

# Surgeon: Sterile Glove Machine

## Adventure Description:

In this adventure, students will think like a surgeon and design a robot that can place sterile gloves on surgeons before they perform surgery.

## Activity

Teacher note: If you choose to complete Step 4 of the lesson, where students test their robot prototypes, letting the colonies grow on the agar plates will take 2-3 days. We recommend using this activity on a Friday, so that colonies can grow over the weekend.

### Step One: Background Information (5 minutes)

- Ask students to name as many types of doctors as they can. Ask students to tell you what they know about surgeons.
- Explain that surgeons are responsible for conducting surgery on people who have an injury or a disease. “Surgery” means cutting a person’s tissues, like skin or muscle.
- Ask students if they think that surgery could be dangerous.
- Explain that when surgeons cut a person’s tissues to perform surgery, they are exposing a person’s internal tissues to germs, like bacteria and viruses. To minimize this, hospital operating rooms practice sterility, where they remove germs from the operating room and ensure that the equipment that they use is sterile. Provide students with [Handout: Sterility](#), or display on a smartboard. Walk through the handout together as a class.
- Ask students if they can think of a way to reduce the chance of contamination. What about a robot created with sterile materials?
- Explain that surgeons want to create a sterile robot that can put gloves onto surgeons. This would reduce the possibility of contamination.

### Step Two: Designing a Robot (10 minutes)

- Tell students that they will be creating a robot that can put gloves on surgeons before they perform surgery.
- Provide students with [Handout: Robot Requirements](#). As a class, walk through the robot requirements.
- Have students spend about 5 minutes sketching their robot design on [Handout: Robot Design](#).

### Step Three: Creating a Robot (15 minutes)

- Explain to students that they will now build a prototype of their robot. Explain that a prototype is the very first version of a product.
- Provide students with art supplies and building materials to build their prototypes.

Please contact Allison Bischoff, Director of Teacher Support, at [allison@rozzylearningcompany.com](mailto:allison@rozzylearningcompany.com) or 314-272-2560 with questions.

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## Step Four: Testing Prototypes (optional) (15 minutes)

- Teacher note: If you do not have access to prepared Petri dishes, skip this step and have a concluding class discussion about surgeons and how their robots can help keep the operating room sterile.
- Teacher note: If you choose to complete this step, follow the teacher prep instructions on [Handout: Teacher Prep and Tips](#).
- Explain to students that they will now test their robot prototype.
- Provide students with [Handout: Testing for Bacteria](#). Walk through the steps together as a class.
- Note: You may need to demonstrate for students how to put on gloves without contaminating them. You can show them yourself or use one of the many videos available on youtube.
- Explain to students that they will be given two agar plates. Each has two quadrants, so there are four quadrants total. Provide students with [Handout: Agar Plates](#).
- Allow students to test their prototypes by swabbing for bacteria.
- Once students are finished testing, have a concluding class discussion about surgeons and how their robots can help keep the operating room sterile.

## Materials List

### Provided online:

- Handout: Sterility
- Handout: Robot Requirements
- Handout: Robot Design
- Handout: Teacher Prep and Tips
- Handout: Testing for Bacteria
- Handout: Agar Plates

### Not provided (each explorer needs):

- Art supplies
- Building materials (should be metal, plastic, etc. not paper-based)
- Sterile gloves
- Soap
- Sink to wash hands
- Prepared Petri dishes (prepared with agar - available at <https://www.sciencecompany.com/-P6259C659.aspx>)
- Masking tape
- Marker to label Petri dishes
- Cotton swabs

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