Kinetic Sculptures Lesson Plan

Intro:

Kinetic sculptures are defined as art that contains moving parts or depends on mechanical motion for its effect. This is a very broad group of sculptures, and you can supplement this lesson plan with Google searches to get a bigger sense of the variety. We are going to focus on art that can be made using a basic 4 bar mechanism and variations of that mechanism.

Objective:

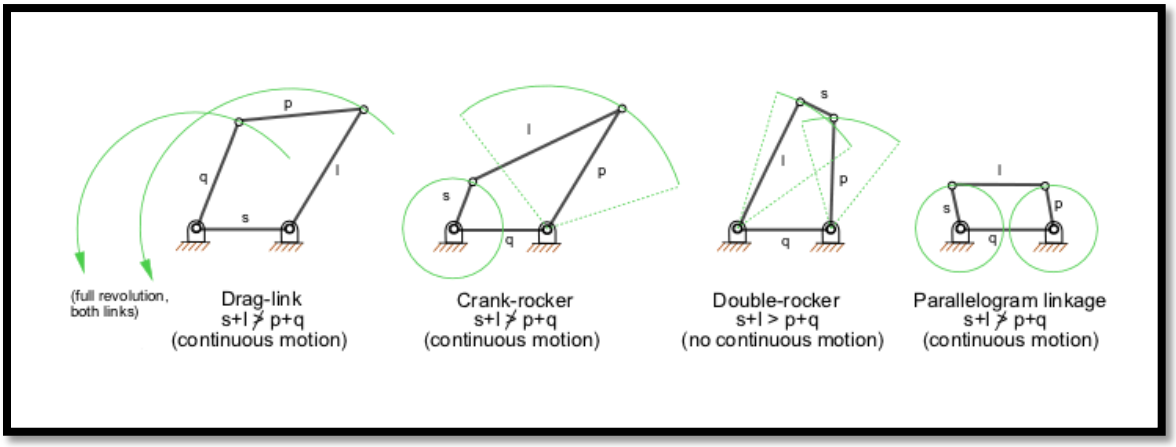
The first objective of this lesson plan is to use at least one 4 bar mechanism to create a kinetic sculpture. The second objective of this lesson plan is to use the 5 step design process to create the kinetic sculpture.

Background Information:

4 Bar Mechanism

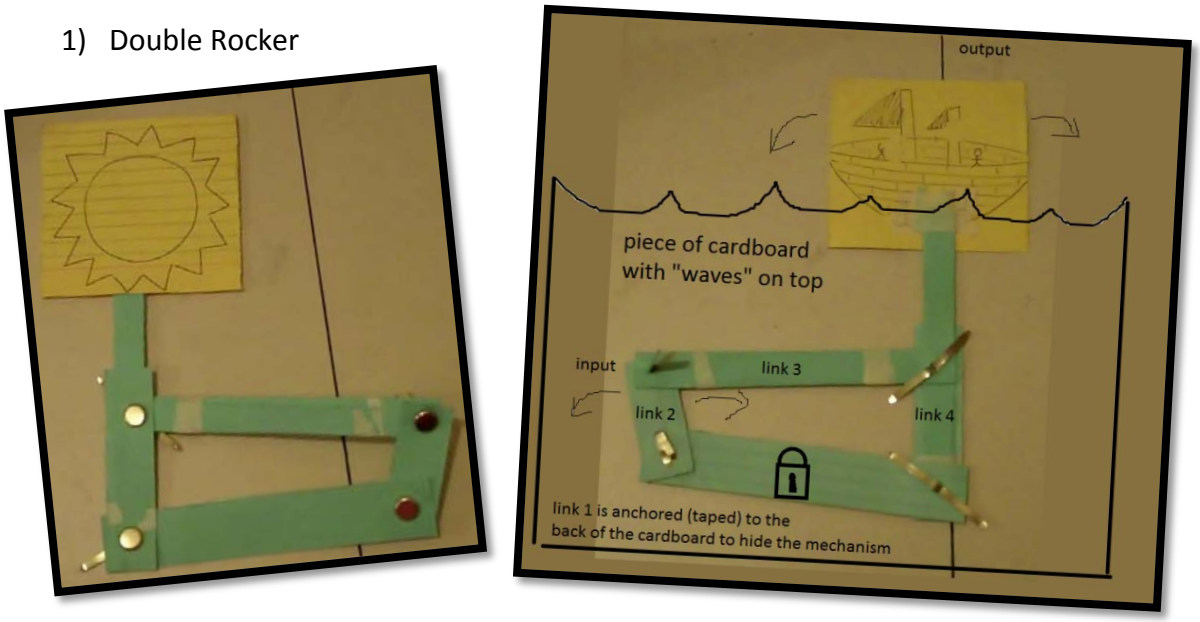
If you take four links and connect them with four joints, you get a simple four bar mechanism. To get it working, you just need to fix one link to the ground/wall/sculpture/etc. We usually call this fixed link “link 1” and then we number the rest of the links 2-4. Link 2 is usually the input link, which is the link that you move to “power” your device. Either links 3 and 4 can be the output link; it’s up to you! Depending on the lengths of the links, and what you consider the input and output, you get different types of motion from the same 4 bar mechanism.

Note: Do not spend much time going over the complicated mechanism of each system. Just explain what it does, maybe the differences, and how to incorporate it into your art. Remember the objective is to BUILD a kinetic sculpture.

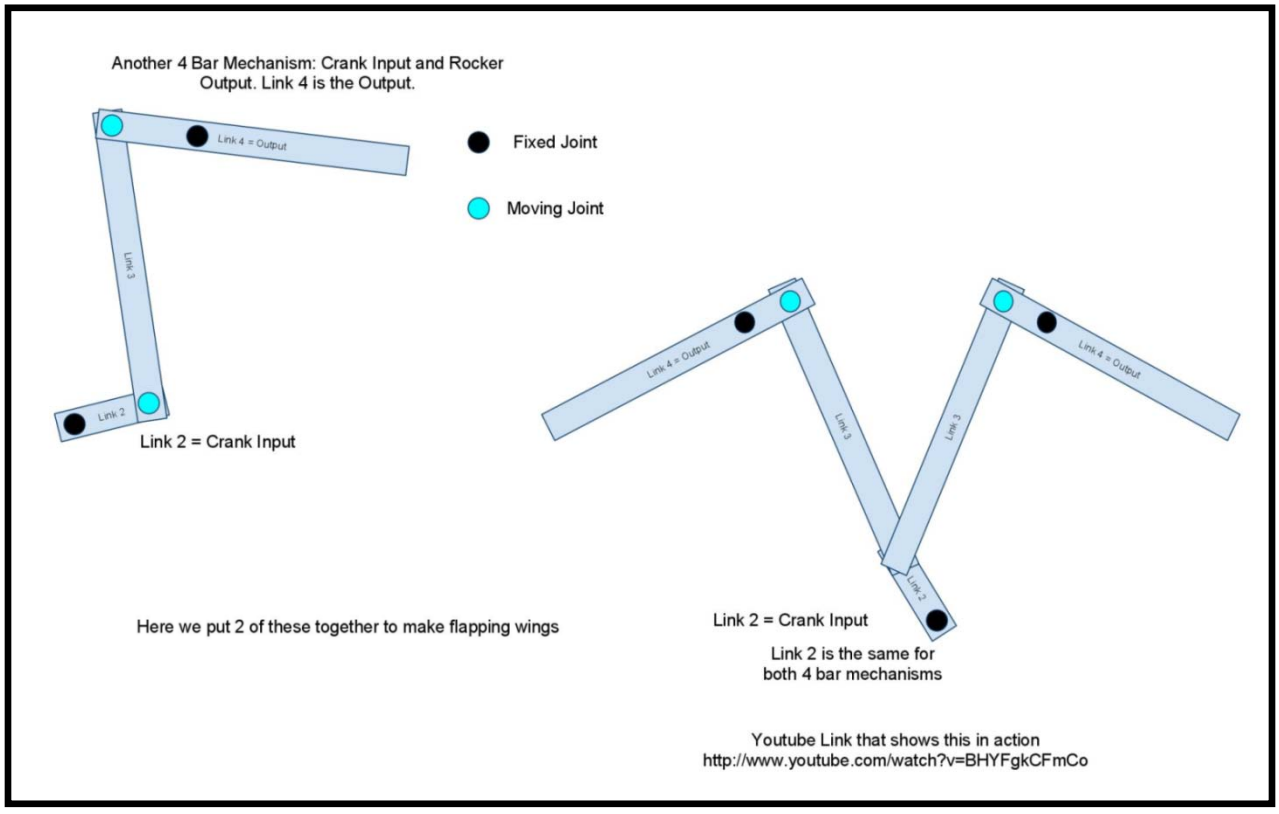


Examples

1) Double Rocker



2) The Flapper: 2 four bar mechanisms powered by the same input (so they share link 2).



3) Dragon: a 4 bar mechanism that DOESN'T have a fixed link. Output (the top and bottom of the head) is both link 3 and link 4. Also note that just link in example 1, you can extend links past the joint to get an output; In fact links don't even have to be straight bars.

4) Other Simple kinetic sculptures—use these videos as inspiration!
    a. http://www.youtube.com/watch?v=bW8IReqdFwo
    b. http://www.youtube.com/watch?v=m2ghWerVlGw&NR=1
    c. http://www.youtube.com/watch?v=BHYFgkCFmCo
    d. Large scale kinetic sculptures
        i. kinetic wave sculptures by Reuben Margolin
            1. http://www.youtube.com/watch?v=dehXioMIKg0
        ii. kinetic sculpture by Theo Jansen
            1. http://www.youtube.com/watch?v=WcR7U2tuNoY

Note: Although these are made with more complicated materials, the mechanisms are the same! And can be replicated with the materials in this lesson plan.

For more detailed description of the mechanisms please refer to the presentation by Professor Youssefi, which was emailed out.

Materials (per site):

- 1 standard pack of 3x5 sturdy index cards
- 1 box of 100 ½ inch brass fasteners
- Small thin cardboard boxes (cereal boxes, fruit snack boxes, coco mix boxes work better over thick cardboard boxes) about 10 depending on how big the site is. Ideally, 1 per child.
- Tape, scissors, hole puncher, markers, construction paper for decoration (usually supplied by the schools)

How to Teach:

1. Go over the objective and introduce Kinetic Scupltures.
2. Show examples of completed kinetic sculptures and break down the mechanism to show that it's a variation on a 4 bar link.
3. Go over 5 step design process below.
    a. Give examples of how to make a kinetic sculpture. Build up the examples from scratch in front of them.
4. BUILD!

Note: step 2 starts with an end product and breaks it down. Step 3 starts from the beginning and shows how to get the end product. Both steps are important for kids to internalize the simple materials given with a final project.

5 Step Design Process

Please go through this with your mentees, it is a very important thought process.

Objective: Use at least 1 mechanism to create a work of art.

1. ASK
   What do you want to get done? What have others done? What are the constraints?
2. IMAGINE
   How would you do it? Brainstorm solutions. Choose best one. Which mechanism(s) will be best?
3. PLAN
   Draw it out. List of materials
4. CREATE
   Follow plan and create it. Test it out!
5. IMPROVE
   What works? What doesn't? (Possible to go back to step 1 and go through the whole design process in improving)

Wrap Up:

Let the kids show off their sculptures. Ask if they had any difficulties with certain aspects of the building. By this discussion, you are actively teaching them Step 5 of the design process. Ask them to keep in mind all of the steps when building and improving their projects.