

ROBOT POWER!

Robots have a part for every job!
They can perform lots of amazing tasks.



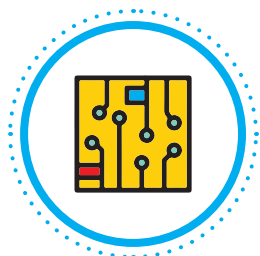
CAMERA

It can record video in tiny spaces, underwater, even inside your body!



SENSOR

It senses light and sound (like your eyes and ears do!).



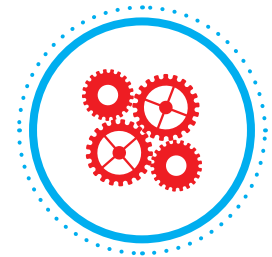
CONTROLLER

The robot's "brain" helps it follow commands.



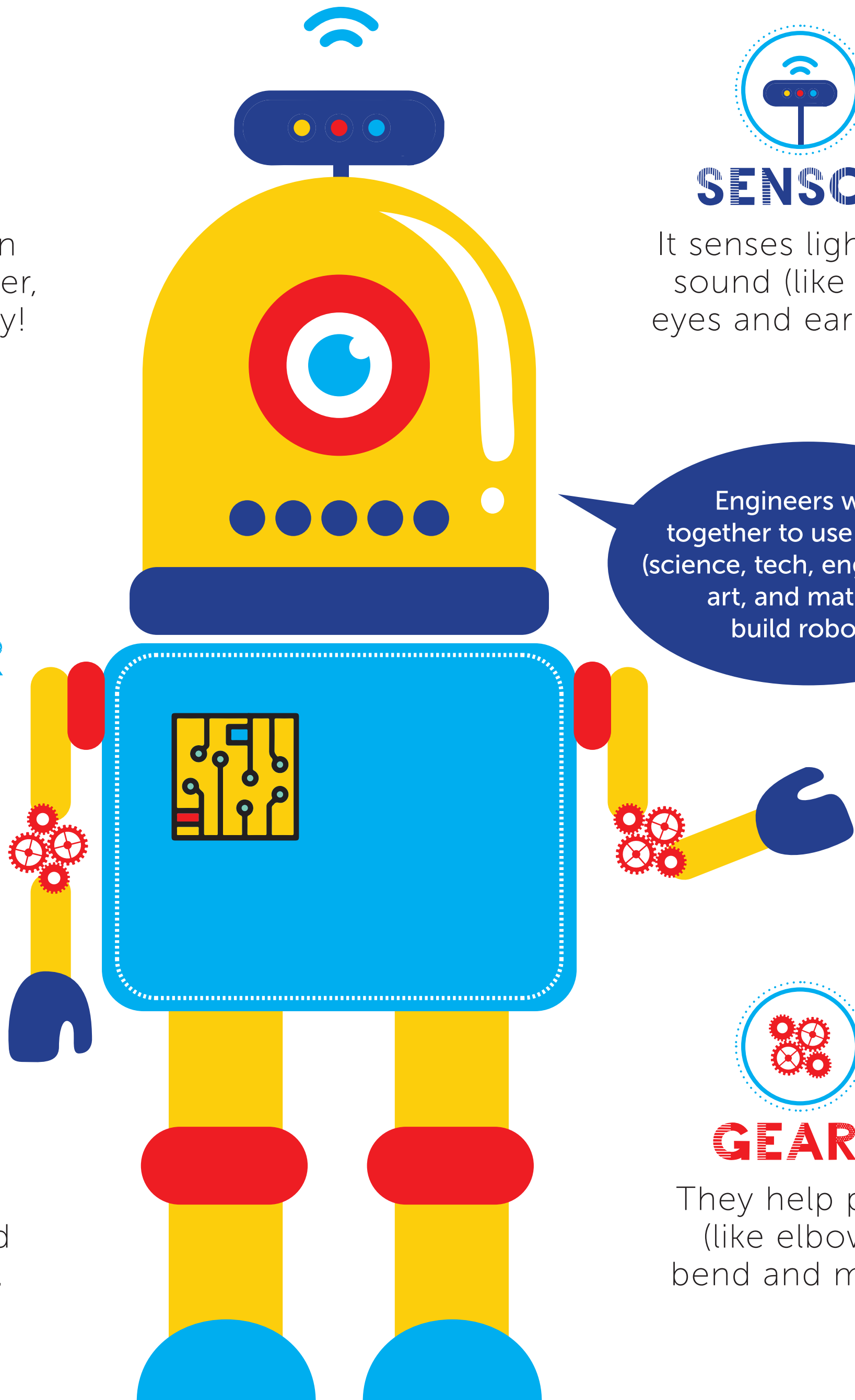
PINCERS

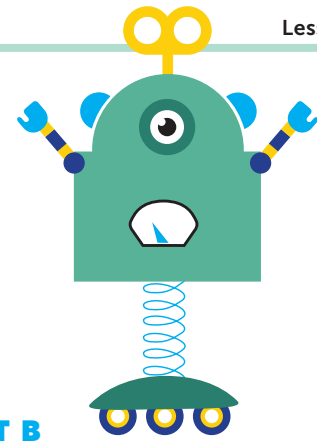
They can grip things, lift them, and move them around.



GEARS

They help parts (like elbows) bend and move.





Robots to the Rescue

Challenge students to design and build a robot prototype that can solve a real-world problem.

Objective

Students will identify a personal or community problem and use the engineering design process to imagine a robotic solution.

Time

PART A: 40 minutes

PART B: 60–90 minutes
(broken into work periods as your classroom schedule allows)

Materials

- Design Your Prototype activity sheet
- Classroom and recyclable materials for building

PART A

1 Hook students by asking them to name all the different types of robots they can think of. Remind them that robots are used in many industries—entertainment, manufacturing, education, medicine, etc.—as well as in homes to help people with tasks like vacuuming. Discuss the reasons that we rely on robots: they can be programmed to do jobs that are difficult, time-consuming, repetitive, or dangerous.

2 Explain that students will be using the engineering design process to create a robot prototype—a model or sample of a robot that helps solve an issue in their lives or their community.

3 Have students brainstorm problems they see in their home, school and community that require solutions. Ex. carrying heavy groceries, help with hard math problems, litter in the park, etc.

4 Hand out the Design Your Prototype activity sheet. Have students choose the issue/problem they would like to solve.

5 Direct students to do research about their issue and the kinds of robotic technology that could be used to help. Then they should sketch and plan a robot design, and collect the materials they will use to build their prototypes.

Math Connections

- Have students include right, acute, and obtuse angles in their designs
- Challenge them to use a protractor to draw matching angles
- Have them use a ruler to draw perpendicular and parallel lines

PART B

1 Have students create their robot prototypes. Encourage them to test their construction, identify problems, and make improvements as they build.

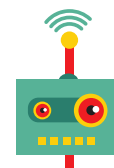
2 Invite them to present their robot designs to their peers, explaining:

- Their chosen issue and solution using science and math vocabulary (friction, balance, cause and effect)
- Their design rationale
- Their experience with the engineering design process

Encourage students in the audience to practice active listening skills, ask thoughtful questions, and share constructive feedback.

Grade 5 Math Extension

Have students approximate the volume of their robot prototype by measuring and calculating the sum of each of its major three-dimensional forms.



BRAIN BREAK

Pair students up, then give them two minutes to come up with multiple ways to join two pieces of paper together—without using staples, tape, or glue.

Name _____

DESIGN YOUR PROTOTYPE

Follow these steps to plan, create and test your problem-solving robot.

1. I will create a robot prototype designed to _____ in order to address the problem of _____.

2. Sketch your robot design.

3. How does your robot work? How does it help to solve your chosen problem?

4. List your materials.

5. Test it out. Jot down what's working well and what isn't.

6. Improve your prototype and test again! On the back of this sheet, explain how your changes solved the problem.