

## Remote Control Car

On SCOPE's Electromagnetic Spectrum episode, Julia used a remote control car to test how radio waves travel through different materials. Here's how you can try the activity at home:



### What you need:

Remote control car

Different materials, eg. aluminium foil, tin can, cotton wool, plasticine, polystyrene etc

### What to do:

1. Begin with a control test. Place the car on a hard, smooth surface.
2. Stand about 10 metres away and drive the car around using the remote control. It is best to do the test from at least 10 metres because some transmitters are pretty powerful and at short distances, the radio waves might not be shielded by *any* material.
3. After that, test out each material. Wrap a material around the antenna of the remote control and the antenna of the car.
4. Then, test whether the car still works. Make sure you and the car are in the same spot as in the control test.
5. Continue to test each material and note down when the remote control car works and when it doesn't.

### What's happening?

Remote control cars work thanks to radio waves. On the electromagnetic spectrum, radio waves are close to microwaves, they are pretty big, low energy and are not at all harmful.

Two important parts of the remote control car setup are the antennas. The transmission antenna on the remote sends a signal, via radio waves, to the car, which picks it up using its receiving antenna.

How the radio waves travel from one antenna to another is called transmittance and lucky for us, air is very good at transmitting radio signals. But not all materials allow radio waves to travel through them.

The result of your tests will depend on how well the antennas are covered and how thick the material is, but most importantly the *type* of material. Because of their internal structure, some materials, like cardboard and plastics, allow radio waves to travel into and through them, while others, like many metals, reflect the radio waves and therefore stop the transmission.

