**SIMPLE MACHINES LAB PROJECT**

***Imagination is more important than knowledge."* Albert Einstein**

**PROJECT OVERVIEW**

* **Student must create a machine consisting of AT LEAST 3 of the 6 simple machines listed.**
* **The device MUST accomplish the task that was originally intended and planned by the student.**
* **Students will have until December 20th to complete their 'invention."**
* **The project will be completed at home.**

**LIST OF SIMPLE MACHINES**

* **Lever**
* **Wheel and axle**
* **Pulley**
* **Inclined plane**
* **Wedge**
* **Screw**

**BACKGROUND**

Rube Goldberg was an artist, inventor, engineer, author and sculptor. He is best known for his comical drawings of crazy contraptions and inventions. His artwork appeared in newspapers throughout the United States from the early 1900's to the 1960's. Today, the term *Rube Goldberg* is used to signify anything done in an overly complicated or round-about manner.

Today, his spirit lives on in Rube Goldberg machine contests and school projects everywhere. Students use household items to try to build the most complex machine possible, to accomplish a simple task. For example, to turn the page of a book, a machine might include balls, string, various toys, pulley systems, old bicycle parts, mousetraps, recycled junk and more. The wackier the better! By building these crazy contraptions, students gain invaluable skills in creativity and science. Plus, it's fun!

Your own imagination and creativity are all you need to build a super Rube Goldberg machine. There are a few rules because this project will be graded. Follow the rubric.

**PROCEDURE**

1. Decide on a goal for your machine. The goal is the last step of your machine. It may be something useful, like how to turn off the alarm clock, or something wacky, such as how to swat a fly.
2. Gather a few things from around the house, in your toy box, junk drawer, or garage. Balls, marbles, dominoes, string, toy cars, mousetraps (never use a rat trap - it could break the bones in your hand), magnets, cardboard or tubes, etc. Don't worry, you can collect more later. **Avoid fire or dangerous chemicals or anything that goes against school policy! If you are not sure please check with me before your bring it in!!** .If there is anything I can provide for you let me know. You are welcome to have it if I have it!
3. Now play with the things! What can the car bump into or knock down? Can the string pull something up? What can push the ball down the cardboard ramp? Try it out!

Get a piece of paper and start writing down any idea that pops into your head. This is called brainstorming. No matter how crazy the idea seems, just write it down for later. Even if you don't use it, it may help you think of more things. This is called brain storming!   Remember not to overlook the most important element of an outstanding Rube Golberg machine: WACKINESS! Rube saw the humor in every situation!! You do not need to spend money to do this. Just look for silly, interesting things around your home to help you. GO CRAZY! A true Rube Golberg machine would be boring without some common household items (old toys, toilet plunger, egg beater, mousetrap, typewriter...). Also remember to follow the rubric for requirements!

Please refrain from using kits. This project is intended to also encourage the students to apply their creativity.

Parent Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5 Points

* Rube Goldberg Project – Rubric

Remember to always aim to get the highest amount of points possible in every category.

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| **Due 12/20/17** | **Blue Print Criteria** | **Pts** |
| **Section 1** | 0 | 1 | 2 | 3 | **4** |  |
| “Blue Print” Drawing  | No drawing. | Does not show entire project, or incomplete. | Complete, with portions that are difficult to understand. | Complete, easy to understand, well-labeled. | **Complete, easy to understand, well-labeled, organized, typed.** |  |
| # Steps | 0-1 | 2-3 Steps | 4-6 Steps | 7-9 Steps | **10 + Steps** |  |
| Steps well labeled on drawing with step number, and type of machine involved. | No labels | Steps labeled. | Steps labeled correctly. | Steps labeled correctly in sequence. | **Steps labeled correctly in sequence with correct type of machine.** |  |
| **Grade** | A = 11-12; B = 9-10; C = 8; D = 7; F= 0-6 |  |
|  |
| **Due 12/20/17** | **Physical Structure Criteria****(3-D Working Model)** | **Pts** |
| **Section 2** | 0 | 1 | **2** |  |
| Apparatus is physically in the room and holds together. | No Apparatus.  | Apparatus is in the room, and does not fall apart. | **Apparatus is in the room, does not fall apart, and appears to be well-constructed.** |  |
| Apparatus is on a solid platform of some sort. | Apparatus is not on a solid platform and/or needs assistance standing from | Apparatus is on a solid platform. | **Apparatus is on a solid platform of good construction.** |  |
| Project fits through the classroom door. | Project does not fit through the door. |  | **Project fits through the door.** |  |
| Apparatus does not create a mess. | Project creates a mess when task is fully completed. | Project creates a minimal mess when fully completed. | **Project does not create a mess when fully completed.** |  |
| Apparatus does not launch, shoot, or catapult anything against people, the wall or the ceiling. | Apparatus launches, shoots, or catapults anything against people, the wall or the ceiling. |  | **Apparatus does not launch, shoot, or catapult anything against people, the wall or the ceiling.** |  |
| **Grade** | A = 9-10; B = 8; C = 7; D = 6; F = 0-5 |  |
|  |
|  | **Presentation and Task Completion Criteria****(All students are required to present to get the points.)** | **Pts** |
| **Section 3** | 0 | 1 | 2 | **3** |  |
| Apparatus works | Apparatus does not work. | Apparatus works on fourth, fifth, or sixth trial. | Apparatus works on third trial. | **Apparatus works on the first or second trial.** |  |
| Correct identification of the simple machines in the project. | Incorrect verbal identification of the simple machines in the project. | Correct verbal identification of 50% of the simple machines in the project. | Correct verbal identification of 75% of the simple machines in the project | **Correct verbal identification of 80%-100% of the simple machines in the project** |  |
| No simple machine is used more than 5 times. | More than 3 simple machines are used more than 5 times. | More than 2 simple machines are used more than 5 times. | 1 simple machine is used more than 5 times. | **No simple machine is used more than 5 times.** |  |
| At least 4 different simple machine types are used. | Only 1 simple machine type used. | 2 different simple machine types are used. | 3 different simple machine types are used. | **4-6 different simple machine types are used.** |  |
| **Grade** | A = 11-12; B = 9-10; C = 8; D = 7; F= 0-6 |  |