Lesson Plan: Robots in Maine-based Businesses
(for Unit 6: Robotics)

OVERVIEW

Purpose of this lesson

These video lessons are meant to show students that:
  a. computational thinking is part of everyday jobs in their local area, and
  b. not all "computer science" related jobs involve programming.

They are also meant to support one or more of the Computational Practices listed in the ECS curriculum (from p. 12 in ver. 7). Which computational practices best align will depend on the approach each teacher takes with the lesson, so once you determine your approach, you can emphasize the relevant practices with students.

> **ECS Computational Practices**
> - **Analyze the effects of developments in computing (impact/connections)**
> - **Design and implement creative solutions and artifacts**
> - **Apply abstractions and models**
> - **Analyze their computational work and the work of others**
> - **Communicate computational thought processes, procedures, and results to others**
> - **Collaborate with peers on computing activities**

This particular lesson presents several different types of robots and their uses in Maine businesses.

We suggest you use this video as part of, or in addition to, the Unit 6, Day 1 activities in the ECS curriculum. It can be used to emphasize (a) one or more of the computational practices listed above and which are being encompassed in jobs all around the state, and (b) various definitions of "robot" and their applications in life and the work place.

ECS connections

This short lesson supports the following objective introduced in ECS Unit 6: Robotics (ver. 7, p. 26):

  - Identify the criteria that describe a robot and determine if something is a robot.

MMSA
Maine Mathematics
and Science Alliance

Lesson Plan: Robots in Maine-based Businesses
(for Unit 6: Robotics)

ACTIVITY INSTRUCTIONS

Engage

In small groups and/or as a whole class, have students discuss the following:

1. List examples of robots used in businesses you are familiar with here in Maine?

    a. Based on what we've learned so far, what makes these items robots?
    b. What impact do such robots have on a business? What would work at these places be like without such robots?
    c. What types of special skills might someone need to work with such robots?
    d. To what extent do the robots you listed replace humans in Maine workplaces?

2. Encourage students to listen for how the questions above are addressed in the accompanying video.

Explore/Explain

Have students do one or more of the following.

1. Show students the video of interviews with folks from several Maine businesses that sell or use robots (https://youtu.be/wiUbLgmxvW8). Help them connect this to the *Engage* activity they did. For example:

    a. What were some of the different robots shown in the video? What makes them robots?
    b. What purposes do these robots serve at these businesses?
    c. What impact do these robots have in these workplaces?
    d. What impacts do these robots have on the workforce in these businesses?
    e. What range of skills is needed to work with these various robots?

2. Use the *Are We Robots* activity sheet in the ECS curriculum (v.7, p. 268) as a guide for students to discuss whether each machine featured in the video meets the criteria for being a robot.

3. Have students conduct local interviews with people in workplaces that use robots. Have students report back to the class about the experience (e.g.- class discussion, create a slideshow, write a story or new report, etc.)

Lesson Plan: Robots in Maine-based Businesses
(for Unit 6: Robotics)

<div style="border:2px solid #2e6da4; padding:10px;">

Sample Interview Questions
1. **Tell us about the robots your business uses.**
2. **Can you show us one of your robots? (Ensure in advance that interviewees are able to do so.)**
3. **What does this robot do?**
4. **What makes this a robot?**
5. **What has been the impact on the business of using this robot?**
6. **Who programs the robot?**
7. **What special skills are needed to work with this robot?**
8. **How has your company's use of robots changed over time?**
9. **How do you decide when it's time to update the robot or its programming? (May only be relevant in some settings.)**

</div>

4. Have students create their own video-based interview of a local use of robots. *(See sample interview questions under option 3.)*

Explain/Elaborate

Have students do one or more of the following.

1. If during the prior stage students conducted interviews (video-based or otherwise) they could now vote on which was the most interesting and plan a field trip to the location. Have them plan in advance what questions they would ask during the visit.
2. If students watched the Robotics video during the Explore/Explain stage, they could elaborate on that experience now by creating their own video-based interview of a local or greater Maine use of robots.
3. Conduct a general discussion about robots to help students identify how their thinking has changed. Discussion questions might include:

   a. How pervasive is the use of robots in Maine businesses? Across the U.S.? Globally?
   b. Are there workplaces where you can envision yourself employed and working somehow with robots? What types of skills would you need to work with those robots, and how could you acquire them?
   c. To what extent do robots replace humans in the workplace?
   d. As robots replace some types of human labor in the workplace, what human labor needs are created?
   e. What surprised you?

Evaluate

We have not included any evaluation since teachers have many directions they can take with this lesson, but suggest that an evaluation or assessment for formative purposes will be useful.

MMSA
Maine Mathematics and Science Alliance