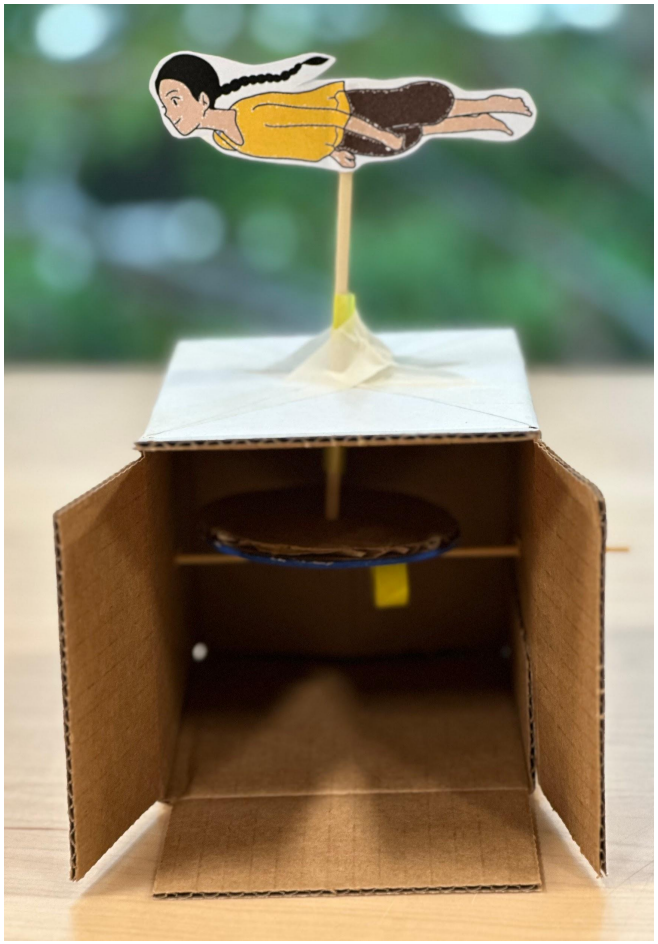
YOU'RE AN ENGINEER!

ENGINEER A STORYTELLING DEVICE



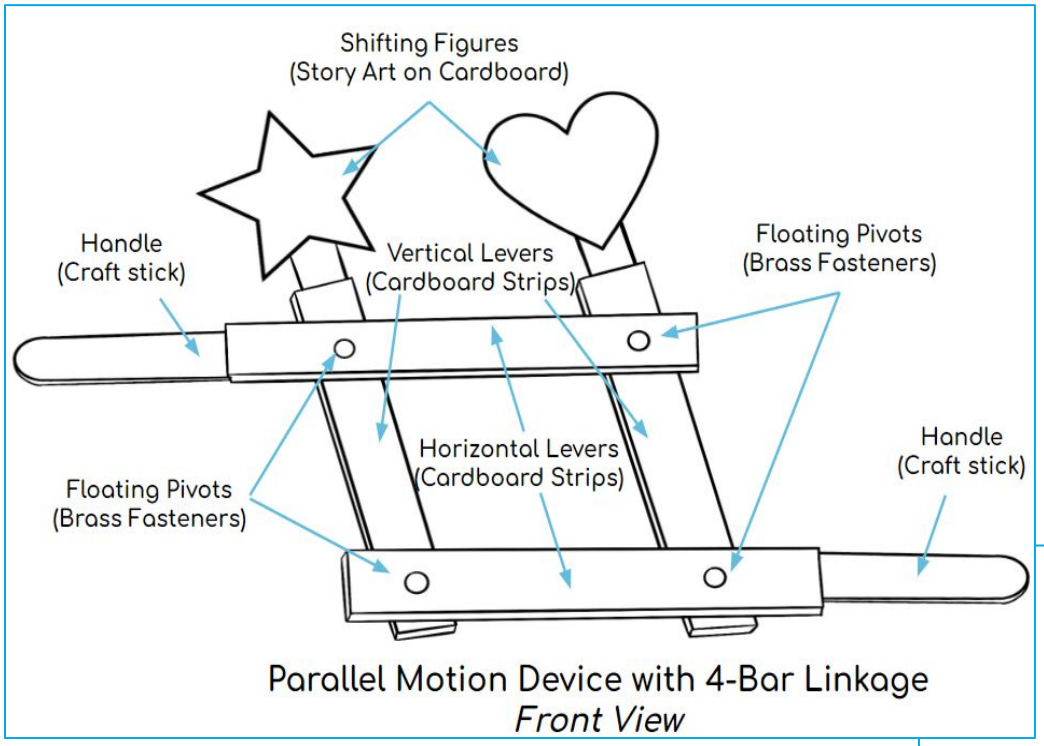
PARALLEL MOTION DEVICE WITH 4-BAR LINKAGE, 1st Page

Device Physics

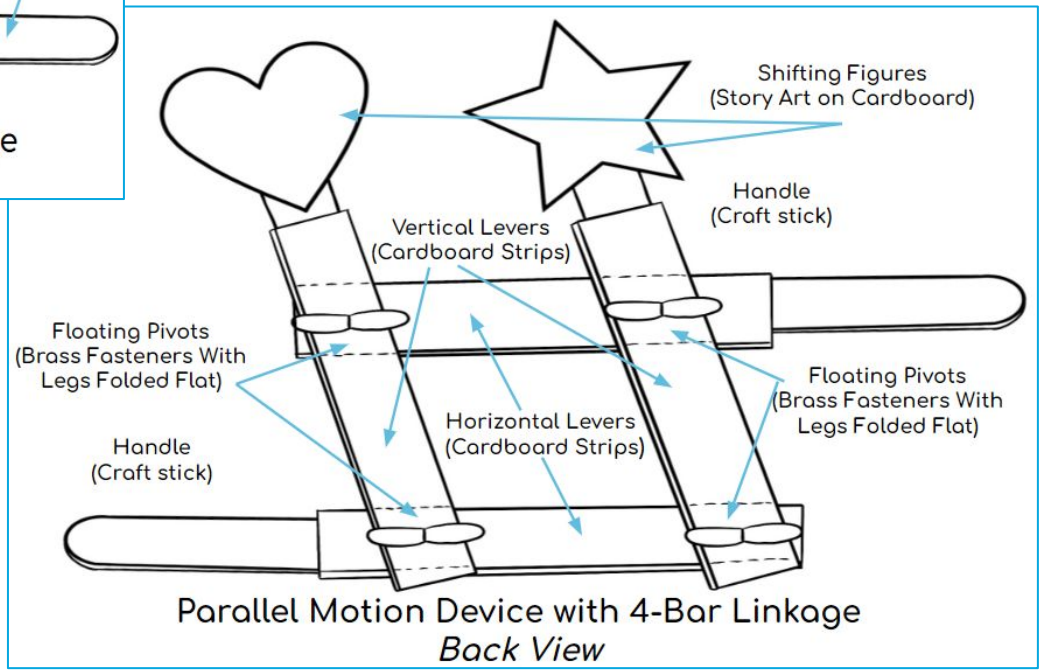
- Cardboard strips placed in a rectangle shape act as **levers**. Two of these cardboard strips will be placed horizontally. The other two will be placed vertically.
- The brass fasteners connect the cardboard strips and act as **floating pivots** that these **levers** rotate around.
- Push and pull forces on the **horizontal levers** transfer force to the **vertical levers** to move the **shifting figures**.

Possible Material & Tools

PARALLEL MOTION DEVICE WITH 4-BAR LINKAGE, 2nd Page



Parallel Motion Device with 4-Bar Linkage
Front View



Parallel Motion Device with 4-Bar Linkage
Back View

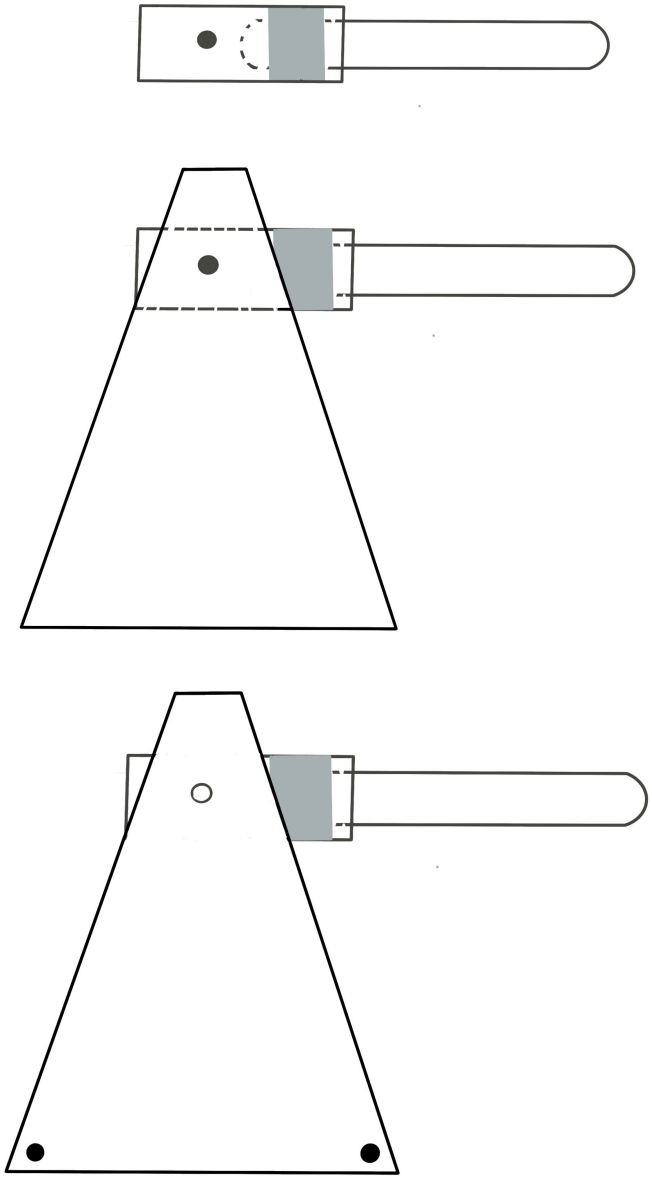
PENDULUM POWERED LEVER DEVICE, 1st Page

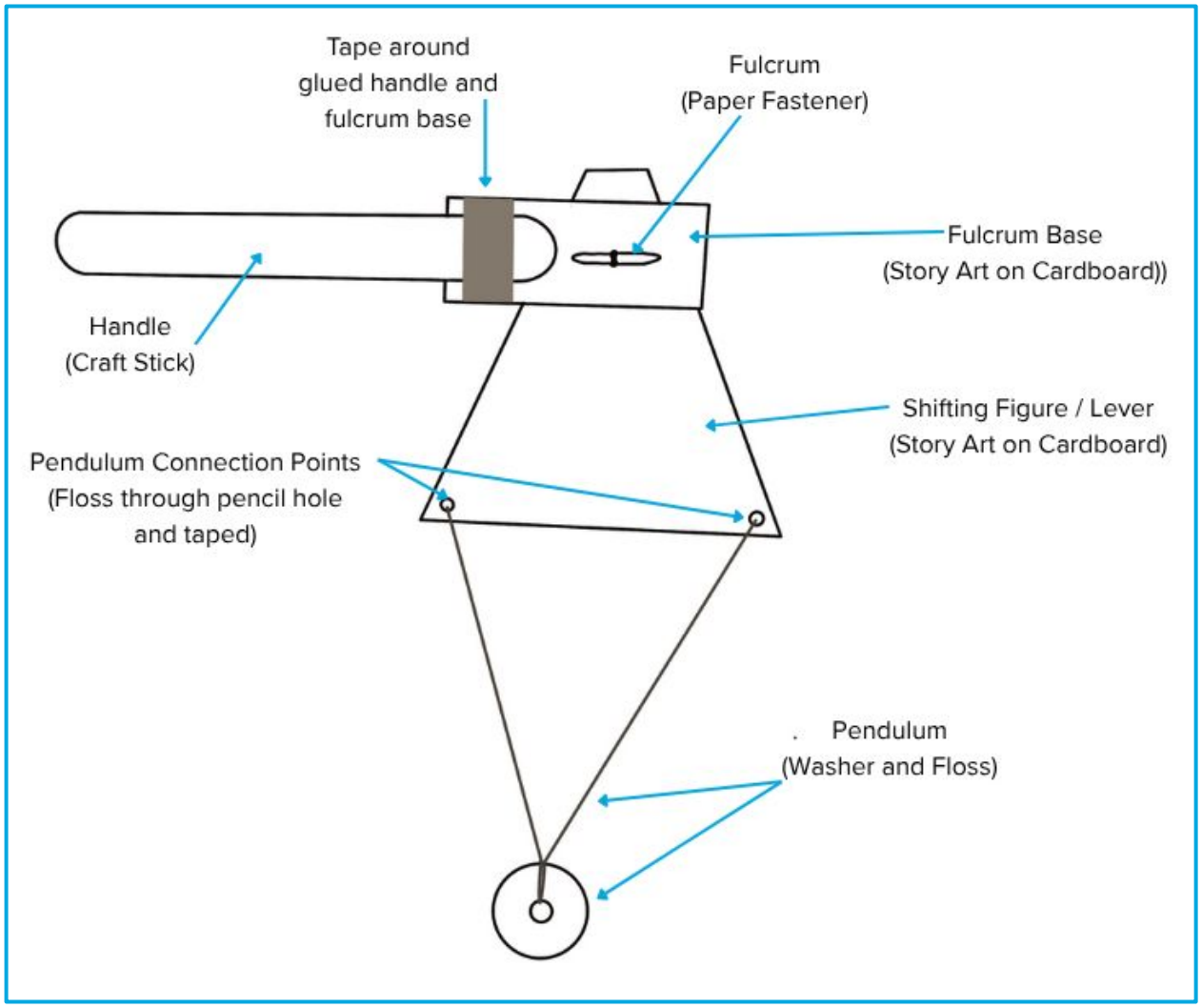
Device Physics

- The **shifting figure** / **lever** rotates around a paper fastener **fulcrum**.
- The **pendulum** is attached to opposite, bottom corners of the **shifting figure**..
- The movement of the **pendulum** shifts the weight of the **shifting figure**, causing it to rock back and forth.

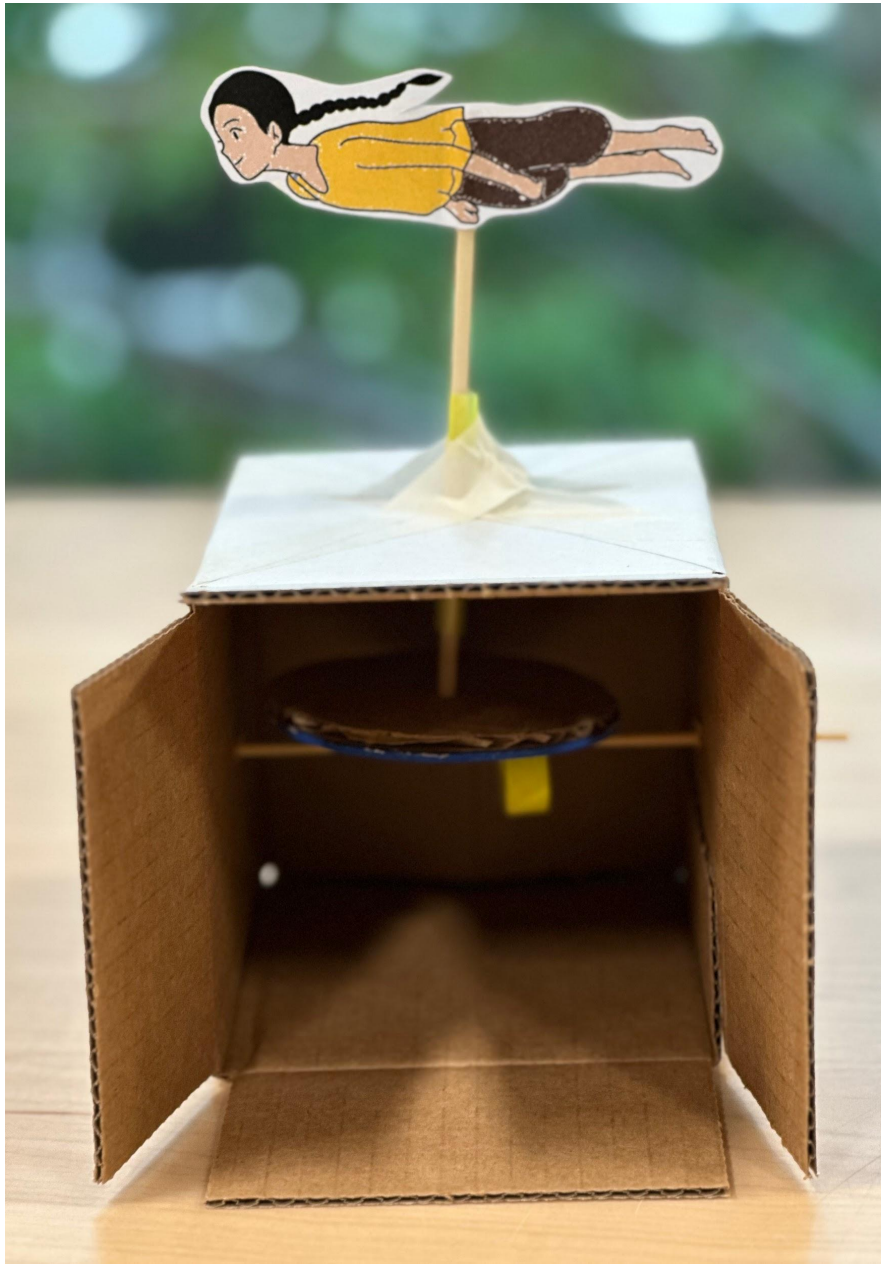
Possible Material & Tools

PENDULUM POWERED LEVER DEVICE, 2nd Page





CAM AND CAM FOLLOWER DEVICE, 1st page

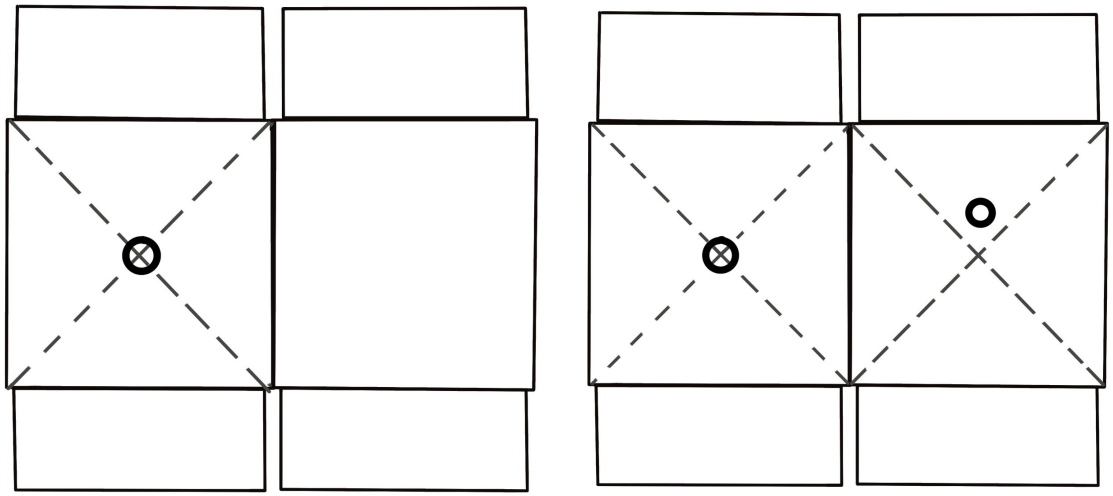


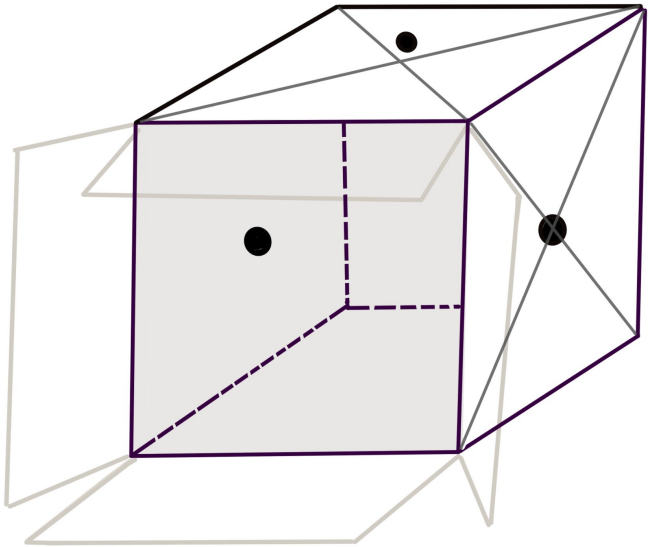
Device Physics

- The **cam follower** sits on the **cam**. When you turn the crank, the **cam** spins and moves the **cam follower**.
- The **cam follower** can spin, go up and down, or do both at the same time. The way it moves depends on the shape of the **cam** and the position of the **axle**.
- When you attach story art to the top of the **cam follower**, your art will move and bring life to your story scene.

Possible Material & Tools

CAM AND CAM FOLLOWER DEVICE, 2rd page

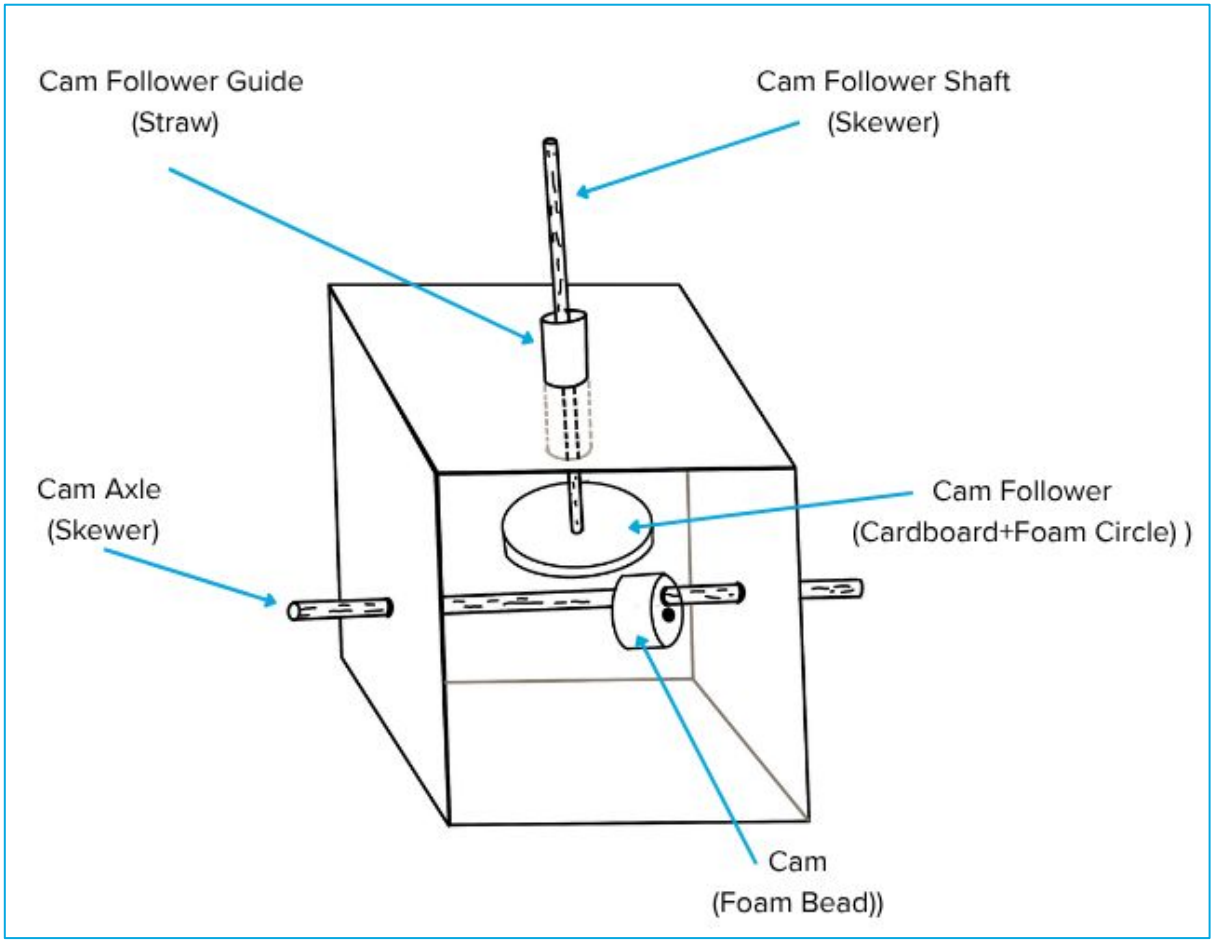


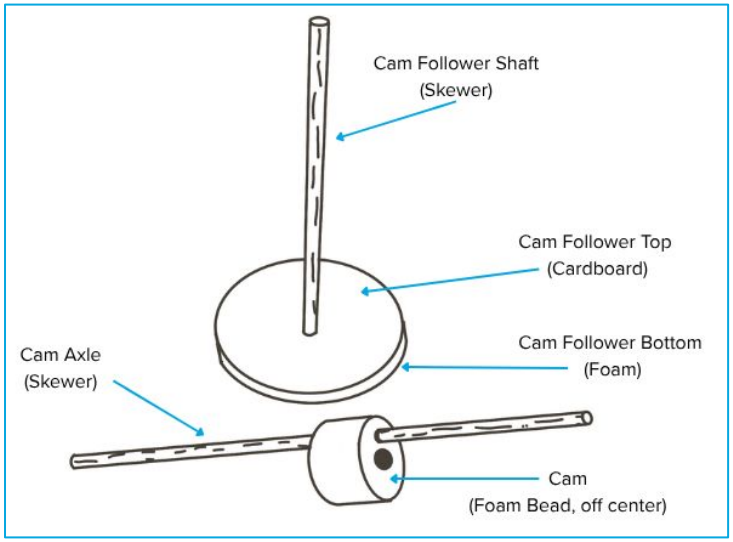


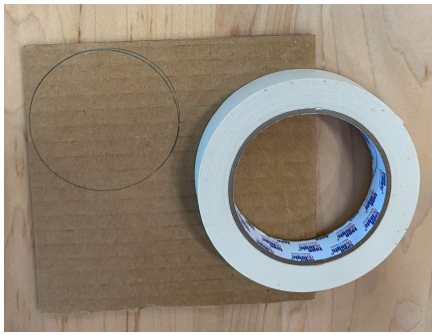
Box Preparation

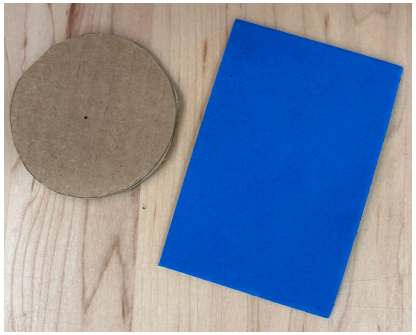
- Draw lines corner-to-corner on 3 sides of the box.
- Mark hole locations by drawing small circles as shown.
- Use skewers to poke holes where the lines cross (on opposite sides of the box).
- Use a pencil to poke the hole that is BEHIND where the lines cross.
- Use tape to close the end of the box closest to the pencil hole.

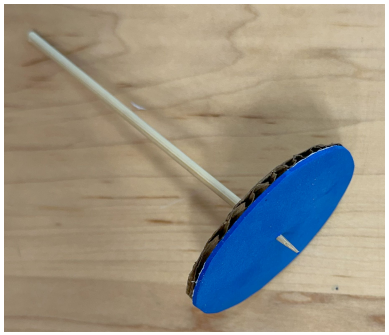
CAM AND CAM FOLLOWER DEVICE, 3rd page







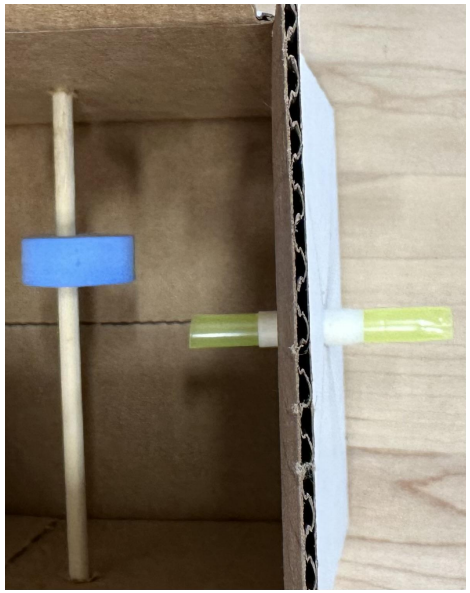




CAM AND CAM FOLLOWER DEVICE, 4th page

Building Tips

- A **guide** made from a short piece of drinking straw can keep the **cam follower** from wobbling or **falling** off the **cam**. You may need to wrap tape around it to hold it in place.
- Masking tape can help stabilize any wiggling parts.
- As the **engineer**, you are designing what motion the **cam** and **cam follower** will produce.



Try Creating Your Own Cam

- Round **cams** with a center **axle** touching the cam follower off to the side will spin the **cam follower**.
- Oval **cams** with a center **axle** make the **cam follower** go up and down.
- Round **cams** with an off center axle make the **cam follower** go up and down and spin around.