



Clear broad aims and objectives given at the start of the activity

Use of group work – matching learning styles to the nature of the activity.

Opportunity to mention health and safety issues with lithium batteries used to power the electronic circuit

Plenary session at end of lesson brings main learning points together.

Systems modelling

Emphasis on systems analysis and systems thinking.

Explain the activity and the context in which it will take place. Show an example of a completed musical greetings card and point out the mechanism for the switch and the circuit details. Explain that the pupils will be undertaking a product analysis of some cards.

Arrange the pupils in groups. Get the pupils to discuss the possible criteria for judging the cards. The group has a limited time to pool their ideas and come up with their five most suitable criteria. After the set time bring the class together to collectively agree five criteria. In groups the class can evaluate a number of the cards that are available.

Each group nominates a spokesperson to speak to the class on their findings and their decisions.

Summarise findings from the class and give homework - to find examples of electronic systems and label what they sense (their inputs) and what they 'do' (their outputs).

In school discuss the electronic systems that the pupils have found – list things that are sensed and the range of outputs – get pupils to explain what they have found out through their research. Emphasise the concept of input sensors and output devices and talk briefly about examples that they will be working with. Relate these concepts to what triggers the musical card and what the musical card does.

Undertake a series of focused practical tasks (problem solving exercises) using either a systems kit or a suitable software package to turn an output device off and on with a single input sensor. Use the block diagram – input, process, output, feedback loop to illustrate the flow of signals at a systems level.

Ask the pupils, as a homework exercise, to decide whom they will design their card for, to think about the kind of card they would like and to look again at some commercial cards for ideas for surface designs, patterns and content.

Undertake product analysis – looking closer at the made world – appreciation of design influences.

Developing language skills – discussion and negotiating. Agreeing on final lists.

Developing literacy and language skills – summarising, presenting information, speaking to the class.

Prepare pupils for the next lesson - develop expectation for next lesson.

Make use of research undertaken by the pupils – participation in the lesson. Developing language skills.

Use of ICT package to rapidly try out ideas

Links with art and design

From here the series of lessons develops into:

- » Finalising the designs of the cards and writing an appropriate greetings message
- » Familiarisation with some components:
  - » a battery
  - » an on/off switch (not an input sensor)
  - » a Melody Generator IC (the processing subsystem)
  - » a piezo sounder (the output subsystem).
- » Constructing a simple circuit to fit within the card. This could be one from a number of options:
  - » providing the pupils with pre-made and drilled PCBs (this has the advantage of introducing pupils to PCB construction at an early stage)
  - » getting the pupils to design their own PCBs (this will take more time and skill but has the advantage of introducing PCB design and CAD)
  - » using Tracktronic copper stick on track (this is quick. It has the disadvantage that Tracktronic is only suitable for simple circuits so it cannot be built on in later work).

