FRANKLIN-SIMPSON HIGH SCHOOL

Course Name: Physics **Unit Name:** **Momentum**

Quality Core Objectives:

Unit 4 Momentum	
A.1. Scientific Inquiry	a. Identify and clarify research questions and design experiments
	b. Design experiments with controlled variables and appropriate numbers of trials
	c. Collect, organize, and analyze data accurately and use appropriate techniques and devices
	d. Interpret results and draw conclusions, revising hypotheses as necessary and/or formulating additional questions or explanations
	e. Write and speak effectively to present and explain scientific results, using appropriate terminology and graphics
	f. Safely use laboratory equipment and techniques when conducting scientific investigations
	g. Routinely make predictions and estimations
A.2. Mathematics and Measurement in Science	a. Distinguish between precision and accuracy with respect to experimental data
	b. Use appropriate SI units for length, mass, time, temperature, area, volume, and density; describe the relationships among SI unit prefixes (e.g., centi-, milli-, kilo-) and how to convert between English units and SI units
	d. Calculate/estimate, using significant figures, the uncertainty in experimental results, and use the uncertainty to evaluate and interpret results
	e. Express numbers in scientific notation when appropriate
	f. Solve for unknown quantities by manipulating variables
	g. Use graphical, mathematical, and/or statistical models to express patterns and relationships inferred from sets of scientific data
B.4. Momentum	a. Define *momentum* and *impulse*
	b. Calculate the total linear momentum of an isolated system of moving masses

	c. Calculate the time-averaged force acting on a body when an impulsive force is exerted on the body
	d. Identify and discuss situations in which linear momentum is conserved, using Newton's second and third laws (the concepts of external and internal forces)
	e. Solve problems using the conservation of linear momentum, including those involving two bodies following paths that intersect at arbitrary angles

Purpose of the Unit:

Prerequisites:

Daily Lesson Guide

Day	Lesson Content and Objectives	Focus Questions	Critical Thinking (High Yield / Literacy /LTF/etc.)	Engagement	Assessment and/or Accommodations
1	**B.4.a** Students will be able to calculate the linear momentum an object given its mass and velocity with an accuracy of at least 66.6% When given two multiple	**What is momentum?** **How are force and momentum related?**	• Learning with others • Evaluation • Analysis • Generating and Testing Hypothesis	Students will be asked to look at 3 pictures and identify a unifying theme between all of the pictures. The theme I will build around is "momentum".	Students will be assessed through the use of clicker questions as an exit slip Accommodations: extended time, prompting and cueing, reader, scribe, paraphrasing, use of technology as needed.

	choice questions, students will be able to calculate an impulse exerted on an object with an accuracy of 100%				
2	**B.4.c** Students will be able to calculate the force on a body due to an impulse.	**How are force and momentum related?**	• Learning with others • Evaluation • Analysis • Comparing and Contrasting • Generating and Testing Hypothesis	Students will compare hitting a volleyball/soccerball and talk about the impulses associated with that activity.	Students will complete a ranking task as an exit slip using the clickers. Accommodations: extended time, prompting and cueing, reader, scribe, paraphrasing, use of technology as needed.
3	**B.4.c** Students will be able to calculate the acceleration of an object which is subjected to a known impulse	**How are force and momentum related?**	• Learning with others • Evaluation • Analysis • Comparing and Contrasting	Students will be asked to write a test question, including multiple choice answers.	Students will exchange questions and answer the question they receive for homework. Accommodations: extended time, prompting and cueing, reader, scribe, paraphrasing, use of technology as needed.
4	**B.4.b,d** Students will be able to calculate the velocity of an object in an elastic collision.	**When is momentum conserved?**	• Learning with others • Evaluation • Analysis • Comparing and Contrasting • Novelty • Generating and Testing Hypothesis	Students will create a scenario where a crash happens and will be asked to analyze the aftermath	Students will complete a series of clicker questions as an exit slip. Accommodations: extended time, prompting and cueing, reader, scribe, paraphrasing, use of technology as needed.

5	**B.4.b,d** Students will be able to calculate the velocity of an object in an inelastic collision.	**When is momentum conserved?**	• Learning with others • Evaluation • Analysis • Comparing and Contrasting • Novelty • Generating and Testing Hypothesis	Students will create a scenario where a crash happens and will be asked to analyze the aftermath	Students will complete a series of clicker questions as an exit slip. Accommodations: extended time, prompting and cueing, reader, scribe, paraphrasing, use of technology as needed.
6	**B.4.e** Students will be able to use the conservation of momentum in a 2-dimensional problem	**How is momentum conserved in a 2-dimensional problem?**	• Learning with others • Evaluation • Analysis • Comparing and Contrasting	Students will either agree or disagree with a statement about the conservation of momentum. The students will then argue the opposing side's viewpoint.	Students will complete a series of clicker questions as an exit slip. Accommodations: extended time, prompting and cueing, reader, scribe, paraphrasing, use of technology as needed.
7	**B.4.e** **(continuation)** Students will be able to use the conservation of momentum in a 2-dimensional problem.	**How is momentum conserved in a 2-dimensional problem?**	• Learning with others • Evaluation • Analysis • Comparing and Contrasting	Students will look create a 2-dimensional problem and will give it to their peers to work	Students will complete a series of clicker questions as an exit slip. Accommodations: extended time, prompting and cueing, reader, scribe, paraphrasing, use of technology as needed.
8	**Test Review**				

9	**Asessment**				
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