

Part 3 Activity Sheet: Active Transport Claw

Name:

Instructions

Your goal is to modify your hydraulic gripper so that it can pick up, move, and drop a ping pong ball over a barrier. This will represent how “ion pumps” move ions across a cell wall!

Step 1: Brainstorm

What could your gripper look like? What could it be made out of? How will you attach it to the lever arm? List 5-10 ideas below! The more creative, the better.

Step 2: Sketch

Choose your favorite idea from the brainstorming list and sketch a quick picture of it! Can you combine multiple ideas into one amazing idea?

Step 3: Prototype

Use tape, glue, cardboard, wood, and any other craft supplies you can find to create a rough model, or “prototype” of your design.

Step 4: Test

Set up a challenge course that has a 1.5” wall with 5 ping pong balls on one side of it (you can also use a cup or roll of tape to represent the wall).

1. Students will take turns placing their hydraulic arms in the course and seeing how many ping pong balls they can transport over the wall in 1 minute.
2. It’s recommended to have one student per control syringe, so your group must communicate and work together!

Step 5: Reflect

Answer the questions below in complete sentences:

1. What is a gripper/claw?

A gripper is...

2. Why do different grippers/claws have different designs?

Different grippers and claws have different designs because...

3. How did you use hydraulics to control a claw or gripper?

I used hydraulics to control a gripper by...

4. What worked well with your design?

Something that worked well with my design was...

5. What would you change about your design?

Something I would change in my design is...