

SCIENCE

Transitional
Kindergarten-
Grade 5

LP6 - LP7

STEM Expo Assignment/Lesson Plans Parent/Student Resource Packet

STEM Expo

Assignment Dates: 1/3/18 - 3/2/18

Due: Final project is due at the STEM Expo on Thursday, February 15th. However, students not presenting in the Expo must turn in a video or display board by Monday, February 12th.

When: students will meet their Educational Advisor in the morning to set up their Rube Goldberg Machines or other STEM Expo exhibits. Students will arrive at 8:30 AM to set up their Rube Goldberg Machines. Teachers and EA's will be sending out more information when the STEM Expo draws closer.

Who: Red and White Track TK-5 Students. Students may work in teams, with a partner, or individually. Students may also work across grade levels with other students. For example 2 third grade students may team with 2 Kindergarten students. Each student is required to submit a Rube Goldberg Weekly Journal Entry.

Students that are unable to attend the STEM Expo also have the option to create a video at home showcasing their project or create a display of their machine. Student projects may be as simple or complex as students would like it to be.

Assignment:

All Red and White Track TK-5 students not enrolled in Project Lead the Way will complete a Rube Goldberg Machine for the STEM Expo. PLTW students may still complete a machine if they choose to do so.

Who is Rube Goldberg? He is best known for his "Inventions" cartoons, which use a string of outlandish tools, people, plants, and steps to accomplish everyday simple tasks in the most complicated way. Pulitzer Prize-winning cartoonist Rube Goldberg's drawings point out that people are often overwhelmed by over complicating their lives.

Sample Description of a Rube Goldberg Invention: A golf ball rolls down a ramp otherwise known as an inclined plane (action), and lands in a paper cup attached to a pulley with a counter weight, that is tripped by the movement of the ball (reaction). The pulley transports the cup with the ball in it to a higher track made of PVC pipe where it is deposited (action) and rolls to another point where another component moves it further (reaction).

Project Instructions:

Step 1: Identify a TASK. This Task should be a very simple goal. It will be the ending of your Rube Goldberg machine. The only requirements are, the project must be: (1) easily and SAFELY tested by you, (2) the machine must fit through a door and, (3) by definition, a Rube Goldberg is a complex solution to a simple problem, therefore your task must be *simple* (i.e. dropping a ball in a cup, closing a book, etc.) You may also refer to the list of resources: Rube Goldberg Machines, Rube Goldberg Website Link, videos explaining simple machines, and even some games for the students to do to learn more about simple machines.

NO PART OF YOUR DISPLAY MAY POSE A SAFETY HAZARD. DO NOT INCLUDE HARMFUL CHEMICALS, BACTERIAL CULTURES, SHARP OBJECTS, OR ANY SOURCE OF HEAT OR FLAMES. NO LIVE OR PRESERVED ANIMALS ARE ALLOWED!

Ideas: Crush a soda can, Water a plant, Plant a seed in a pot of soil, Pop a balloon, Fill a glass with water, Squeeze toothpaste onto a toothbrush, Turn off an alarm clock, Turn a page in a book

There are MANY great resources on the Internet for Rube Goldberg Ideas. Copying is okay as long as you truly make it your own. BE creative. And, be ready for some challenges ahead.

Step 2: Choose your supplies and be creative, you will add to your supplies as you engineer your machine.

Ideas:

- Aluminum Foil, Plastic Containers, Cardboard, Toilet paper or paper towel tubes for chutes, Cereal boxes to use like dominoes, Soda and Soup Cans, Dominoes, Funnels, Marbles, Golf Balls, Toy Cars, Strings, Buckets, Cups or Bowls, and anything else you can come up with. BE CREATIVE!
- Your invention must have its own base. The Rube Goldberg must be free-standing and supported by its own base. Remember, your project must fit through a doorway.
- Electrical energy may not be used (batteries are allowed)

Step 3: Sketch your machine before building it. It can help you choose the right materials and assemble a mechanism that works. Sketching will also help you to think of more supplies that you may need to have your machine work. Remember recycled materials work great.

Step 4: Assemble the different parts of your machine; remember to test each part before moving to the next. Keep in mind that you may want to add or leave out certain materials during the building process.

Step 5: Test your machine. Once the machine is complete, test to see if it works. Take notes on which parts of the machine work and which ones do not. Does it achieve the task? If something doesn't work, what can you do to make it work next time?

Step 6: Student must complete the Rube Goldberg Journal Entry each week and submit to their teacher or EA.

Congratulations you are ready to showcase your Rube Goldberg Machine at the STEM Expo on Thursday, February 15th. Remember you **MUST** be present to showcase your machine. If you are unable to attend the STEM Expo you have the option to create a video or display of your Rube Goldberg Machine in action and submit it no later than Monday, February 12th.

Activities for students that cannot present at the STEM Expo.

Students presenting at the STEM Expo do NOT need to complete the options below.

Video:

1. Introduce yourself and title of your Rube Goldberg Invention.
2. Describe the feature the audience should pay attention to.
3. Run your Rube Goldberg Invention
4. If you are submitting a video please place your presentation on a flash drive and turn into your child's teacher or EA.

Display Board: The backboard **MUST** be sturdy and stand by itself on a table.

1. Title: Name of your Rube Goldberg Invention
2. Equipment or Materials: Please put in list form all the equipment or materials you used
3. Purpose: This explains the problem that you want your Rube Goldberg to solve. What task did it complete?
4. Initial Design Idea: Diagram of your plan and brief explanation of how it should work.
5. Diagrams, Photos, and Graphs: Drawings and photos are most useful on the display. You may want to include photographs of your progress. Please title all photos.
6. Sketch of your final design

Click on the links below for more information and Examples. Have fun!!

Pouring Milk: <https://youtu.be/EjOFeC-Dm7U>

Popping a Balloon: <https://youtu.be/TdTYXc9EYHo>

Popping a Balloon 2: <https://youtu.be/b-IDAqxl9Dk>

Rube Goldberg Ideas: <https://youtu.be/MqDF1tyoOvU>

Rube Goldberg with 6 simple machines:

<https://youtu.be/VunNpfdw68g>

Share a Coke:

https://youtu.be/eQyYvPBrm5M?list=PLpKC_Wp8uaARqrFz9wBEI7A1QMxdfCa5M

Ok, This Too Shall Pass Rube Goldberg Machine:

<https://youtu.be/Y8cuuP4Jmio>

Goldieblox and Rube Goldberg: <https://youtu.be/IIGyVa5Xftw>

Honda Rube Goldberg Machine: https://youtu.be/_ve4M4UsJQo

Simple Machine Resources: Primarily Videos

All about Simple Machine and includes Bill Nye the Science Guy:

[https://www.schooltube.com/video/b92aaeff6cf4431aa6c7/Bill Nye - Simple Machines](https://www.schooltube.com/video/b92aaeff6cf4431aa6c7/Bill+Nye+-+Simple+Machines)

All About Simple Machines: <http://www.neok12.com/Simple-Machines.htm>

Sid the Science Kid Videos:

Sid's Amazing Invention:

https://youtu.be/UjxsW5NeL8s?list=PLickS_jCzd8NX2pu8wMeIF7FSygEcqHNB

The Broken Wheel

https://youtu.be/BEHYhH99jzo?list=PLickS_jCzd8NX2pu8wMeIF7FSygEcqHNB

My Slide <https://youtu.be/TQL0dN1V7bs>

PBS Simple Machines:

<http://www.pbslearningmedia.org/resource/idptv11.sci.phys.maf.d4ksim/simple-machines/>

Simple Machines Interactive:

<http://www.watchknowlearn.org/Video.aspx?VideoID=46415>

Pulley's: <https://youtu.be/9T7tGosXM58>

Websites

Simple Machines: <http://www.mikids.com/Smachines.htm>

Simple Machine Facts:

http://idahoptv.org/sciencetrek/topics/simple_machines/facts.cfm

Facts About Simple Machines: <http://easyscienceforkids.com/all-about-simple-machines/>

Rube Goldberg Website: <https://www.rubegoldberg.com>

Online Games

Goldburger to go: Get Ideas for your machine.

<http://pbskids.org/zoom/games/goldburgertogo/realworld.html>

Rube Goldberg, Catch the Burglar Game!

<http://archive.fossweb.com/modules3->

[6/LeversandPulleys/activities/rubegoldbergmachine.html](http://archive.fossweb.com/modules3-6/LeversandPulleys/activities/rubegoldbergmachine.html)

Simple Machines Online Game <http://www.msichicago.org/online-science/simple-machines/activities/simple-machines-1/>

Edhead's Simple Machine's <http://www.edheads.org/activities/simple-machines/FREE iPad Apps>