Physics Sem 1

1. Scientific Processes
   1. Scientific Methods
      1. Instruction
         1. What methods do scientists use to gather new knowledge?
      2. Assignment
         1. Read about scientific inquiry.
      3. Quiz
   2. Research in Science
      1. Instruction
         1. How can referencing multiple sources bring validity to science research?
      2. Assignment
         1. Write about experimental error and bias.
      3. Assignment
         1. Practice what you have learned about research in science.
      4. Quiz
   3. Hypotheses, Theories, and Laws
      1. Instruction
         1. What is the relationship between hypotheses, theories, and laws?
      2. Assignment
         1. Describe hypotheses, theories, and laws.
      3. Quiz
   4. Safety in Science
      1. Instruction
         1. How is safety achieved during scientific investigations?
      2. Assignment
         1. Review laboratory safety.
      3. Quiz
   5. Tools, Technology, and Measurement
      1. Instruction
         1. What is the role of tools, technology, and measurement in the development of scientific knowledge?
      2. Assignment
         1. Practice describing how to use tools and to convert units.
      3. Quiz
   6. Accuracy and Precision
      1. Instruction
         1. What are the roles of accuracy and precision in science?
      2. Assignment
         1. Apply your knowledge of accuracy and precision in measurements.
      3. Quiz
   7. Data Analysis
      1. Instruction
         1. How can data from experiments be analyzed and displayed?
      2. Assignment
         1. Practice analyzing data.
      3. Quiz
   8. Evaluating Scientific Explanations
      1. Instruction
         1. How are scientific explanations evaluated?
      2. Assignment
         1. Read “Who Built the Pyramids?”
      3. Quiz
   9. Evaluating Scientific Design
      1. Instruction
         1. Why should scientific design be evaluated?
      2. Assignment
         1. Practice evaluating scientific design.
      3. Quiz
   10. Technological Design
       1. Instruction
          1. What is technological design?
       2. Assignment
          1. Evaluate technological designs.
       3. Quiz
   11. **Unit Test - (Must be taken in Person)**
       1. Unit Test Review
2. One-Dimensional Motion, Forces, and Momentum
   1. Speed and Velocity
      1. Instruction
         1. How can speed and velocity be used to describe motion?
      2. Assignment
         1. Identify and describe motion.
      3. Quiz
   2. Acceleration
      1. Instruction
         1. How can acceleration be used to describe motion?
      2. Assignment
         1. Solve problems involving acceleration.
      3. Quiz
   3. Lab: Motion with Constant Acceleration
      1. Instruction
         1. How does an object's position and velocity change as the object accelerates?
      2. Virtual Lab
         1. Explore the changes in position and velocity of an object as it accelerates using a virtual experiment.
      3. Assignment: Reflect on the Lab
         1. Answer questions based on the lab activity.
   4. Introduction to Forces
      1. Instruction
         1. How do forces affect the motion of an object?
      2. Assignment
         1. Identify and calculate force interactions.
      3. Quiz
   5. Fundamental Forces
      1. Instruction
         1. How do the four fundamental forces differ?
      2. Assignment
         1. Compare the four fundamental forces.
      3. Quiz
   6. Newton's First and Third Laws
      1. Instruction
         1. How do Newton’s first and third laws describe the motion of an object?
      2. Assignment
         1. Apply Newton’s first and third laws of motion to solve problems.
      3. Quiz
   7. Newton's Second Law
      1. Instruction
         1. How does Newton’s second law describe the motion of an object?
      2. Assignment
         1. Apply Newton’s second law of motion.
      3. Quiz
   8. Lab: Newton's Second Law
      1. Instruction
         1. How do force and mass affect the acceleration of an object?
      2. Virtual Lab
         1. Explore the effect of force and mass on acceleration of an object using a virtual experiment.
      3. Assignment: Reflect on the Lab
         1. Answer questions based on the lab activity.
   9. Impulse and Momentum
      1. Instruction
         1. How are impulse and momentum related?
      2. Assignment
         1. Describe momentum and impulse.
      3. Quiz
   10. Conservation of Momentum
       1. Instruction
          1. How is momentum conserved?
       2. Assignment
          1. Use conservation of momentum to solve collision problems.
       3. Quiz
   11. Lab: Conservation of Linear Momentum
       1. Instruction
          1. How does changing mass affect colliding objects?
       2. Virtual Lab
          1. Explore changes in position and velocity of an object as it accelerates, using a virtual experiment.
       3. Assignment: Reflect on the Lab
          1. Answer questions based on the lab activity.
   12. **Unit Test - (Must be taken in Person)**
       1. Unit Test Review
3. Two-Dimensional Motion
   1. Vectors
      1. Instruction
         1. How can vectors be used to describe and analyze motion in two dimensions?
      2. Assignment
         1. Perform calculations involving vectors.
      3. Quiz
   2. Projectile Motion
      1. Instruction
         1. How can the motion of a projectile be described?
      2. Assignment
         1. Describe projectile motion.
      3. Quiz
   3. Universal Law of Gravitation
      1. Instruction
         1. How does the universal law of gravitation affect all objects?
      2. Assignment
         1. Practice applying the universal law of gravitation.
      3. Quiz
   4. Centripetal Acceleration
      1. Assignment
         1. Solve tangential speed and centripetal acceleration problems.
      2. Quiz
   5. Circular Motion
      1. Instruction
         1. How can circular motion be described and calculated?
      2. Assignment
         1. Describe and calculate circular motion.
      3. Quiz
   6. Orbital Motion
      1. Instruction
         1. How does one object orbit another?
      2. Assignment
         1. Solve satellite motion problems.
      3. Quiz
   7. Earth-Moon-Sun System
      1. Instruction
         1. How do Kepler’s laws and Newton’s universal law of gravitation affect motion in the solar system?
      2. Assignment
         1. Apply Kepler’s laws to solve problems.
      3. Assignment
         1. Read about the historical development of laws of planetary motion.
      4. Quiz
   8. **Unit Test - (Must be taken in Person)**
      1. Unit Test Review
4. Work, Energy, and Thermodynamics
   1. Work and Power
      1. Instruction
         1. How is the concept of work applied in science?
      2. Assignment
         1. Apply work and power concepts.
      3. Quiz
   2. Kinetic Energy
      1. Instruction
         1. How are kinetic energy and work related?
      2. Assignment
         1. Apply kinetic energy and work concepts.
      3. Quiz
   3. Potential Energy
      1. Instruction
         1. What is the relationship between potential energy and the position of an object?
      2. Assignment
         1. Apply potential energy concepts and equations to solve problems.
      3. Quiz
   4. Energy Transformations
      1. Instruction
      2. How does energy change from one form to another?
      3. Assignment
         1. Evaluate energy transformations.
      4. Quiz
   5. Conservation of Energy
      1. Instruction
         1. How and why is energy conserved?
      2. Assignment
         1. Apply the law of conservation of energy to solve problems.
      3. Quiz
   6. Temperature and Heat
      1. Instruction
         1. How are temperature and heat related?
      2. Assignment
         1. Describe the relationship between heat and temperature.
      3. Quiz
   7. Heat Transfer
      1. Instruction
         1. How is thermal energy transferred?
      2. Assignment
         1. Describe how thermal energy is transferred.
      3. Quiz
   8. First Law of Thermodynamics
      1. Instruction
         1. How does the first law of thermodynamics demonstrate energy conservation?
      2. Assignment
         1. Describe and apply the first law of thermodynamics.
      3. Quiz
   9. Second Law of Thermodynamics
      1. Instruction
         1. How is entropy related to the second law of thermodynamics?
      2. Assignment
         1. Relate entropy and the second law of thermodynamics.
      3. Quiz
   10. **Unit Test - (Must be taken in Person)**
       1. Unit Test Review
5. Cumulative Exam - (Must be taken in Person)
   1. Cumulative Exam Review