

Design task

Teachers Notes - Lesson 4 - Slide 13

Task: Students demonstrate understanding gained through a scientific investigation by resolving a design brief.

A task for students to design and make a product that uses the 'transformation of electrical energy' as an essential feature of its design. The final phase provides an opportunity for students to evaluate and reflect on their own learning, new understandings and development of skills.

Assessment

Summative assessment of the science inquiry skills.

Explore and define

Define purpose of the product, develop criteria and find out what is currently available.

Design brief

- Students design and make a product that transforms electrical energy and solves a personal need.
- Students should consider:
 - What products exist that address similar problems or needs? How do they work?
 - What resources are available to construct our product?
 - How will they test and evaluate their design solution?
 - How they will manage the time available to develop the product?
 - Is there a 'technical expert' who can provide assistance?
 - Are there electrical safety issues?

Generate and develop ideas

- Students sketch initial ideas for their product and annotate their sketch to explain how the product works.
- Remind students to consider the circuit required to operate the product.
- Students identify the need addressed by the product or the system, and the energy transformations involved in its operation.
- Suggestions of problems which could be solved with the design of a product:
 - My little brother reads my diary.
 - Everyone barges into my room. I have no privacy.
 - I like reading in bed at night but the light disturbs my little sister
 - We get very hot in our tree house.
 - The mosquitoes always bite me when I am in the garden.
 - How can I make a game that keeps my younger brother/sister amused?

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Produce Solutions

- Ensure that students understand that their product must be housed in a suitable casing. Discuss what functions the casing must perform, e.g. hold the circuit in place, hold the working parts, protect the product from dirt and damage, be easy to handle, be aesthetically pleasing and convey information about the operation of the product. Provide students with a wide range of materials that can be used to complete the product e.g. paddle pop sticks

Product	Need / Purpose	Energy transformations
Home security alarm	Warn off intruders	Sensor (light/sound energy) > electrical energy > sound energy
	Dissuade intruders	
	Protect people and property	
Vacuum cleaner	Remove dust and dirt	Electrical energy > mechanical energy
	Remove dust mites that cause allergies	
Stove	Heat or cook food	Electrical energy > heat energy
Solar garden lights	Provide lighting for paths	Light energy > electrical energy > chemical energy (battery) > electrical energy > light energy
	Provide security	
	Increase enjoyment of garden	

Evaluate

- Ask students to evaluate the design against the design brief and consider the effectiveness of the process
- Provide students with questions to be used when reflecting on their task
 - What part of the task was most enjoyable?
 - What part of the task was least enjoyable?
 - What did you learn?
 - What part of the learning was most important? Why is it important?
 - If you were to undertake the task again, what would you do differently and why?