

ASME and GatorTRAX Mechanical Engineering Module:

SUPPLY LIST:

For part 1 (volume measurements):

- 1) You will need a container full of a small candy. The container should be comprised of a combination of geometric shapes, such as cubes, rectangular prisms, cylinders, spheres, etc We handmade ours using supplies like boxes and soda bottle, and we filled it with jellybeans. Also make sure to count exactly how many candies are put into your container.
- 2) Measuring supplies (e.g. rulers or tape measures)
- 3) Writing supplies and paper.
- 4) Calculators if possible.

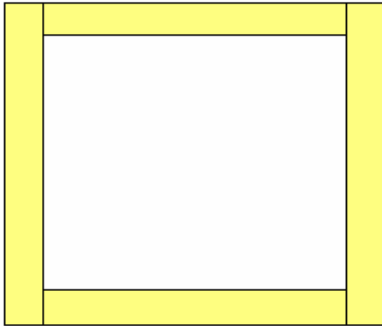
*As a precautionary note, we achieved about a 33% packing efficiency with jellybeans That means that after calculating the volume of a jellybean and the volume of a container, the actual number of jellybeans in the container was about 1/3 of the maximum that we calculated.

For part 2 (penny launchers):

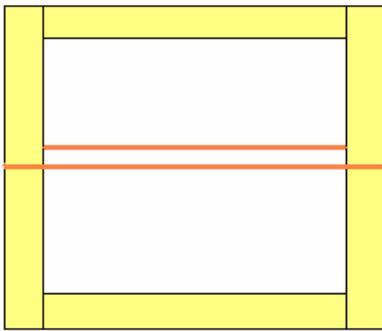
- 1) A minimum of 5 popsicle sticks per penny launcher. It is preferable to provide the kids with more sticks to allow them to get more creative They can use their extra sticks to build a stand that holds the launcher at precisely a 45° angle, or they can extend the length of the launching apparatus, etc.
- 2) At least one medium-sized rubber band per penny launcher More rubber bands allows for more creativity
- 3) Masking tape to secure the joints of the penny launcher.
- 4) Pennies!

To construct a penny launcher:

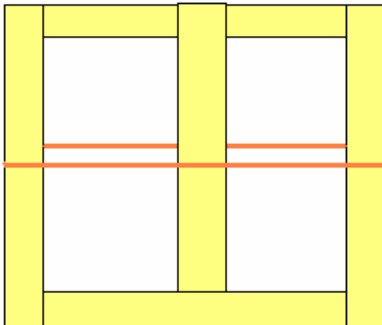
- 1) Using masking tape at the joints, connect four popsicle sticks into a frame like the one below:



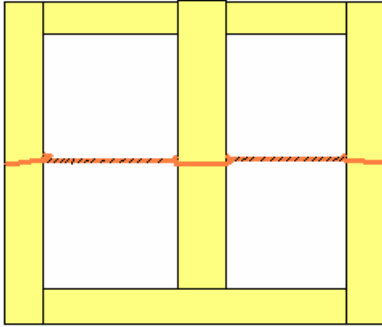
- 2) Stretch a rubber band around the middle of the frame.



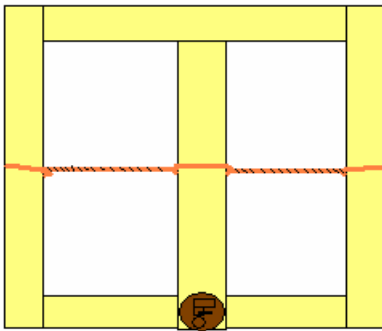
- 3) Thread a fifth popsicle stick through the middle of the rubber band.



- 4) Rotate the fifth popsicle stick so as to twist the rubber band. Because the popsicle stick will not easily fit through the frame, you will have to turn it to an angle every time you twist the stick an additional 180° . Once the stick has been rotated many times (you can decide how many, but normally you want to rotate it as many times as possible without breaking the rubber band).



- 5) In order to launch a penny, pull the fifth popsicle stick back 180° (without having it pass through the frame opening). Then, place the penny on the end of the stick.



- 6) When the stick is released, the rubber band will snap the stick forward and then penny will be launched!

Ideas for modifications:

- A) Build a stand to hold the launcher at a 45° .
- B) Find other creative ways to incorporate rubber bands.
- C) Extend the length of the launching stick by taping another stick to it.
- D) Add tape to the end of the launching stick to form a small cup-like shape that holds the penny better.
- E) You can build your penny launcher for force (i.e. to shoot it as far as possible) or for accuracy (i.e. to shoot it into a bucket 5 feet away). Or build both!