What Makes a Seesaw Move Up and Down?
A Model 5E Lesson
UASEP Fall 2015

ENGAGEMENT

- Describe how the teacher will capture students' interest and **access the student's prior knowledge and misconceptions.**
- What kind of questions should the students ask themselves after the engagement?

- Ask questions to capture interests and to elicit prior ideas and experiences: What is a seesaw? Is there another name for it? Have you ever played on one before? Was it fun? What do you need to have fun playing on a seesaw (two people)? Can it be any two people? Can you have fun on a seesaw with someone smaller than you? What about someone bigger? Can only two people play on a seesaw? Etc.…

- Read *The Seesaw*, a story about a giraffe who wants to play on seesaw, but stop before getting to the end of the story…"They devised a plan...."

- Ask… What do you think their plan was?

EXPLORATION

- Describe what hands-on/minds-on activities students will be doing.
- List "big idea" conceptual questions the teacher will use to encourage and/or focus students' exploration

- Say let's build a seesaw and see if we can figure it what they did so the giraffe could play on the seesaw.
- Give students materials to build a seesaw and to explore how to make is move.
- The teacher should walk around the room while students are exploring and offer suggestions and ask questions to guide students thinking and their seesaw building.

EXPLANATION

- Student explanations should precede introduction of terms or explanations by the teacher. What questions or techniques will the teacher use to help students connect their exploration to the concept under examination?
- What concepts will the students be explaining? What format will the explanation take?
- List higher order thinking questions which teachers will use to solicit *student* explanations and help them to justify their explanations.
- How should vocabulary be addressed in this stage?

- After students explore for about 10 minutes, bring them back together, and ask them questions about their observations and experiences:

    - So what did we learn about seesaws? What happens with both sides of the seesaw are equal? What happens when a big object is added to one side but not to the other? How many people can play on a seesaw? What does it take to make a seesaw fun to play on?

- As students share their responses, when it is most appropriate and meaningful, use a word wall to define and describe the pertinent terms relevant to the lesson. Some suggestions follow:

Kindergarten	**3rd Grade**
Force	Force
Push	Balanced Forces (Equal Forces)
Pull	Unbalanced Forces (Unequal Forces)
Motion	Weight
Direction	Gravity

- Then ask…. How many people does it take to make a seesaw unbalanced? LET's find out!!!

What Makes a Seesaw Move Up and Down?

ELABORATION

- Describe how students will develop a more sophisticated understanding of the concept. What activity, discussion, etc will the students engage in?
- What vocabulary will be introduced and how will it connect to students' observations?
- How is this knowledge applied in our daily lives?

➢ Provide students a handout with instructions and guidance to lead them to predict and then discover how different sizes and combinations of forces (balanced and unbalanced) affect seesaw motion.

Other Options for the Elaborate:

- Kindergarten: Students watch the video (https://www.youtube.com/watch?v=tZrlmqRpgdQ) of the boy who wants to play on a seesaw, but because he is all alone, he has to try and find objects that will provide balanced and unbalanced forces. Pause the video each time after the boy puts the object on the seesaw, and let students predict what will happen.)

- Third Grade: Use this Interactive website so students can explore how to make the seesaw balance: (*http://fearofphysics.com/Seesaw/seesaw.html*)

EVALUATION

- How will students demonstrate that they have achieved the lesson objective?
- This should be embedded throughout the lesson as well as at the end of the lesson

➢ **Third Grade:** What was the great plan the giraffe, mouse, monkey, and the dog came up with so the giraffe could have fun on the seesaw?
  - Draw a picture to predict how the story ended.
  - Label your picture with the words Balanced Forces or Unbalanced Forces.

How do you Make a Seesaw Teeter- Totter?

EXPLORE: Exploring with Seesaws. (For TEACHER INFORMATION ONLY)

Materials:

- Wooden ruler / or paint stir sticks (for seesaw lever)
- Play dough (to hold the objects in place)
    - Or a Dixie cup could be glued to each end so students can add/remove objects easily.
- Wooden blocks or various shapes and sizes (for building a seesaw)
- Various objects of different sizes and mass (to use for manipulating the amount of weight on each end of the seesaw)

Instructions:

1. Take your baggie of supplies and build a seesaw.
2. Explore what makes the seesaw move up and down?
    a. Can you make it move fast?
    b. Can you make it move slowly?
    c. What else can you do to make a seesaw move?

EXPLAIN: Get students to share their observations and discuss their findings.

Sample Questions for student discussion:

1. What did you learn about seesaws?
2. How does a seesaw work?
3. What happens on the seesaw when both sides are equal?
4. What happens to each side of the seesaw when an object is added to one side but not the other? Why does it happen this way?
5. Have you ever been hurt on a seesaw? What happened? Why did you fall so fast?

Teacher Instruction (during student discussion): Using a Word Wall during discussion, make sure students know and can use these terms:

- **Force**-push or a pull
- **Force-**A push or a pull acting on an object
- **Balanced Forces**- equal forces acting on an object
- **Unbalanced Forces**- unequal forces acting on an object
- **Gravity**-A force that pulls objects toward the Earth
- **Weight**- the force of gravity pulling on an object of a given mass

How do you Make a Seesaw Teeter- Totter?

ELABORATE (option A):

Question: Do the numbers of objects on either end of the seesaw affect its motion?

1. **Predict:** Draw a picture to describe what you think will happen if **unequal** numbers of objects are placed on opposite ends of the seesaw?

Draw a picture here to describe your prediction.	Will the forces be **BALANCED** or **UNBALANCED?** (Circle your answer.)
	Will it seesaw**:** **Yes** or **No**? (Circle your answer.)

2. **Now TRY IT for real!** Place different numbers of objects on your seesaw, and see what happens.

Test 1: Draw a picture to describe your observations.	Are the forces **BALANCED** or **UNBALANCED?** (Circle your answer.)
	Will it seesaw**:** **Yes** or **No**? (Circle your answer.)

3. **What about this!** Is it possible to put unequal numbers of objects on opposite ends of the seesaw and still **make it balance?** Try it, and see what happens.

Test 2: Draw a picture to describe your observations.	Are the forces **BALANCED** or **UNBALANCED?** (Circle your answer.)
	Will it seesaw**:** **Yes** or **No**? (Circle your answer.)

4. **Try this too!** Can you put unequal numbers of objects on either end of the seesaw and make the side with the fewer objects move down?

Test 3: Draw a picture to describe your observations.	Are the forces **BALANCED** or **UNBALANCED?** (Circle your answer.)
	Will it seesaw**:** **Yes** or **No**? (Circle your answer.)

5. **So what did you learn?** Does the number of objects on the seesaw affect its motion? Explain why or why not.

How do you Make a Seesaw Teeter- Totter?

ELABORATE (option B):

1. **Question:** What makes a seesaw move? Choose one of the following questions to help you explore the answer. Circle the one you want to explore?

    a. Do the **numbers of objects** on either end of the seesaw affect its motion?
    b. Does **the size of the objects** on either end of the seesaw affect its motion?
    c. Does the **weight of the objects** on either end of the seesaw affect its motion?
    d. OR make up your own question, and write it in the space below:

    _____

2. **Predict an answer to your question:** Draw a picture to describe your prediction.

Draw a picture here to describe your prediction.	Will the forces be **BALANCED** or **UNBALANCED?** (Circle your answer.)
	Will it seesaw: **Yes** or **No?** (Circle your answer.)

3. **Now TRY IT for real!** Build a seesaw and then test your prediction.

Test 1: Draw a picture to describe your observations.	Are the forces **BALANCED** or **UNBALANCED?** (Circle your answer.)
	Will it seesaw**:** **Yes** or **No**? (Circle your answer.)

4. **Now TRY IT again** for real**,** but this time, try something different to test your prediction. REMEMBER, you are still trying to answer the same question you circled above.

Test 2: Draw a picture to describe your observations.	Are the forces **BALANCED** or **UNBALANCED** (Circle your answer.)
	Will it seesaw**:** **Yes** or **No**? (Circle your answer.)

5. What makes a seesaw move?

6. **Was your prediction correct?** Explain your answer.

Force

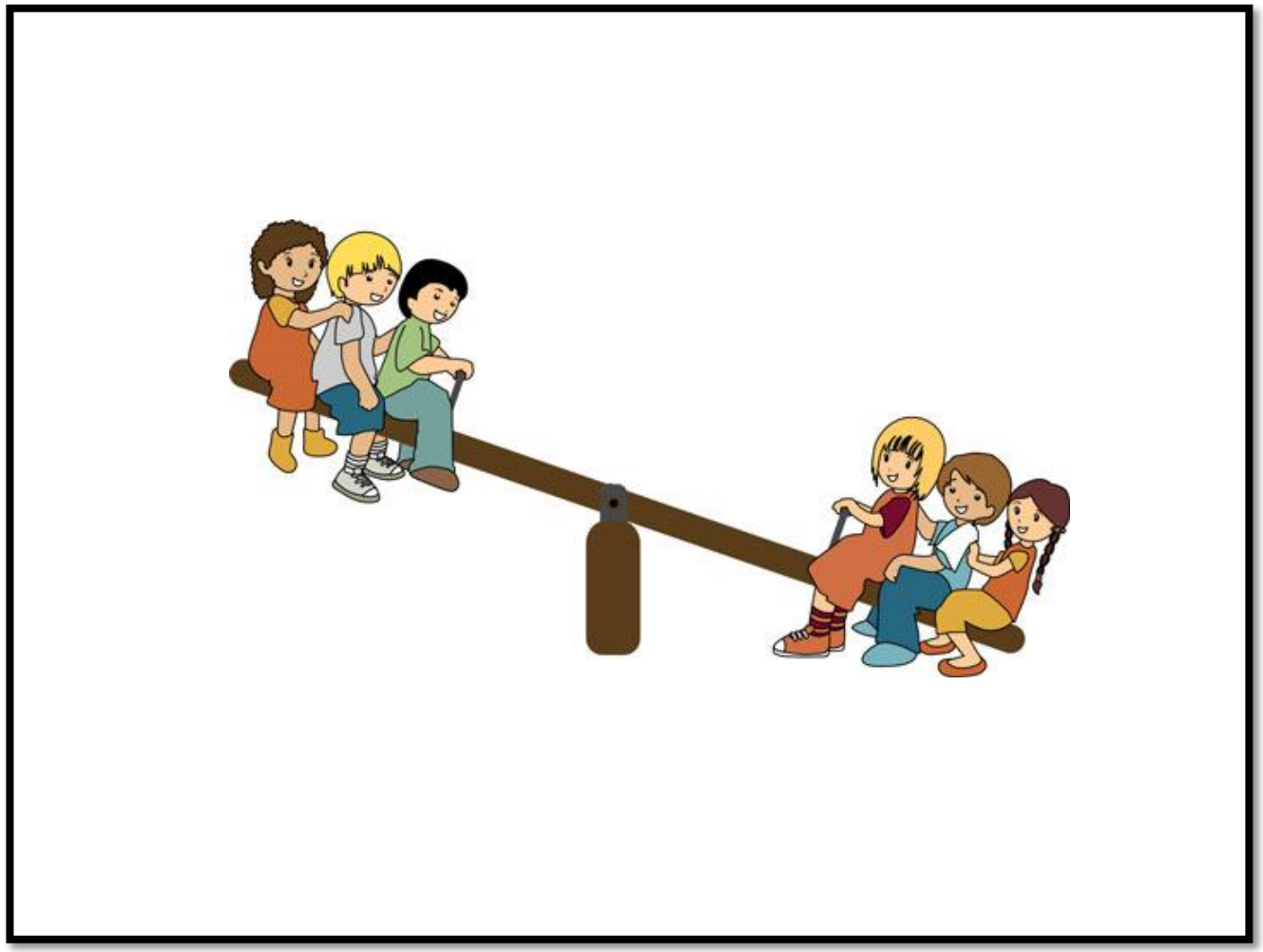
Balanced Forces

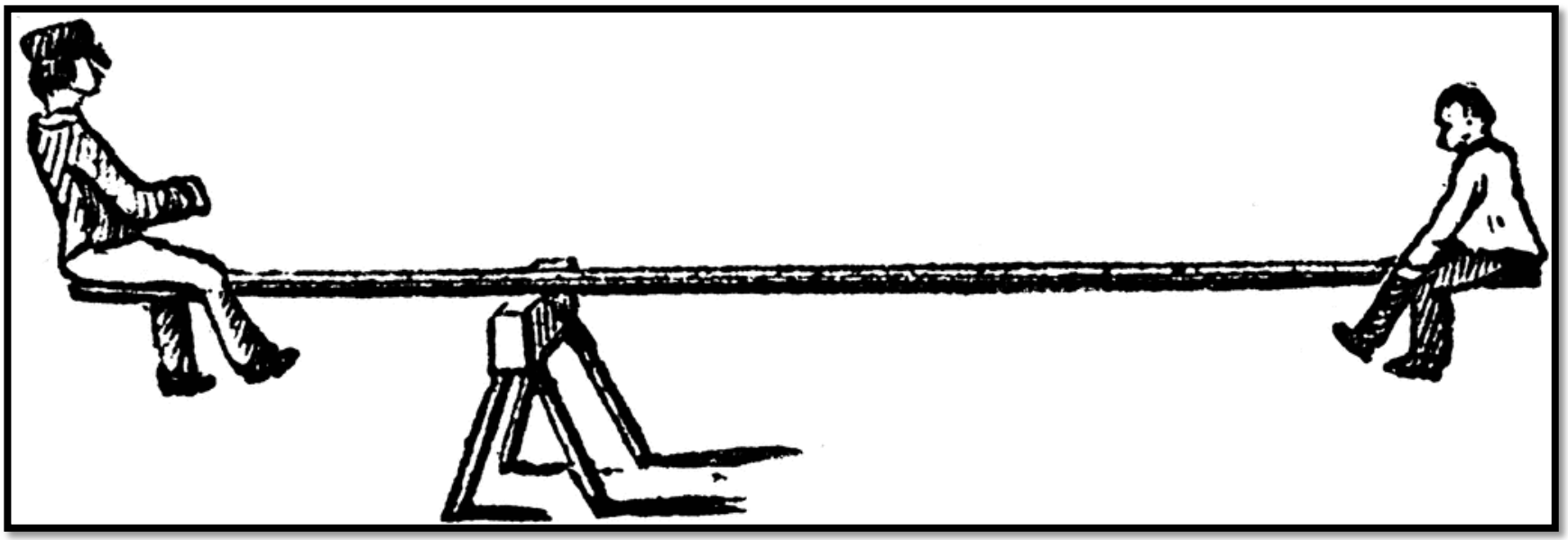
Unbalanced Forces

Equal Forces

Unequal Forces Push or a Pull

Weight





A car speeding up

A car driving the same speed on a straight road

Speed = 3 m/s