



Lesson Plan

Taught by: Samantha Lee

School: Broadmeadow Elementary School

Grade or Age of Students: Grade 5

Date: 2/6/24

Goal and Standard Alignment

The purpose of this lesson is for students to further investigate simple machines and answer the question “How do simple and complex machines perform a task?” by using evidence from provided examples of household items and Rube Goldberg machines.

NGSS Performance Expectations addressed:

Standard	PE	DCI	CCC
3-5-ETS1-1 Engineering Design	Asking Questions and Defining Problems: Define a simple design problem that can be solved through the development of an object, tool, process, or system and include several criteria for success and constraints on materials, time, or cost.	ETS1.A: Defining and Delimiting Engineering Problems: Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria).	Influence of Science, Engineering, and Technology on Society and the Natural World: People’s needs and wants change over time, as do their demands for new and improved technologies.
3-5-ETS1-2 Engineering Design	Asking Questions and Defining Problems: Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem.	ETS1.B: Defining and Delimiting Engineering Problems: At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved	Influence of Science, Engineering, and Technology on Society and the Natural World: Engineers improve or develop new technologies to

		designs.	increase benefits, decrease known risks, and meet societal demands.
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Objective

Students will be able to explain verbally and in writing “How do simple and complex machines perform a task?” in small-group discussions and independent work using knowledge of simple machines.

Proactive Planning for All Learners

Supporting Multilingual Learners:

Slides are available on Canva for students that require a translation. Read all slides aloud with students to support comprehension. To further guide students to answer the question, review verbs related to the question – pick up, move, raise, elevate. Students may or may not be comfortable sharing their reasoning orally in group or class discussion.

Tiered Supports:

- Tier 1: thoughtful and proactive classroom management, conscious groupings for small group work, high expectations for all students, visual models and repeated directions
- Tier 2: push-in or small group support by the Special Education Liaison or Special Education Instructional Assistant
- Tier 3: pull-out support provided by the Special Education Liaison

Universal Design for Learning:

- Engagement: Sustaining Effort & Persistence by optimizing challenge and support. This is offered by having the opportunity to provide small group support for students while also having additional work for “fast finishers.” Provide templates for forming a Rube Goldberg contraption for students that do not want to start from scratch.
- Engagement: Sustaining Effort & Persistence by clarifying the meaning and purpose of the goal. It is displayed in multiple ways, in the slideshow and on the student worksheet, connected to the background of students' science knowledge, and reinforced throughout the lesson.
- Representation: Building Knowledge by cultivating multiple ways of knowing and making meaning. There are multiple entry points to the lesson including a video launch and turn and talk warm-up.
- Action and Expression: Expression & Communication by building fluencies with graduated support for practice and performance through the gradual release of responsibility during the lesson.

High Leverage Practices:

- The “turn-and-talk” routine has been taught to the class and practiced multiple times.
- Formative assessments are a practiced and regular part of each lesson, in the form of exit tickets to check for continued understanding.

Embedded IEP Goals:

- Opportunities for structured social interaction: turn-and-talk with an elbow partner practices short and structured conversations
- Asking a student to repeat the directions: to check for understanding, a student may be asked to repeat the directions for the activity
- Promote interest in the activity: the video engages students and the slides include images of different simple machines to engage students in the lesson

Multi-language Learners:

- The lesson plan and related lesson materials are available on Canva for students that require a translation.
- Read all slides aloud with students to support comprehension. To further guide students to answer the question, review verbs related to the question – pick up, move, raise, elevate. Students may or may not be comfortable sharing their reasoning orally in group or class discussion.
- The activity directions are shared in writing via the slideshow, in the student workbook, and read out loud.

Time

Warm-up - Activator: What simple machines do we have in the classroom?	5 minutes
Activity 1 - Everyday Objects groupwork - Goldberg Machines	25 minutes
Activity 2 - Youtube Video Noticings - Rube Goldberg Contraption Project	30 minutes

Materials and Technology

Materials: Simple Machines Definition sheet, [Lesson slide deck](#), Everyday Machines worksheet, Rube Goldberg Noticings, Rube Goldberg Simple Machines Project Rubric, [Student examples](#)
Technology: Projector screen, computer, document camera

Assessment

Formative assessment opportunities during this lesson include verbal student responses during small group work and whole class discussion. Another opportunity for formative assessment of

student learning is when students are working independently or in groups the teacher can check in with students.

Procedures

Beginning

Timing	Activity	Teaching Notes
3 min	Activator: What simple machines do we have in the classroom? Project Slide 26 and ask the question: <i>“What simple machines do we have in the classroom?”</i> Give students about 60 seconds to turn and talk to a partner about their thinking. Have students share their responses.	Students should recall that there are six different kinds of simple machines. They should take out the handout from the last class to remind themselves.
2 min	Project Slide 27 with the goal. Read the goal out loud. Inform the students that today, they will build upon their understanding of simple machines and recognize how simple and complex machines help us to complete tasks. They will learn who Rube Goldberg was and his complex machines (contraptions) and have the opportunity to begin designing their own Rube Goldberg machine to complete one task. Goldberg made “the simple, complex.”	
5 min	Project Slide 28 with their task. Explain the station activity. Count the students off by six to put them in groups. Explain that there will be one everyday object at each station. Students should discuss which simple machine their object is, then draw a diagram on their paper. Walk students through an example together under the document camera.	You can either make six groups of students in advance or count students off by six to create teams of 2-4 students.

Middle

15 min	Provide each group with two objects. They should	If time allows, you may want
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	complete two objects to finish their Everyday Objects worksheet.	to invite students to share their work under the document camera and present it to the class about their objects.
5 min	Project Slide 29. Invite students to the rug and ask the students if they have any prior knowledge of who Rube Goldberg was. Inform them that he was an American inventor, engineer, author, and cartoonist. He was best known for making complicated contraptions that did simple tasks. These are called Goldberg Machines.	
5 min	Project Slide 30. Ask the students to look at the contraption and share any simple machines they can recognize in the image. This is an example of a Goldberg Machine because it performs the simple task of stapling paper but in a complicated way using a complex machine.	

End

6 min	Project Slides 31 and 32. Watch the two YouTube videos. The Honda machine is made entirely out of car parts and is a car commercial. The second video is a music video for the band OK Go for their song “This Too Shall Pass.”	
5 min	Project Slide 33. Invite the students to share what they notice about the Goldberg Machine. This is also on the last page in their packet on the back.	A list of Rube Goldberg Noticings is provided on page three of their packet.
5+ min	Project Slide 34 to introduce the project. Students will create their own design of a “Rube	Past student examples may be provided for students to draw inspiration from. These are in

	Goldberg Contraption.” The rubric is the last page in their packet. With any remaining time, allow students to start their rough drafts of their machine on plain white paper.	a separate slideshow that can be posted to their Google Classroom for reference during the project.
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References

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