

Engage: Making inferences about a simple machine

Figure 8
Science processes and inquiry discussion rubric

	Advanced	Proficient	Developing
Shows respect during discussion	Is a vital contributor to the discussion by adding feedback, posing questions, and listening respectfully	Listens and contributes frequently	Is inattentive at points or lacks contribution/makes no attempt
Reports quantitative and qualitative data	Makes a clear connection with a depth of understanding	Makes a clear connection and accurate presentation	Makes no clear connection and inaccurate presentation
Communicates scientific processes, procedures, and conclusions	Clearly shows a step-by-step process of trial and error, with reflection	Demonstrates a clear process	Doesn't demonstrate a clear process, communicates unclearly, or makes no attempt
Uses evidence to communicate conclusions	Uses evidence that leads to the conclusion, has a theory that is fully developed/developing	Uses points of evidence that connect with observations (whether true or false)	Does not use clear evidence or clear communication or makes no attempt
Uses evidence to communicate alternative explanations	When posing alternative views, provides in-depth evidence to oppose the original view	Poses alternative explanations or communicated evidence	Does not present alternatives, communicates unclearly, or makes no attempt
Presents claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details	Uses sequential and logical procedure when communicating claims and findings	Communicates claims and finding	Does not communicate or presents unclear claims

Figure 9
Simple-machine checklist

	Yes	No
Does it contain two spur gears?		
Does it contain two bevel gears?		
Does it contain two wheels?		
Does it have a predicted outcome/application?		
Is there an input (crank/handle) to connect to the motor?		
Is there an output (object being moved)?		
Are the parts connected accurately?		

Figure 10
Instructions-to-a-friend and bicycle-application rubric

	Advanced	Proficient	Developing
Student accurately describes in a clear manner how gears work.	Explanation is easy to understand; student shows in-depth knowledge of the subject.	Student shows an understanding of the subject.	Student shows a developing understanding.
Student created a diagram that is labeled correctly.	Diagram is clean and parts are easy to identify; movement of gears is correct.	Diagram shows correct movement of gears.	Student shows a developing understanding; parts are labeled incorrectly.
Student accurately uses new vocabulary to identify or label parts, including spur gear, bevel gear, and wheels.	Student uses all new vocabulary to explain gears.	Student uses a couple of new vocabulary terms but demonstrates a developing understanding of gears.	Student uses no new vocabulary and shows minimal understanding or application.
Student accurately uses new vocabulary to explain how gears work together in a machine, including <i>gear ratio</i> , <i>input force</i> , and <i>output force</i> .	Student uses all new vocabulary to explain how gears work together in a machine.	Student uses a few new vocabulary terms but demonstrates a developing understanding of the function of gears.	Student uses no new vocabulary terms and shows minimal understanding or application.
Student accurately explains mechanical advantage.	Student fully and accurately explains the concept of mechanical advantage and applies it to bicycles.	Student accurately explains the concept of mechanical advantage or demonstrates a developing understanding of the concept.	Student does not accurately explain mechanical advantage and shows minimal understanding or application.

Figure 11
Activity Worksheet checklist

	Yes	No
Student answered all questions.		
Student's responses were thoughtful and represent student ideas.		
Student applied observations and data to support responses.		
Student created a diagram with correct labels, directions, etc.		
Student documented new vocabulary words with correct definitions.		