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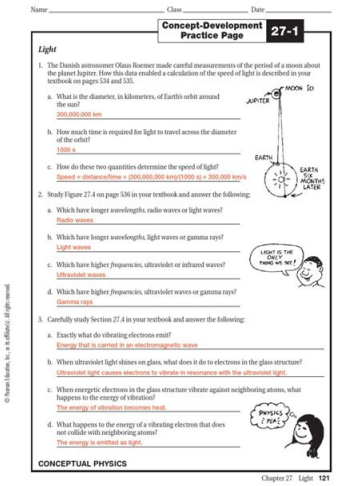

Name _____ Class _____ Date _____

Concept-Development Practice Page 27-1

Light

1. The Danish astronomer Olaus Roemer made careful measurements of the period of a moon about the planet Jupiter. How this data enabled a calculation of the speed of light is described in your textbook on pages 534 and 535.

a. What is the diameter, in kilometers, of Earth's orbit around the sun?
300,000,000 km

b. How much time is required for light to travel across the diameter of the orbit?
1000 s

c. How do these two quantities determine the speed of light?
Speed = distance/time = (300,000,000 km)/(1000 s) = 300,000 km/s

2. Study Figure 27.4 on page 536 in your textbook and answer the following:

a. Which have longer *wavelengths*, radio waves or light waves?
Radio waves

b. Which have longer *wavelengths*, light waves or gamma rays?
Light waves

c. Which have higher *frequencies*, ultraviolet or infrared waves?
Ultraviolet waves

d. Which have higher *frequencies*, ultraviolet waves or gamma rays?
Gamma rays

3. Carefully study Section 27.4 in your textbook and answer the following:

a. Exactly what do vibrating electrons emit?
Energy that is carried in an electromagnetic wave

b. When ultraviolet light shines on glass, what does it do to electrons in the glass structure?
Ultraviolet light causes electrons to vibrate in resonance with the ultraviolet light.

c. When energetic electrons in the glass structure vibrate against neighboring atoms, what happens to the energy of vibration?
The energy of vibration becomes heat.

d. What happens to the energy of a vibrating electron that does not collide with neighboring atoms?
The energy is emitted as light.

JUPITER MOON IO EARTH EARTH SIX MONTHS LATER LIGHT IS THE ONLY THING WE SEE ? PHYSICS IS WEIRD

CONCEPTUAL PHYSICS

Chapter 27 Light 121

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