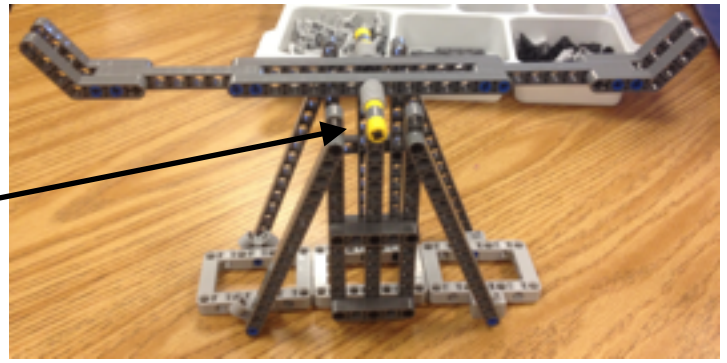
BUILDING PRACTICE: MAKING A BALANCE

Vocabulary

Criteria: This is basically your goal for the project. Required design elements that are used to evaluate the success of a design.
Constraint: things that control or put limits/restrictions on design goals. This includes time, materials, etc.
Priority: a design element that is regarded as more important than another.
Modification: a change in your design meant to improve performance.



DAY 1

I. Building a balance

1. Criteria - build a structure that can balance 2 equal weights on each side. Make sure the pivot is in the middle of your model. Also, make sure your model has a place for you to hold it, when you use it. The pivot should be the only part of your model that moves.
2. Constraint - you have until the end of the period tomorrow (time)
3. Priority - SIMPLE, STRONG, SYMMETRICAL

II. Testing your design

1. Place weight on each side. Your balance should hold the weight securely for at least 10 seconds (criteria).
2. Modification: if it doesn't satisfy #1, make a change to your balance to improve it. Try **not** to take the whole model apart. Try to make one change at a time.
3. When you have a working balance, answer the following questions.
    1. What are the strengths of your design?

    2. What are the weaknesses of your design? What would you like to improve?

III. SKETCHING A DESIGN ELEMENT

1. You will be rebuilding and improving your design tomorrow.
2. Choose the parts of your design that you want to use to rebuild your model.
3. Sketch them in the box on the previous page. Your sketch should contain enough detail to be able to recreate it.

DAY 2

IV. MODIFICATION 1: REBUILD YOUR BALANCE

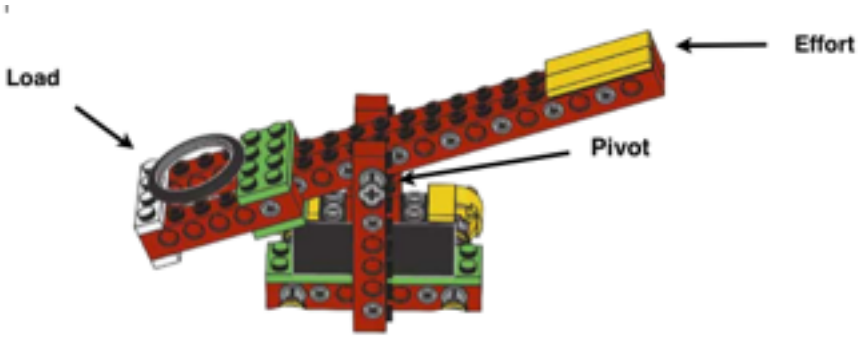
1. Modification: Try to make an improvement in your design.
2. If you didn't get a balance built yesterday, try to use the successful elements of you design.

*Catapults are a type of lever. The **load** is what you want to catapult. The **effort** is where force is applied to catapult the load. The **pivot** lies near the middle. You can move the pivot either closer to the pivot or closer to the load to find that perfect sweet spot for your catapult.*

Predict

Will the object (load) fly farther if the pivot is closer to the effort or the load?

Please write your prediction below



V. MODIFICATION 2: MAKING A BASIC CATAPULT

1. Criteria - following 'test your model' below.

Levers and Catapults - Prediction

_____

_____

Test your model

Using your **balance** set up, test it like a catapult three times. Pick one side as the **load** and the other as the **effort**. Measure the distance (cm) the object flies. Please hold the catapult down. It should not fly.

Test 1	Test 2	Test 3
cm		

Move the pivot **closer to the effort**. Test your model.

Test 1	Test 2	Test 3

Move your pivot **closer to the load**. Test your model.

Test 1	Test 2	Test 3

Compare your results to your prediction.

Highly Proficient (4)	Proficient (3)	Close to Proficient (2)	Developing (1)
Design All requirements for a 3, plus: ☐ I can modify my balance to make it a catapult. ☐ I can test my catapult to check my prediction.	Design ☐ I can design a working balance. ☐ I can provide sketches for design solutions. ☐ I can identify and describe the strengths and/or weaknesses of the design.	Design ☐ I can test my design at least once. ☐ I can give basic information about my first design.	Design ☐ No evidence of design before and after modification. ☐ Not attempted

Target Challenge

1. Choose a distance that you want to hit consistently.
2. Make a target out of LEGO to put at that distance.
3. See how many times you can hit the target out of 10 attempts.