

GCSE

Separate

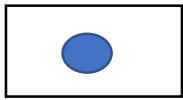
Physics

Weeks 9-12

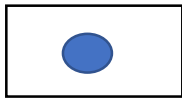
Online Tuition

Exam Question Workbook

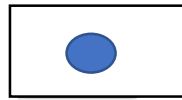
The diagram shows four identical pieces of aluminium. Each had been painted with a different type of paint. A drop of water was placed on each and they were then heated by a radiant heater held about one metre above them.



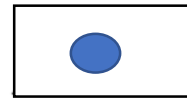
A Matt black



B Shiny white



C Matt white



D Shiny black

1. Suggest in which order the pieces of aluminium would become dry.

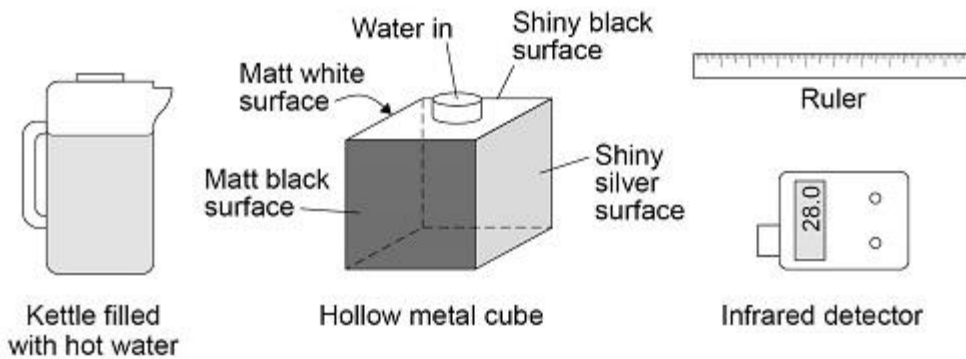
First _____ Last

2. Explain why you chose your order.

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3. Describe how the equipment shown in **the image above** would be used to compare the infrared radiation emitted from the vertical surfaces of the cube.

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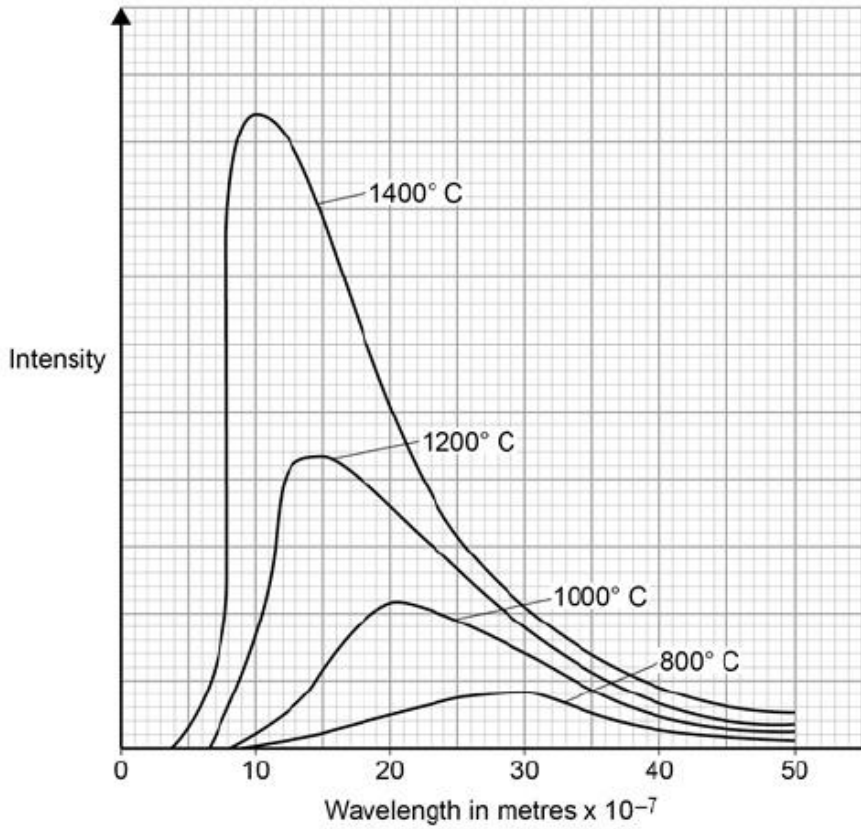
1. What is meant when an object is described as a perfect black body?

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The graph below how the intensity of different wavelengths of radiation from a hot object varies with temperature.



2. Explain how the distribution of the intensity of radiation from an object changes as the temperature of the object increases?

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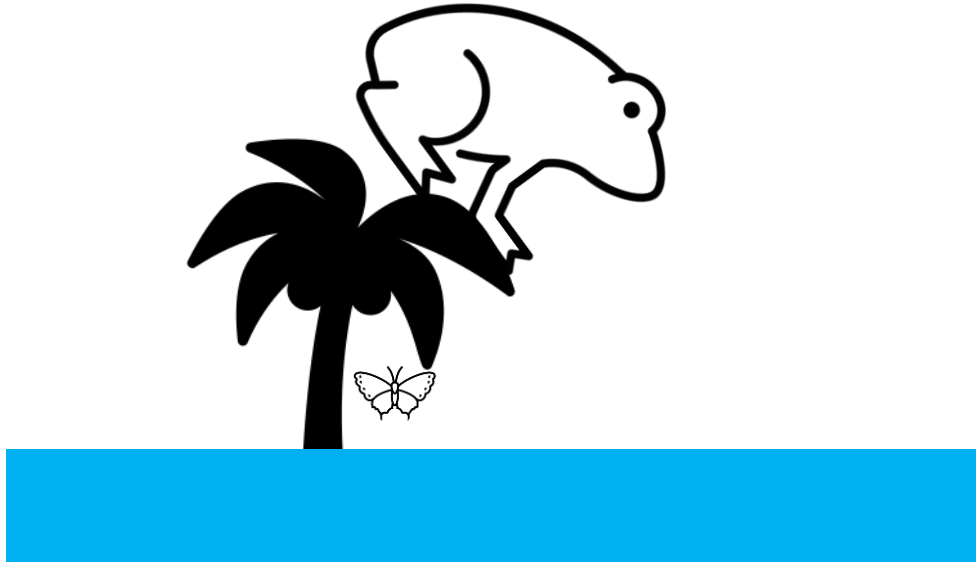
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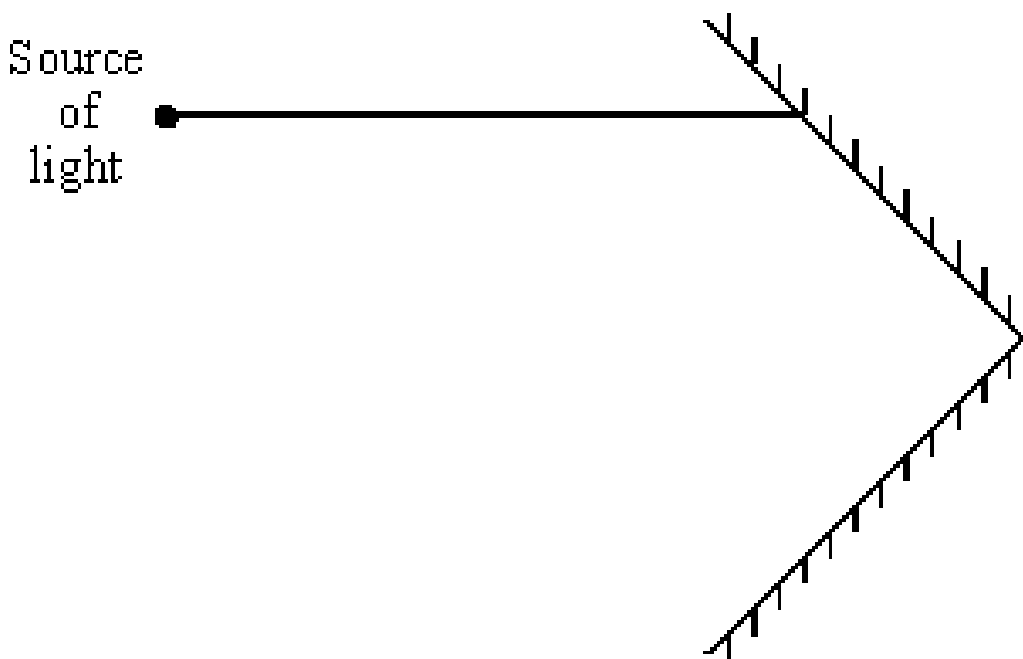
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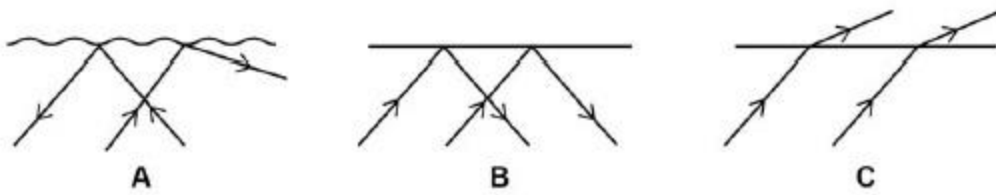
1. A butterfly is beneath a plant. Use a ruler to draw rays of light on the diagram to show how the frog uses reflection to see the butterfly. Mark the direction of the rays and the normal.



2. The diagram shows two mirrors at right angles to each other. A ray of light shines onto one mirror as shown. Carefully draw the path of the ray which is reflected from both mirrors. Draw an arrow on the ray to show the direction of the light. Draw each normal.



The images below rays of light incident on three different surface.



1. What is meant by specular reflection?

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1. What is meant by diffuse reflection?

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1. Which **one** of the diagrams shows diffuse reflection?

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1. Which **one** of the diagrams shows specular reflection?

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1. Which **one** of the diagrams shows refraction?

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6. Compare specular and diffuse reflection.

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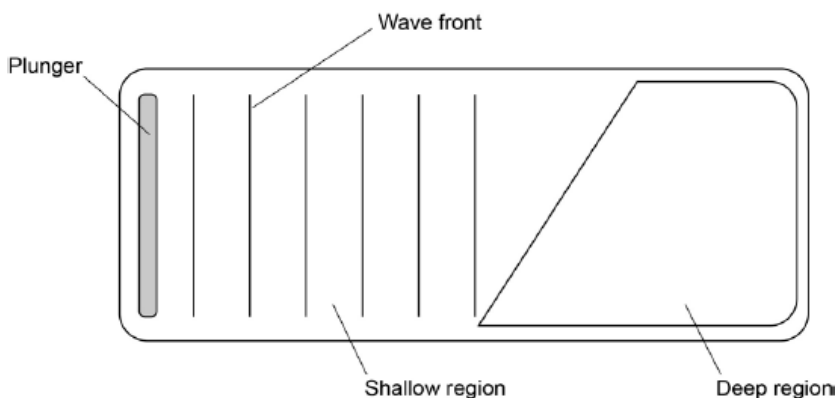
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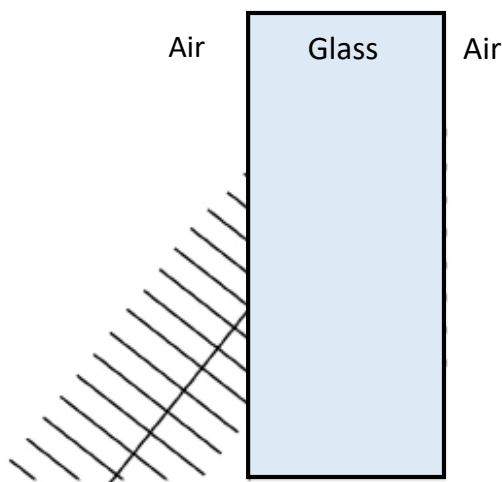
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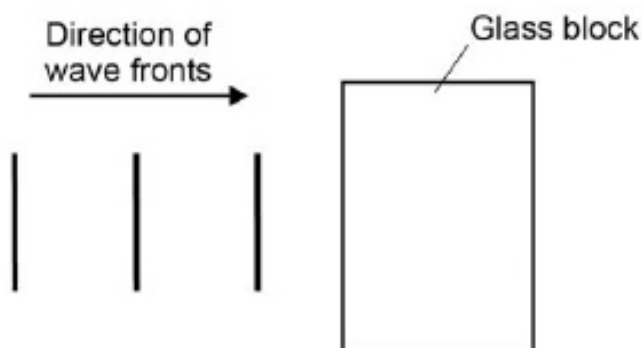
- The image below shows a ripple tank students used to model the behaviour of waves. Complete the wave fronts on the figure above. Show how the wave is refracted as it passes from the shallow region into the deep region.



- Complete the image below by drawing wave fronts as they enter the glass block and after they have left the glass block.



- The image below is a wave front diagram showing light travelling through the air and into a glass block. Complete **the image below** by drawing wave fronts as they move through and as they leave the glass block.



1. Explain why there is refraction at the boundary between air and glass.

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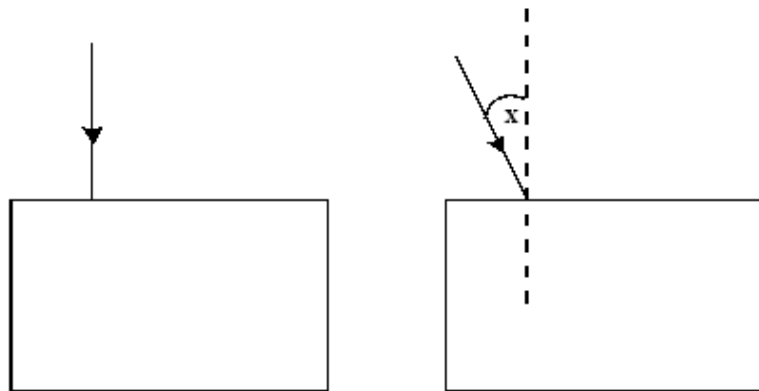
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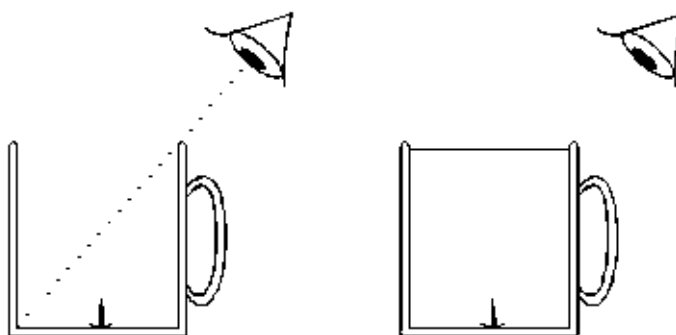
2. The diagrams show rays of light. Each ray strikes a surface of a glass block.

a) On the diagram draw the path of each ray through the glass block and out into the air again.

a) Label another angle on the diagram which is equal to the angle marked **X**. Label this angle **Y**.



The diagrams below show two beakers. Both beakers have a drawing pin inside as shown. The first beaker is empty. The eye cannot see the drawing pin. The second beaker is full of water and the eye can see the drawing pin.



3. Explain how the eye is able to see the drawing pin in the second beaker. You may add to the diagram if it helps your answer.

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2019 Explain why the light refracts as it passes from air into glass.
[3 marks]

T2022 A student used a ray box to shine a ray of light through air into a glass block.
box

The student investigated how the angle of refraction varied with the angle of incidence.

Angle of incidence in degrees

10

20

30

40

50

60

70

80

Angle of refraction in degrees

5

10

14

19

23

26

28

29

Describe a method the student could have used to obtain the results in table above.
Your answer may include a labelled diagram.

[6 marks]

Viewing an object through a colour filter may make the object look a different colour.

1. Complete the sentences.

A red object viewed through a blue filter will look a) _____.

This is because the red object only b) _____ red light and the blue filter only c) _____ blue light.

A white surface is viewed through a green filter, the surface will appear d) _____.

A student wears a white T-shirt and a red baseball cap to a party.

2. Why does the T-shirt look white in white light?

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2. Explain how the colour of the baseball cap appears to change when the room lights at the party change from white to blue.

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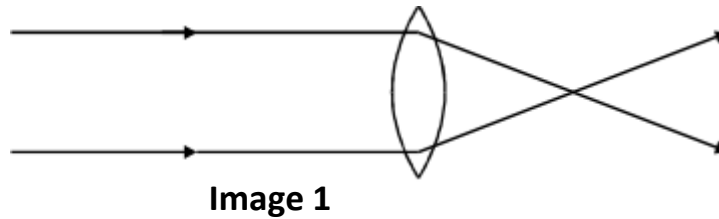
2. Explain how the colour of the baseball cap appears to change when the light remains blue and someone looks at the baseball cap through a red filter.

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1. The diagram shows how parallel rays of light pass through a lens. State the type of lens shown in **image 1**.

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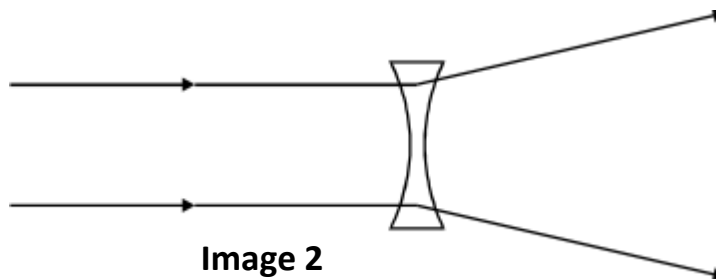
2. Mark the position of the focus on the lens in **image 1**.



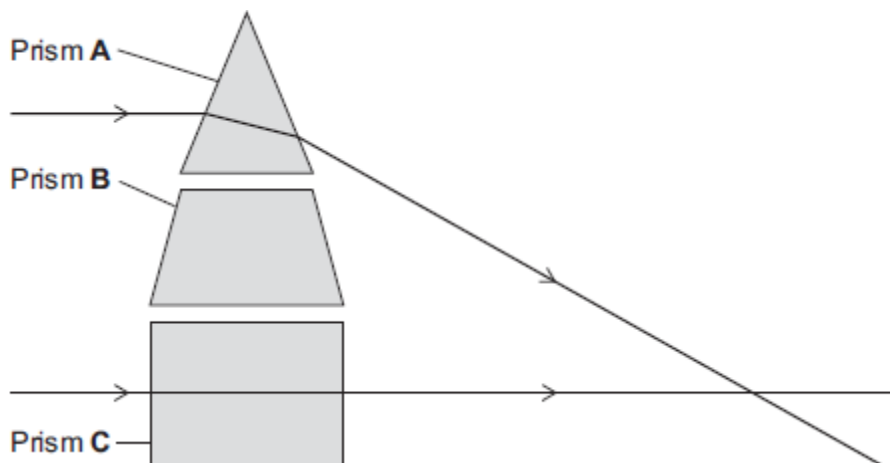
3. The diagram shows how parallel rays of light pass through a lens. State the type of lens shown in **image 2**.

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4. Mark the position of the focus on the lens in **image 2**.

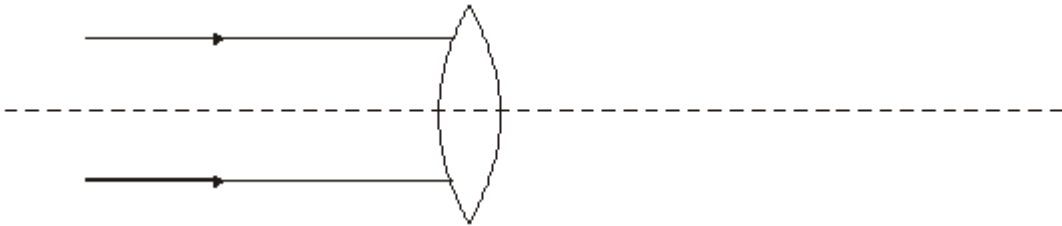


5. Draw a third parallel ray entering and passing through prism **B** in the image below.



The diagram shows two parallel rays of light, a lens and its axis.

1. Complete the diagram to show what happens to the rays.

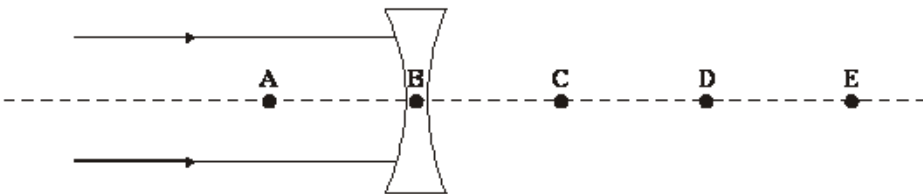


2. Name the point where the rays come together.

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2. What word can be used to describe this type of lens?

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4. Which point **A**, **B**, **C**, **D** or **E** shows the focal point for this diagram? Point _____

4. Explain your answer to question 4.

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4. What does **magnify** mean?

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4. What is a **real** image?

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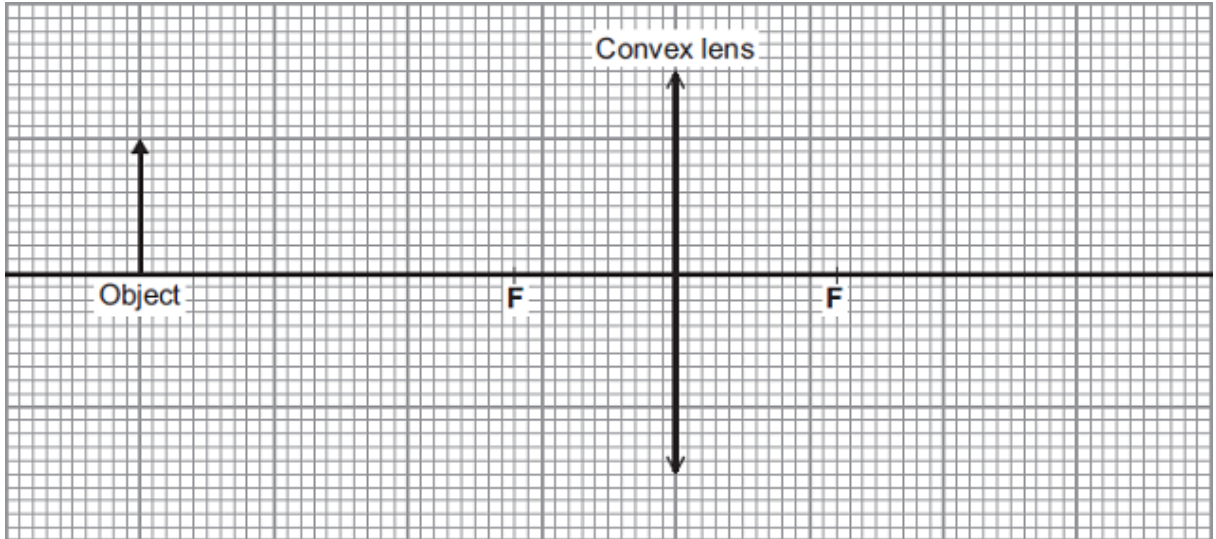
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4. What is a **virtual** image?

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1. A camera was used to take a photograph. The camera contains a convex (converging) lens. Complete the ray diagram to show how the lens produces an image of the object.

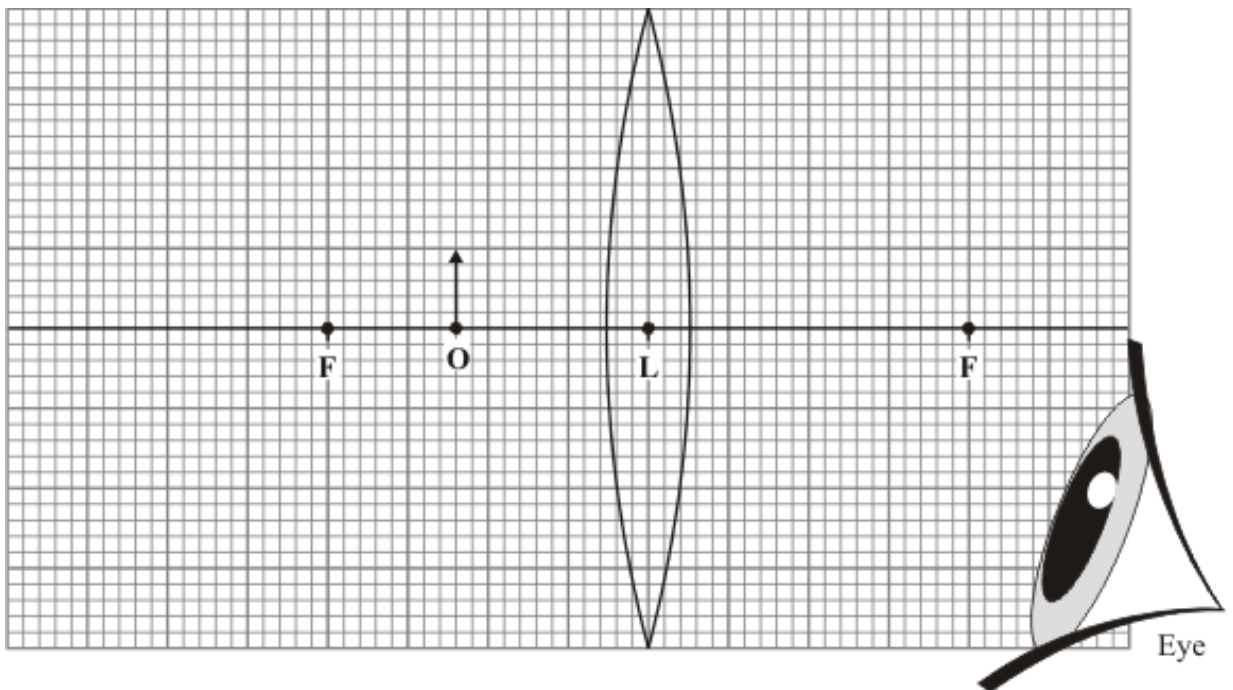


2. State **two** words to describe the nature of the image produced by the lens in the camera.

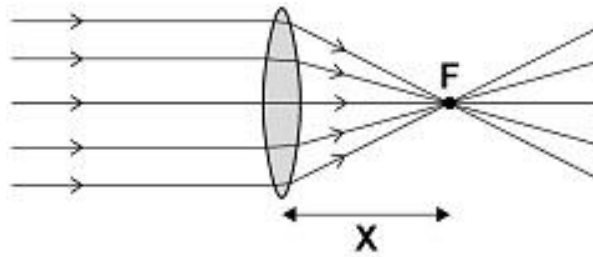
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3. On the diagram, construct the position of the image. You should show how you construct your ray diagram and how light appears to come from this image to enter the eye.



The image below shows parallel rays of light being refracted by a convex lens.

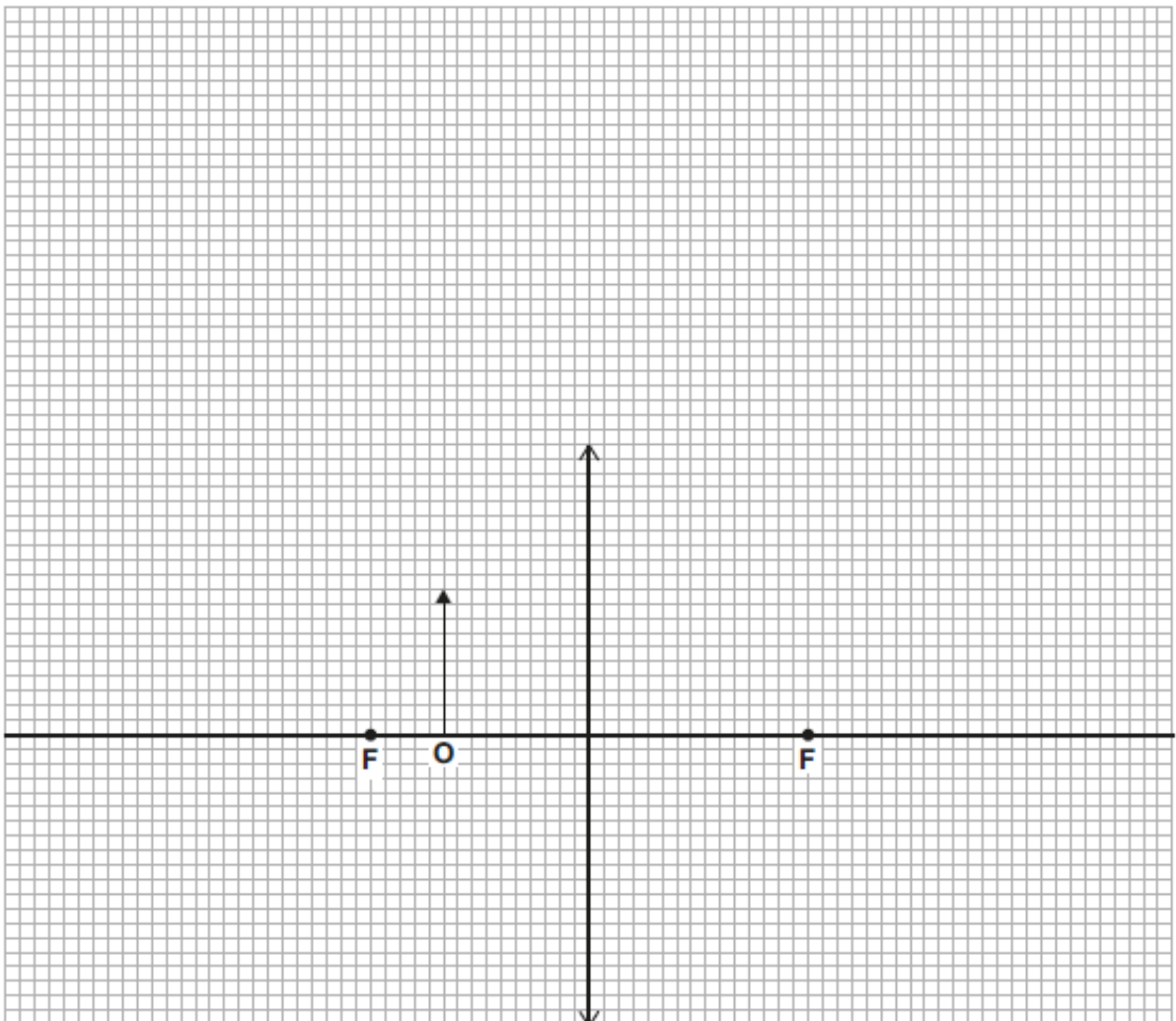


1. What is distance 'X' called?

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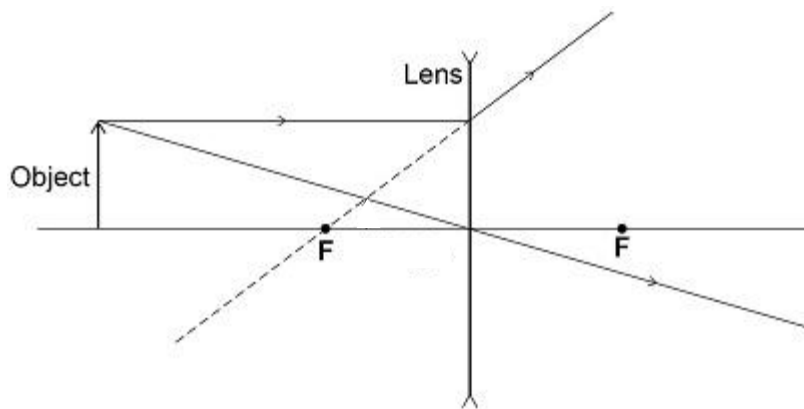
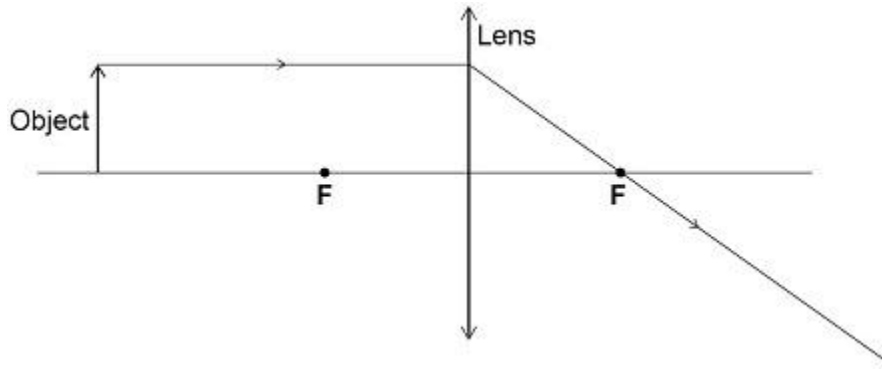
An object, O, is very near to a convex lens, as shown in the image below.

2. Complete the ray diagram below to show how rays of light from the object form an image.



Lenses can be used to form the image of an object.

- Complete the ray diagram in both images below to show how a **convex** and **concave** lens forms the image of the object. Use an arrow to represent the image.



- Give **one** similarity and **two** differences between the image formed by the convex lens and the image formed by the concave lens.

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1. What is a longitudinal wave?

(2)

2. In a diagram of longitudinal waves, what is the area called when the lines are close together?

(1)

3. In the diagram of longitudinal waves, what is the area called when the lines are further away from each other?

(1)

4. Explain the effect does a sound wave has on the particles on a surface of a solid when a sound wave hits a solid.

(2)

5. Describe what can happen to the energy when the sound wave hits a solid.

(2)

6. What is the frequency of a sound wave controlled by?

(1)

7. What is the amplitude of a sound wave controlled by?

(1)

8. Explain why astronauts cannot hear sound in space.

(2)

9. What is ultrasound?

(1)

10. How are microwaves different from sound waves?

(4)

1. Give the name of reflected sound waves.

(1)

2. What is echo sounding used for?

(1)

3. When the reflected sound waves are detected, what is measured?

(2)

4. Write the equation to calculate the total distance travelled by the sound wave calculated using speed and time.

(1)

5. Write the equation to calculate the depth below a ship to the seabed calculated.

(1)

1. Give the name of the sound wave used for prenatal scanning.

(1)

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2. Explain why X-rays are not used to scan unborn babies, yet ultrasound is used to scan unborn babies.

(3)

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3. Describe how an image is created when ultrasound waves meet a boundary between different materials.

(2)

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4. Explain the risk of carrying out ultrasound scans on unborn babies.

(3)

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5. Explain how ultrasound can be used to clean jewellery.

(2)

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6. Explain why it is necessary to produce a narrow beam of ultrasound waves during a prenatal scan.

(1)

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7. An oscilloscope, ultrasound transmitter and detector have been fixed to the front of a metal block which has an internal crack. The screen of the oscilloscope displays a transmitted pulse followed by two pulses, pulse X and then pulse Y. Explain what causes pulse X and pulse Y.

(3)

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1. What is the focus of an earthquake?

(1)

2. What is the epicentre of an earthquake?

(1)

3. What are seismic waves detected by?

(1)

4. Which states of matter can transverse waves be transmitted through?

(1)

5. What effect do P-waves have on material inside the crust?

(1)

6. What effect do S-waves have on material inside the crust?

(1)

7. What effect do L-waves have on material inside the crust?

(2)

8. Describe what happens to primary and secondary waves as they move through the mantle.

(2)

9. Describe what happens to P-waves at the boundary between the mantle and outer core.

(2)

10. Explain what causes the S-wave shadow zone.

(3)

11. What is the P-wave shadow zone?

(1)