

## Science in Collections tool-kit

A tool-kit for museum, archive and library staff  
integrating science into their programming.

Developed by Ecsite-uk with participants in the Science in Collections  
project 2004/2005. The project was funded by Copus.

## **The Science in Collections Project**

**The Science in Collections project was designed to bring together science and discovery centre staff with education and programming staff from museums, libraries and archives.**

**Seven two-day workshops were held in Glasgow, Bristol, Oxford, Manchester, Liverpool, Cardiff, and Birmingham. An additional one-day workshop was held in the South West**

**Each workshop was focused on developing practical programming ideas for family learning that were related to an institution's collections.**

## **How Does the Toolkit work?**

**This toolkit contains a number of ideas developed by museum, library and archive staff. These can be applied to themed collections or can be run independently.**

**We have also included a number of ideas from the workshop speakers.**

**The toolkit is an ongoing work, and we look forward to including any new contributions that may be inspired by these ideas!**

**Please email your new ideas to [scizmic@scizmic.net](mailto:scizmic@scizmic.net)**

# Nature Activity Ideas

## Plant Smells

Provide the smells of plants/flowers in an exhibition to enhance an otherwise visual and or/auditory experience. Make plant extracts/perfumes available for smelling at different stages in the exhibition.

**Audience:** all visitors

## Stop and Grow

Re-create the life cycle of a plant or animal (i.e. frog, dragonfly, butterfly) using stop frame animation. Demonstrate how things grow. Use claymation techniques to capture your own footage of a plant growing or life cycle of an animal. Speed up to real time to illustrate what happens.

**Audience:** schools, families, adults, teenagers

## Genius Genetics

Look at link between apes/humans through evolution. Use videos and activities to stand like an ape, walk like an ape, swing like an ape, communicate like an ape, have facial expressions like an ape.

**Audience:** families

## Plants magic

Use microscopes to look at different oxidizing properties of plants and then look at their uses in medicine, industry, food, clothes, buildings, technology, etc. Look at real plants: touch, taste, smell, view, use microscopes.

**Audience:** families, schools

# Nature Activity Ideas

## April Fool

Select a number of the wildest, wackiest creatures that do actually exist (and are present as specimens in the museum). Create one (or more) make believe creatures with a description. Present them on a poster and people have to find the April fool (made up creature).

**Audience:** all, children 6-14 in particular.

## Garden Trail in A Booklet

A set of "can you find" sheets with a series of activities crossing learning styles. These relate to art, archaeology and science. Also include story telling in the garden.

**Audience:** family audience in the summer

## Build a Bird

Look at bird adaptation to habitats, food sources, camouflage, male or female, flight characteristics, look at real specimens then develop imaginary birds to live on an alien planet. Including a Mister-potato-head style bird creation activity.

**Audience:** families

## Jungle Science

A hands-on look at rainforest ecology, for primary children. A half day visit with four hands-on activities.

- Microscopes – butterflies and flowers.
- Specimen handling.
- Tropical greenhouse.
- Museum trail – rainforest animals.

**Audience:** 6/7 years

# Nature Activity Ideas

## Nature Nut

1.5 hour session to run once a week for each after school club in LEA to explore sustainable developments and the environment. Three hands-on activities: pond dipping, bird feeders from fruit juice cartons, Microscopes: Our Amazing world. Groups also get ideas pack for use back at club.

**Audience:** after school clubs, participants and staff.

## Antarctic Food Chain

Using origami make a food chain mobile to demonstrate Antarctic food chain.

**Audience:** family groups and early primary

## Colours from Nature

Use natural materials to dye wool/make prints. Wool can be dyed using a range of plant-based dyes, some of these can be prepared in advance – onion skins, wood, fungi, others could be created in the workshop – crushed brambles. Sheep's wool/cotton wool could be dyed and each participant could build up a palette of colours. Mineral paints could be mixed from ochres, iron-stone, other stones.

**Audience:** families

## Nature trail

A nature trail around the house and park, developed in partnership with schools.

**Audience:** 6-11 years

# Science Experiment Activity Ideas

## Pick a perfect planet

Start with visuals and a discussion that is interactive and scene setting. Run 3 carousel activities:

- investigating gravity, matching weight to planet
- surface and atmosphere – ingredients of four planets – Earth, Mars, Uranus, Pluto
- magnetic fields – using iron filings to identify tilt of model planets

**Audience:** 13/14 years

## Supporting Structures

Look at shapes of structures that support buildings i.e. columns and tee-pees. Begin with discussion of your own building. Build a structure on gallery and complete a testing for strength process. Look at artwork showing structures.

**Audience:** schools and families

## Football Science

Make marble mazes with the challenge to reach the goal in set time, use defenders. Cut out shirts and numbers – combinations.

Football: different volumes of air. How balls bounce – rubber/basketball/play dough/etc. Bouncing balls together and comparing. Shapes: hexagons vs. pentagons. Crowd estimation of areas. Shadows at night – flood lights.

**Audience:** family drop-in activities

## Sounds like Science

A hands-on workshop exploring pitch, volume and tone. What is a sound? What makes different sounds sound different? Make different pitches by filling 600ml beaker with different amounts of water. Create straw flutes.

**Audience:** families

# Science Experiment Activity Ideas

## Geology trail

A self-guided trail around museum looking at rocks and their uses in farming. Look at types of rocks used in different buildings/contexts in their special properties – slate roofs, stone throwing floors, dressed-stone for buildings, drystone dykes, millstones. Chance to look at how different rocks weather, and how local geology affects vernacular architecture and farming technology.

**Audience:** schools/families/lifelong learners

## Toot, plink, rat-a-tat-tat!

An activity on the physics of sound. A wide variety of musical instruments – percussion, stringed, wind (but preferably not blown by mouth for hygiene reasons, so a car horn, for example). Some big boxes with pictures on the side e.g. finger plucking a string, hand hitting a drum, hand shaking and maracas. Children have to find out how they work and put them in the right box.

**Audience:** families with children under 7

## Compass, come and pass

Linking geography, cartography and physics. Make a compass using a needle, water, bowl, tissue. Consider what makes Earth magnetic and how that is useful at sea. What else are magnets/magnetism used for? Complete a mission-based trail in and out of building counting degrees and steps.

**Audience:** school children, families

## Waterproof materials

Look at different materials, why some of them are waterproof and how others can be made waterproof. Look at clothing, weather and properties of materials. Compare parasols and umbrellas. Could include a make-and-take with mini parasols/umbrellas for teddy bears.

**Audience:** families with Sure Start age children

# History Activity Ideas

## **Who are these people?**

Explore local scientists and naturalists: who they were, where they lived. Explore their discoveries, contribution to our knowledge and what happened to them. Move around country concentrating on local achievements. Relevance of artefacts to people – treasure trail: identify the mystery person through artefacts, places and documents.

**Audience:** families

## **How did they survive that?**

Link archive pathology reports: medical instrument collection, illustrations. Split into groups. Give each group a real (doctored) case report with symptoms and a medical reference guide. Each group has to work out what is wrong with the case patient using diagnosis books. Look up remedies and cures. Plan a cure and calculate probability of survival. Report back to larger group.

**Audience:** outreach, GCSE

## **Build a Wear-able tank**

Build a cardboard tank to wear linked to D-Day funnies, tanks adapted for a specific purpose on D-Day. Recycle a large cardboard box, add straps to wear. Decorate and add gadgets with recycled junk.

**Audience:** parade/carnival: families schools

## ***Ancient Pottery Industry***

Investigating the Roman Pottery Industry in Oxford – based on the Churchkill Kiln. Use different types of soil from different areas. How do you get from clay to kiln? Make pots.

**Audience:** families

# History Activity Ideas

## Georgian Pig Roasting

Enable families to consider how food (in particular meat) was cooked in the Georgian period. To take place at the Georgian House in Bristol. Have the gear system working in the fire place. Have a simplified model which replicates the mechanism. Have activities sheet to think about the cooking process and why the meat needs to be rotated.

**Audience:** age 9 + and families

## Vermin trail

To give visitors some idea of the diversity of the environments the Fleet Air Arm have served in, the problems they meet and how they deal with them ie bird strikes, rats and cockroaches on board ship, lice, fleas, parasites, diseases, (bacteria and viruses), sharks, poisonous animals, cleanliness on board, protecting food, keeping vermin out, antidotes.

**Audience:** families

## Build your own Anderson shelter

Make structure and shelter to fit one person. Later to be tested by dropping fake bombs and shrapnel onto it. Testing structure and materials. Split into groups. Build structure and coat with materials. Load with weight or drop weights onto it. That which takes the most weight is the winner.

**Audience:** either structured school groups or drop in family stations but on a smaller scale.

## Survival workshop

Investigation climate themed tables: temperate, desert, arctic, jungle. Looking at different survival challenges: shelter, water, food, transport, communication.

**Audience:** 16/17 years, families

# History Activity Ideas

## Victorian Science and Invention

A variety of different experiments and demonstrations of Victorian discoveries and inventions from the light bulb to the telephone. Have approximately six different tables set-up with examples. Light bulb – electricity – how does electricity work? Telephone – make your own with cups and string. Locomotive – steam engine. Illusion. Camera – make a pin-hole cameras.

**Audience:** schools/families

## Form and fabric

A trail based on the materials used in fashionable dress in the 1600s.

**Audience:** families

## Life in Nelson's Navy

A family activity in which we will find out what it was like to be a sailor in an eighteenth century: living conditions, diet, navigation. Make rope by twisting fibres together, use rope and piece of cloth to make a hammock for a teddy-bear to sleep in, make a compass, go on a navigated trip, using a compass to find a ship, make a "ship's biscuit" from clay, look at weevils under microscopes

**Audience:** families with children aged 5+

## The light fantastic

Making images with light. The main activity: making slides for an original Victorian magic lantern to tell a story. Three extension activities: making kaleidoscopes, printing with light sensitive paper and making rainbows with prisms.

**Audience:** families

# Transport Activity Ideas

## Evolution of transport

A workshop allowing children to discover how transport has changed over the centuries and why science has played such an important role in this process.

**Audience:** 11-14 years, families

## Off the Rails

Build a train to carry a set load around a track. Day long challenge with different groups. Each group builds a different part of the challenge. One group builds the track, one the engine, and one the carriages and one a bridge.

**Audience:** 14-16 years, families

## Canals

Consider the materials used and the structures built along canals. A design and build workshop with possibility to extend it at school. Use archives as basis for discussion on conservations and examine the plans and documents relating to canals.

**Audience:** 11-14 years, families

## Boat Science

Rent a vacant ship for a month in the summer as a mini museum. It would cover six areas: live animals for handling, museum artefacts, specimens, biodiversity craft activity, microscopes – computer, meet a scientist, the way that we eat.

**Audience:** families

# Transport Activity Ideas

## Sounds of Science

A weekend family event focusing on sound and its relationship to vehicles in a transport collection. A really noisy afternoon with lots going on! Look at horns, alarms, etc. Numerous activities going around on gallery. Sirens, bells, pitch – how sound is used in different contexts, how it can be used to mean different things (music, danger signals).

**Audience:** families

## Wacky Boat Races

Part of river festival. Schools get a pack to help design boats which will then be raced in a grand event (real river? Or not?) Visits will take place with help from other organisations.

**Audience:** schools, groups in local areas, families

## Making ship models

Show group different types of ship models: prisoner of war ship models carved from scrimshaw or bone; ship in a bottle; standard model-making with wood and glue then select one to let them try. Use soap and lolly sticks to carve small boat hull. Push cocktail stick into hull and attach sail. Create ship in a bottle.

**Audience:** families

## Ship Challenge

“Tomorrow’s world” type challenge – build your own ship of the future. Publicised event with specific start time. Can work in teams of three to build a ship from materials provided. Participants must sign disclaimer first! Given maximum size, have competition for one or two hours later.

**Audience:** families

## Challenge Activity Ideas

### **Who did it? Examine the evidence**

There has been a murder! Find out about gathering evidence at a crime scene. Use forensic techniques in the lab to find out who is guilty. Audience gather at the scene of the crime. Group follows inspector into lab, explain terminology, samples to work with. Group solves the riddle. Use "blood" tests, fingerprinting, and chromatography.

**Audience:** family/schools

### **Gladstone's Wacky Water Challenge**

Gladstone Adam's original idea for a windscreen wiper from when he realised that there was a need for them. Show original windscreen and talk about what makes wipers work. Design and create your own wiper. Test effectiveness of blade – design, how well it clears screen. Vote best in each category.

**Audience:** families

### **The Simplex Challenge**

Make a simple car that will travel either far or fast. A fun family event to launch a transport area or gallery. Based on "simplex car" or other car in your collection. Give instruction cards, a design brief, and plenty of materials.

**Audience:** families

### **Genetics debate**

For/against idea of genetic engineering debate for teenagers. Invite schools in for debate, and experts from university or similar.

**Audience:** 16+

# Communication Activity Ideas

## Making Connections

Examine uses of communication. Set up four stations, the group devises a method of communication. (1) circuitry activity to create flashing light/buzzer signal/siren. (2) Cups, string, straws etc. to create 'telephone'. (3) Code-breaking, series of cue-cards with ideas for codes (4) Mirrors, flags, etc for signalling.

**Audience:** drop for family groups.

## Telecom and Encryption

Look at telecommunications and data encryption using historical devices and present day options. Explore why it's changed over time. Make music with ring tones. Make codes and decrypt simple radio transmissions or Morse coded signals.

**Audience:** 14-19 year olds, families

## Communication

Look at communication between visitors, communities and open spaces: sharing information and ideas, watching and listening carefully. One group on mezzanine, one group on gallery floor. Send and receive information. Think about how Morse code works, electricity effectiveness, translating information from one form to another. Ask questions to discover information.

**Audience:** families 5-14

# Art and Conservation Activity Ideas

## Why Conserve?

An opportunity to explore and discuss protecting objects and documents. Wax room – try to wax coat something (paper) yourself using wax crayons. Make paper into cup or umbrella. Varnish room – create your own drawing, photocopy three times and try three different ways of conserving the paper. Discuss yellowed newspapers and yacht varnish. Talk about what items we want to last forever and which we want to disintegrate.

**Audience:** drop in for family groups

## Paints and Pigments

A workshop combining gallery based discussion and “messy work” in the education room. Examine where paints started from natural materials. Examine synthetic paints. Try creating a painting using red cabbage. Extracting materials with grinding and meshing and make a brush.

**Audience:** 11-14 years and families

## Colour Coded

What are different colours used for by humans? Look at traffic lights, road signs, packaging, clothing, and painting. Using boards, prisms, lenses, paints compare coloured vs. impairment glasses.

**Audience:** 8-12, families

## The great colourists

Based on the ‘Great colourists’ from Turner to Picasso exhibition. Create a focussed activity session on colour and light.

**Audience:** 6-12, families

