

TECHNOLOGY ACTIVITY

SKETCHING DESIGN & PROBLEM SOLVING

NATIONAL STANDARDS

- #11 – Students will develop the ability to apply the design process
- #16 – Students will develop an understanding of and be able to select and use energy and power technologies
- #8 – Students will develop an understanding of the attributes of design
- #9 – Students will develop an understanding of engineering design
- #10 – Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving

NATIONAL BENCHMARKS

Grades 9-12

- #11 – N Identify criteria and constraints and determine how these will affect the design process
- #11 – Q Develop and produce a product or system using a design process
- #11 – R Evaluate final solutions and communicate observation
- #16 – J Energy cannot be created nor destroyed, however, it can be converted from one form to another
- #16 – N Power systems must have a source of energy, a process, and loads

Grades 6-8

- #8 – E Design is a creative planning process that leads to useful products and systems
- #8- F There is no perfect design
- #8 – G Requirements for a design are made up of criteria and constraints
- #9 – F Design involves a series of steps
- #9 – H Modeling, testing, evaluating and modifying are used to transform ideas into practical solutions
- #10 – H Some technological problems are best solved through experimentation
- #10 – G Invention is a process of turning ideas and imagination into devices and systems

ACTIVITIES

- Students will be able to recognize, identify, sketch and understand the six simple tools
- Students will be able to sketch the simple tools and place them into usable situations to perform possible functions according to their identified purpose and use
- Students will sketch a Rube Goldberg contraption using all six simple tools at least once in the design to perform a task as assigned by the teacher. The tasks could include such items as: opening a soda can, smashing a can, cutting an apple in two, kicking or hitting a ball, etc
- Students will analyze a Rube Goldberg design and write a one page paper explaining how the contraption works in their own words and identify all simple machines used in their description.
- **Extra Credit** Students will work with a partner to build from their sketched design an actual working model.

SHOW ME STANDARDS

Performance Standards:

- Goal #1- 2 Conduct research to answer questions and evaluate information and ideas
- Goal #1- 10 Apply acquired information, ideas and skills to different contexts as students, workers, citizens and Consumers
- Goal #3 - 1 Identify problems and define their scope and elements
- Goal #3 – 2,3,4,5,6,7 Develop and apply strategies as others have done and from own experiences, evaluate the processes, reason inductively, examine problems and solutions and evaluate as to how it addresses the problem

Knowledge Standards:

- COMM ARTS #1 Speaking writing standard English
- SCIENCE #1,2 Properties and principles of matter & energy, force & motion
- SCIENCE #7 Process of scientific inquiry

ASSESSMENT

- Sketches clearly show mechanisms and clear illustration of each simple tool
- Sketches are linked to show viable/believable possibilities for working together to solve a given problem
- Sketch clearly shows with proper labeling all steps needed to perform given task with machine capable of performing the given step in the contraption drawn
- Paper describes the given Rube Goldberg device with all steps and machines clearly identified