

# Gears at Work Lesson Plan

**Context** (InTASC 1,2,3)**Lesson Plan Created By:** Heath Horpedahl**Created:****Lesson Topic:** Gears**Grade Level:** 5-6<sup>th</sup> Grade**Duration:** 1 – 50 minute class period**Kit Contents:** [http://odin-primo.hosted.exlibrisgroup.com/nmy:nmy\\_all:ODIN\\_ALEPH007372538](http://odin-primo.hosted.exlibrisgroup.com/nmy:nmy_all:ODIN_ALEPH007372538)**Desired Results** (InTASC 4)**Purpose:** The purpose of this lesson is to give students an understanding of gears and how they work in a pulley system.**North Dakota Science Content Standards**

- Engineering Design
  - ETS1-1 (Grade 3-5:MP.5) Use appropriate tools strategically.

**PS3.C: Relationship Between Energy and Forces**

- When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object.

**Objectives:**

1. The student will be able to explain what a gear is and how it makes work easier.
2. The student will be able to give examples of everyday items that use gears.
3. The student will be able to create a pulley system with gears.

**Assessment Evidence** (InTASC 6)**Evidence of meeting desired results:** At the end of class students will be expected to explain where the gears are on a bike, where the pulley system is, and how it all works.**Learning Plan** (InTASC 4,5,7,8)**Instructional Strategy: (Check all that apply)** Direct  Indirect  Independent  Experiential  Interactive**Technology Use(s): (Check all that apply)** Student Interaction  Align Goals  Differentiate Instruction  Enhance Lesson Collect Data  N/A**Hook and Hold:**

- Show the BrainPop video called “Gears” to the students. Make sure they know to take notes on any information they think might be helpful for today’s hands on activity. The link to the video is:

<https://www.brainpop.com/technology/simplemachines/gears/>

**Materials:**

## STEM Collaborative Cataloging Project

- ActiveBoard
- Projector w/sound
- Gears at Work kit
- Pencils
- Journal paper

**Procedures:**

1. Go over key vocabulary from the video – gears, gear ratio, and pulley. Discuss what they mean and real world examples of them.
2. Introduce the “Gears at Work” science kits. Go through the parts so students are aware of what they will be working with and know what each piece is.
3. Place students in small groups or pairs (depending on class size) and give each group a kit.
4. Display a picture of a bicycle on the board. Tell students that by the end of class they will have to explain to you where the gears and pulley are located on the bike and how they work.
5. Instruct students that they must complete activity 2, 3, & 9. They do not have to answer the questions (unless you want to make this activity last two days as it will take more time to do them).
6. Encourage students to take notes as they explore and learn about gears & pulleys.
7. Give students the class period to complete the activities and explore within their groups. Make sure students are all participating as they will all be responsible for knowing the information at the end of the class period.

**Summary:** Bring students back together for the last 5-10 minutes of class. Give each student a bicycle printout and individually have them diagram and explain on this paper how the gears and pulley system work. Once all papers have been turned in, discuss as a collective group their findings.

**Reflection** (InTASC 9)**Reflect On:**

- *Preparation*
- *Planning*
- *Teaching*
- *Student Engagement and Participation*
- *Evidence of Student Learning*

**Standards**

Council of Chief School Officers. (2011, April) *Interstate Teacher Assessment and Support Consortium (InTASC) model core teaching standards: a resource for state dialogue*. Washington DC. Retrieved from [http://www.ccsso.org/documents/2011/intasc\\_model\\_core\\_teaching\\_standards\\_2011.pdf](http://www.ccsso.org/documents/2011/intasc_model_core_teaching_standards_2011.pdf)

North Dakota Department of Public Instruction. (2011) *North Dakota Science content standards*. Bismarck, ND. Retrieved from [https://www.nd.gov/dpi/uploads/132/NDScienceStandardsDraftFormat2\\_Gr3\\_5\\_Engineering\\_Design.pdf](https://www.nd.gov/dpi/uploads/132/NDScienceStandardsDraftFormat2_Gr3_5_Engineering_Design.pdf)

This project was made possible in part by the Institute of Museum and Library Services. [SP-02-15-0044-15]