## 4–5 Explore, page 25

1. Light should be more white and intense where there is coating on the glass and less white and intense where the coating is missing.
2. Since the gas appeared to be attracted or repelled by the magnet, students may speculate that there are charged or ionized particles in the bulb. Current flows through the bulb mainly by ionizing the inert gas in the bulb.
3. The bulb continued to emit some light when the electricity was turned off. This may suggest to students that there is a time lag between the excitation of the white coating and the resulting emission of light.

## 4–5 Practice Problems, page 26

*Answers marked with an asterisk denote additional practice problems that appear in the Teacher's Edition.*

*1. a. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$, 1 unpaired electron
b. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$, 3 unpaired electrons
*2. nitrogen
3. a. $1s^2 2s^2 2p^6 3s^2 3p^2$, 2 unpaired electrons
b. $1s^2 2s^1$, 1 unpaired electron
4. phosphorus
5. a. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^7$, 3 unpaired electrons
b. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^4$, 2 unpaired electrons
6. scandium
7. a. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10} 6p^3$, 3 unpaired electrons
b. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$, 3 unpaired electrons
8. cadmium
9. a. $1s^2 2s^2 2p^6 3s^2 3p^4$, 2 unpaired electrons
b. $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6 6s^2 4f^{14} 5d^{10}$, no unpaired electrons
10. osmium

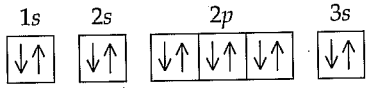
## 4–5 Apply, page 27

1. Visible light is being absorbed by electrons, which move to a higher energy level and then emit light as they fall back to the ground state.
2. In phosphorescence, absorbed light may continue to be emitted for some time even after the initial light source has been turned off. Fluorescence is emission that occurs only as long as the absorbed light stays on.
3. Sample 5, because the concentrated ultraviolet light has more energy than visible light.
4. The energy was not sufficient to cause electrons in these substances to enter higher energy levels.
5. The electrons have quantized energy, which is seen as different colors. When the electrons jump down to lower energy levels, they emit radiation of a specific wavelength and frequency.

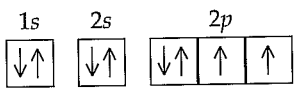
## 4–5 Review and Reinforcement, pages 28-29

1. true
2. electrons
3. lowest
4. true
5. most
6. true

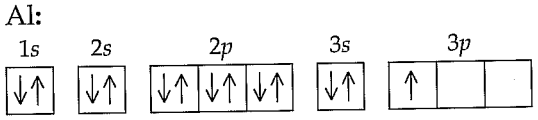
7. Mg:



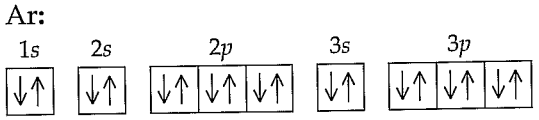

8. O:



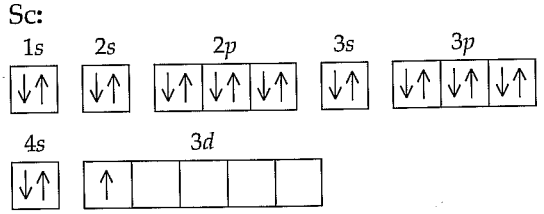

9. Al:




10. Ar:




11. Sc:




12. P: