# GEARS

## INTRODUCTION

Ever tried pedaling a bicycle uphill? Quite a task, isn't it? Now think of the same scenario, this time with a geared bicycle. Doesn't it seem easier? Changing gears can magically make your bicycle move incredibly fast or decrease the amount of effort needed to cycle. Well, it's not exactly magic but the physics of gears that helps us here.

**Learners begin** by understanding the mechanical advantage of different types of gears and apply the concepts and skills acquired to solve a real world problem.

**Learners exit this module** with an understanding of different types of gears, their applications, advantages and disadvantages.

**This module is a part of** "APPLY - SCIENCE FOR A BETTER WORLD" series.

## MODULE DETAILS

- **Series 2: Apply - Science For A Better World**
- **Module 1: Gears**
- **Student Accomplishment Level: 4**

Grade Group : >8 Number of Sessions: 8 Session Duration: 60 min

## SESSION EXPERIENCE

1. **Tuning In:** Understand the module structure and goals. Learn the use of tools such as the Engineering Manipulatives.
2. **90 Degree Turns:** Explore transfer of power across right angles using bevel and crown gears.
3. **Worm Gear Winch:** Build a hoist using a worm gear.
4. **Power Ratio:** Build a machine that uses power ratios to lift weight.
5. **Speed Ratio:** Build a model of a machine that uses speed ratios.
6. **Egg Beater Challenge 1:** Design an egg beater that uses gears to function.
7. **Egg Beater Challenge 2:** Build and evaluate the egg beater that was designed in the previous session.
8. **How Did I Do?:** Reflect on the learnings from the module: Types, Applications, Advantages and Disadvantages of different types of gears. Present work to peers.

## Learning Objectives:

Learners will:

1. Be able to understand different types of gears like spur, inter-toothed and bevel gears.
2. Be able to calculate the mechanical advantage of different gear systems.
3. Apply physics concepts such as gear ratios and math concepts like proportions and percentages.
4. Follow instructions, think critically, solve problems and create tangible engineering artifacts.
5. Engage in active collaboration, communication and design thinking.

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