Integrated Physics & Chemistry A - Unit 2

Preparing for the exam

Be prepared to devote an adequate amount of study and preparation time so that you are ready to take the exam.

Part of your preparation for this exam depends on the work you have done throughout Unit 2. As you worked through each of the activities, make sure that you have done all of the following:

- watched all Tutorials;
- completed all Guided Practice questions;
- completed all Additional Practice Problems;
- finished all of the Laboratory Activities;
- completed all Graded Assignments.

In addition, you should do the following:

- Be sure to carefully study the information in Chapters 1–3.
- Test items were derived from material in all three chapters of Unit 2, and were correlated with guided practice problems, additional practice problems, and graded assignment questions from these chapters. Therefore, during your study time give attention to all three chapters.

Concepts and Objectives

In Unit 2 of IPC, students focus on the following concepts:

- Newton's Laws of Motion
- Mass, Weight, and Gravity
- Momentum
- Friction
- Work and Machines
- Simple and Compound Machines
- Power
- Conservation of Energy

In studying each of the above concepts, students should be able to demonstrate mastery of these skills:

Newton's Laws of Motion:

- Know, understand, and recognize examples of Newton's First, Second, and Third Laws;
- Use the formula for Newton's Second Law to solve for force, mass, or acceleration;
- Recognize the difference between balanced and unbalanced forces in real-world examples;

Mass, Weight, and Gravity:

- Explain the difference between mass and weight;
- Use the formula for weight to calculate the mass, the acceleration from gravity, or the weight of an object;
- Understand the relationship between the mass of two objects and the amount of gravitational attraction between them;
- Understand the relationship of the distance between two objects and the amount of gravitational attraction between them;

Momentum:

- Compare the momentum of various objects given their masses and velocities;
- Determine which object will have more momentum if two objects have identical velocities;
- Know that overall momentum in a system is conserved, where the momentum of one object is transferred to another;
- Recognize that an object will not have momentum if it does not have velocity;

Friction:

- Recognize examples where it is an advantage to have sufficient friction;
- Know what factors affect the amount of friction between two objects;
- Be familiar with static, rolling, sliding, and fluid friction, as well as examples of each;

Work and Machines:

- Recognize that work is only done when the applied force on an object, and the direction of motion of the object, are both in the same direction;
- Explain the ways in which machines are able to make work easier;
- Be able to name several everyday items which can function as machines, and explain why they make work easier.

Simple and Compound Machines

- Calculate the Ideal Mechanical Advantage (IMA) of an inclined plane;
- Determine the efficiency of a machine, given its work input and work output;

Power:

- Using the appropriate formula, determine the amount of power exerted in various situations, and compare which situations involve more power;

Conservation of Energy:

- Be familiar with the Law of Conservation of Energy and its ramifications for the work input and work output of a machine;
- Recognize the types of energy conversions happening in given situations;
- Compare the gravitational potential energy of various objects, using the formula and the mass and height of each object;
- Calculate the kinetic energy of an object, using the appropriate formula.