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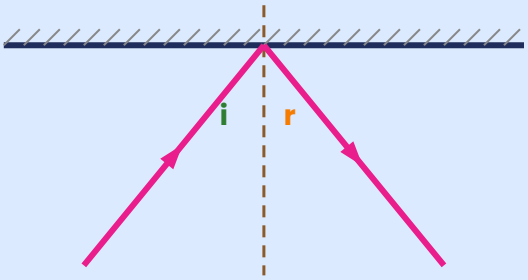
Year 8 · KS3 Physics · GCSE foundations

Reflection of Light

Homework Worksheet

Practise the law of reflection, ray diagrams, measuring angles and real-life uses of mirrors and echoes.



angle of incidence (i) = angle of reflection (r)

Name: _____ Class: _____

Date set: _____ Date due: _____

What's inside

Section A	Key words, types of waves & labelling a ray diagram	Q1–Q4 · 19 marks
Section B	The law of reflection: angles, drawing & common mistakes	Q5–Q8 · 17 marks
Section C	Exam-style & challenge: practicals, periscopes, echoes ★	Q9–Q12 · 18 marks

Instructions

- Answer **all** questions in the spaces provided.
- You will need a **ruler**, a **protractor** and a sharp pencil.
- Draw rays with a ruler and add arrows to show direction.
- Marks for each question are shown in [ ]. Questions marked ★ are challenge questions.

Total score

/ 54

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Section A — Key ideas & ray diagrams

19 marks

1 Complete the sentences using words from the box. Each word is used **once**. Two words are not needed. **[8]**

reflected · boundary · medium · mirror · normal · incidence · reflection · equal · absorbed · refracted

a) Waves, including light, can be _____ at the _____ between two different materials.

b) In reflection, the wave does not pass through — it stays in the original _____.

c) We see the reflection of light waves in a _____.

d) The line drawn at 90° to the surface where the ray hits is called the _____.

e) The law of reflection says: angle of _____ = angle of _____.

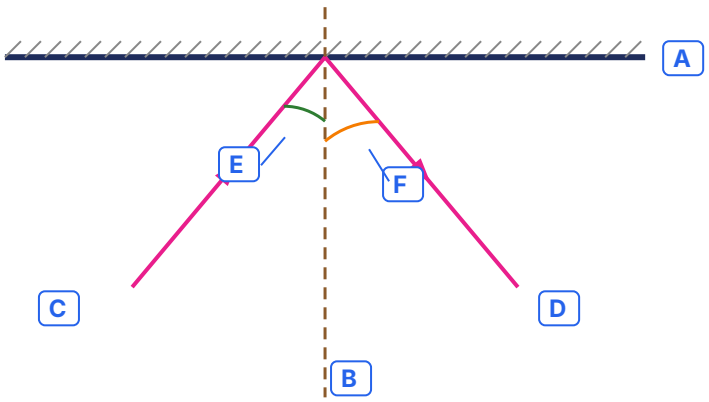
f) This means the two angles are always _____.

2 Name **three** types of wave that can be reflected. **[3]**

1. _____ 2. _____ 3. _____

3 Label parts **A** to **F** on the ray diagram using the words below. **[6]**

incident ray · reflected ray · normal · boundary (mirror) · angle of incidence · angle of reflection



A _____

B _____

C _____

D _____

E _____

F _____

4 Arrows on rays show the direction light travels. **[2]**

a) Which way does the arrow on an **incident** ray point? _____

b) Which way does the arrow on a **reflected** ray point? _____

Section B — Using the law of reflection

17 marks

5 Use the law of reflection to complete the table. **[5]**

Angle of incidence (i)	Angle of reflection (r)
25°	
	48°
60°	
	15°
0° (ray hits along the normal)	

6 A ray of light hits a plane mirror. The angle between the ray and the **mirror surface** is 30°. **[3]**

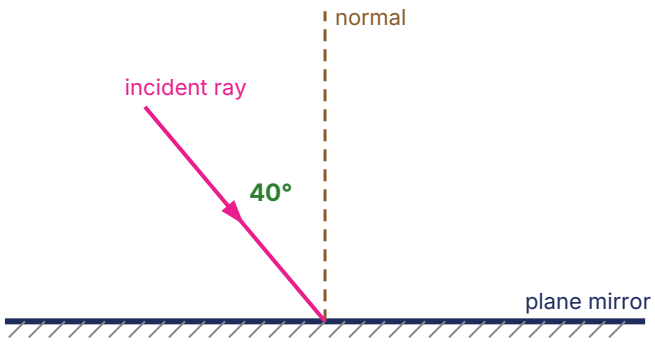
> Hint: the normal is at 90° to the mirror. Angles are always measured from the **normal**.

a) What is the angle of incidence? _____ °

b) What is the angle of reflection? _____ °

c) What is the total angle between the incident ray and the reflected ray? _____ °

7 Use a ruler and protractor to **draw the reflected ray**. Add an arrow and mark the angle of reflection. **[3]**



8 Sam says: *"The angle of incidence is the angle between the incoming ray and the mirror."* Explain what Sam has got wrong. **[2]**

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8b Why can you see your face in a mirror but **not** in a sheet of white paper? Both reflect light. **[2]**

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8c ★ The word AMBULANCE is printed back-to-front (ƎƆИAJUBMA) on the front of ambulances. Explain why, using the word **reflection**. **[2]**

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Section C — Exam-style & challenge questions

18 marks

9 **Exam-style (GCSE required practical)** A student uses a ray box and a plane mirror to test the law of reflection. Number the steps **1–5** in the correct order. **[4]**

- ☐ Shine a thin ray of light at the mirror where the normal meets it.
- ☐ Draw a line along the mirror's edge and draw the normal at 90° using a protractor.
- ☐ Mark the incident and reflected rays with small crosses, then join them with a ruler.
- ☐ Measure angles i and r from the normal with a protractor and record them in a table.
- ☐ Repeat for different angles of incidence.

9b Why should the room be darkened during this experiment? **[1]**

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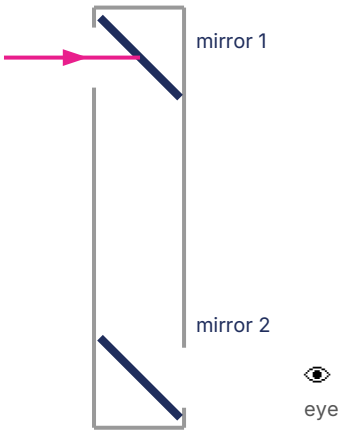
10 **Periscope ★** A periscope uses two plane mirrors, each at 45°. Light enters horizontally. **[4]**

a) What is the angle of incidence at mirror 1? _____ °

b) Through how many degrees does mirror 1 turn the ray? _____ °

c) Complete the path of the ray through the periscope to the eye. (2)



11 **Corner mirrors ★** Two mirrors meet at 90°. A ray hits mirror 1 with an angle of incidence of 30°. **[5]**

a) Complete the path of the ray after it reflects from **both** mirrors. (2)

b) What is the angle of incidence at mirror 2? _____ °

c) Compare the direction of the final ray with the original ray. Name one use of this. (2)

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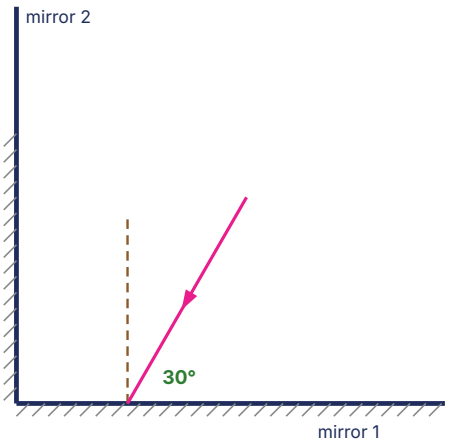

12 **Exam-style** A ship sends a pulse of sound down to the seabed. The echo returns after **0.4 s**. Sound travels at **1500 m/s** in water. **[4]**

> distance = speed × time · Remember: the sound goes **down and back up**.

a) Calculate the total distance travelled by the sound.

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b) Calculate the depth of the sea. depth = _____ m

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