Science – Year 3/4B Summer 2

Electricity

Electric Personalities

Session 5

Resource Pack

6	1	2	3	4	5	6
A single unit that converts chemical energy into electrical energy is called a …	A material that does not conduct electricity is an …	If a bulb goes out by mistake on your circuit, you must find the break in the wires and …	This is the name given to a flow of electricity	Electricity can be dangerous if you forget the safety rules. Another word for dangerous is …	When you were given a heap of electrical components and asked to light up a bulb, you needed to …	This person was a scientist who invented more than 2000 electrical devices

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C	I	R	C	U	I	T
Cell	Insulator	Reconnect	Current	Unsafe	Investigate	Thomas Edison

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Helpful Hints on Using Bulbs and Motors

To make Light Up Eyes
Draw a face for your personality on card and make bulb sized holes for the eyes. The face is probably going to be attached to a box or pot that will be the head so you will need to make holes in this too. Hold your cardboard face in the right place on the head and mark the place where the eyes should be. Then put a blob of sticky tack behind the mark and push through with a sharp pencil from the front. Do this for both eyes.

Now glue the face to the head so that the eye holes line up and gently push a bulb into each hole from the front.

Finally, screw in the bulb holders from the back. They are now ready to attach your wiring.

Helpful Hints on Putting in your Electric Circuit

Once you have constructed the body of your personality, you will need to begin work on your electric circuit.

First think about where you will place your battery. Try to make it somewhere inside, in a place that you can reach fairly easily. You could make a little shelf for it using another box or tube. You may need to cut out a little doorway so that you can get to it.

Next think about where the switch should go. Ideally this should be somewhere on the outside of your model – perhaps at the side or the back. The wires will attach to it on the inside (out of sight).

Here are the split pins from the paperclip switch. They have been pushed through to the inside of the box and connected into the circuit.

To Use a Motor

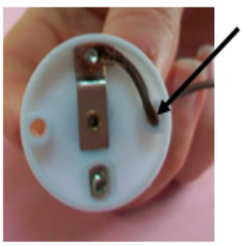
You will need to mount the motor on your model so that the revolving pin sticks outwards. The best way to do this is using the "Draw round and slit" method from before. Decide where you want the motor to be and draw round it as tightly as you can. 2 slits will probably be enough as the motor is so small.

Then push the motor gently into the hole from the outside so it is half in and half out. You may want to hide the front of your motor by using the cap from a bottle. Make a hole in the centre of the cap by pushing the point from a pair of compasses through into a blob of sticky tack behind. If the pin fits very tightly, the whole cap will turn which may help you.

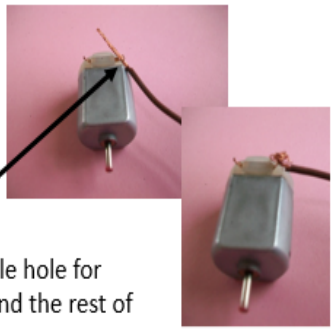
Wiring Up Your Circuit

The electrical circuit inside your model needs to be strong and secure so instead of using crocodile clip leads that can slip off, you will be making your own electrical connections.

Use leads with 2 cm of bare wire showing at each end. Twist the wires slightly to make a neat pointed end then carefully wind the wires around the connection point to make a really tight join. You can put a little piece of plastic tape over it to keep it even more secure.



Some components have features to help with the wiring. This bulb holder has a hole to feed the wire through and a narrow gap between the point and the rim that squashes the wire against the metal point to make a really good connection.



The connection point on this motor has a little hole for threading the wire through. You can then bend the rest of the wire into a neat coil.

Session 5 Teachers' Notes

Creativity

During this session the children will construct their Electric Personality including their electric circuit with a switch. This fulfils the ***Make*** phase of the Design and Technology curriculum and much of the ***Technical Knowledge*** section too, which dovetails beautifully with learning the science of electricity. The children will have already gained considerable knowledge and practical knowhow in constructing electrical circuits from the earlier sessions and through putting their detailed plan together, but building a working model will present all kinds of new challenges to be overcome. It is through the freedom to explore, try out, adapt and modify plans that deep learning and enjoyment will take place.
Encourage children to find creative solutions to problems even if this means adapting their original plan - this is after all what all scientists and inventors do.

Managing the Session

You will be amazed how focused and motivated the children will be once they begin the task and there will probably be a wonderful creative buzz around the room. It works well if you have basic resources ready like pots of PVA and spreaders for each table. You could make a Tool Zone for items that need closer supervision for safety reasons, e.g. craft knife and cutting mat, hot glue gun and pairs of compasses with sticky tack for making holes. An extra adult or two would be a huge help to supervise the using of the craft knife and glue gun so that you can be freed up to support children needing help elsewhere. It might be worth recruiting some parental help for this session.
You will need a large number of electrical wires with about 2cm of the plastic sleeve stripped off at each end. To save time it makes sense to prepare these ahead using wire strippers. Each child will probably need 3 - 5 each so it is worth calculating the quantity you will require. 15 - 30 cm is an ideal length but you may well need a few longer than that as well. Reels of electrical wire are cheap to purchase.

Some *Helpful Hints* sheets are included in the Resource Park. Having a few of these available for children to reference during the session may serve as a useful reminder and encourage independence.

Health and Safety

Check your school's policy on using hazardous tools and make any necessary arrangements to comply with safety guidelines including warning the children about how to use tools safely.

Demonstrating Joining and Wiring Techniques

If you are experienced in Design and Technology you may prefer to demonstrate the basic techniques available to construct a working model yourself. The second half of the Teaching PowerPoint is there as a backup if needed.