

Great Science - Great Scientists 500BC - 2002AD - Teaching Resources

Other Ideas and Activities

- Find out what materials batteries are made from. (*outer casing, packaging or company links from the Rebat website*).
- Weigh batteries of different sizes, find the average weight. Survey children in your school to find out how many have a radio and other electronic equipment that needs batteries. How many batteries do they use each year? What do they do with their batteries when they run out? Do they use rechargeable batteries? Do they recycle batteries? Ignore all replies from children who recycle or recharge batteries. From the remainder, work out the weight of batteries being put into our rubbish. What can you do about it? (*The recycling officer at your local authority may be able to help or find information on the Rebat website.*)
- Do children in other countries have radios and electronic equipment? Do they use batteries? Link up with children in other countries by e-mail and ask them.
- Using this opening line **Toval could hear the sound of...** write a fantasy story that might be broadcast on the radio. Use the sound of rain, running feet and bells (and any others you want to add) somewhere in this story. How will you make the sound of rain, running feet, bells, or any other sound you need?

Alexander Graham Bell (L) Answers

- Chicago, 1892, Morse, transmitter, current, microphone.
- 23 3. 1873. 4. Underground
- Material stretched over a frame e.g. drum/tambourine and rice, dry sand. Put rice on top of the membrane and tap the membrane. The rice should bounce around.
- EXCHANGE

Alexander Graham Bell (H) Answers

- Chicago, 1892, Watson, Morse, transmitter, vibrate.
- 23 3. 1873
- They are underground, to improve the countryside, mobile phones used now etc.
- Material stretched over a frame e.g. drum/tambourine and rice, dry sand. Put rice on top of the membrane and tap the membrane. The rice should bounce around.
- Use voice and speech, no need to learn or look up the code, not very mobile
- EXCHANGE

Curriculum links

Science: 5F Sound

History: Victorian inventors - communication

DT: Design criteria

Books

P. Hepplewhite, *Super Scientists: Worlds Along Wires*, Hodder

E. Fischel, *Alexander Graham Bell*, Franklin Watts

J. Shuter, *Lives & Times. Alexander Graham Bell*, Heinemann

Websites

<http://sln.fi.edu/franklin/inventor/bell.html> Brief biography along with history of telephones.

www.fitzgeraldstudio.com/html/bell/inventor.html Detailed biography.

Other Ideas and Activities

- Sound causes a thin membrane to vibrate. Bell wanted to convert this vibration into electrical impulses. He found that by vibrating a steel reed over a magnet, that a current was made that could be carried along a wire. This would not just carry sound but changes in pitch according to the vibrations made by the change in tone of someone's voice. Working in pairs, try to find out more about sound and vibration. Try the experiment with the drum and the rice. Was your prediction correct?
- Find out how telephones changed since 1876. Besides transmitting human speech, in what other ways are telephone lines used?
- Find out how telephone conversations can be carried from one country to another and from one continent to another. Use a phone book to see which countries you could telephone.
- Look at an itemised telephone bill. What information is on it? Imagine that you share a house with 4 other people. What would this bill help you to do?
- Throughout his life, Bell had been interested in the education of deaf people. This interest led him to invent the microphone. How would you modify a telephone to help an elderly person, who cannot get up from a chair quickly, has arthritic (stiff) fingers, is deaf and cannot see very well?

James Dyson

Answers:

- Dyson; Sea Truck: student; ball; 1983; cyclone; bagless.
- (Hurricane, typhoon or tornado) fast moving air in a spiral that drags in everything in its path.
- no bag; wheelbarrow with a ball instead of a wheel
- wheelbarrow; b. everyday; c. worldwide
- gravity
-

Sea Truck 20th century

The wheel 3000 B.C.

A mechanical clock 13th century

Flint axe Stone age

Telephone 19th century

9. Research

Curriculum links

Science: Scientific methodology; 5/6H Enquiry in environmental and technological contexts.

DT: Familiar products and the process of design in general.

History: Invention in any era

Books: N. Morgan *History makers of the Scientific Revolution* (Wayland)

20th Century Visual History (Dorling Kindersley)

Websites:

New designs <http://www.design-council.org.uk>

Patent office education (origins, Tudors, 18th century, current)

<http://www.patent.gov.uk/patent/history/fivehundred/origins.htm>

Other Ideas and Activities

- The Dyson Company has a website. It shows the cyclone vacuum cleaner and James Dyson's other inventions.
- The Design Council has a website with plenty of examples of good design. Ask children to select one that they think is particularly simple, useful and sustainable.
- James Dyson could be described as an engineer. An engineer needs to understand the theories of science so that he or she can put these theories and ideas into practice. There were no handbooks or much education for crafts people through the ages - they learned by experience from a master craftsman. If a craftsman invented a good tool or machine, he kept it a secret as long as possible so that he was the only one that sold the item. This is how guild and organisations like the Masonic Order began. Patenting was a way of protecting people's ideas. Look at the Patent Office web site and find out how ideas and designs are protected.
- When the children have described the picture of a wheelbarrow, bring a real wheelbarrow into class. Is it the same as the one in the picture? What are the similarities and differences? How would they improve the design of the wheelbarrow?

Thomas Edison (L) Answers

- Light, candles, Edison, filament, burn, 1200, carbon, power, street, Swan, 1860
- Sun, candles, torch, stars.
- 60 W; 10,000 hours, 10, A. 550, lower
- persevere persist resolute keep trying determined dogged
- candle

Thomas Edison (H) Answers

- Light, candles, gas, oil, Edison, filament, burnt, platinum, 1200, carbon, power station, streets
- Sir Joseph Swan
- Sun, candles, torch, stars
- 11W, 60W, 10,000 hours, 4.8 years, A, keeps the bill lower, 550 lumens
- persevere persist single-minded purposeful unwavering keep trying dogged tenacious resolute determined

Curriculum links

Science: 3F Light and shadow; 4F Circuits and conductors; 5C Gases around us; 5E Earth, Sun and Moon; 6F Changing circuits. Scientific method.

Sustainable development: Built environment; economic choices.

History: Victorian inventors

C+PSHE: Personal safety (at night, fires etc); public services; consumer choices