

# Surgical Techniques

Grade **8**

Developed with i2 Learning by New York Hall of Science

What is it really like to be a physician or surgeon? In this course, students will investigate how the body works by participating in a range of hands-on activities, such as dissections and construction of life-sized physiological system maps (skeletal, nervous, circulatory, immune). Students will conduct simulated surgeries, perform biopsies, and learn how to suture. They will also learn about important medical and surgical breakthroughs and practice the type of problem-based learning taught in medical school.

## Course Schedule

4 hours per day | 20 hours per week | Student-Led Showcase

5 additional hours of curriculum available

## Sample Activities

Throughout the week, students will step into the medical field and be presented with several patients and medical problems they will be asked to treat using knowledge gained from experiences like those listed below.

### Intro to the ER

Students are presented with a scenario of a patient with sickle cell being brought in to the emergency room. This will act as the backdrop for learning about cells and DNA.

### DNA Isolation

Students follow a procedure to isolate their own DNA.

### Biopsy Simulation

Students perform their first surgical procedures by completing model biopsies and lumpectomies.

### Blood Typing

Students learn how blood types are determined by parents and complete a model blood typing activity.

### Sheep Brain Dissection

Students participate in the dissection of a sheep brain to observe parts of the brain.

### Healthy and Sick Bones

Students learn about bone health and model some of the possible consequences of low bone density.

### Setting Bones

Students cast a model broken bone.

### Final Patient

Students are presented with a patient whose treatment will require them to apply their knowledge from throughout the week.

# Materials and Classroom Requirements

## Curriculum guide and materials kits provided for all activities

A lab space with running water is ideal for this course.

Tables or lab benches where students can work in groups and collaborate are useful.

A refrigerator to store chicken legs and other specimens is needed for this course.

1 microscope (ideally compound microscope) per 2 students.

### Additional materials to be provided by the school

- Crayons
- Scissors
- Markers
- Pencils

## Standards Addressed in the Unit

### MA Science and Technology/Engineering Standards

8.MS-LS1-5. Construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms.

8.MS-LS3-1. Develop and use a model to describe that structural changes to genes (mutations) may or may not result in changes to proteins, and if there are changes to proteins there may be harmful, beneficial, or neutral changes to traits.

8.MS-LS3-3(MA). Communicate through writing and in diagrams that chromosomes contain many distinct genes and that each gene holds the instructions for the production of specific proteins, which in turn affects the traits of an individual.

8.MS-LS3-4(MA). Develop and use a model to show that sexually reproducing organisms have two of each chromosome in their nucleus, and hence two variants (alleles) of each gene that can be the same or different from each other, with one random assortment of each chromosome passed down to offspring from both parents.

### Common Core standards

#### Reading Standards for Literacy in Science and Technical Subjects

1. Cite specific textual evidence to support analysis of science and technical texts.

3. Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

10. By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently.

#### Mathematics

6.SP Develop understanding of statistical variability.

7.SP Draw informal comparative inferences about two populations.