

Lab Practicum

# Aeronautics for Introductory Physics

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## Lab Experience

### Overview

The aim of this lab is for students to explore the principle of the conservation of momentum and to gain a better understanding of elastic collisions.

The simulation being used is: [Collision Lab](#) and it is taken from PhET Colorado.

This lab will be useful in helping students to learn content for Unit 2.4 Momentum and impulse

### Understandings

- Conservation of linear momentum
- Elastic collisions

### Applications and Skills:

- Applying conservation of momentum in simple isolated systems including (but not limited to) elastic collisions
- Qualitatively and quantitatively comparing situations involving elastic collisions

### Reference

IB Diploma Programme Physics guide. (2014). Retrieved from

<https://ibphysics.org/wp-content/uploads/2016/01/ib-physics-syllabus.pdf>

### Evidence of Completion

Please find a [video of scenario #1](#).

Please find a [video of scenario #2](#).

### Sample Work

Please find the completed activity [linked here](#).

[The PDF is here](#).

## Teacher Reflection

### **How does this activity connect Physics to learning outcomes?**

In this activity, students will explain why energy may or may not be conserved in elastic collisions between the objects having the same or unequal masses and gain a better understanding of the terms 'elasticity' when applied to collisions. After working through the activity, students will use their data to draw conclusions about conservation of linear momentum.

As mentioned earlier, this activity connects to the following learning outcomes (taken from the IB Diploma Programme Physics Guide):

#### Understandings

- Conservation of linear momentum
- Elastic collisions

#### Applications and Skills:

- Applying conservation of momentum in simple isolated systems including (but not limited to) collisions
- Qualitatively and quantitatively comparing situations involving elastic collisions

### **Pros of completing this activity with my students**

The students can learn a lot about collisions by just playing with the simulation and with no explicit instructions.

The Collision Lab encourages students to learn through repetition and inquiry; and the conditions in the simulation are near perfect; and so, it is easier for students to make connections and draw conclusions.

Unlike a traditional hands on lab where equipment can be damaged, minimal supervision is required for simulation type labs.

Students can engage in a number of challenges; and so this can make learning a lot more engaging.

Very useful during remote and online teaching.

### **Cons of completing this activity with my students**



It will be difficult for students to determine potential sources of error during the lab because the conditions in the simulation are near perfect.

Students may approach the activity as if it is a game; and so, they may not exert the type of effort that they normally would during a traditional hands-on lab.

**Age/Developmental Appropriateness for my students**

The Collision Lab is developmentally appropriate for my IBDP students in grade 11. I feel that most if not all students would be able to visualize what is happening; however, a few students may still struggle with the concepts. Students' understanding would have to be gauged before and after the activity to determine if a follow up traditional hand on lab is required or if explicit teaching/lectures are required to clarify the concepts being covered through the Collision Lab activity.

