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Unit 4B
Conservation of Momentum
Note-Taking Guide TEACHER

Main Ideas, Key Points, Questions:

After watching the video segment, write down key points, main ideas, and big questions.

Objective(s):

- *Define the law of conservation of momentum and apply this to different types of collisions.*
- *Understand how Newton's third law determines that momentum is conserved in all collisions.*

Notes:

During the video segment, use words, phrases, or drawings to take notes.

Summary:

After watching the video segment, write at least three sentences explaining what you learned.
You may ask yourself: "If I was going to explain this to someone else, what would I say?"

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Questions to Consider TEACHER

Answer the following.

1. **Define the law of conservation of momentum in your own words.**

The law of conservation of momentum states that momentum is neither created nor destroyed in an interaction between objects; only transferred from one object to another.

2. **Which of Newton's laws explains how momentum is conserved in all interactions between objects?**

Newton's third law, which states that forces occur in equal but opposite pairs between objects, explains how momentum is conserved in all interactions between objects.

3. **What do you know about the forces involved in an interaction between two objects?**

The forces on each of the two objects will be equal in magnitude but opposite in direction.

4. **Is momentum a vector or a scalar quantity? Based on your answer, which other value is important besides the numerical value of momentum?**

Momentum is a vector quantity because it is equal to mass, a scalar, times velocity, a vector. This means that besides the numerical value, direction is also important.

5. **How do you find the total momentum of objects in a system?**

To find the total momentum of objects in a system, add up the individual momentum values of all the objects.

6. **If objects are traveling in opposite directions, what do you know about the signs of their momenta?**

Because momentum is a vector quantity, objects moving in opposite directions must have opposite signs.

questions continued on next page

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Answer the following.

7. **What characteristics are required for a system to be considered closed and isolated?**

No mass can enter or leave the system.

No external forces act on the system.

8. **What forces are considered when we examine interactions between two objects in a closed, isolated system?**

If the system is closed and isolated, only the forces that occur

between the two objects when they interact are considered.

9. **If two objects begin at rest, what is the total momentum of the system before they push off from one another? What is the momentum of the system after they push off from one another?**

The total momentum of the system must be zero if the objects are initially at rest.

According to the law of conservation of momentum, which states that the momentum of

the system cannot change, the total momentum after the interaction would also be zero.

10. **If two objects are moving but the total momentum of the system is zero, what do you know about the momentum of the two objects?**

If the two objects are moving but the momentum of the system

is zero, then the objects must have equal but opposite momenta.