

## Simple Machines Lessons

This lesson package includes 6 individual lessons, 1 on each of the 6 simple machines.

- Inclined Planes, Levers, Pulleys, Screws, Wedges, and Wheel and Axles

Each lesson has 3 components.

- 1. Lesson Plan – notes and curriculum connections for teachers
- 2. PowerPoint – slideshow to present the content to students
- 3. Worksheet – notes for students and activity sheet

Teaching simple machines is heavily emphasized in the Grade 2 curriculum, but they are important to understand at all elementary grade levels for the “Understanding Structures and Mechanisms” strand in the Ontario curriculum.

Each PowerPoint lesson plan follows the same format.

The PowerPoint lessons are laid out as follows:

- Slide 1: Title page
- Slide 2: Introduction
- Slide 3: YouTube clip ([Mocomi](#))
- Slide 4: Definitions and vocabulary
- Slide 5: Parts of the simple machine
- Slide 6: How it helps lift/move weight (force and load diagrams)
- Slide 7: Examples from daily life (blank – brainstorm with students)
- Slide 8: Examples from daily life (pictures – some potential examples)
- Slide 9: When and why do we use the simple machine
- Slide 10: How the simple machine makes work easier
- Slide 11: Types and components of the simple machine
- Slide 12: Diagrams/examples of different types/parts
- Slide 13: Activity prompt (see “worksheet” page 3)

It is recommended that the “worksheets” be handed out to students and filled in as the lesson progresses as they follow the same format as the PowerPoint.

During the lesson, there are many pictures and diagrams that can be used to help explain to students how the simple machines operate. Take some time to discuss these diagrams so students can see how they work to move a load.

At the end of each lesson there is a brief activity that allows students the chance to actually use the simple machines. It is recommended that you have physical manipulatives of each of the simple machines to use – your school may have sets of these for teaching purposes.

At the end of all these 6 lessons, there is a Rube-Goldberg Machine building project that can be implemented (see next page). This project takes a hands-on approach to teaching technology and engineering to elementary level classes.

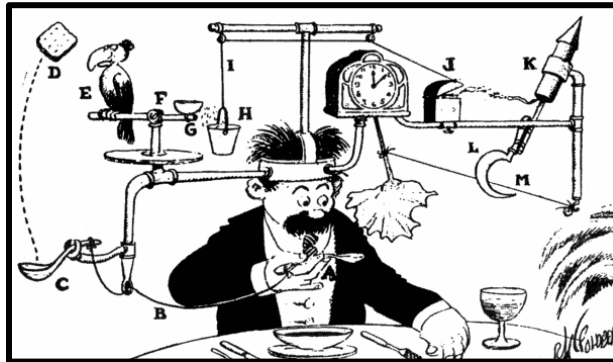
## Rube-Goldberg Machine Project

This assignment can be completed in various fashions, depending on available time, resources, and classroom needs.

The first part of the project can be done on its own as a “thought experiment” or can be combined with the second part to build the machine in earnest.

### Rube-Goldberg Machines

A Rube-Goldberg machine is something that is designed to make a simple task more complex. Reuben “Rube” Goldberg studied to become an engineer, but gained notoriety when he changed careers and became a cartoonist. He drew cartoons depicting outrageous inventions that would perform menial tasks. Below is an example, the “Self-Operating Napkin”:



There are 15 steps involved in this cartoon just to use a napkin. Rube-Goldberg machines are inventions that combine the use of simple machines with performing simple tasks.

#### Part 1: Designing Rube-Goldberg Machines

Break students into groups of between 4 and 6.

Each group will need:

- Bristol board/large poster paper
- Markers
- Pencil crayons

Students will be tasked with combining their knowledge of all 6 simple machines into 1 mechanism. Have students answer the following questions:

- What simple task is your machine going to perform?
  - ex. pop a balloon; flip a light switch; fill a glass with water; etc.
- How are you going to use each simple machine?
  - Be creative!
- How are you going to make each one set off the next one?

Let students sketch out their ideas on large poster paper. Make sure they draw arrows of the **force** and **load** of each step, and which **direction** the movement of the machine goes in.

#### Part 2: Building Rube-Goldberg Machines

Have students write out a **materials list** of things they would need to actually build their design. If possible, let each group build their own machine by bringing in necessary materials!

This can also be done as a class project, everyone contributing to 1 final product built together.

Some creative examples for ideas/inspiration:

