

## Final PBL Science: MOTION

Your final project will include the following:

1. **Informative writing piece** (1 paper per person, and no sharing the same paper will be allowed)
  - a. Use the key vocabulary to aide your paper.
2. **Science Project & Video Taping**
3. **Presentation of the science project on Tuesday evening, May 27th**

You will be placed in groups of two. It is up to you to work together and plan out everything with your partner.

**Informative Writing Piece must have these questions answered:**

1. What are the relationships between forces and motion?
2. What are the variables that affect motion and force?
3. How does Newton's three laws describe the motion of a moving object?
4. How does gravity impact objects?

**Key Vocabulary:**

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• acceleration</li><li>• force</li><li>• free fall</li><li>• friction</li><li>• gravity</li><li>• inertia</li></ul> | <ul style="list-style-type: none"><li>• mass</li><li>• motion</li><li>• Newton's First, Second &amp; Third Laws of Motion</li></ul> |
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**Science Project:**

A) Students pick **one** of two projects to plan, construct and test in class, simulating Newton's Laws of Motion. *Students may use the internet to search for ideas & replicate, or use the instructions supplied by this packet.*

B) Students will also create a video documentary of their progress to go with it, justify understanding of Newton's concepts, cost of materials, and effectiveness. All projects will compete in a Motion Field Day at the Gallery of Experts.

**Air:** Create a parachute that will successfully land a raw egg (must be sealed in a sturdy plastic bag) without cracking.

**Goal:** To land the egg safely from a two-story drop.

**Land:** Create another balloon powered car using different materials.

**Goal:** Go the farthest distance in least amount of time.

## Motion - Air Project: Parachute Egg Drop Supply List

Here is the list of approved materials. You do not have to use all of the materials.

- **1 white large or extra large chicken egg - raw NOT boiled.** NO it may not be small, brown, blue, speckled, rainbow, etc.!! Does it make a difference? I don't know, but the answer is **NO YOU MAY NOT USE ANY OTHER TYPE OF EGG - OTHER THAN ONE WHITE LARGE OR EXTRA LARGE UNBOILED EGG!!**
- **Choose one:**
  - Four 5 oz Dixie cups (make sure they are 5oz!)
  - 3 toilet paper rolls (NO toilet paper on them!) **You may NOT use both - may NOT mix cups and paper rolls! One or the other but NOT both!**
- **10 regular straws (straight or bendy)** - not coffee straws, stir sticks, Starbucks giant drinking straws, etc. Just plain ol' straws!
- **25 wooden toothpicks** - pointy or flat tipped or rounded.
- **25 popsicle sticks** - Any size or color is acceptable.
- **10 cotton balls**
- **1 sandwich bag** - (NOT gallon/quart/snack/etc! Just sandwich size!!)
- **1 meter of string/yarn** - you MAY cut up into smaller lengths
- **50 cm of masking OR scotch tape no wider than 1 inch** - (no duct tape/mailling tape/wider width/etc.) be careful here...I have seen some kids projects who looked like they used an entire ROLL of tape! You want to cut off 50 cm and work with only that strip of tape. Not pull off strips and forget how much you've used.
- **6 rubber bands** - Any size or color is acceptable.
- **10 paperclips (no size specification)** - You MAY change the shape.
- **Glue - Plain ole school glue, no super glue, etc!** You MAY not coat your egg or glue anything to your egg!
- **Anything parachute related**

You may **NOT** use the glue, tape, string, or anything else to strengthen your egg!! Glue, tape, string, etc. is for either holding your structure together or for packing material. You may not adhere anything to your egg. Your egg may be surrounded by supplies, but they may NOT be glued or taped to your egg.

Your structure may be **NO LARGER than 12x12x12 inches.**

You may design a structure using **ONLY** the supplies listed above to protect an egg from a 2<sup>nd</sup> story drop. We are **NOT** launching the egg, simply dropping it.

**This project is a TEST GRADE. Grades are as follows:**

- Egg survives with no cracks/damage = **100**
- Egg is cracked but intact = **90**
- Egg has lost its innards = **80**
- Student **uses more supplies than on list or uses supplies that are NOT on the list or creates an air resistance design** = **75**
- Student doesn't participate or tries to "cheat the system" (uses boiled egg, rubberbands one cotton ball onto the egg and drops it, etc.) = **0**
- your structure is **difficult to open** after it's dropped and it takes me **more than 3 minutes** to cut it open to inspect your egg = **minus 10 points**

You may build and test at home as much as you wish, but you need to bring the project to school to work on it as well.

**NO BUILDING or REDESIGN** will be allowed on your drop day. I supply **NOTHING**. I will have to cut open your structure to inspect your egg after it's dropped.

You must bring your own supplies. No supplies will be provided at school.