

Radio to gamma waves and digital signals

Grade 8 science (Year 9 · Class 8) · Lab answers

These model answers use the sample table above. If you collect your own readings, the exact lux values will differ, but the pattern should match: metal blocks radio waves, and thick opaque materials block visible light and infrared.

Level: Grade 8 science (Year 9 · Class 8) · **Curriculum:** MS-PS4-3

Question 1 Light through plastic

$760 \div 820 \times 100 = 92.7 \%$, which rounds to **93 %**.

Question 2 Light through paper

$310 \div 820 \times 100 = 37.8 \%$, which rounds to **38 %**.

Question 3 Ranking the materials

From most to least transparent: **none, clear plastic, white paper, then cardboard and foil together** (both pass 0 %).

Question 4 Cardboard and radio

The cardboard absorbed or reflected the visible light and the infrared, but the radio waves passed through. Radio waves have a much longer wavelength and interact with materials differently, so **different parts of the spectrum behave differently**.

Question 5 Foil and radio

Metal reflects and absorbs radio waves, so a complete foil covering shields the radio from the signal. An everyday example is poor phone signal in a lift: **metal blocks radio waves**.

Question 6 Paper and the remote

Paper is thin, so some infrared from the remote passed through even though the visible light was reduced. The TV needs only a small share of the signal to respond, so **enough infrared got through**.

Question 7 Uncertainty

$10 \div 310 \times 100 = 3.2 \%$. Take three readings and calculate a mean, and keep the meter still: **about 3 %**.

Question 8 Predicting tracing paper

Tracing paper is translucent, so expect a reading between the plastic and the paper, such as 500 lux. The remote should work and the radio should stay clear because it is not metal:

between 310 and 760 lux, remote works, radio clear.