

90768



907680



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA



For Supervisor's use only

## Level 2 Science, 2009

### 90768 Use physics concepts and principles to describe the behaviour of light

Credits: Four

2.00 pm Wednesday 2 December 2009

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

For Assessor's use only		Achievement Criteria	
Achievement		Achievement with Merit	Achievement with Excellence
Use physics concepts and principles to describe the behaviour of light.	<input type="checkbox"/>	Use physics concepts and principles to explain the behaviour of light.	<input type="checkbox"/>
Overall Level of Performance		<input type="checkbox"/>	

You are advised to spend 40 minutes answering the questions in this booklet.

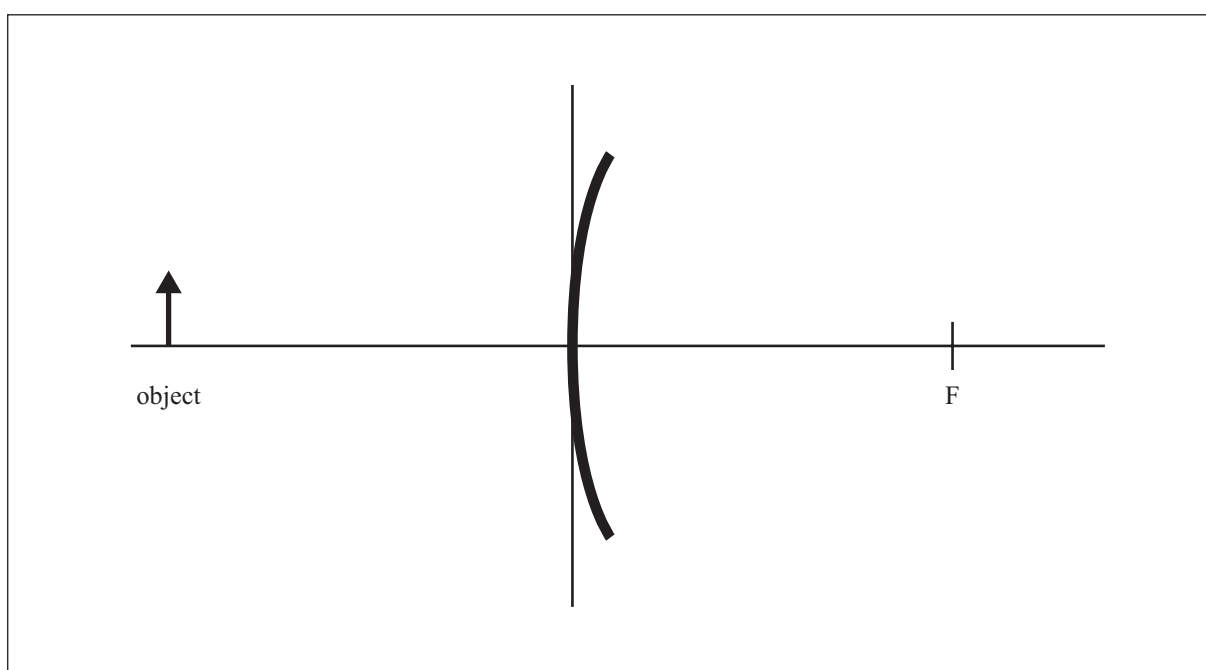
### QUESTION ONE: THE CAR MIRROR

Car wing mirrors are convex mirrors and often have the warning “objects in the mirror are closer than they appear” written on them.

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- (a) Complete the ray diagram for a convex mirror.

<http://www.flickr.com/photos/ryancordell/1040657607/>



- In your discussion include:

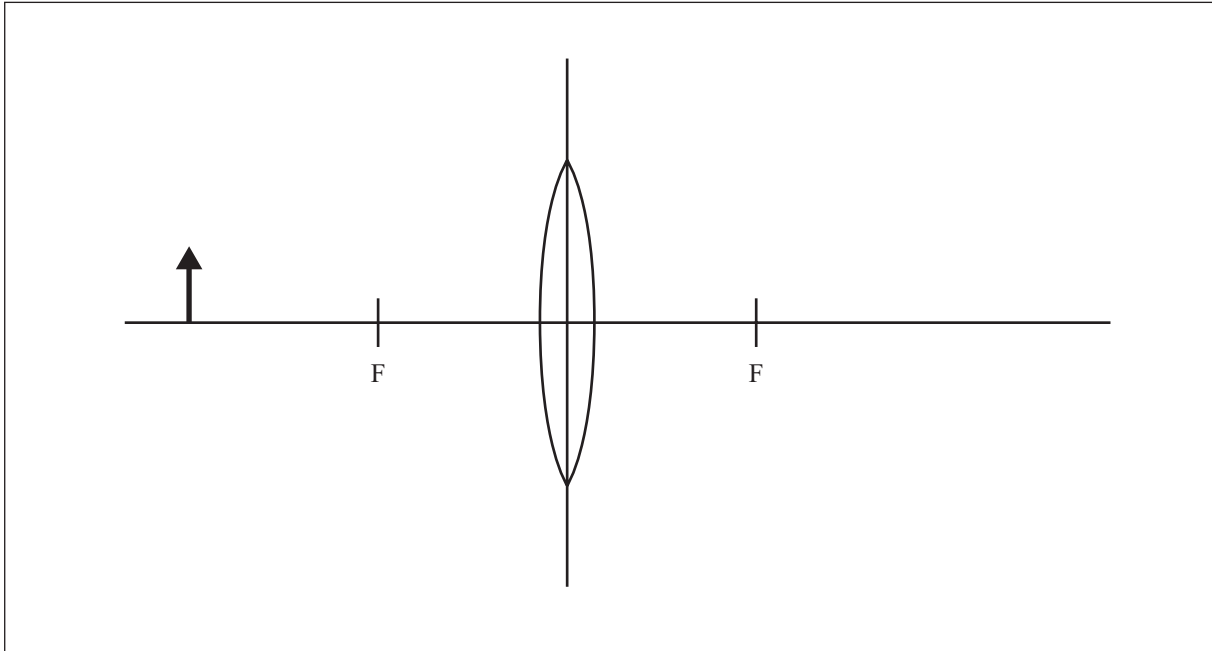
- 
- This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

- [illegible]

**QUESTION TWO: THE MAGNIFYING GLASS**Assessor's  
use only

A convex lens, of focal length 5 cm, is to be used as a magnifying glass. It is placed 10 cm in front of an object that is 2 cm high.

- (a) Complete a ray diagram to find the **position**, **height** and **nature** of the image in this configuration.



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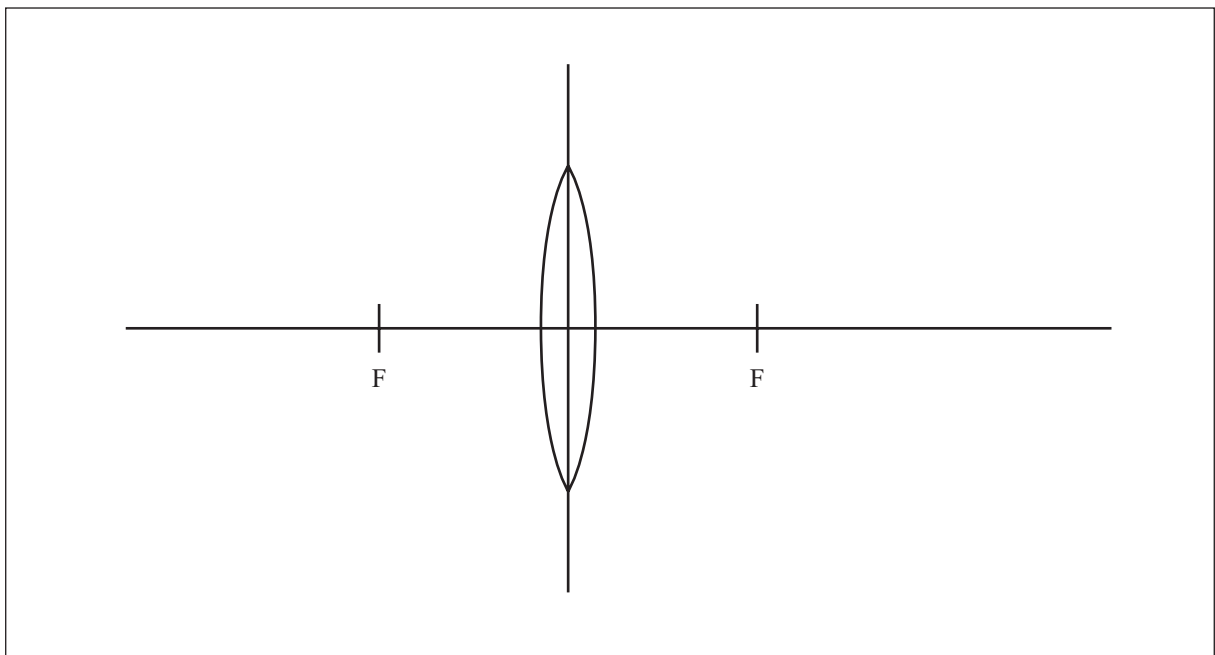
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- You can refer to a second ray diagram below to help you justify your answer. Ensure your diagram is fully labelled.

[illegible]

### QUESTION THREE: THE USE OF COLOUR IN THEATRE

A gobo, also called a template or pattern, is a thin circular plate with holes cut in it to create patterns of projected light on walls, screens or dance floors.

If the gobo shown below left is placed in a fixture with a red gel, the light pattern shown below right would be produced.



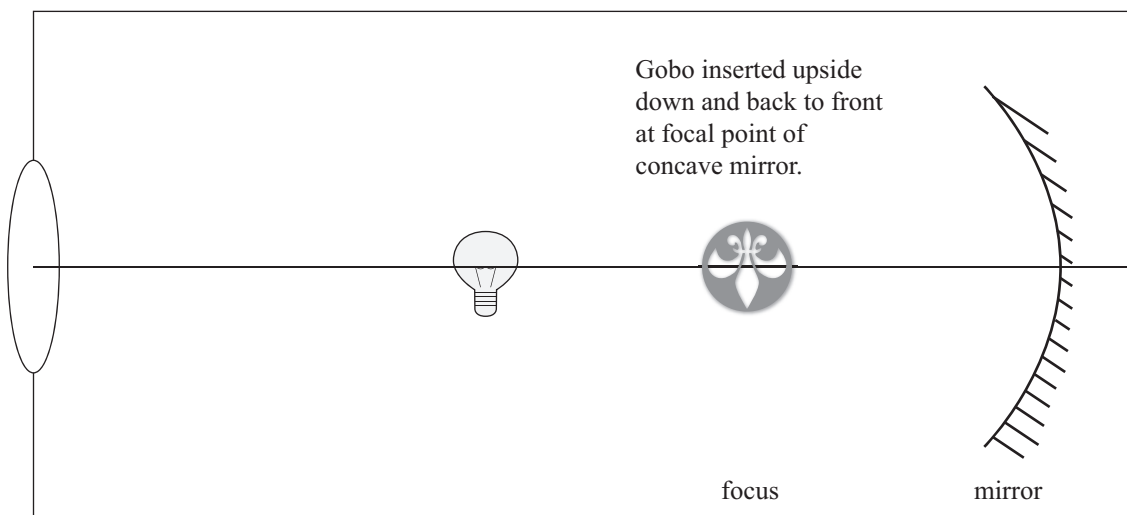
gobo



light pattern

The gobo is placed at the **focal point** of the concave mirror inside the lantern. The gobo is inserted **upside-down** and **back-to-front**. The desired pattern is then projected by the lantern onto whatever surface it is pointed at, such as a wall or dance floor.

Inside the lantern:



- (a) Discuss why the gobo is placed upside down and at the focal point of the mirror.

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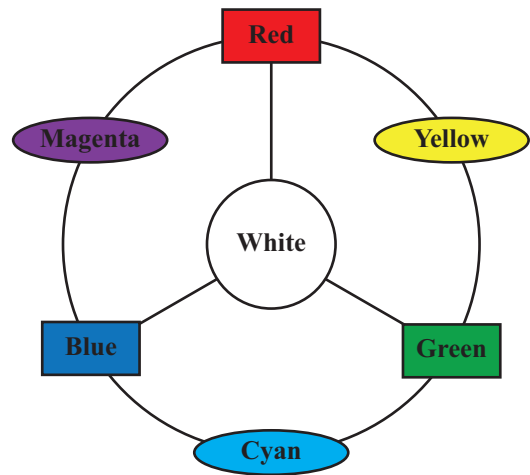
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- (b) A red gel absorbs all colours but red.

Magenta and cyan coloured gels are placed together in front of the mirror.

Discuss what colour would be seen, and how this colour is produced. Use the diagram of primary and secondary colours to assist your discussion.



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**Extra paper for continuation of answers if required.  
Clearly number the question.**

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Question  
number

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