

## Rube Goldberg Challenge!

Your group will get three classroom days to create a Rube Goldberg machine.

**The Task:** Open a textbook using a complex machine that has at least six different steps.

**The Requirements:** Use at least 3 different simple machines (remember the six different simple machines are wedge, inclined plane, wheel and axle, lever, pulley, and screw). With six different steps, some machine types can be used more than once and some steps may not use a simple machine at all. Draw each step of your machine, label the different machines used, and what type they are.

**Suggested Materials:** Masking tape, balls, marbles (large and small), pipe insulation cut lengthwise, pull back cars, matchbox cars, weights, string, slinkies, cups, toilet paper rolls, dominoes, pulleys (if you don't think students can make their own), paper clips, bamboo skewers, k'nex, large wooden or plastic spoons, blocks, books, boxes (anything to create levels or ramps), miscellaneous toys and repurposed "trash" (e.g., oatmeal and strawberry containers, meat trays).

### Day 1:

Play around with the materials, start brainstorming what your machine might look like. Test ideas you may have for different steps. Remember if you come up with steps you like, to write them down or sketch them out in your science notebook. *(Note to teachers: You may want to limit the materials on the first days so groups do not hoard items. Ways to do this include only having one student from each group collect items, limiting the number of items, only allowing them to take what fits into a paper bag, or only allowing each group to have one of the most coveted items like large marbles and pull back cars. Once the groups start building, they can go back and get more materials or trade with other groups as needed.)*

### Day 2:

Plan out your machine. Decide on the materials and plan out your steps. The best way to make one of these machines is to work backwards from the final task (in this case opening the book).

Draw each of your steps and write a brief description of what each step does (transfer energy from what to what, uses which simple machine, what materials are used, etc.). **DRAWINGS MUST INCLUDE LABELS OF MACHINE TYPE, and MATERIALS!!** *(Note to teachers: You may also want to include energy type (kinetic or potential), where things accelerate, changes in momentum, forces, work—the possibilities for review are endless).*

You may also want to draw a sketch of your whole machine in your science notebook to make it easier to recreate on Day 3.

**Day 3:**

1. Using your plans of the steps above, construct your complete Rube Goldberg machine.
2. Once it is working, describe each step and show how it works to the teachers.
3. You will get points for each step successfully executed. Having more than six steps will be considered extra credit.
4. Adjust your drawings above to reflect any changes you make on Day 3.

Group Names: \_\_\_\_\_ Period: \_\_\_\_\_ Grp: \_\_\_\_\_

## Rube Goldberg Planning and Design Sheet

**Step 1:**

Explain: \_\_\_\_\_  
\_\_\_\_\_

**Step 2:**

Explain: \_\_\_\_\_  
\_\_\_\_\_

**Step 3:**

Explain: \_\_\_\_\_  
\_\_\_\_\_

**Step 4:**

Explain: \_\_\_\_\_  
\_\_\_\_\_

**Step 5:**

**Explain:** \_\_\_\_\_  
\_\_\_\_\_

**Step 6:**

**Explain:** \_\_\_\_\_  
\_\_\_\_\_

**Step 7 (optional):**

**Explain:** \_\_\_\_\_  
\_\_\_\_\_

**Step 8 (optional):**

**Explain:** \_\_\_\_\_  
\_\_\_\_\_

## Grading Rubric

2 points for each step (total=12)

2 points for each simple machine type used (total=6)

2 points for getting it to work start to finish

2 points per step drawing on the worksheet (total=12)

1 point per step description on the worksheet (total=6)

2 points for accomplishing end task.

**Bonus:** Use 5 of the 6 simple machine = 4 points