Worksheet - WHAT IS LIGHT?

1. For each fact about light, choose the theory that explains it (“W” for wave or “P” for particle):
   a. When light goes through a single slit, it spreads out. _____
   b. When some colors of light shine on a metal plate, electrons are ejected. ___
   c. Only certain colors of light cause photosynthesis. _____
   d. When light moves from air to water, it bends. _____
   e. When light goes through two narrow slits, a pattern of dark and bright regions shows on the screen. _____
   f. When gaseous atoms are bombarded with electricity, certain colors of light are produced. _____

2. What is the scientific term for the property of light described in
   #1a? ___________________  #1b? ___________________
   #1d? ___________________  #1e ___________________

3. What is the photoelectric effect?  
   Give two uses.

4. What three experimental facts about the photoelectric effect could only be explained by the idea of atoms absorbing photons of light of a certain energy?

5. The "particle theory" of light has a more scientific name. 
   What is it?  
   Who developed this theory?  
   Who used it to explain the photoelectric effect?

6. What is the formula for calculating the energy of a photon of light? 
   __________
   What does each letter represent?

7. According to the quantum theory, why does bright red light never produce the photoelectric effect, no matter how long it shines on the metal plate?

8. According to the modern theory of light, light acts as a wave when it ___________________________________________ and acts as a particle when it _______________________________________.
   This is called _______ - _________  ___________