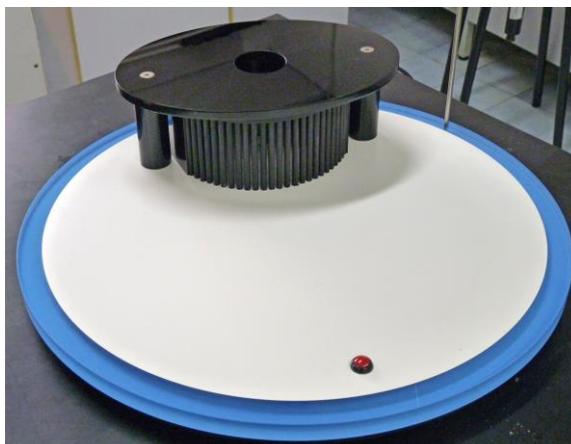
You can't easily do this by yourself because there are (deliberately) three connections which come apart when you let go and you only have two hands. You have to call a friend over to help. Then you discuss it together.

If preferred, a more robust (but less tactile) version is available with three push-button switches.

Light-ray table

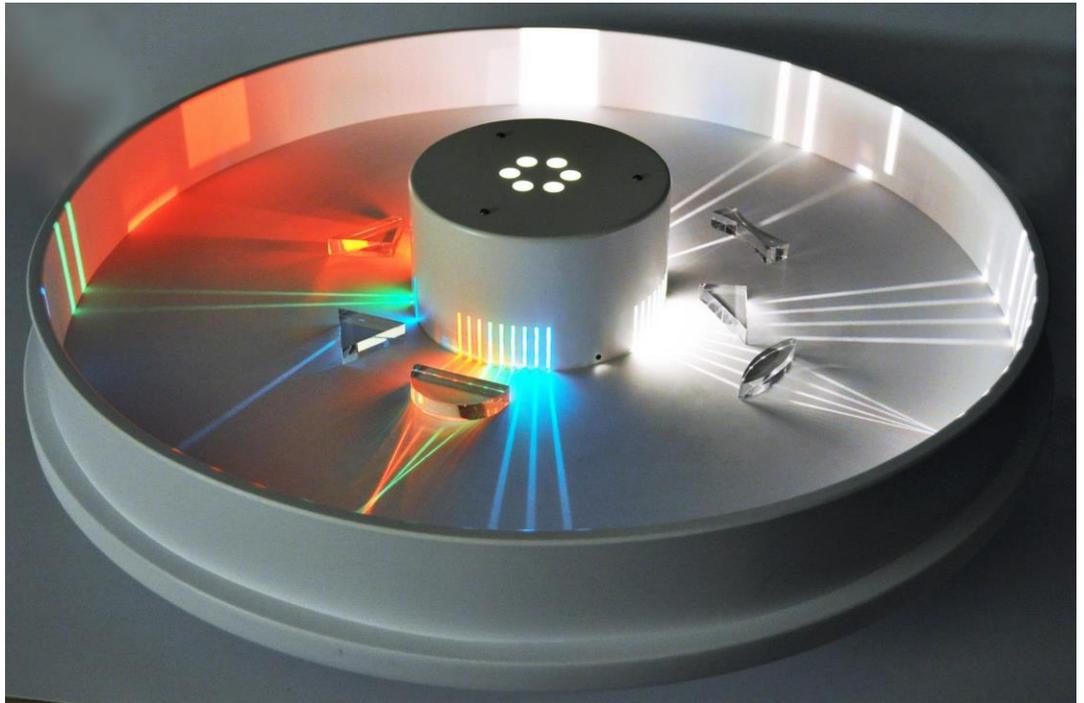
Duration of visitor engagement *****

Robustness ***



Press and hold the red button to shine many rays of light across the white surface.

Experiment with the clear plastic shapes to discover what effects they have on the rays.



This can be created in almost any size: here is a larger one we made.

Lungs and diaphragm

Duration of visitor engagement ***

Robustness *****

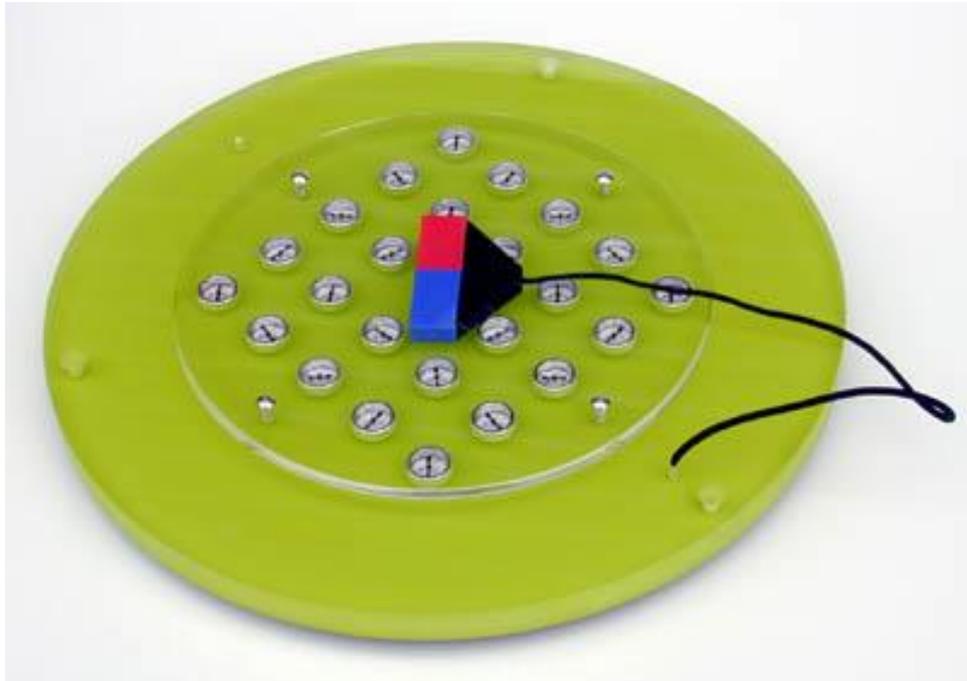


You pull down the red ball on a strong black nylon cord connected to a black rubber diaphragm. Air is drawn into the blue balloons through the Y-shaped stainless steel tubes. If you put your finger over the top tube, you can feel the air flowing in and you can also stop it from coming in.

Magnet and compasses

Duration of visitor engagement ***

Robustness ****



The compass needles are sensitive at a considerable distance from the coloured bar magnet and show the shape of the magnetic field.

Magnetic field from a coil

Duration of visitor engagement **

Robustness *****



Pressing and holding a button to switch on an electric current through the coil produces a strong magnetic field, whose pattern is shown by the compass needles.

Magnetic pendulum

Duration of visitor engagement *****

Robustness ****



Gently swing the magnetic pendulum.

Watch how crazily it swings above the other magnets. Which magnets are attracting the pendulum and which magnets are pushing it away?

The north poles of the magnets are red and the south poles are blue.

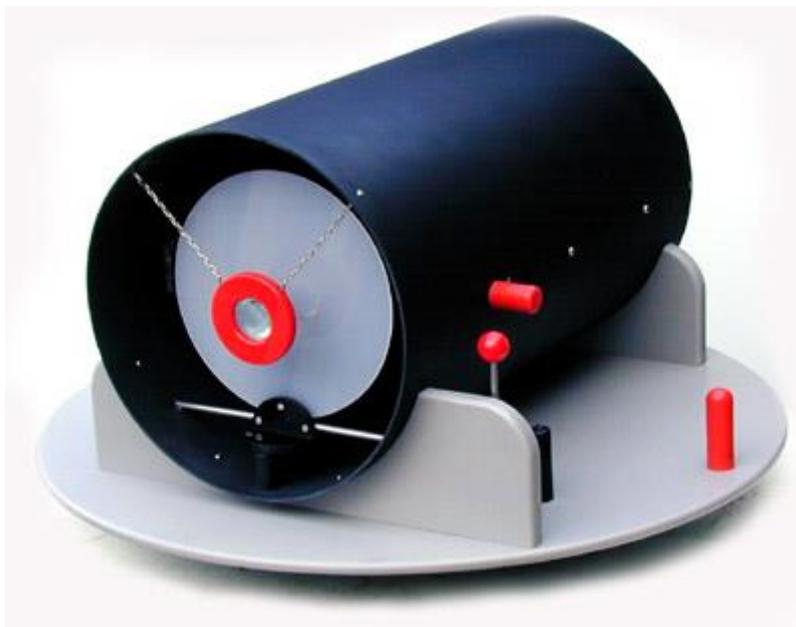
You can turn the black disc to try different sets of magnets.

This exhibit is extremely popular with visitors.

Make-a-telescope

Duration of visitor engagement *****

Robustness ***



A glass objective lens is mounted on a sliding disc inside a 400mm diameter plastic tube. The lens forms an inverted image on a circular, "opal", translucent, acrylic screen. Two handles enable the lens assembly to be focused.

The screen can be tilted forwards using a lever to the right. It is magnetically indexed in the upright and forward positions. A smaller "magnifying" lens with shorter focal length hangs from two thin chains, in front of the screen.

The "telescope" can be rotated sideways by a small amount, using the two handles. The bearing has slight friction and "stops" to limit movement.

You can examine the image on the screen through the smaller magnifying lens. While doing this, you can tilt the screen forwards, out of the way, using the red lever. Now you can still see the magnified image, even more clearly than before.

You have just assembled the components of an astronomical telescope...

Million turns

Duration of visitor engagement ***

Robustness *****



Turn the red wheel in the direction of the arrow.

Notice how slowly the gear wheels turn.

The bigger gears have 100 teeth. The smaller gears have 10 teeth. Can you see why you have to turn the red wheel a million (1,000,000) times before the 6th gear wheel turns once?

Peepholes

Duration of visitor engagement ***

Robustness *****



Each of the three peepholes incorporates a magnifying lens. These provide different views of any suitable object mounted in the centre, illuminated by long-lasting LED lamps..

This item has many different uses, especially where it is necessary to focus visitors' attention on small specimens, such as insects, shells, fossils, minerals etc.

Praxinoscope

Duration of visitor engagement *****

Robustness *****

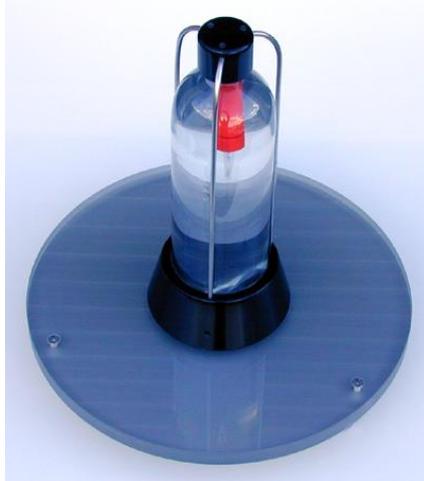


Spin the dome and watch an impressive '12-frames' repeating animation in the polygonal mirror. The left-hand version shows a 2D image of a running animal. The right-hand version shows (for example) a 3D animation of the fission of a uranium atomic nucleus.

Pressure

Duration of visitor engagement *****

Robustness *****



Squeeze the bottle and watch what happens.

Notice the sides of the little plastic tube being squashed when you squeeze the bottle. The air inside the little tube is being squeezed smaller, causing it to sink.

Does it make any difference if you squeeze the bottom of the bottle instead of the top?

Pulleys

Duration of visitor engagement *****

Robustness ****



Try joining different wheels with the elastic bands.

Turn the middle wheel to make the others turn.

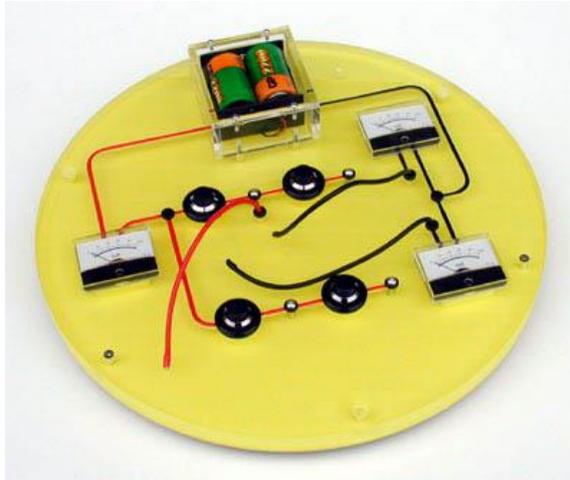
How fast can you make a wheel turn? How slowly can you make a wheel turn?

Puzzle circuit

Duration of visitor engagement *****

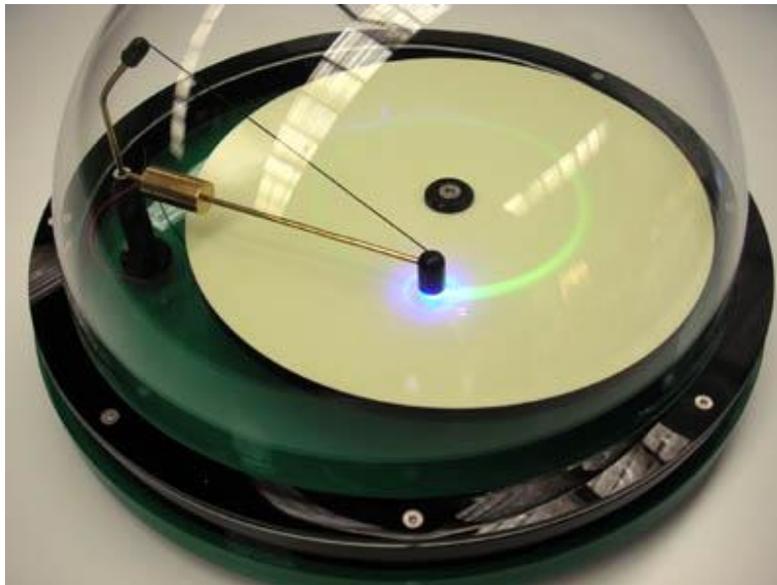
Robustness ****

Suitable for portable use, if battery powered.



Deceptively simple-looking, the three loose leads in this clearly laid-out circuit present very many experimental possibilities. The questions on the hanging disc are powerful ones. "How many ways can you find to light two lamps?" "When all lamps are lit, what do you notice about the readings on the three ammeters?" "Is it possible to light three lamps so that they all shine with the same brightness?"

Seismograph

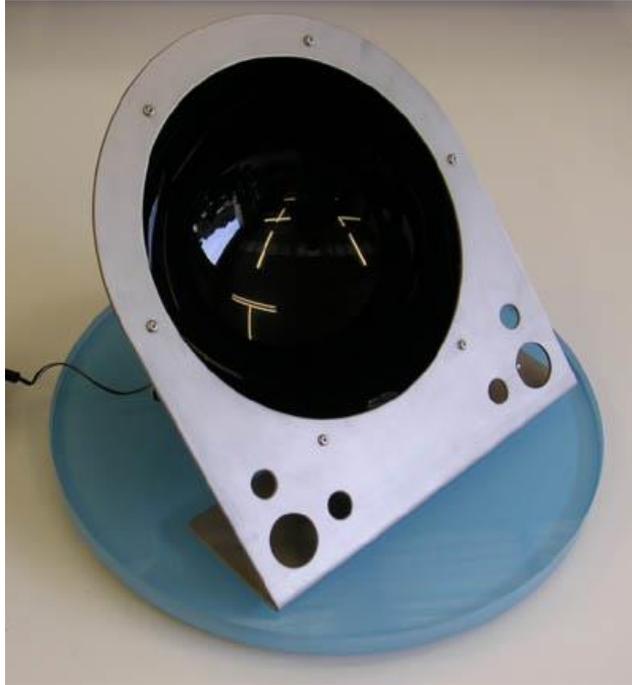


The LED draws a glowing line on the slowly rotating photophosphorescent plastic disc. The line fades within one rotation. When the seismograph is shaken, it draws a wiggly line.

Shake hands

Duration of visitor engagement *****

Robustness *****



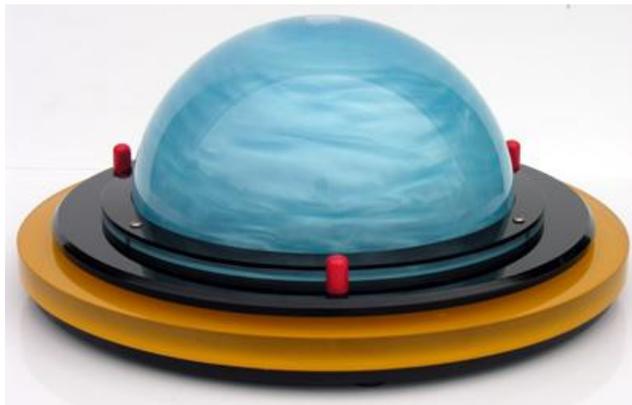
A bright LED light source shines upwards onto your finger when you hold it in front of the concave black dome. The 'ghost' reflection of your finger floats amazingly in front of the black mirrored inner-surface of the dome.

Shampoo turbulence

Duration of visitor engagement *****

Robustness *****

Highly recommended!



Gently turn the dome and watch the swirling patterns in the water.

Gently turn the dome.

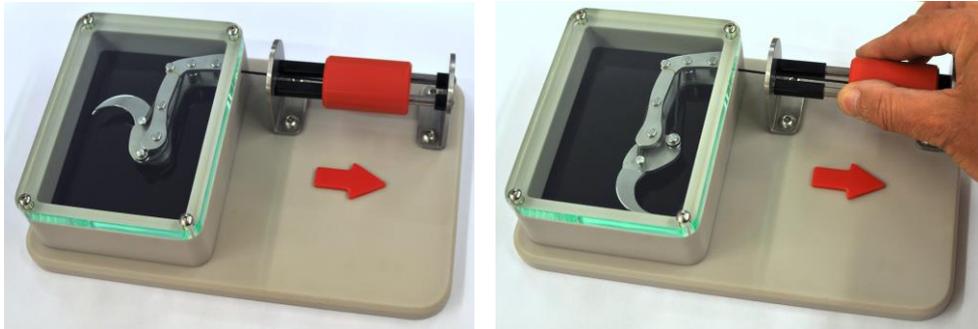
Watch the swirling patterns in the water.

Tiny, flat particles are suspended in the water. These particles tend to become aligned and face in the same direction when different parts of the water are flowing at different speeds. Because the tiny particles are also shiny, we can SEE flow patterns in the water that would normally be invisible.

Skeletal articulation

Duration of visitor engagement ***

Robustness *****



This life-size model of a lion's claw was specially created for the Museum of Natural Sciences, Brussels. We shall be pleased to discuss similar exhibits based on this principle.

Sliced whirlpool

Duration of visitor engagement ***

Robustness *****



Gently and carefully spin the tank of water.

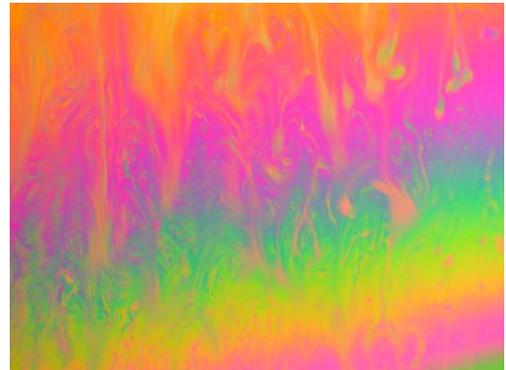
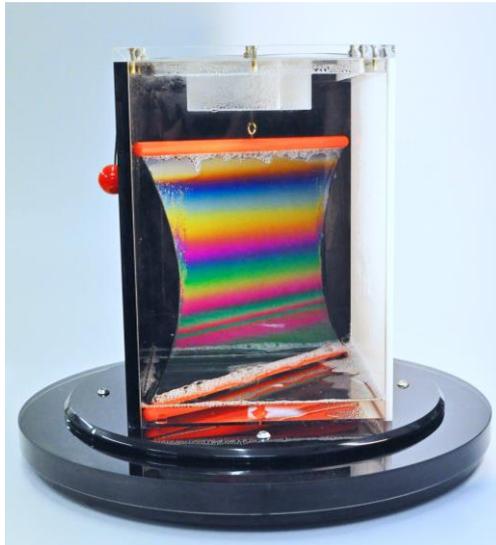
Watch what happens to the water. Investigate!

How many different things can you discover about the shapes of the curves that appear in the water surface?

Soap film

Duration of visitor engagement *****

Robustness ****



With the cord, gently pull the plastic bar up out of the mixture of water and dishwashing liquid.

What can you discover about the amazingly bright, swirling patterns in the flat "bubble-film"?

The thickness of the "bubble-film" is as small as the length of a single light wave. Thin films of oil on a wet road make similar colours.

The 'soap film' is perfectly illuminated to show brilliant colours against a black background.

Spinning disks

Duration of visitor engagement ***

Robustness *****



Slowly spin each disc and watch the pattern carefully. Try to find the best speed for each.

One of the patterns produces a strange, three-dimensional effect, like a wobbly cone. The other two patterns somehow cause your brain to see colours.

The colours are an interesting scientific mystery!

Streamlines

Duration of visitor engagement *****

Robustness *****



Gently press down the edges of the spring-mounted tank to make the little ball roll across. Or spin the whole thing round to stir up the liquid...

Watch the air bubbles as well. What can you discover about the swirling trails they leave behind when they move through the water?

Special, shiny particles in the water show flow-patterns that are usually invisible. Some kinds of hair shampoo also contain substances that show flow-patterns. If all these particles have sunk to the bottom, you can stir them up by spinning the water around.

Tornado

Duration of visitor engagement *****

Robustness ***



This is a Mini-interactive version of the classical mist-tornado exhibit, scaled down to fit on the standard 400mm diameter base disc.

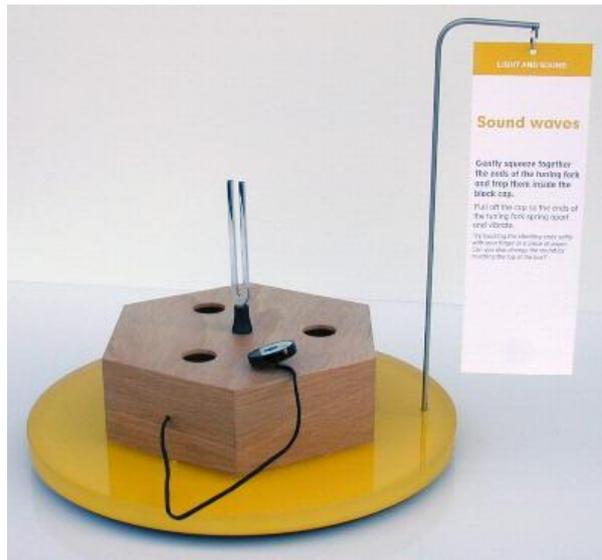
The mist tornado is fully enclosed and can be controlled by rotating the red knob which varies the speed of the fan.

The tornado is illuminated from above by two high-brightness LEDs.

Tuning fork

Duration of visitor engagement ****

Robustness ****



Gently squeeze together the ends of the tuning fork and trap them inside the black cap.

Pull off the cap so the ends of the tuning fork spring apart and vibrate.

Try touching the vibrating ends softly with your finger or a piece of paper. Can you also change the sound by touching the top of the box?

Video microscope

Duration of visitor engagement *****

Robustness *****



One of the most engaging, popular, educational and versatile of all interactives. It can be used for examining all kinds of specimens. The camera focuses automatically, so you

'zoom' simply by holding your specimen higher or lower. The base is graduated in centimetre squares. A ring of cool LED lamps around the lens illuminates the base. Solidly built from a huge range of different Corian artificial stone colours and textures. A composite video lead connects to a monitor or projector.

Water tornado

Duration of visitor engagement *****

Robustness *****



Turn the red disc and watch what happens to the water.

Can you make a "whirlpool"? How many things can you discover about it?

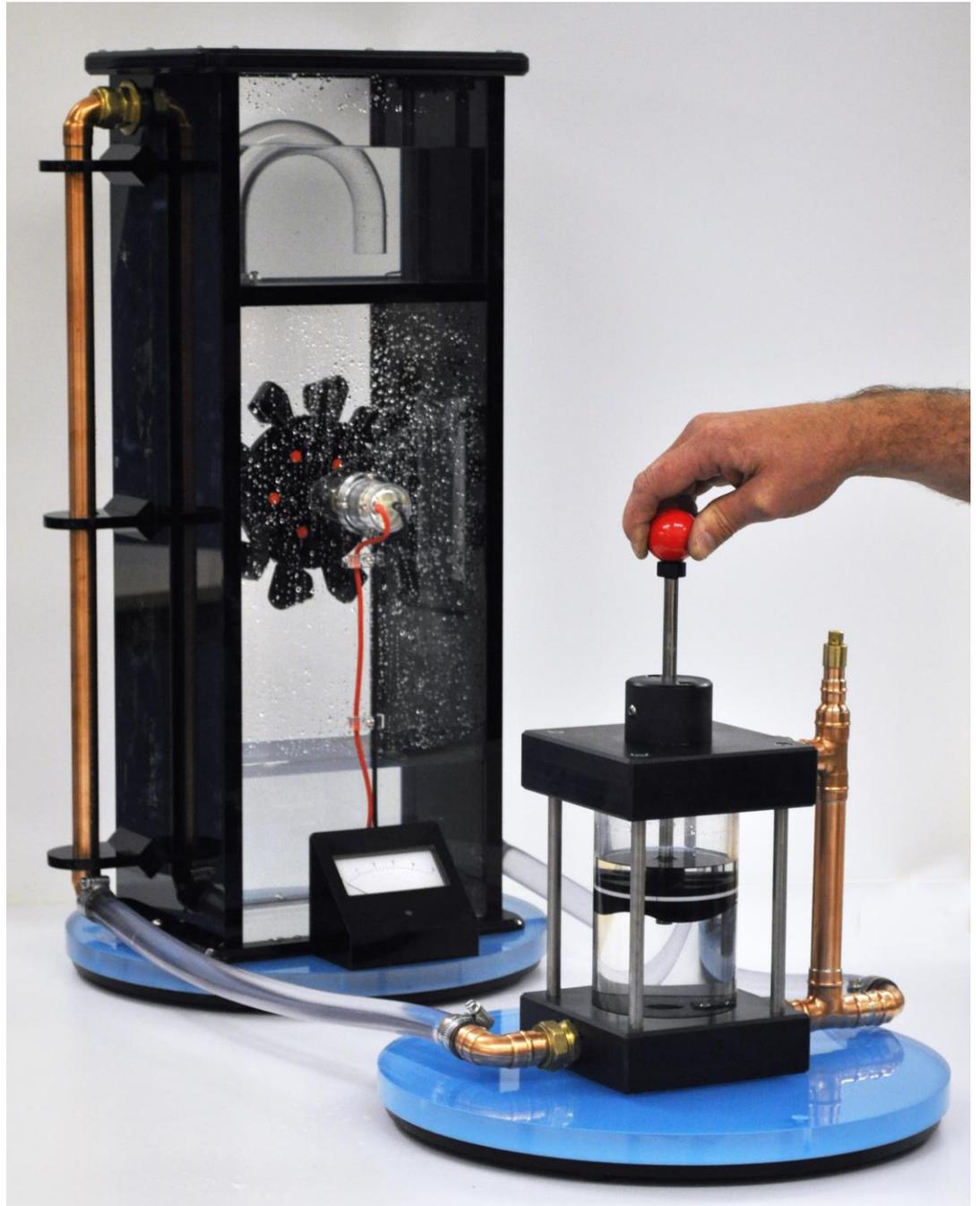
What tricks can you make the floating beads perform? What happens to the magnetic stirrer if you try to turn it too fast?

This is another extremely popular exhibit.

Water-power

Duration of visitor engagement ****

Robustness ****



The hand-operated pump and the turbine are on separate bases. Water fills the upper tank until a self-starting siphon causes it to empty itself, flowing past the turbine.

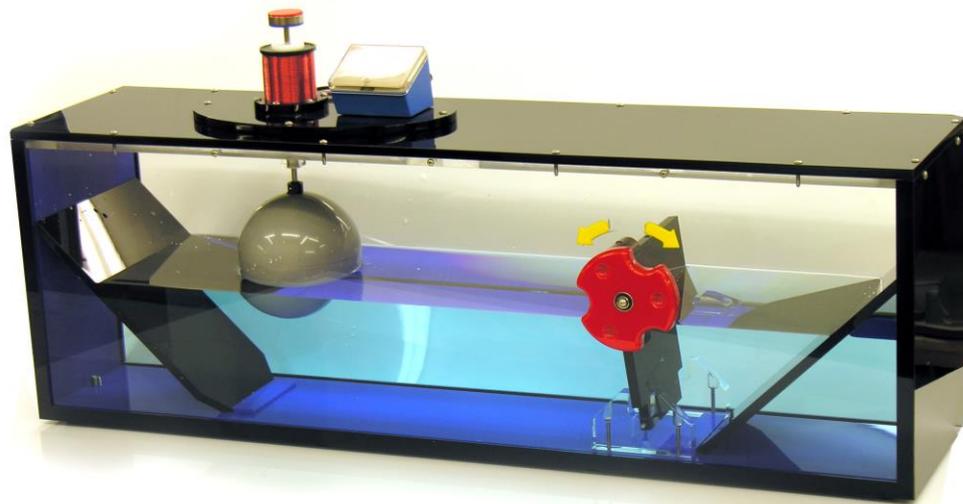
The electric current from a small generator is shown by the needle of an analogue ammeter.

We worked hard to develop a suitable pump, because nothing suitable seems to be available commercially. This simple design works well.

Wave-power

Duration of visitor engagement ****

Robustness ****



Rotate the red knob backwards and forwards to make waves. How far can you make the electrical meter needle move?

Notice the red and blue magnet moving up and down near the coil of copper wire. The meter needle and the LED lamps show that you are generating an 'alternating' electrical current: its direction is constantly reversing.

The coil of wire and the moving magnet form a simple electrical generator. Large electrical generators work on the same basic principle.

Rotating the red knob moves the magnetically linked wave-maker to-and-fro. The floating ball causes a red and blue magnet up and down above a coil. The electric current is shown by a moving needle on a centre-zero analogue ammeter. This is a larger mini-interactive (0.9m long) which fits into its own flight case.

What do you see?

Duration of visitor engagement ***

Robustness *****



There are two different illusions here. After looking at one, turn the middle part round to see the other.

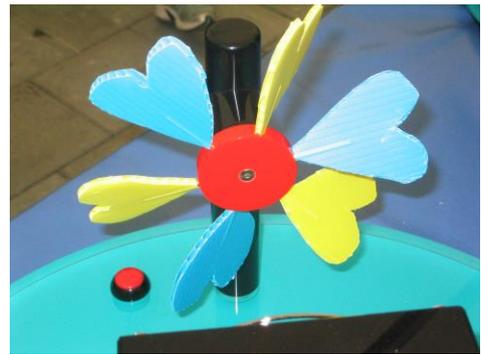
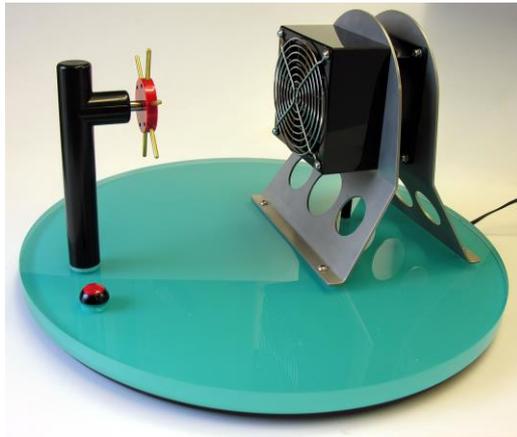
Is one side of the grey ring darker than the other? Are both sides of the white board exactly the same?

Lift each red ribbon and look again. Your brain struggles to make sense of what you see!

Wind turbine, simple version

Duration of visitor engagement *****

Robustness ***



Press and hold the red button to switch on the 'wind'.

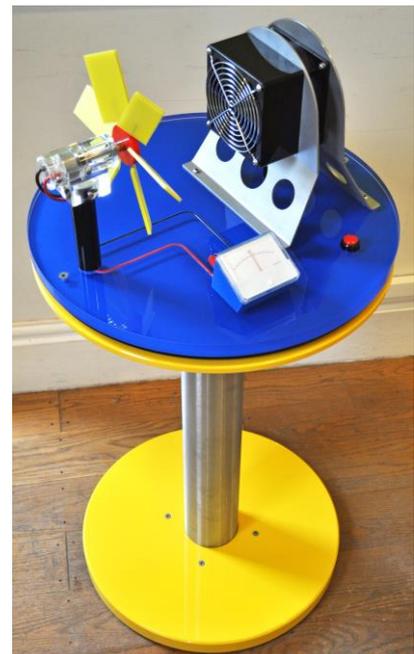
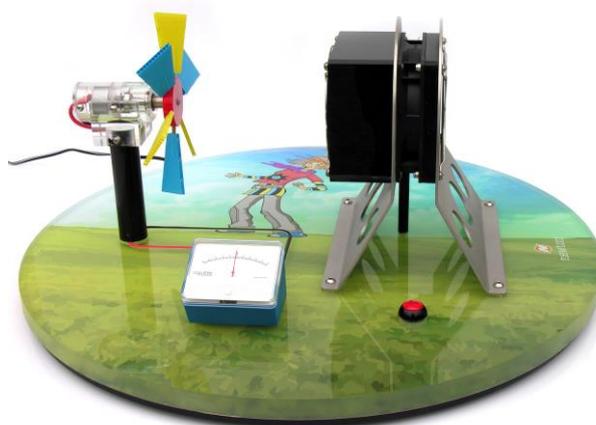
Design your own wind turbine by pushing pieces of cardboard or fluted plastic sheet onto the pegs. Adjust the angle of each piece to improve the efficiency of your turbine.

If necessary, design your own turbine blades and cut them from the material provided.

Wind turbine with generator

Duration of visitor engagement *****

Robustness ***



Similar to the simple version, but with an electrical generator, a meter with moving needle and a larger 50cm diameter base.

Wind turbine, hand-cranked

Duration of visitor engagement *****

Robustness ***



Similar to the previous designs, but with a hand-cranked 'wind-maker'.

Also, the generator is a simple horseshoe magnet rotating above a wire coil, with a diode rectifying the electrical output to Direct Current.