RESOURCE LIBRARY
ACTIVITY : 4 HRS

Redefining Work Debate: Are Robots Taking Over Our Jobs?

Students participate in a debate on the issue of human workers being replaced by robots and automation.

GRADES

9 - 12+

SUBJECTS

Engineering, English Language Arts

CONTENTS

1 Video, 6 PDFs

OVERVIEW

Students participate in a debate on the issue of human workers being replaced by robots and automation.

For the complete activity with media resources, visit:

http://www.nationalgeographic.org/activity/redefining-work-debate-are-robots-taking-over-our-jobs/

Program

ROBOTS 3D

DIRECTIONS

1. Activate students' prior knowledge about robots' abilities.

Show the video clip "DARPA Trials," which investigates a contest to design a robot that can deal with natural and manmade disasters. Discuss other situations or jobs where a robot could perform a task impossible or dangerous for a human to perform.

Ask students to talk about the robots they've encountered in their lives (Roomba vacuums, toys, mechanical arms in automotive factories, robots in movies, etc.). On a board or a large sheet of bulletin board paper, create a T-chart with these two headings: "What tasks can robots do as well or better than humans?" and "What tasks can humans do better than robots?" Begin by brainstorming some ideas on both sides with the class and adding them to the chart. Leave the chart available to students so they can add to the lists as more ideas come to them. (You might even place the chart in the hallway so everyone in school may contribute.)

2. Make a connection between tasks and jobs.

Write the words "task" and "job" on the board and ask a volunteer to explain the difference between the two. Ask:

- *In what type of job might a human be happy to have a robot take over some tasks?*
- *If robots take on some tasks currently performed by humans, how might the humans' jobs change?*
- *What sorts of jobs that humans currently perform might be completely taken over by robots?*

3. Discuss robots and jobs, and take an initial class poll on the issue.

Explain that the role robots will play in the workforce is often debated. Ask why some people might welcome robots in the workforce and, conversely, why others might fear them. Allow a brief discussion on that general question, and then create on the board a simple three-column chart labeled "yes," "no," and "undecided." Down the left side of the chart, write the following questions as you ask them, and tally the number of votes for each item.

- *Will robots in the workplace affect employment opportunities?*
- *Will robots in the workplace save human lives?*
- *Do you think the addition of robots in the workplace might create new jobs for humans?*

- *Do you think the benefits of robots performing tasks in the workplace are worth the effect on human jobs?*

4. Identify stakeholders that will be used later for the debate.

Discuss the term "stakeholder" as a person or group of people who are personally affected by a course of action. Ask students to consider who might be affected positively and negatively by the addition of robots in the workforce. Divide the class into small groups and ask each group to discuss and identify two different stakeholder groups on each side of the issue. Quickly ask the groups to share their stakeholder lists and discuss them. Record the stakeholders that students identify, and post the list in the classroom for students to reference in Step 7. Discuss how even within the two different sides of the issue, there might be more differences according to an individual's point of view. (For example, a factory line worker might understand that his job will be taken over by robots, but might see it as an opportunity to move into a different, perhaps even better, type of job.)

5. Students read about the issue in order to form their own opinions.

Review the Background Information handout. Distribute the handout and have students read the information—as a whole group, in small groups, or independently—as homework. Tell students that before the next class they will need to choose a side of the issue they most agree with: those who think robots will be beneficial and those who believe robots will negatively affect the workforce.

6. Students identify themselves or are assigned to debate teams.

Divide the class into two teams ("Yes" and "No") for the debate. You may do this in two ways: by allowing students to select the side they prefer, or by assigning students to a side yourself or through a random drawing. The choice is yours and will depend on the climate of your class and/or the maturity of your students:

- Can they effectively debate a side that doesn't appeal to them?
- Can you tell, through the previous discussion, whether you will have two sides of roughly the same size?

7. Students define their stakeholder roles and construct stakeholder viewpoints.

Return to the stakeholder lists that groups identified in Step 4. Explain that the class will develop this list more fully by adding arguments and rebuttals for each group. Students will take on the perspectives of these stakeholders during the debate. Create small groups formed from the two sides of the issue (yes or no) and have members share their stakeholder lists from Step 4, working together to develop their stakeholder roles. (More than one student on a team may be given the same viewpoint, as long as all stakeholders are represented. If a stakeholder is represented by more than one student, have these students work together in a small group to prepare.) Pass out the Sample Position Statement handouts, one to each group. Tell the students to:

- Discuss and select one of the stakeholders that fits your side of the debate (yes or no). The stakeholder your group chooses will help you define your individual roles in the debate.
- Define the stakeholders.

  - Are they workers, factory owners, robot manufacturers, people interested in job safety, or another group with a stake in the debate?
  - Give your group a name, and create a name tag for members to wear during the debate. Make sure the name tag clearly identifies your role and point of view.

- Create a list of points these stakeholders might make during the debate.

  - Support my side: Create at least three points that support your side, from your role's point of view.
  - Rebut their side: Create another list of at least two points the opposition might have, and for each one, devise a rebuttal to argue against that point.

- Read together the Sample Position Statement and, focusing on the debate question "Are robots taking over our jobs?", work together to write a position statement that clearly defines your group's position on the issue.

8. Students prepare to debate by conducting additional research.

Distribute the Research Prep handout and have students use their Background Information handout, the library, and/or the Internet to conduct research in preparation for the debate. Provide time for research in class or assign it as homework.

9. Discuss debate protocol with students.

Distribute the <u>Debate Rubric</u> handout and review with the class how a debate is conducted, and how the three criteria are used to ensure a lively and effective debate experience. Ask students to consider each of the criteria as they practice for their part in the debate, which will be held in the next class period.

10. Students draft position statements.

After the research period ends, have teams work together to craft a formal position statement, which will serve to frame and begin the formal debate. Be sure to remind students that their position statement should answer the question, "Are robots taking over our jobs?"

11. Conduct the debate.

Take on the role of moderator, and call the two groups to take positions on either side of the room facing each other. Remind students that they should remain in the role of their group's stakeholder throughout the debate. (If they created name tags, they should wear them so others can easily identify the stakeholders.) Invite each group to have one member present the group's position statement. Then, guide the debate with the following opening question (NOTE: Insert the stakeholder group name where the terms in parentheses are used in the questions): *Some people worry new technologies, like robots, will leave people without jobs. What do you say to that argument, <u>(YES team)</u>? <u>(NO team)</u>, do you have a rebuttal for these points?* Use prompts of your own to continue the debate as the team arguments lead the discussion.

- *What is another point that you would like to make, <u>(EITHER team)</u>?*

    - *<u>(OTHER team)</u>, do you have a rebuttal for these points?*

- And so on …

12. Discuss the debate.

Have students return to their seats and conduct a debriefing of the experience, using the following or your own questions. Explain that now you want students to think about the debate from their own personal points of view, rather than the role they played in the debate. Ask:

- *Did your research prepare you well for the arguments brought up by the other side during the debate?*
- *How did your personal point of view compare to the viewpoint of your stakeholder role?*
- *What were some of the challenges you experienced in taking on this role? Was it easy for you or difficult? Why?*
- *Which point brought up by someone from either side of the issue made the biggest impact on you? Why?*
- (Return to the three-column chart tallies from Step 3.) *Remember your votes on these four questions? Would you change your mind if I asked the same questions now? Which ones, and why?*
- *If I asked you to choose a side on the entire issue of robots in the workforce right now, would you change your mind? Why or why not?*

Modification

As an alternative to a whole-group debate, you might want to hold "mini debates," choosing two stakeholder groups, one on each side, to debate the issues from their viewpoints only. The rest of the class can serve as audience to the debate, and take turns asking questions of each side according to their own roles. Allot a certain amount of time for each debate, then switch groups and repeat the activity.

Tip

Before your main debate, have the teams conduct "practice debates" outside of class. One member of the team gathers the list of rebuttal points from each member, and randomly calls one out. Team members take turns rebutting the points, using their roles to frame their arguments.

Tip

If you choose to allow students to self-select the side of the debate they will join, you may wish to use the **National Geographic Decision Making Matrix**.

Modification

If you chose to provide students with a full research period in Step 8, the activity will take four days.

Testing

Assessment 1: Use the Debate Rubric worksheet to evaluate how each student met the three criteria for debate behavior. Since it may be difficult to play the role of moderator while also assessing students, you might ask another teacher or student to moderate the debate while you observe and assess.

Assessment 2: Wait at least two days before assessing the learning of this activity, but bring back into the classroom the list that was started during the "Activate Prior Knowledge" portion of the lesson. Each day, ask students if they have changed their minds about the jobs on either side of the list. When you are ready to assess, post the following essay topic: Are Robots Taking Over Our Jobs? Tell students they should begin by telling how they felt about this topic before the debate, and whether their opinions have changed because of the class activity. What arguments brought up during their own research or by others in the debate influenced their decisions? How do they predict the world of work will change in the next 20 years?

Extending the Learning

Have students research and report on the "uncanny valley," the notion proposed by a Japanese roboticist in 1970 that the more robots are made to look human—without being fully convincing as humans—the more uncomfortable humans are around them. Ask students to gather examples of robots that are "too real for comfort," used in real life, movies, and even special computer-graphic (CG) effects in animations and video games. Ask students to search for articles or data related to humans' responses to human-like robots. Have students reflect on their findings, and then discuss the phenomenon. Ask: *Why is it that some people think animated monsters are creepy, but a perfectly human-looking creature that doesn't emote properly (as humans are used to) is far more unsettling? Do you feel this way? Explain.*

OBJECTIVES

Subjects & Disciplines

- Engineering
- English Language Arts

Learning Objectives

Students will:

- Construct opinions through research
- Articulate arguments on an issue to others
- Participate in a debate on a scientific and cultural issue

Teaching Approach

- Learning-for-use

Teaching Methods

- Brainstorming
- Cooperative learning
- Discussions
- Research
- Role playing
- Writing

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
  - Information, Media, and Technology Skills
    - Information Literacy
    - Media Literacy
  - Learning and Innovation Skills
    - Communication and Collaboration
    - Critical Thinking and Problem Solving
- Critical Thinking Skills
  - Analyzing
  - Evaluating

- Science and Engineering Practices
  - Engaging in argument from evidence
  - Obtaining, evaluating, and communicating information

National Standards, Principles, and Practices

IRA/NCTE STANDARDS FOR THE ENGLISH LANGUAGE ARTS

- **Standard 12:**
Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).
- **Standard 7:**
Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.
- **Standard 8:**
Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

NATIONAL GEOGRAPHY STANDARDS

- **Standard 16:**
The changes that occur in the meaning, use, distribution, and importance of resources

NATIONAL SCIENCE EDUCATION STANDARDS

- **(9-12) Standard F-6:**
Science and technology in local, national, and global challenges

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- **Speaking and Listening Standards 6-12:**
Presentation of Knowledge and Ideas, SL.11-12.4
- **Speaking and Listening Standards 6-12:**
Presentation of Knowledge and Ideas, SL.9-10.4

- **Writing Standards 6-12:**

Text Types and Purposes, W.9-10.1

- **Writing Standards 6-12:**

Text Types and Purposes, W.11-12.1

NEXT GENERATION SCIENCE STANDARDS

- **HS-ETS1-1:**

Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

- **HS-ETS1-3:**

Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Paper
- Pencils

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per learner, Projector

PHYSICAL SPACE

- Classroom

GROUPING

- Large-group instruction
- Small-group work

OTHER NOTES

This activity should be conducted over three of four class periods. Complete Steps 1 through 5 in the first session, and decide if you want to reserve another class period for research or assign it. The debate and debriefing will be held on the final class period.

Background Information

Prior Knowledge

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Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
automation	*noun*	technique, method, or system of operating or controlling a process by highly automatic means, as by electronic devices, reducing human intervention to a minimum.
computer	*noun*	device designed to access data, perform prescribed tasks at high speed, and display the results.
debate	*noun*	instructional strategy that fosters the mastery of content and the development of critical thinking skills, empathy, and oral communication skills. The process of considering multiple viewpoints and arriving at a judgment. Applications range from an individual using debate to make a decision in his or her own mind to an individual or group using debate to convince others to agree with them.
job	*noun*	piece of work, especially a specific task done as part of the routine of one's occupation or for an agreed price.
machine	*noun*	apparatus consisting of interrelated parts with separate functions, used in the performance of some kind of work.
rebut	*verb*	to provide some evidence or argument that refutes or opposes another piece of evidence.

Term	Part of Speech	Definition
robot	*noun*	machine that can be programmed to perform automatic, mechanical tasks.
stakeholder	*noun*	person or organization that has an interest or investment in a place, situation, or company.
task	*noun*	specific piece of work to be done.

FUNDER

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