

## Class Summary

### Quick Facts

**Inside:** 2.5 hours

**Grade:** 5-8th

**Offered:** Year-round

**Physical Activity:** Low physical level

**Other:** none

### Concepts

- Design
- Energy
- Inquiry
- Safety

### Minnesota Academic Standards

- Science
- Math
- Language Arts
- Physical Education

### Classroom Activities

- Pre-Activity: Paper Airplanes
- Post-Activity: Engineering

### STEM Components

- Hypothesize
- Test
- Record
- Calculate
- Analyze
- Explain

### IB Profiles

- |                                                   |                                                |
|---------------------------------------------------|------------------------------------------------|
| <input checked="" type="checkbox"/> Inquirers     | <input type="checkbox"/> Open-minded           |
| <input checked="" type="checkbox"/> Knowledgeable | <input type="checkbox"/> Caring                |
| <input checked="" type="checkbox"/> Thinkers      | <input type="checkbox"/> Risk-takers           |
| <input checked="" type="checkbox"/> Communicators | <input type="checkbox"/> Balanced              |
| <input checked="" type="checkbox"/> Principled    | <input checked="" type="checkbox"/> Reflective |

Revised January 2014

### Outcomes, students will:

1. Practice safe and responsible archery by gaining knowledge of the equipment, its proper use, and shooting technique.
2. Generate a hypothesis and carry out an experiment to determine how different factors on both the bow and arrow affect the speed of an arrow.
3. Discuss the results of the experiments with the class to gain deeper insight in to the physics behind archery and how this applies to sport shooting and hunting.

### Brief Synopsis:

Humans like fast things—high-speed internet, fast cars and quick-drying paint; It's no different when it comes to archery equipment. Class will begin with an introduction to archery equipment, range protocols, and safety rules. After hands-on target practice, participants will identify factors on both the bow and the arrow that affect an arrow's speed then break into groups to generate a hypothesis, carry out an experiment, and draw conclusions based on their results. Finally, the class will discuss their findings, reflecting on their methods, to gain deeper insight into the physics behind archery and how it applies to sport shooting and hunting.

### Activity Summaries:

#### Introduction (45 minutes)

Class begins with a brief introduction to the history of archery and moves into learning about the equipment, eye dominance, range safety, and proper shooting technique.

#### Range Open (30 minutes)

Participants will spend time practicing the proper shooting technique using a compound bow at our indoor archery range.

#### The Need for Speed (20 minutes)

The class will take a closer look at the mechanics and energy transfers when shooting an arrow and understand why arrow speed is an integral part of target shooting and hunting.

#### Data Collection and Analysis (1 hour 25 minutes)

The class will identify factors on both the bow and the arrow that could affect an arrow's speed then break into groups to generate a hypothesis, carry out an experiment, and form a conclusion based on their results. The experiments involve manipulating components of the bow and arrow then shooting arrows through a chronograph which measures the arrow's speed. Finally, each group will explain why certain arrows achieved higher speeds than others and apply this knowledge to sport shooting and hunting.