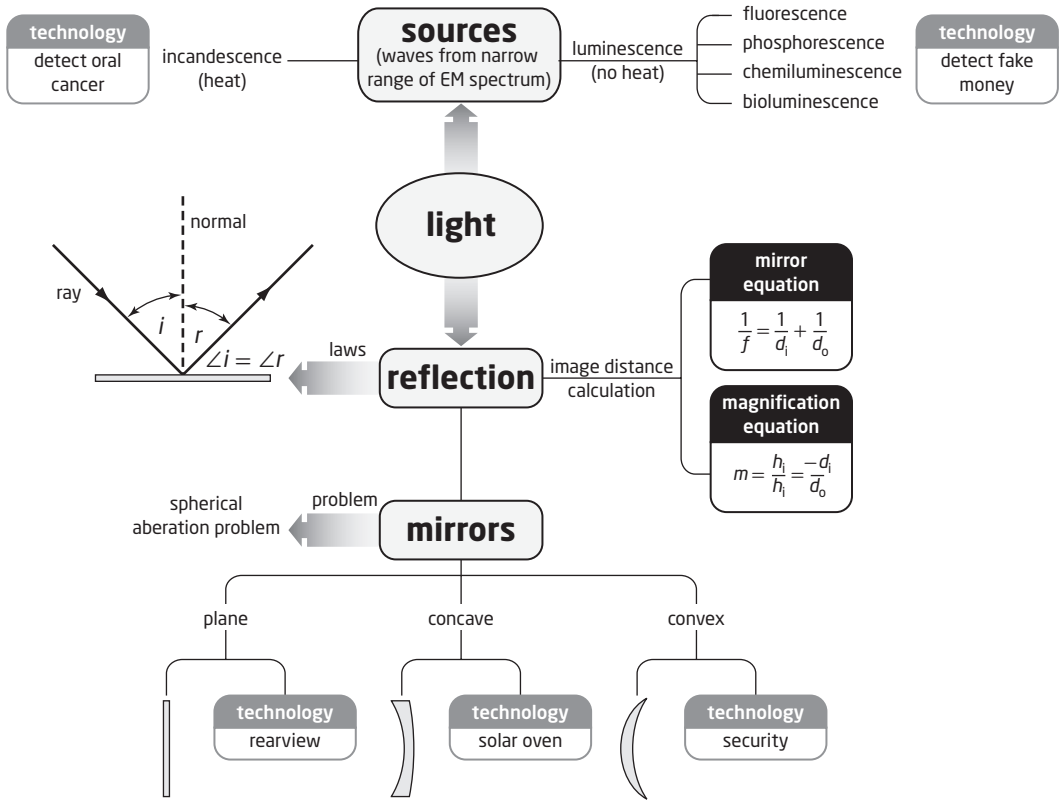
Chapter Review Answers (Student textbook pages 444 and 445)

Please also see **BLM 10-12 Chapter 10 Review (Alternative Format).**

Make Your Own Summary



Reviewing Key Terms

1. Incandescent, fluorescent
2. Bioluminescence
3. Reflection
4. incidence, reflection
5. virtual
6. concave
7. focal, principal axis
8. convex

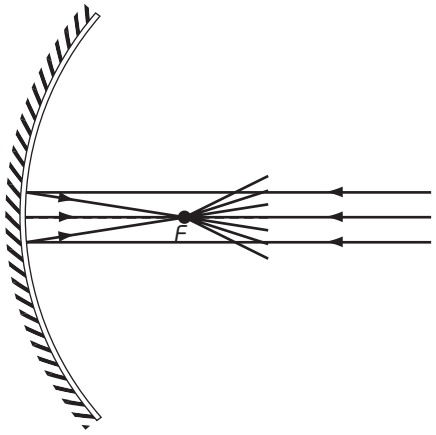
Knowledge and Understanding

9. An atom absorbs energy and becomes excited. When the atom releases its energy, it is often in the form of light.
10. Electrical energy creates a separation of charge. Energetic electrons are emitted from an electrode. The electron collides with an atom in the gas thus exciting it. The excited atom releases its excess energy as light.
11. Visible light is composed of different wavelengths, and the individual wavelengths are associated with a particular colour.
12. A light ray is an imaginary arrow that points in the direction in which the light is travelling.
13. Light rays are reflecting off the mirror in a way that makes them to appear to be coming from behind the mirror. This is called a virtual image.
14. Draw rays parallel to the principal axis then reflecting off the mirror. Extend the reflecting rays back behind the mirror. The point where the lines meet is the focal point.
15. There is no true focal point because parallel rays that reflect from the mirror do not all cross the principal axis at the same point. The mirror, therefore, cannot produce an image that is focussed properly.
16. The centre of a convex mirror protrudes outward from the edges.

Thinking and Investigation

17. No. The light ray will reflect to your right. The light will never reach your eye.
18. The difference is caused by the nature of the surface of the water. If it is perfectly still, it will reflect like a plane mirror. If there is any wind or boats disturbing the surface of the water, it will be rough and will no longer act like a plane mirror.

19. Concave: You can collect a lot of sunlight and focus it on one small area. This "concentrated" sunlight is hot enough to ignite paper or dry grass.



20. 3 m

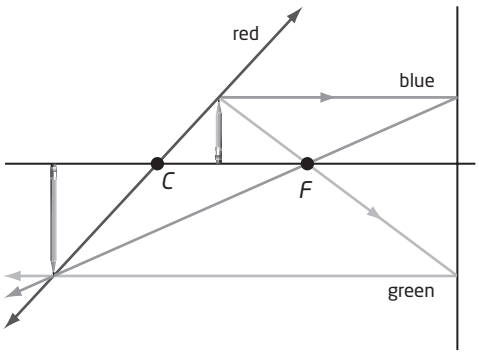
Communication

21. Example: solar cookers, and stealth aircraft

22. Example: security mirrors

23. Fusion reactions, in which atoms combine, or fuse, occur inside the Sun and release large amounts of energy. The energy is transferred to the surface of the Sun where it excites atoms on the surface. When these atoms release some excess energy, it is in the form of light.

24. a.



b. The blue ray goes from the top of the object to mirror and is reflected back through *F* and beyond. The green ray goes from the top of the object through *F* until it hits the mirror and is reflected back, parallel to the principal axis. The red ray goes from the top of the object through *C*, which is twice the distance from the mirror as *F*.

c. The real image is inverted. $d_i = 13.33$ cm (in front of mirror); $h_i = -3.33$ cm (inverted)

25. If you have to extend reflected rays backward, the image is virtual. If rays actually meet, the image is real.

Application

26. The object is placed at the centre of curvature, 3.2 m from the mirror.

27. The concrete structures reflect sound waves. A lookout person, standing at the focal point of the concave "sound mirror" could hear an airplane long before it came into sight.

28. Example: light technician for the Famous People Players, an artist, and a toy designer

29. a. GaN LED lighting is predicted to be three times more efficient than fluorescent lighting.

b. They could last 100 000 hours.

c. Example: LEDs do not contain mercury, are a fraction of the cost, last longer, do not flicker, and reach maximum brightness as soon as they are switched on.

d. Not currently, although it is possible.

e. Example: Overall reduced energy consumption and waste (i.e., fewer bulbs) and eliminate headaches and other side effects since they don't flicker.