

2-5

Engineering Game

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K-5

Engineering/
Game

Prep time: ~5 mins
Lesson: ~30 mins



Teeter - Lever Game

In this lesson, students learn how a basic lever works by playing the Teeter-Lever game to get Jake's basketball into the net!

Materials:

1. Copy paper to print "basketball net" paper cone
2. Teacher: scissors and tape
3. 1 ruler OR popsicle stick per group
4. 1 marker and piece of masking tape OR 1 rolled up ball of masking tape per group
5. 1 scrunched up square Post-it or ball of paper per group

Prep:

1. Place children into pairs or trios for the game, with special attention to the fact that paper will fly through the air.
2. Cut out 1 paper cone "net" per group and tape securely.
3. Scrunch one ball of paper per group

Step-by-step

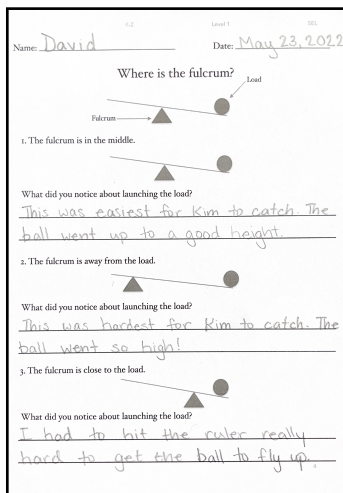
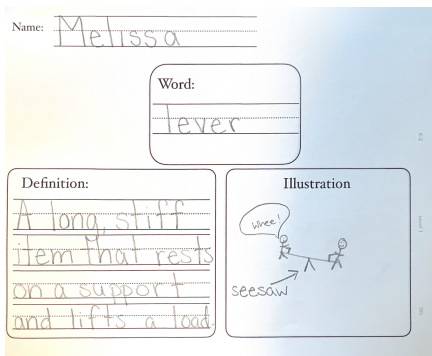
1. Today we will read a book about a child who uses machines to solve problems!
2. Read Mazie's Amazing Machines aloud, pausing on pages 23/24/25 to reflect on how the Teeter-Lever gets the basketball into the hoop.
 1. Have you ever seen a lever before? (Connect to seesaw)
3. After reading, tell students that today you are going to play a game inspired by the book: you are going to try to launch "Jake's basketball" (paper ball) into "the net" (cone)!
4. Name the parts of the lever: the ruler is the stiff bar, the marker/rolled up masking tape is the fulcrum, the paper ball is the load.
5. Review behavior expectations with students: kind words, careful hands, remember to take turns
6. Show children how they can launch the "basketball" (scrunched up paper ball) in the air with a basic lever and try to land it in the "net" (paper cone) that their partner will hold. After three tries, they will switch jobs (from launcher to catcher, and then back).
7. Ask children to pay attention to:
 1. Where they hold the "net," how high they hold the "net," how much force they apply to the teeter-lever, where the fulcrum is
 2. Can they get two in a row in the net? Three in a row?
8. Send children to play the game around the classroom; circulate, observe, and support.

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9. 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 game when you moved the fulcrum? Was one position harder or easier?
 1. If you had students record observations on the fulcrum worksheet, invite them to share their findings.
 3. What was challenging about this game? Would you do anything differently next time?

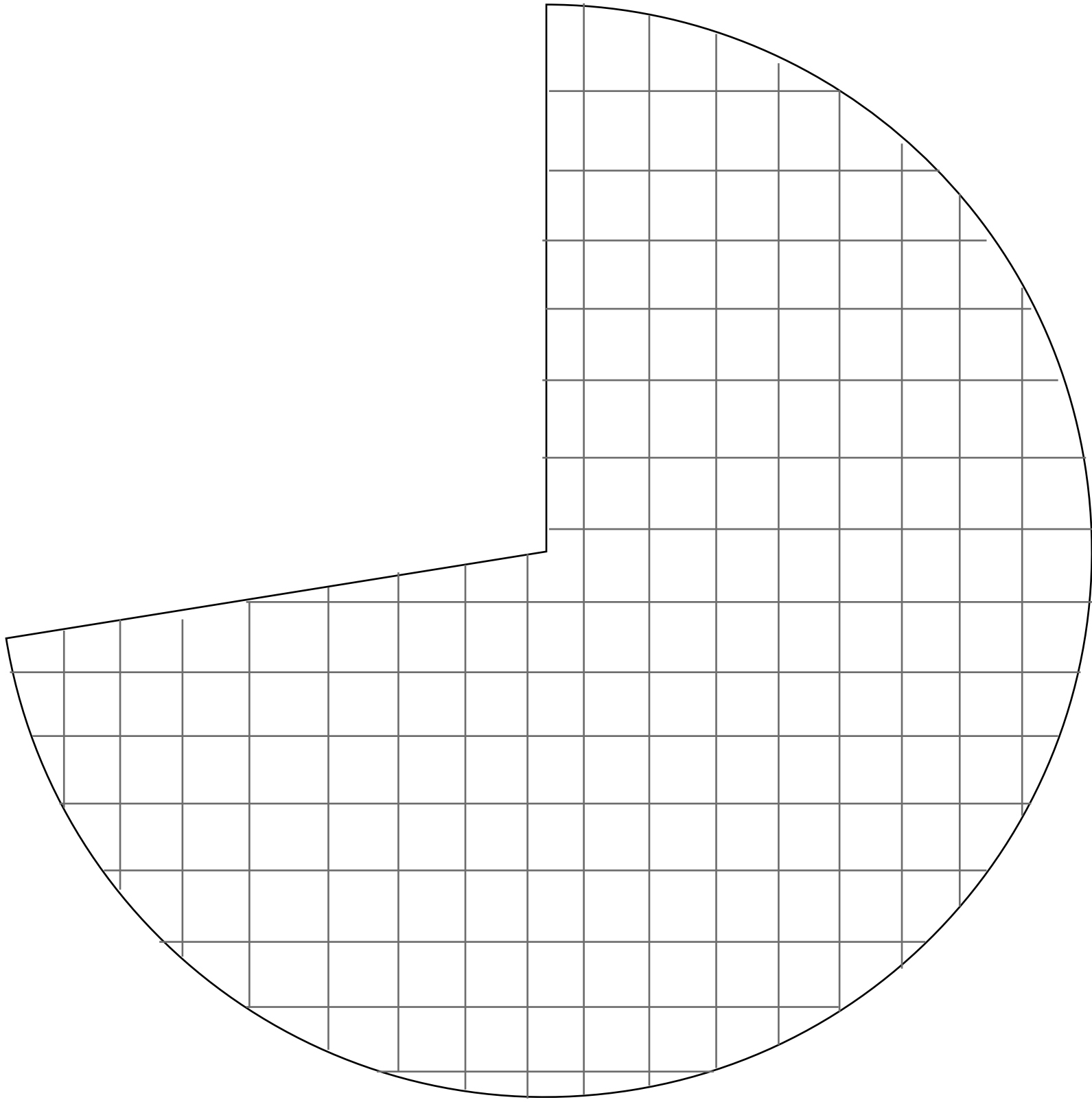
Enhancements and Modifications

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
2. Use the Fulcrum Worksheet to have students record their experiences during the game as they change the location of the fulcrum.
3. Identify 1st class, 2nd class, and 3rd class levers in daily life (scissors, stapler, hammer)
4. Early finishers?
 1. Challenge students to catch a certain number in a row



Additional Teacher Guidance

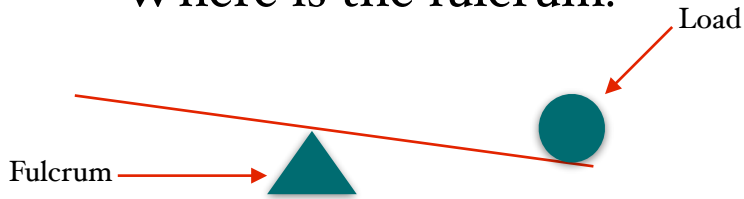
1. Consider assigning partner 1 and 2 to reduce friction with choosing who goes first
2. If you do not have enough prep time, allow children to cut out and tape the paper cones
3. If you are using the fulcrum worksheet, give students an opportunity to play the game without the worksheet at first. Then, bring students back to the carpet and show them how to fill the worksheet out before releasing them back to their stations.
4. 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.



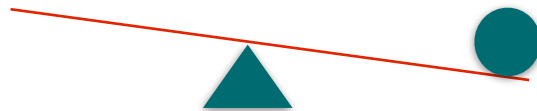
Name: _____

Date: _____

Where is the fulcrum?



1. The fulcrum is in the middle.



What did you notice about launching the load?

2. The fulcrum is away from the load.



What did you notice about launching the load?

3. The fulcrum is close to the load.



What did you notice about launching the load?

Name:

.....

Word:

.....

Definition:

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.....

.....

.....

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

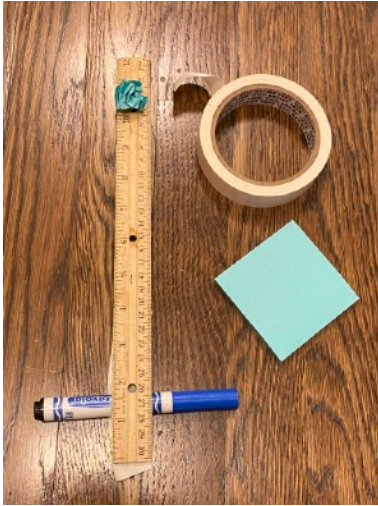
Social Awareness: Recognizing and acknowledging the inherent strengths in others

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

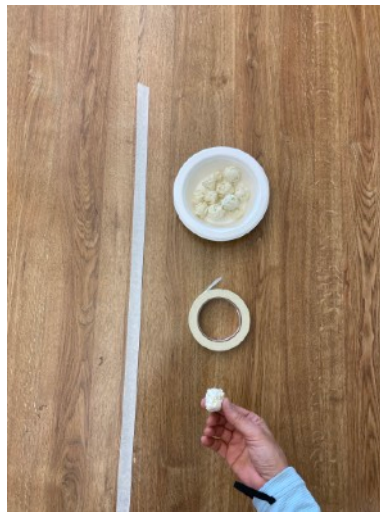
TEETER-LEVERS - Materials Options 1&2

Option 1: Lever: Ruler; Fulcrum: Marker affixed with tape

“Basketball”: Roll square Post-it - OR- strip of paper into a ball



Option 2: Lever: Popsicle stick; Fulcrum: Masking tape rolled into ball



Roll approx. 18” of masking tape into a ball to make a fulcrum



Mazie’s Amazing Machines - Penguin Random House/Nancy Paulsen Books