

# Physics First Mid-year exam Study guide

- The midterm exam will include but not be limited to the following concepts, vocabulary and formulas. Be sure to review all vocabulary terms.
- You will be allowed to use your formula flipbook so be sure it is up to date.
- Get organized!! Look through your notebooks & binders to find information on the following topics. Past unit study guides, test corrections and quizzes are a great place to start, you can be sure you'll see similar problems on the exam. Review past notes/power-points, warm ups, rewrite notes, make flash cards etc. Text book sections in parentheses follow the topics below.

- **Remember to bring:**
  - **Calculator**
  - **Formula flipbook**
  - **Something to work on after the exam**

## Unit 00 – Introduction to Basic Science Skills

### Essential Questions:

- What is a system?
- How should calculations be used to predict and determine the motion of an object?
- How should information from a position vs. time and velocity vs. time graph be used to predict and explain the motion of an object?

### What is Physics (1.1)

- Scale of a system
- Be able to give an example of a system
- Scientific Method

### Time & distance (1.2)

- Dimensional analysis
- Graphing
- Distance vs. Time Graph
- English vs. Metric
- Qualitative vs. Quantitative

### Speed formula (1.3)

- Speed
- Units for Speed
- $V = d/t$

### Acceleration (2.2)

- Acceleration
- Units for Acceleration
- $a = \frac{V_f - V_i}{t}$

### Graphs of Motion (2.4)

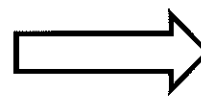
- Position vs. Time Graph
- Velocity vs. Time Graph
- Acceleration vs. Time Graph
- What does the slope or curve on each graph represent?
- What does the positive or negative represent on the graphs?

### Essential Questions

- What conclusions can be drawn about the relationship between the net force on a macroscopic object, its mass, and its acceleration?
- How can we use Newton's second law to model the mathematical relationship between net force, mass, and acceleration of an object?
- How do Newton's first and third laws relate to the mathematical relationship represented in Newton's second law?

### Newton's Laws

- First Law (2.1)
- Inertia
- Second Law (2.2)
- $F=ma$
- Weight
- $F_{wt}=mg$  (p. 43-44)
- Know the units for each of the variables
- Third Law (3.1)
- Action-reaction pairs and why they do not cancel each other out
- FBD
- $F_{net} = ma$
- $F_{net} = F_1 + F_2$



## Unit 01 – Forces-Newton's Laws

## Unit 02 – Impulse/Momentum

### Essential Questions

- How can conservation of momentum be used to predict the relationship between the motion of objects before and after a collision?
- How do momentum, force, and time relate to minimize the net force on a macroscopic object during a collision?

#### Momentum (3.1)

- **$P=mv$**
- Units for each variable
- How momentum relates to inertia
- Be able to provide an example of momentum
- Law of Conservation of Momentum (3.1)

#### Impulse/Momentum Theorem

- Derived from Newton's second law
- Relationship within formula
- **$Ft = m\Delta v$  or  $Ft = mv_2 - mv_1$**
- Units for each variable
- Crumple Zone CCA

Good Luck 😊