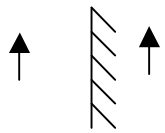
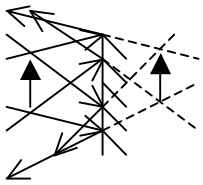
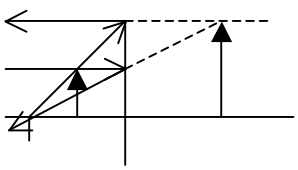
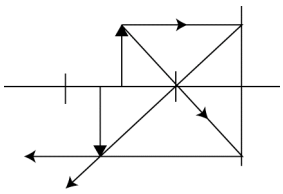
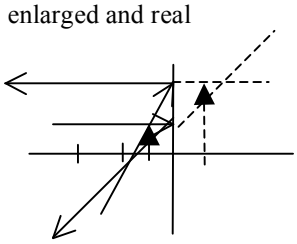
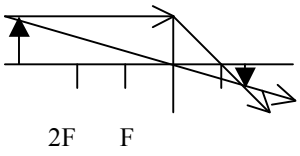
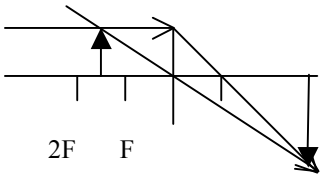
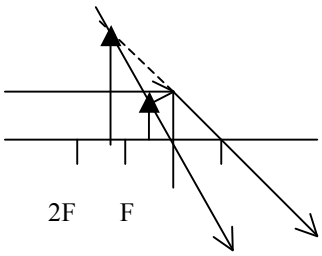
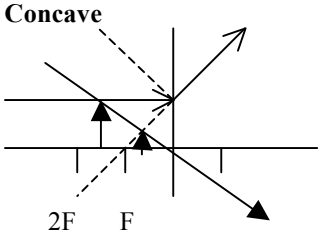
Assessment Schedule – 2008

Science: Use physics concepts and principles to describe the behaviour of light (90768)

Evidence Statement

	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)	 Image drawn	 Image drawn. One correct ray. Ray diagrams have arrows.	
(b)	Cannot be used because: • It creates a virtual image that cannot be projected. OR • Image would be laterally inverted. OR • Image is the same size.	Cannot be used Explains that a convex mirror or a prism is what should be used in a camera. OR because it creates a virtual image that cannot be projected AND / OR image would be laterally inverted AND / OR image is the same size.	Cannot be used because it creates a virtual image that cannot be projected AND image would be laterally inverted AND image is the same size.
TWO (a)	 Object in correct position AND focal point correct AND one ray drawn correctly. OR If ray diagram incorrect but candidate has TWO features of image (virtual, upright, enlarged) described correctly.	Object in correct position AND focal point correct AND two rays drawn correctly AND image in correct position AND Candidate has image (virtual, upright, enlarged) described correctly.	Object in correct position AND focal point correct AND two rays drawn correctly AND image in correct position AND Nature: virtual, enlarged, upright. AND one of: Size: 20 ± 2 cm Position: 40 ± 2 cm
(b)	Magnified OR upright.		

(c)	 Between F and 2F, inverted, enlarged and real  Inside F, upright, enlarged, virtual. Describes 2 / 3 features of image correctly OR one ray diagram correct. OR because outside of F gives inverted image.	ONE correct ray diagram for EITHER between F and 2F OR inside F drawn correctly AND 2 / 3 features for image for that ray diagram described correctly.	TWO ray diagrams drawn correctly AND Describes both images with 2 / 3 features of image correct AND States inside F is ideal for shaving or make-up mirror as do not want inverted.

THREE	**Convex** Outside 2F  Diminished, real, inverted Between 2F and F  Enlarged, real, inverted Inside F  Enlarged, virtual, upright **Concave**  ALWAYS Diminished, virtual, upright ONE diagram drawn OR image described (real) for **convex** to show they form real images. AND ONE diagram drawn OR image described (virtual) for **concave** to show they form virtual images.	TWO ray diagrams that show (or states) that convex lens forms real and virtual image AND Ray diagram shows (or states) that concave lens forms virtual image.	TWO ray diagrams for convex lens to show convex lens forms real and virtual image shown from: Real image – outside 2F. – between F and 2F. Virtual image – Inside F. PLUS Ray diagram shown for concave lens that shows virtual image formed.

FOUR (a)	A: Light slows as it enters the gemstone and hits the other edge of the gemstone at an angle greater than the critical angle, and it is internally reflected onto the second edge of the gemstone, where it is refracted and exits the gemstone. C: The light ray slows as it hits the gemstone at an angle smaller than the critical angle and is refracted out of the gemstone on that same angle. B: Light slows and enters gemstone and hits other edge at an angle greater than critical angle, so total internal reflection occurs. At second edge of gemstone, light ray is still greater than critical angle and total internal reflection occurs twice before light leaves gemstone. Pathway in ONE gemstone correctly described.	Explanation that gemstone A has total internal reflection followed by refraction and gemstone C has refraction only. OR Gemstone B has total internal reflection twice compared to once (A) or none (C).	Gemstone B well cut because total internal reflection occuring twice, so light bouncing inside gem for longer and gem appears more brilliant.
(b)	$v = f\lambda$ $= 6.4 \times 10^{14} \times 4.7 \times 10^{-7}$ $= 3.0 \times 10^{8}$ m s^{-1} Velocity in air found	$v = f\lambda$ $= 3.0 \times 10^{8}$ m s^{-1} AND incorrect rearrangement to give incorrect λ OR incorrect velocity found and follow-on error with correct rearrangement to give incorrect λ OR correct velocity and rearrangement to give incorrect answer for λ.	$v = f\lambda$ $= 3.0 \times 10^{8}$ m s^{-1} $\lambda = v / f$ $= 3 \times 10^{8} / 4.4 \times 10^{14}$ $= 6.8 \times 10^{-7}$ m

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Total of FOUR opportunities answered at Achievement level (or higher). 4 × A	Total of FOUR opportunities answered with THREE at Merit level (or higher) plus ONE at Achievement level. 3 × M + 1 × A	Total of FOUR opportunities answered with THREE at Excellence level plus ONE at Achievement level. 3 × E + 1 × A