Buzz Bot Harvester

Science STEM

Grade Level
K-12

Length of Lesson
45 minutes

Objective
By the end of this lesson, students will have explored cause and effect as well as forces and motion through engineering and design.

Materials (per group)

- Buzz Bot or HexBug nano
- Masking tape
- Various craft/building supplies
  - Large and small popsicle sticks
  - Cardstock strips
  - Small Dixie cups
  - Bendy straws
  - Pipe cleaners
- Testing area (one per class)
  - Hula hoop
  - Corn or soybeans

Standards
NGSS
Physical Science: K-PS2-1, 2; 3-PS2-1; MS-PS2-1, 2; HS-PS2-1

Lesson Summary
This lesson is a fun, hands-on activity where students use design and engineering practices to create a specialized machine for harvesting grain.

Suggested Sequence of Events:

1. Set Up: Place a hula hoop on a hard, flat surface to act as your boundary. Tile floors or large lab tables work well for this. Avoid carpeted areas. If carpet is unavoidable, place a posterboard under the hula hoop to ensure your bot can still buzz and move. Next, tape off a small area at the edge of the hula hoop boundary to act as your "target unload zone". Directly opposite this zone, mark the starting spot for all completed Buzz Bot Harvesters with a piece of tape. Lastly, spread a couple handfuls of corn or soybeans around the hoop, avoiding your taped off zone. This set up will be used for all groups to test their designs of the Buzz Bot Harvester. To see a picture, go to the Teacher Resources page.
2. Read *It's Corn Picking Time!* by Jill Esbaum to capture student interest and learn about the technology needed for harvest.
3. Watch our Virtual Field Trip video, Soybean Harvest, to learn more about harvesting another of Illinois' top commodoties.
4. Complete the activity following the procedures:
   - Place students in groups of 3-4 students.
   - Give each group a buzz bot and have them turn it on to observe how it moves.
   - Next, give groups the materials and tape to start designing an attachment for their buzz bot that will collect the most corn or soybeans into the designated "target unload zone".
   - Allow groups to test their design and make improvements as needed.
   - In the last part of class, have each group test their final design and see which harvester can collect the most grain!
   - **Tip:** Because of the way the buzz bots move, you may want to allow each group so many "touches" of their bot as it is collecting grain to redirect, not move forward, its position.
5. Whole class discussion and reflection of activity.

TEACHER RESOURCES

Extension Ideas

- Use the STEM: Student Worksheet with this activity to help guide student problem solving.
- Explore corn harvest more by watching our Awesome Agriculture: Corn video.
- Watch a short pumpkin harvesting video to show students some of the machines used to harvest processing pumpkins in Illinois. Here is one good example: https://youtu.be/5Ac98DrsKmY

- Check out IAITC Ag Mag (4th-8th grade), Junior Ag Mag (2nd-3rd grade), Reader (6th-12th grade), Facts for Little Readers (K-1st grade), and other printed resources on the IAITC website.
  - Consider these topics
    - Corn
    - Soybeans
    - Pumpkins
- Have students complete other STEM challenges using our STEM and Inquiry Challenge Cards.
- Read other great ag-accurate books about different crop harvests.
  - We recommend:
    - *Time for Cranberries* by Lisl H. Detlefsen
    - *Harvest Year* by Chris Peterson
    - *Sleep Tight Farm: A Farm Prepares for Winter* by Eugenie Doyle
    - *The Thing About Luck* by Cynthia Kadohata
- Go to agintheclassroom.org to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!