UBC Geering Up Engineering Outreach
Faculty of Applied Science
Geering Up - Room 208, 6190 Agronomy Road,
Vancouver BC, Canada V6T 1Z3

604-822-2858 | workshops.geeringup@ubc.ca | geeringup.apsc.ubc.ca

Phenomenal Forces (6-7)

Hello! This document includes a brief outline of our Phenomenal Forces workshop, as well as relevant BC ADST curriculum connections. In this workshop, students will explore Newton's three laws through a variety of demonstrations and will use what they learn to make a rubber band powered car!

BC Curriculum Ties (In addition to satisfying multiple core competencies)	BC Science Links 6-7:
	Content
	• *Newton's three laws of motion describe the relationship between force and motion:*
	  ○ *First law: objects will stay stopped or in constant motion until acted upon by an outside force.*
	  ○ *Second law: only an unbalanced force causes acceleration*
	  ○ *Third law: every force has an equal and opposite reaction force*
	• *Effects of balanced and unbalanced forces*
	  ○ *Balanced forces are equal and opposite forces (e.g., sitting in a chair)*
	  ○ *Unbalanced forces are unequal; one force is larger (e.g., race cars on different ramps, mousetrap cars, rockets)*
	• *Force of gravity*
	  ○ *on Earth, gravity pulls objects toward the centre of the planet (e.g., falling objects, egg drop)*
	
	BC Applied Design, Skills, and Technologies Curriculum Links 6-7:
	
	Complex tasks require the acquisition of additional skills & complex tasks may require multiple tools and technologies.
	• *Applied Design:*
	  ○ *Ideating – Generating potential ideas and add to others' ideas, Screen ideas against criteria and constraints, & choosing an idea to pursue.*

	○ *Making – Identify use of appropriate tools, technologies, and materials for production, & making a plan for production and carrying it out, making changes as needed.*
Grade Levels	6-7
Time	1~1.5 Hours
Goals of the Workshop	1. Understand each of the 3 laws of motion 2. Know different types of forces and how they interact to create or stop motion 3. Understand that motion is created due to unbalanced forces 4. Understand that for every action there is an equal and opposite reaction

Activity Descriptions

Newton's Three Laws Demonstration

Objective: To teach students how gravity and Newton's three laws work through physical examples

Participants will:

- Learn about gravity and Newton's first two laws through demonstrations with ping pong balls and golf balls
- Learn about Newton's third law through observing bottle cap rockets

Rubber Band Car Engineering Design Challenge

Objective: To have students implement Newton's three laws to build their own rubber band car!

Participants will:

- Design their own rubber band car
- Work as a group to build their car based on the materials given
- Test and improve their car
- Compete against their classmates in a friendly competition

We can't wait to connect with your school & expose your students to the STEM field with our exciting, hands-on STEM activities!