8.1 Light travels in a straight line

1. Draw rays of light to show how the girl sees the words in the book.

2. Circle the correct answer.

a. **Opaque** / **Transparent** objects form shadows.

b. **Non-luminous** / **Luminous** objects are light sources.

c. **Clear** / **Frosted** glass does not form shadows.

d. The **Sun** / **Moon** is the Earth's main light source.

e. When light is **absorbed** / **transmitted** by an object, it creates a shadow **in front of** / **behind** the object.

3. Look at the pictures and explain the use of each object.

Curtains made of thin fabric

a. Because thin fabric is translucent and some light can pass through it.

Greenhouse made of clear plastic

b. Because clear plastic is transparent and a lot of light can pass through it.

Beach umbrella made of thick fabric

c. Because thick fabric is opaque and light can not pass through it.

4. Violet wants to make a ray box for a physics experiment about light.

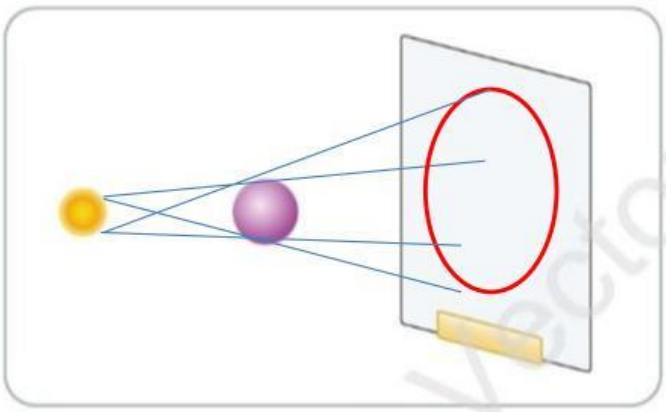
a. How might a ray box be useful in a physics experiment about light?

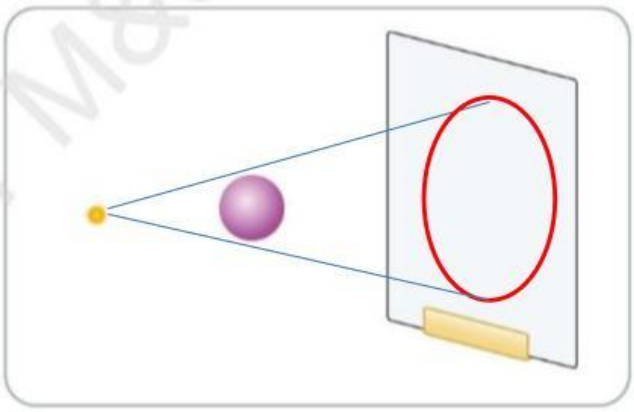
To see how light travels in straight lines

b. What materials should she use?

A box and a light source like a bulb or a torch

5. Draw the ray diagrams and the shadows. Then answer the questions.





a. How can shadows be used as evidence that light travels in straight lines?

Because they only form when light is blocked by an object.

b. What kind of shadow does each light source create and why?

Its size is similar to the size of the ball.

c. Which diagram best represents a model for a solar eclipse, and which part of the diagram represents the Sun, which represents the Earth, and which represents the Moon?

The first diagram can be used as a model for a solar eclipse.

8.2 Reflection of light

1. Complete the sentences with the words in the box.

mirrors incidence reflected regular periscopes
incident diffuse normal reflection

a. A ray that is travelling towards a surface is called a(n) incident ray, while a ray that is redirected while leaving a surface is called a(n) reflect ray.

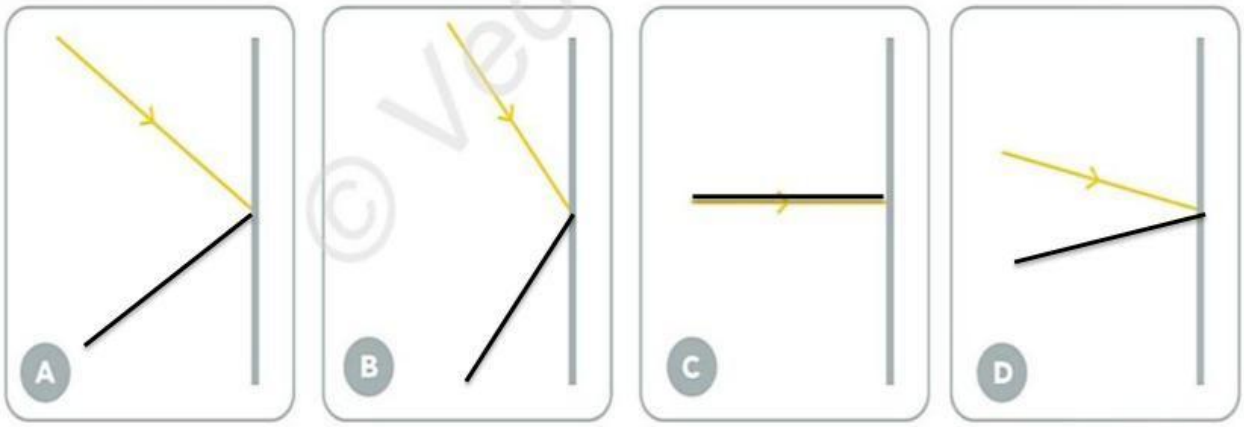
b. The angles of incidence and reflection are formed between the ray and the normal.

c. The law of reflection says that the angle of incidence is equal to the angle of reflection.

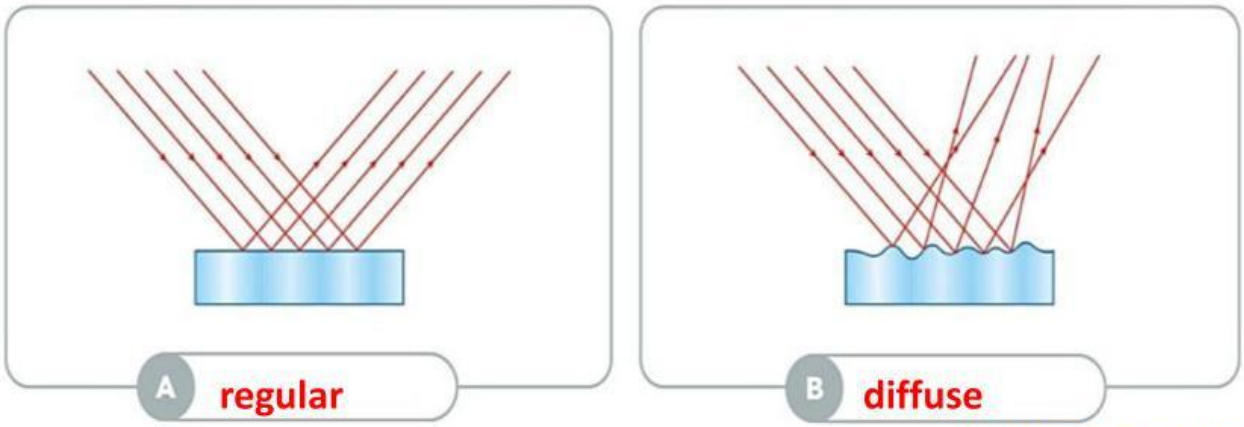
d. Mirrors give us an image of ourselves and our surroundings, while periscopes give us an image of places that our vision cannot reach because of obstacles.

e. Rough surfaces cause diffuse reflection while smooth and flat surfaces cause regular reflection.

2. Complete the ray diagrams.



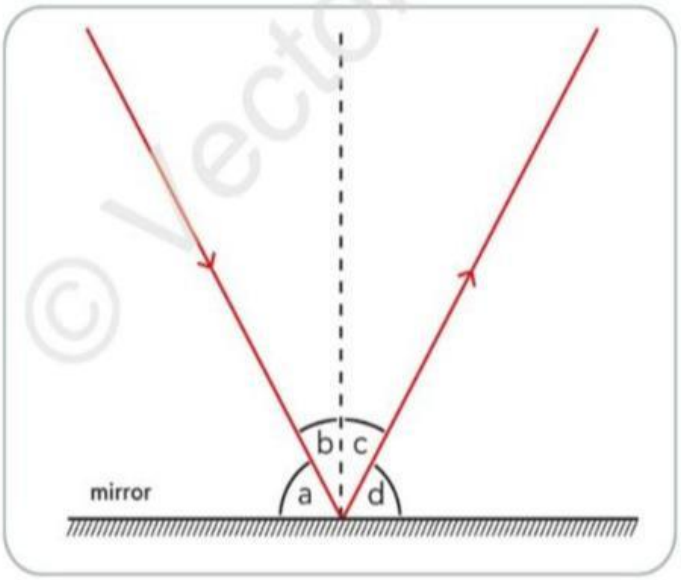
3. Write the name of each type of reflection.



4. Number the sentences to explain how the crew of a submarine can see above the surface through a periscope. Write 1-7.

Light reflects off the object.	2
Light reflects off the bottom mirror.	6
Light travels to the top mirror of the periscope.	3
Light travels to the crew's eyes.	7
Light travels to the bottom mirror of the periscope.	5
Light travels from a light source to an object.	1
Light reflects off the top mirror.	4

5. Look at the ray diagram. Then answer the questions.

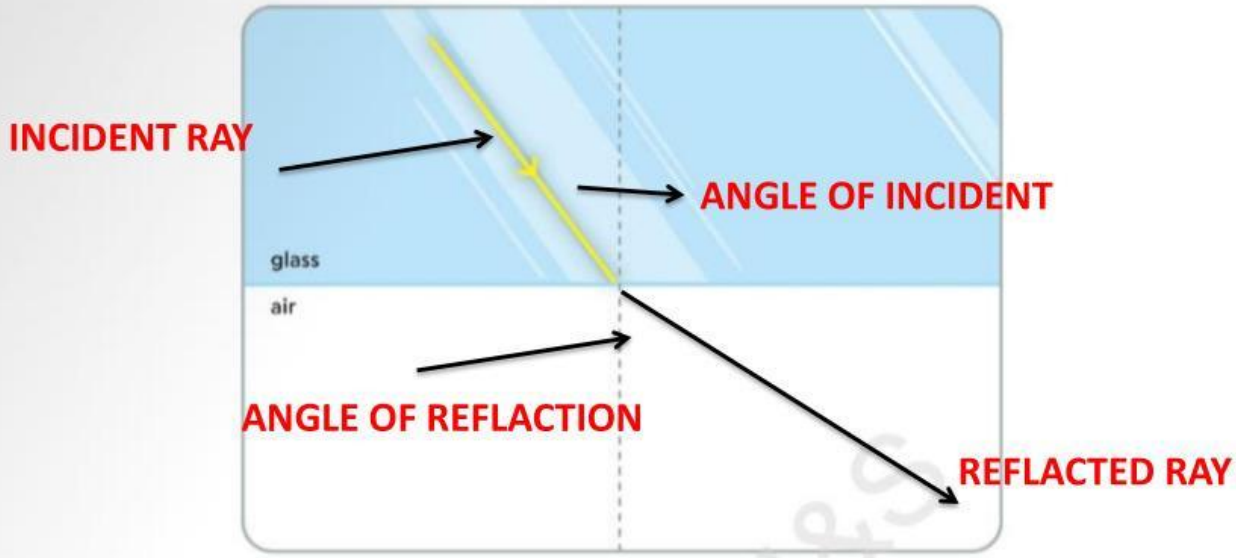


a. Which is the angle of incidence and which is the angle of reflection?

b. If angle a is 60°, what sizes are the angles b, c, and d?

8.3 Refraction of light

1. Complete the ray diagram and name its components.



2. Circle the correct answer.

a. The phenomenon according to which light changes direction as it travels through one transparent medium to another is called **reflection** / **refraction**.

b. Refraction happens because light travels at **the same** / **a different** speed from one medium to another.

c. Light travels faster in **air** / **water**.

3. Tick (✔).

a. A ray passes from air to glass

angle of refraction > angle of incidence	
angle of refraction < angle of incidence	X

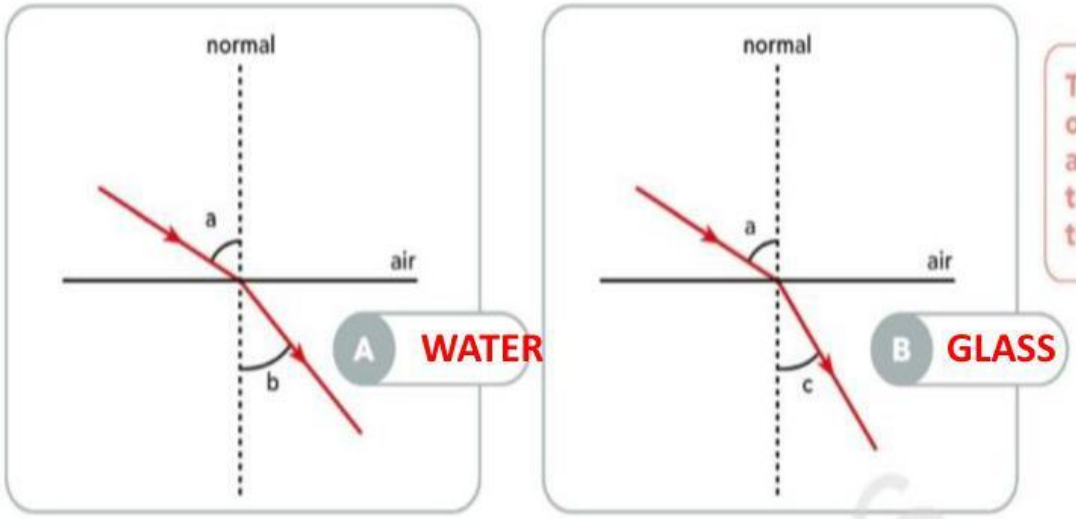
b. A ray passes from glass to water

angle of refraction > angle of incidence	X
angle of refraction < angle of incidence	

c. A ray passes from water to air

angle of refraction > angle of incidence	X
angle of refraction < angle of incidence	

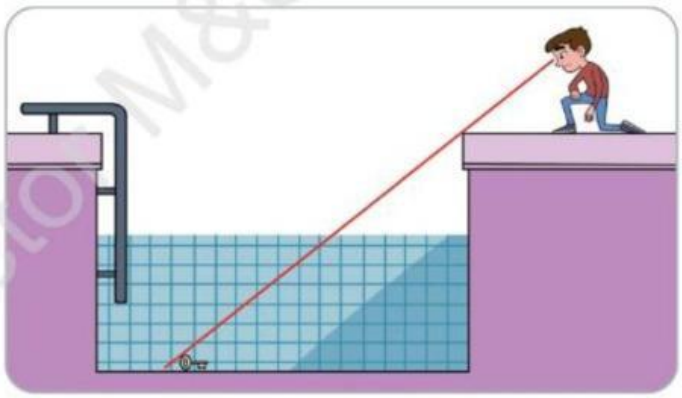
4. Is the media water or glass if the angle a is 60°, angle b is about 41°, and angle c is about 34°?



tip!

The more the speed of light slows down as it travels from air to another medium, the more it refracts.

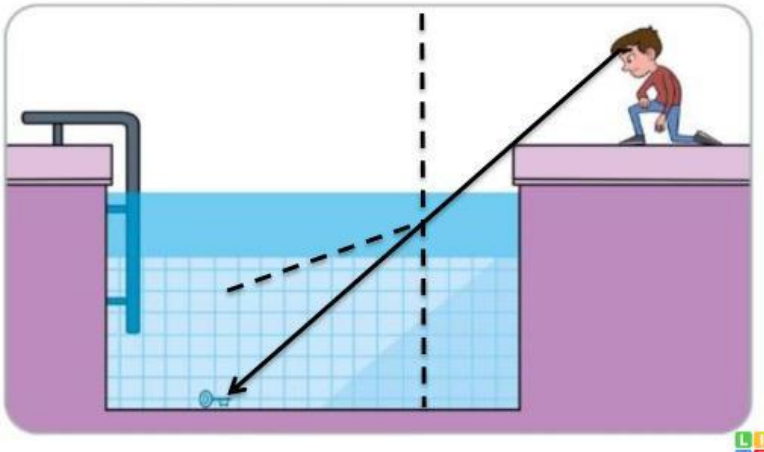
5. Haruki accidentally dropped his key into a pool without water and bends down trying to find it, but from his position he can barely see it.



a. What would change if the pool was full of water? Explain your thinking.

THE POSITION THAT THE KEY APPEARS TO BE IN WOULD CHANGE AND HE WOULD BE ABLE TO SEE THE KEY

b. Draw the ray diagram when the pool is full of water so that Haruki can see the key. Then draw the position of the key as Haruki sees it.



8.4 Dispersion of light

1. Complete the sentences with the words in the box.

prism dispersed spectrum disperse red reflected dispersion violet

a. Prisms are objects made of a transparent material with flat surfaces that DISPERSE light.

b. The light SPECTRUM is a range of colours that starts with RED and ends with VIOLET.

c. The splitting of light into its components is called DISPERSION.

d. Rainbows occur when sunlight gets DISPERSED and REFLECTED inside a water droplet.

e. Isaac Newton was the first to use a PRISM to study the dispersion of light.

2. Tick (✔) the spectrum of white light.

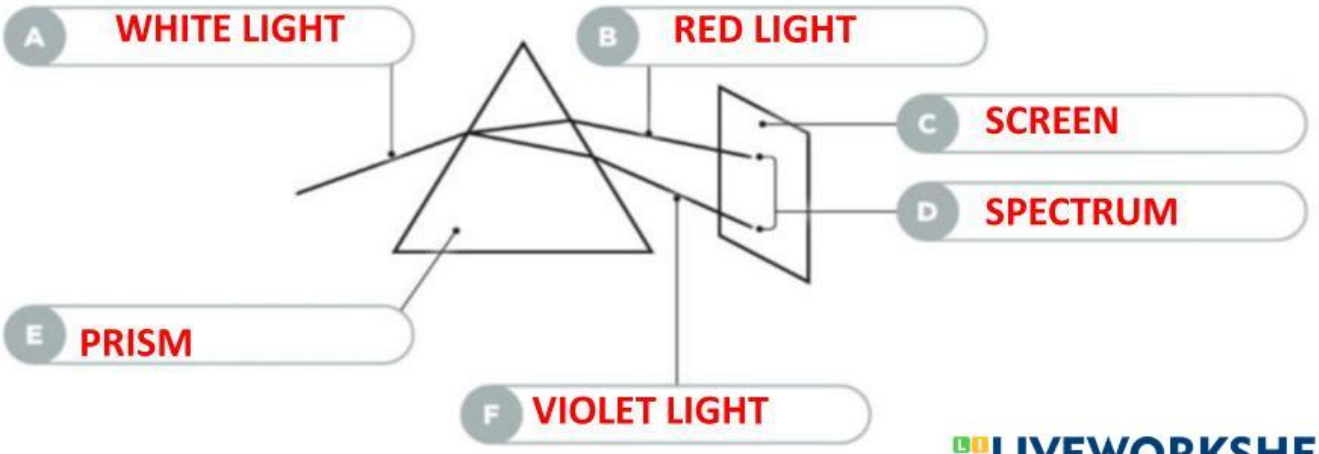
A X

B

C

3. Label the components of the diagram with the words in the box.

spectrum red light prism white light screen violet light



4. Read the sentences and find the mistakes in each sentence. Then write them correctly.

a. The beam of light that hits the prism is called the light spectrum.

THE LIGHT SPECTRUM

b. A prism is a triangular opaque object usually made from plastic.

IT IS MADE OF GLASS OR PLASTIC

c. The spectrum that is created after white light has passed from a prism consists of eleven colours.

CONSISTS OF SEVEN COLOURS

d. Light emitted by the Sun is considered coloured light.

IT IS CONSIDERED WHITE LIGHT