Remote Control Cars

Sections

Joey Scouts | Cub Scouts | Scouts | Venturer Scouts | Rover Scouts

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Challenge Areas

COMMUNITY | CREATIVE | OUTDOOR | PERSONAL GROWTH

Scout Method Elements

COMMUNITY INVOLVEMENT | LEARNING BY DOING | NATURE AND THE OUTDOORS | PROMISE AND LAW | PERSONAL PROGRESSION | PATROL SYSTEM

SYMBOLIC FRAMEWORK | YOUTH LEADING, ADULTS SUPPORTING

SPICES Growth Areas

CHARACTER | EMOTIONAL | INTELLECTUAL | PHYSICAL | SOCIAL | SPIRITUAL

The Adventure

Design an experiment to learn about how electromagnetic waves power remote controlled toys and what can get in their way.

Plan

Remote controlled toys such as vehicles or dinosaurs use radio waves to transmit signals from the controller to the toy. The radio waves, a form of electromagnetic radiation, carry information in the form of binary codes which the toys can then use as a set of instructions for operation. The controller will transmit signals on a specific frequency selected to minimise the change of interference from other radio signals such as wifi or phone signals.

Some materials can act as shields to electromagnetic radiation. The effectiveness of the shield can be impacted by factors such as the conductivity, thickness and permeability of the material.

Your challenge is to design an experiment testing the effectiveness of different materials in shielding the radio waves produced by a remote controlled toy. You should consider the following when designing your experiment:

- Do some background research into what materials are best at blocking electromagnetic radiation.
- Decide what type of materials you want to test.
- How will you use your material to block the radiation?
  Consider focusing on blocking the antenna on the transmitter.
- How many layers of the material will you use?
- What will you measure to test the effectiveness of the shield? Can you measure the distance that the signal transmits under different conditions?

Do

Conduct your experiment and keep a record of your results. You might want to set up a results table to record any measurements and take some images of how the experiment was set up.

Review

1. Look back at your predictions and check if they match your results.
2. What have you learned from your experiment?
3. Do you think you could improve your experimental design if you were going to repeat this experiment?

Safety

- Follow the safety instructions provided with any remote control products you are using.
- Be sure to keep batteries secure away from animals and young children and follow protocols for safe disposal.

Variations

- Make this into a patrol game or competition. After investigating the properties of different materials with this experiment, build a protective barrier to stop other patrols infiltrating your base with their remote control vehicles.
- Remote controls for TVs work on a similar principle as remote controlled toys, but using shorter wavelength infrared radiation instead. You could investigate how the transmission of these waves compares to the radio waves from the first part of the experiment.