

Teeter - Lever Launcher & Target Game

In this lesson, students learn how a lever and stored energy work together to make a ball launcher like Mazie's

Materials:

1. MAZIE'S AMAZING MACHINES Book

2. Launcher - per group:

- (1) rubber band
- (1) paper straw
- (1) paper candy cup
- (1) pom-pom

(2) popsicle sticks Masking Tape, Scissors

3. Basketball Net Target - per group:

- (1) Index card
 - (1) paper candy cup
 - (1) paper straw
 - (1) paper plate
- Masking Tape, Scissors

Prep:

1. Prepare a sample launcher and basketball net target
2. Place children into pairs for building and playing the game, with special attention to the fact that pom-poms will fly through the air.
3. Place the materials at stations around the room.

Step-by-step

1. Today we will read a book about a child who uses machines to solve problems!
2. Read Mazie's Amazing Machines aloud, pausing on pages 23/24/25 to reflect on how the Teeter-Lever gets the basketball into the hoop.
 1. Have you ever seen a lever before? (Connect to seesaw and a stapler.)
3. After reading, tell students that today they are going to make a game inspired by the book: to try to launch "Jake's basketball" (pom-pom) into the basketball hoop (mini-cup.)
4. Name the parts of the sample launcher (which is a 2nd class lever similar to a stapler): the craft stick is the stiff bar, the rubber band holds "stored energy" and is the "fulcrum:" the point on which the lever pivots; the pom-pom is the "load" that they will launch.
5. Show children how in teams, one student will build the launcher and the other, the target net. [See: Make a Mazie Machine Sheet](#)
6. Review behavior expectations with students: kind words, careful hands, remember to take turns.
7. Show children how they can launch the "basketball" (pom-pom) in the air with the lever launcher and try to land it in the basketball hoop (mini-cup.) After 5 tries, they will switch jobs (from launcher to target holder and then back).
8. Ask children to pay attention to:
 1. How far away from the launcher they hold the target net. What happens when the straw is moved closer to the "fulcrum" (rubber band) or further away?
 2. Can they get two in a row into the net? Three in a row?

9. Send children to build launcher and target net and then play the game. Around the classroom; circulate, observe, and support.
10. Return as a group to reflect on the game:
 1. What did you notice when you were playing?
 2. What did you notice about your launcher when you moved the position of the straw? Which position made the ball go further? Which position of the straw made the ball go closer?
 1. If you had students record observations on the lever launcher worksheet, invite them to share their findings.

Enhancements and Modifications

1. Vocabulary enhancement/ELL support: explicitly teach a vocabulary word through quick vocabulary mapping (attached), American Sign Language (handspeak.com), or Morning Meeting.
 1. Lever: a long, stiff item that rests on a support and is used to lift a load
 2. Fulcrum: the support on which the lever turns or pivots
 3. Use the Lever Worksheet to have students record their experiences during the game as they change straw location.
2. Identify 1st class, 2nd class, and 3rd class levers in daily life (scissors, stapler, hammer)
3. Early finishers?
 1. Challenge students to land a certain number of closer launches onto paper plate and higher launches into the net
 2. Challenge students to create other types of launchers. [See: More Launchers Challenge Sheet](#)

Name: Melissa

Word: lever

Definition: A long, stiff item that rests on a support and lifts a load

Illustration:

2-5 Engineering Game Created by Sheryl Haft
Name: Callie Date: June 21, 2023

Changing the power of the lever

Fulcrum (Rubberband) Load (Pom-Pom) Straw Stiff Bar (Craft stick)

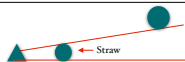
1. The straw is in the middle.
What did you notice about launching the load?

The pom pom almost went to the net but was not strong enough



2. The straw is closer to the load.
What did you notice about launching the load?

The pom pom did not go very far



3. The straw is closer to the fulcrum.
What did you notice about launching the load?

The pom pom went super high and far! I had to press down softer so it wouldn't go so far.

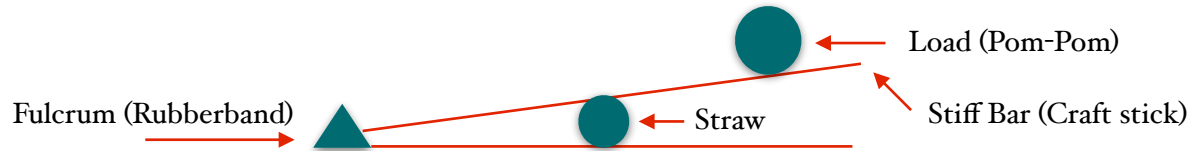
Additional Teacher Guidance

1. Consider assigning partner 1 and 2 to reduce friction with choosing who builds the launcher/target and who goes first
2. If you are using the lever worksheet, give students an opportunity to play the game without the worksheet at first. Then, bring students back to the carpet and show them how to fill the worksheet out before releasing them back to their stations.
3. Ensure children know behavior expectations and consequences before they begin, and give frequent reminders throughout. This game may be too exciting for some children, and they might need the opportunity to take a break and calm down before rejoining.

Name: _____

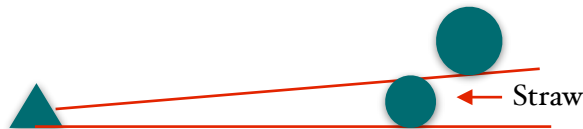
Date: _____

Lever Worksheet - Changing the Power of the Lever



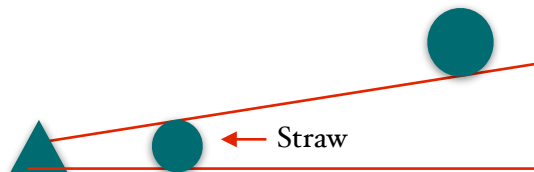
1. The straw is in the middle.

What did you notice about launching the load?



2. The straw is closer to the load.

What did you notice about launching the load?



3. The straw is closer to the fulcrum.

What did you notice about launching the load?

Name:

Word:

Definition:

Illustration

Standards Alignment

2-5

CCSS.ELA-LITERACY.SL.2.1. 3.1, 4.1, 5.1 Participate in/engage effectively in collaborative conversations with diverse partners about (*grade relevant*) topics and texts with peers and adults in small and larger groups

Next Generation Science Standards (NGSS)

K-2-ETS1-1 Engineering Design Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object

3-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion

3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem

SEL Competencies

Social Awareness: Recognizing and acknowledging the inherent strengths in others

Relationship Skills: Listening actively, communicating effectively, and self-advocating; making and maintaining trusting, respectful friendships; practicing collaborative problem-solving focused on the common good.

MAKE A MAZIE MACHINE

TEETER-LEVER LAUNCHER & TARGET GAME



BUILD!

HOOP TARGET: Materials: Index Card, Candy Cup, Paper Straw, Paper Plate, Tape

- 1) Tape straw to back of index card
- 2) Tape candy cup to other side of index card
- 3) Fold bottom 1" of paper straw and tape to plate

LAUNCHER: Materials: Paper Straw, Candy Cup, Pom-Pom, Rubber band, (2) Craft Sticks, Tape

- 1) Tape cup to (1) stick 1/4" from end
- 2) Rubber band both sticks together at other end
- 3) Slip straw between sticks

NOTE: Moving straw closer and further away from rubber band ("fulcrum") changes power of lever

PLAY! Score points with your Launcher Game!
How many can you get onto the plate? Into the net?

READ! MAZIE'S AMAZING MACHINES for more Invention Inspiration!

Created by Sheryl Haft - For more activities: sherylhaft.com



MAKE A MAZIE MACHINE

MORE LAUNCHERS! TEETER-LEVER GAME



**WHAT OTHER LAUNCHERS
CAN YOU INVENT?**

MATERIALS:

**Paper Straws
Candy Cups
Craft Sticks
Pencils
Rubber Bands
Paper Coffee Cups
Printer Paper
Pom-Poms
Tape, Scissors**

**OPTIONAL: Make 18" X 24"
print of Mazie's Treehouse,
Tape sundae cup targets**

Created by Sheryl Haft - For more activities: sherylhaft.com

INVENTION
FACTORY

1
Pedal

WOOF!

2
Pull

MAZIE'S

AMAZING

MACHINES

