

Housekeeping

Problem How can our house take care of some basic needs when I am not there?

Lesson Summary The functions and limitations of each hummingbird robot component were modeled to allow the students to realistically generate a product that would be functional. They experimented with the parts before formulating a design. They sketched and decided on what materials they would need to complete their idea. They constructed, deconstructed, and reconstructed until they were happy with their product. We showcased their robots at a family night where they communicated their successes and setbacks and answered questions.

Major Topic and SOL

Basic Operations and Concepts

C/T 6-8.1 Demonstrate an operational knowledge of various technologies.

A. Use various types of technology devices to perform learning tasks.

- Demonstrate the ability to perform specific tasks using technology, including organizing, analyzing, and presenting data; formatting and presenting text and graphic information; and capturing and manipulating images.

B. Communicate about technology with appropriate terminology.

- Use technology vocabulary in daily practice.

C/T 6-8.8 Draw conclusions from research and relate these findings to real-world situations—investigating further, if necessary.

A. Use digital research to support written and oral presentations.

- Apply research derived from digital resources to original work, as appropriate.

Thinking Skills, Problem Solving, and Decision Making

C/T 6-8.10 Practice reasoning skills when gathering and evaluating data.

A. Employ technology in developing strategies for solving problems.

Lesson Contributed by: T. Wilson

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- Identify and use technology resources and tools that can help with problem solving.
 - Use a variety of technologies to identify and provide possible solutions to real-world problems.
- B. Select resources that extend one's own capability to solve problems and make informed decisions.
- Understand how certain technologies can extend human capabilities to understand complex situations.
- C/T 6-8.11 Demonstrate organization and persistence when completing personal and group assignments, activities, and projects.

Technology Communication Tools

C/T 6-8.13 Communicate effectively with others (e.g., peers, teachers, experts) in collaborative learning situations.

C. Assume different roles (e.g., leader/follower, orator/listener) on teams in various situations.

- Use technology to complete a wide variety of tasks when working in teams, depending on the individual's group role.

Length of Time 20 days x 90 minutes

(Not all students could attend every day due to other commitments which required the length to seem exorbitant)

Student Objectives

- The students will be able to design and create a robot that will be able to perform a function around the house when they were unable or unwilling to do it themselves.

21st Century Skills

- Critical-Thinking and Problem Solving
- Communication
- Creativity and Innovation
- Collaboration
- Information and Media Literacy
- Contextual Learning
- Initiative
- Technology Literacy

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Assessment Evidence

- The students will operate and explain their projects to their peers and teacher.
- They will also showcase them at family night to take questions from peers and their parents.

Supplies/Materials/Technology

- [Hummingbird Robotics kits](#)
- Computers and [software](#) loaded
- On hand craft supplies: recyclables
- Basic building tools
- Extra needed supplies: caster wheels, pvc pipes, wooden blocks (we used an old Jenga), additional wire for farther away parts, and cat food.

Lesson 1:

Teacher led:

- Get acquainted with the hummingbird parts and their functions and limitations
- Seeing [examples of code and basic code instructions](#)

Student led/Teacher in a support role:

- Adequate time to self-teach and peer-teach the parts as they independently tried and experimented with each part.
 - What worked and how.
 - How did you do that?
 - Show me how you....
 - You need to see how I did this...

Lesson 2:

- Teacher will explain what problem-based learning is, and how we will be coming up with a central theme based on a problem we want to solve.
- After the theme is decided on, each team decides on a possible project and conferences with teacher to determine if the idea is problem based. The student(s) then design a sketch and have it approved by the teacher in another conference.

Lesson 3+

- The students will use trial and error to design and modify their robots.
- At the start of each club meeting, sit together and discuss where we were, what they are having difficulty with, and what the teacher can help them with. They may also share coding successes with other groups.

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- As students finished their robots, they would help other students or practice with new codes on the [Finch robot](#) (another robot programmed with the same software as the Hummingbird Robot).

