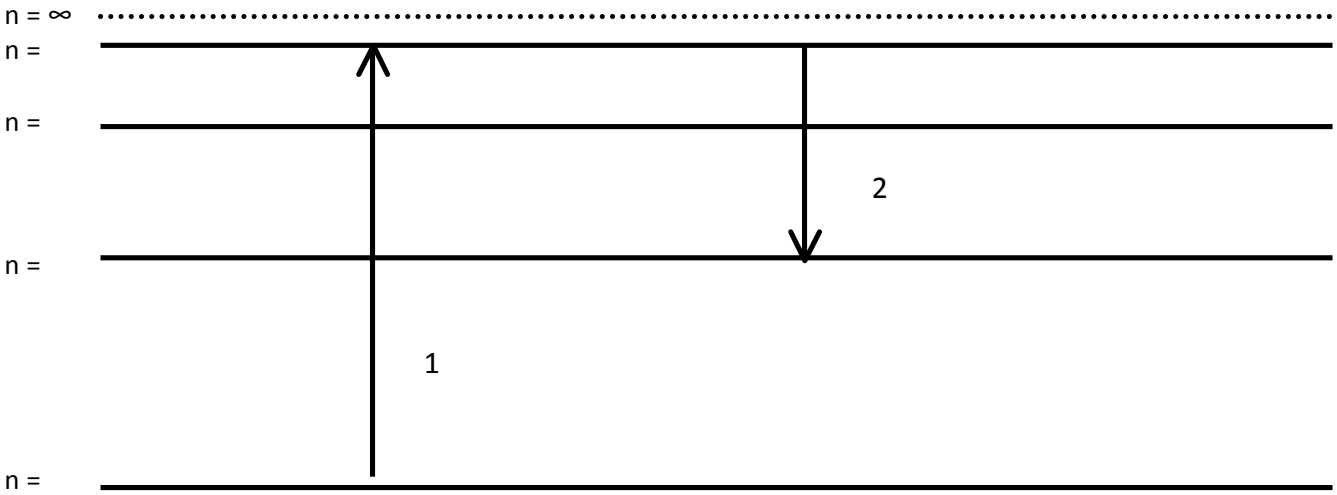
Fill out the corresponding energy levels, *n*, on the energy level diagram below and answer the following questions.



1. What trend do you notice as the energy level increases?

2. A) Arrow 1 on the diagram represents emission/ absorption *(circle one)* of a particle known as a(n) _____. Why?

   B) In Arrow 2, a(n) _____ particle moves from a higher/lower *(circle one)* energy level to a higher/lower energy level. This phenomenon is known as _____.

3. The energy of a photon of light is _____ proportional to its frequency and _____ proportional to its wavelength.

   A) indirectly, not B) inversely, inversely C) directly, inversely D) inversely, directly E) directly, directly

4. The energy of a photon of light is _____ proportional to its mass and _____ proportional to its velocity.

   A) indirectly, not B) inversely, inversely C) directly, inversely D) inversely, directly E) directly, directly

5. For the Bohr hydrogen atom determine the energy level corresponding to $n = 3$.

6. Which of the following transitions represent the **emission** of a photon with the largest energy?
   A) n = 2 to n = 1 B) n = 3 to n = 1 C) n = 6 to n = 3 D) n = 2 to n = 5
   E) n = 1 to n = 4

7. When the electron in a hydrogen atom moves from n = 6 to n = 2, light with a wavelength of _____ nm is emitted.

8. What color of visible light has the longest wavelength?
   A) blue B) red C) green D) violet E) yellow

9. What is the frequency of light (s^{-1}) that has a wavelength of 1.23×10^{-6} cm?

10. A mole of yellow photons of wavelength 527 nm has _____ kJ of energy.

11. The fact that we cannot simultaneously measure the exact position and precise momentum of an electron is referred to as:
    A) Pauli Exclusion Principle B) Heisenberg Uncertainty Principle C) Hund's Rule
    D) The Aufbau Principle E) The DeBroglie Relationship

12. Which of the following statements is TRUE?
    A) Part of the Bohr model proposed that electrons in the hydrogen atom are located in "stationary states" or particular orbits around the nucleus.
    B) The emission spectrum of a particular element is always the same and can be used to identify the element.
    C) The uncertainty principle states that we can never know both the exact location and speed of an electron.
    D) An orbital is the volume in which we are most likely to find an electron.
    E) All of the above are true.