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TEACHER RESOURCE PACKET

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ABOUT ROBOT REVOLUTION

We are in the midst of a revolution in our society's relationship with the robots we create. In a high-touch, high-tech environment, you have an unprecedented opportunity to engage with real robots, witness their astonishing skills and ponder their life-like qualities. *Robot Revolution*, supported by Google.org, transforms the way you think about robots as well as encouraging and empowering you to envision your own role in creating and using technology positively as the future unfolds.

As you get your hands and mind involved in the world of robots, you'll see the rich possibilities the future holds for those with the spirit of innovation. This exhibition is designed to increase awareness and appreciation of robots as well as interest and involvement in science, technology, engineering and math (STEM) topics, particularly the field of robotics.

The exhibit is divided into different zones that highlight the distinct attributes of robots, including:

- Cooperation: Robots can collaborate with us, as well as with other robots.
- Smarts: The programming of robots enables them to sense, plan and act to meet a goal.
- Skills: There are a variety of ways that robots can grasp, grip and interact physically with their environment.
- Locomotion: Discover a surprising array of ways that robots can get around.

The exhibit zones contain functional robots, hands-on interactives, videos and graphics designed to help you explore further.

Complementing and supporting these zones is a stage that offers scheduled demonstrations of robots; a robot garage where technicians repair robots in real time in front of guests; and a build-a-bot area, where you can build a simple robot.

EXHIBIT GOALS AND MESSAGES

Robot Revolution is designed to:

- Encourage personal understanding of and connection with robots.
- Showcase diverse examples of robot applications in daily and future life.
- Offer opportunities for hands-on interaction with real robots.
- Highlight the innovative spirit and evolving nature of robotics.
- Engage K-12 students in 21st Century skills and STEM content.

The key messages of *Robot Revolution* are:

- The robot revolution is happening now.
- Robots will transform how we live, work and play.
- Robots, no matter their function, capabilities or design, operate in similar ways: they SENSE, PLAN and ACT.
- Robots serve as a mirror through which we see ourselves.
- Robotics is a creative field in a continuous state of development and discovery.
- No matter your age or experience, you can be involved in robotics.

NEXT GENERATION SCIENCE STANDARDS CONNECTIONS

Robot Revolution is aligned with the following Next Generation Science Standards:

Science and Engineering Practices:

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Constructing explanations and designing solutions
- Obtaining, evaluating and communicating information

Crosscutting Concepts:

- Cause and effect
- Systems and system models
- Structure and function

Disciplinary Core Ideas:

- PS4: Waves and their applications in technologies for information transfer
- ETS1: Engineering design

CLASSROOM LESSONS

To enhance a *Robot Revolution* field trip, teachers can use free classroom lessons before and after their visit.

What is a Robot?: Students unveil their personal interactions with robots and understand how robots assist with real life scenarios.

Robot Brains: Explore the intricacies of robotic programming through an activity where students act as robots and programmers.

Robot Bodies: Discover how robotic “hands” are shaped in different ways depending on their intended function.

Robot Senses: Explore how robot sensors can either mimic human sensors or do things that humans can't do.

Robots and Society: Learn about how different peoples' values and perspectives shape how robots are developed and used.

In addition, the ***Robot Revolution Exhibit Guide*** lesson focuses your field trip to *Robot Revolution*. Students use a worksheet to record their observations and experiences in the exhibit then complete a follow-up writing exercise back in the classroom.

ROBOT REVOLUTION ADDITIONAL RESOURCES

GENERAL WEBSITES

Institute of Electrical and Electronics Engineers Robotics Newsletter

<http://spectrum.ieee.org/static/newsletters-signup>

Lego Engineering

www.legoengineering.com/

NASA Robotics

<http://robotics.nasa.gov>

National Robotics Week

www.nationalroboticsweek.org/index.php

PBS Design Squad

<http://pbskids.org/designsquad>

Programming

Hour of Code

<http://code.org/>

Raspberry Pi Programming

www.raspberrypi.org/

RobotC Programming

www.robotc.net/

Scratch Programming

<https://scratch.mit.edu/>

Online community for Scratch educators

<http://scratched.gse.harvard.edu/>

ROBOTICS KITS

Cublets Robotics

www.modrobotics.com/education/#lesson-plans

TI-83 calculator robots

www.smallrobot.com/robot-kit.html

SmartBot phone robot kit

www.overdriverobotics.com/

PROGRAMMING-RELATED IPAD APPS

Daisy the Dinosaur

www.daisythedinosaur.com/

Hopscotch

<https://www.gethopscotch.com/>

Cargo-Bot

<http://twolivesleft.com/CargoBot/>

ROBOTICS COMPETITIONS

Best Robotics, Inc.

<http://best.eng.auburn.edu/>

Bot Ball

www.botball.org/

FIRST LEGO League

www.firstlegoleague.org/

MATE Underwater Robotics

<http://www.marinetech.org/rov-competition/>

Robofest

<http://www.robofest.net/>

US First Robotics

<http://www.usfirst.org/>

Vex Robotics Competition

<http://www.vexrobotics.com/competition/>