

## Syllabus

# Science 7, Semester A

## Course Overview

Science is the study of the natural world. It relies on investigations and evidence to describe the natural events that occur around us. Science 7A discusses the major life processes of organisms, including nutrition, growth and development, and reproduction. In the first unit, you'll explore the cell as the structural and functional unit of life. The second unit covers the growth, development, and modes of reproduction in different plants and animals. In the third unit, you'll learn about sensory receptors, photosynthesis, and cycles of energy transfer that occur in nature.

## Course Goals

By the end of this course, you will be able to do the following:

- Use the steps of the scientific method to plan a life science investigation.
- Use evidence to explain that living things are made up of cells, and create a model that shows cellular organelles.
- Conduct an investigation of cells, and use evidence to argue that the human body is made up of tissues, organs, and systems.
- Research a vaccine, and present a sound argument about its value to public health.
- Develop models to describe the similarities and differences between the two types of reproduction.
- Perform an experiment, and use the results to predict whether a cabbage plant will be genetically identical or different from its parents.
- Develop an argument that explains how animal behaviors and special plant structures affect an organism's chances for reproduction.
- Create a Venn diagram to compare the characteristics of different types of organisms.
- Gather and use information to explain that sensory receptors respond to stimuli by sending messages to the brain.
- Monitor your food intake, and draw conclusions about your diet compared with the recommendations for people your age.
- Explain the role of photosynthesis in the cycling of matter and flow of energy.
- Develop a model that shows how organisms use food to create energy for growth and development.
- Plan an investigation that answers a scientific question about the growth needs of yeast.

- Use life cycle models to compare and contrast the growth and development of different organisms.

## General Skills

To participate in this course, you should be able to do the following:

- Complete basic operations with word processing software, such as Microsoft Word or Google Docs.
- Complete basic operations with presentation software, such as Microsoft PowerPoint or Google Docs presentation.
- Perform online research using various search engines and library databases.
- Communicate through email and participate in discussion boards.

*For a complete list of general skills that are required for participation in online courses, refer to the Prerequisites section of the Plato Student Orientation document, found at the beginning of this course.*

## Credit Value

Science 7A is a 0.5-credit course.

## Course Materials

- notebook
- computer with Internet connection and speakers or headphones
- Microsoft Word or equivalent
- Microsoft PowerPoint or equivalent
- equipment listed in Appendix B

## Course Pacing Guide

This course description and pacing guide is intended to help you stay on schedule with your work. Note that your course instructor may modify the schedule to meet the specific needs of your class.

## Unit 1: Cells

### Summary

In this unit, you'll explore the basic unit of life—the cell. At the beginning of the unit, you'll use the scientific method and learn about the theories and scientific tools that are relevant to life science. You'll then learn about cells and their internal structures. You'll observe plant and animal cells, and create a model of their parts. You'll also learn about how cells make up tissues, organs, and important systems of the body.

<b>Day</b>	<b>Activity/Objective</b>	<b>Type</b>
1 day: 1	<b>Syllabus and Plato Student Orientation</b> <i>Review the Plato Student Orientation and Course Syllabus at the beginning of this course.</i>	Course Orientation
4 days: 2–5	<b>Methods of Science</b> <i>Use the steps of the scientific method to plan an investigation that answers a life science question.</i>	Lesson
4 days: 6–9	<b>Cells: The Building Blocks of Life</b> <i>Use evidence about the characteristics of organisms to explain that all living things are made up of cells.</i>	Lesson
4 days: 10–13	<b>The Parts of a Cell</b> <i>Create a model that shows how the parts of a cell contribute to its function.</i>	Lesson
5 days: 14–18	<b>Examining Cells</b> <i>Conduct an investigation to provide evidence that living things are made of cells.</i>	Course Activity
4 days: 19–22	<b>Tissues, Organs, and Systems</b> <i>Use evidence to argue that the human body is made up of tissues, organs, and systems.</i>	Lesson
5 days: 23–27	<b>Infectious Diseases and Vaccines</b> <i>Research a vaccine, and present a scientifically sound argument about its value to public health.</i>	Course Activity
5 days: 28–32	<b>Unit Activity and Discussion—Unit 1</b>	Unit Activity/ Discussion
1 day: 33	<b>Posttest—Unit 1</b>	Assessment

## Unit 2: The Life Cycle

### Summary

The focus of this unit is reproductive structures and strategies in different organisms. At the start of the unit, you'll study life cycles of animals and plants. Next, you'll learn about the two kinds of reproduction and explore their similarities and differences. You'll also investigate the strategies and behaviors adopted by animals to reproduce. The two course activities in this unit will give you an opportunity to explore the reproductive capabilities and structures of plants.

Day	Activity/Objective	Type
4 days: 34–37	<b>The Growth and Development of Organisms</b> <i>Use life cycle models to compare and contrast the growth and development of different organisms.</i>	Lesson
5 days: 38–42	<b>Reproduction in Cabbage Plants</b> <i>Perform an experiment, and use the results to develop a model that predicts whether a cabbage plant will be genetically identical or different from its parent(s).</i>	Course Activity
4 days: 43–46	<b>Types of Reproduction</b> <i>Develop models to describe the similarities and differences between asexual and sexual reproduction.</i>	Lesson
5 days: 47–51	<b>Identifying Reproductive Structures in Plants</b> <i>Identify the parts of flowers used for reproduction.</i>	Course Activity
4 days: 52–55	<b>Reproductive Structures and Strategies</b> <i>Develop an argument that explains how animal behaviors and special plant structures affect an organism's chances for reproduction.</i>	Lesson
5 days: 56–60	<b>Unit Activity and Discussion—Unit 2</b>	Unit Activity/ Discussion
1 day: 61	<b>Posttest—Unit 2</b>	Assessment

## Unit 3: Nutrition and Energy


### Summary

This unit provides an understanding of how organisms use food to grow and develop. First, you'll study how your body's sensory receptors send messages to your brain—a key regulator in your body's food intake. Next, you'll compare your daily diet with a recommended diet by comparing calories. You'll then learn about the process of photosynthesis in plants. In a hands-on activity, you'll inspect the process of yeast fermentation and its benefits to humans. Finally, you'll develop a model to explain the process of digestion in various organisms.

Day	Activity/Objective	Type
4 days: 62–65	<b>Sensory Receptors</b> <i>Gather and use information to explain that sensory receptors respond to stimuli by sending messages to the brain.</i>	Lesson
5 days: 66–70	<b>Human Nutrition</b> <i>Monitor your food intake, and draw conclusions about your diet compared to the recommendations for people your age.</i>	Course Activity
4 days: 71–74	<b>Photosynthesis</b> <i>Explain the role of photosynthesis in the cycling of matter and flow of energy.</i>	Lesson
5 days: 75–79	<b>Yeast Fermentation</b> <i>Plan an investigation that answers a scientific question about the growth needs of yeast.</i>	Course Activity
3 days: 80–82	<b>Nutrition and Digestion</b> <i>Develop a model that shows how organisms use food to create energy for growth and development.</i>	Lesson
5 days: 83–87	<b>Unit Activity and Discussion—Unit 3</b>	Unit Activity/ Discussion
1 day: 88	<b>Posttest—Unit 3</b>	Assessment

Day	Activity/Objective	Type
1 day 89	<b>Semester Review</b>	
1 day 90	<b>End-of-Semester Test</b>	Assessment

## Appendix A: Safety Notes and Disclaimer

Each Course Activity and Unit Activity that includes a lab/experiment component will highlight key safety guidelines using the safety icon () , which appears directly in the activity. In addition to adhering to those guidelines, you must ensure that you follow these general safety practices:

- Work slowly and safely at all times, and abide by the safety notes and icons.
- Pay attention and be alert at all times. Limit any distractions.
- Keep your hands away from your nose, eyes, mouth, and skin. Wash your hands before and after experiments.
- If you don't understand something, ask a teacher or an adult before proceeding.
- Wear the required protective gear.
- Adult supervision is required for all activities involving an experiment/lab component.
- Do not perform experiments that have not been approved. Follow the procedure.
- Follow good housekeeping practices. Keep your work area clean.
- Abide by all disposal instructions and icons to protect yourself and our planet.
- Report any problems or complications to an adult.

**Note:** *Edmentum assumes no liability for personal injury, death, property damage, equipment damage, or financial loss resulting from the instruction included in this course.*

## Appendix B: Equipment List for Course Activities and Unit Activities

Unit	Activity Name	Task	Equipment List
1	Course Activity: Examining Cells	Task 1: Modeling Animal Cells	<ul style="list-style-type: none"> <li>• 1 clear glass (16 ounce or larger)</li> <li>• 1 cup vinegar</li> <li>• 1 large egg</li> <li>• spoon</li> <li>• flashlight or desk lamp</li> </ul>
		Task 2: Magnifying Living Things	<ul style="list-style-type: none"> <li>• magnifying glass (at least 10x magnification)</li> <li>• a leaf</li> <li>• a twig or tree bark</li> <li>• the skin on your hand</li> <li>• a flower</li> <li>• a strand of your own hair (or a sample of pet hair, if you have a dog or cat)</li> <li>• a sample of your choice</li> </ul>
		Task 3: Observing Onion Cells and Bacteria under a Microscope	<ul style="list-style-type: none"> <li>• 1 red onion</li> <li>• 1 compound optical microscope (three magnifications, 300x, 600x, 1200x)</li> <li>• 3 microscope slides</li> <li>• 3 coverslips</li> <li>• 1 (8-ounce) container yogurt with live active cultures</li> <li>• ½ cup water</li> <li>• iodine</li> <li>• knife</li> <li>• tweezers</li> <li>• 1 teaspoon salt</li> </ul>
1	Course Activity: Infectious Diseases and Vaccines	Planning and Creating a Presentation	None



Unit	Activity Name	Task	Equipment List
1	Unit Activity: Cells	Testing the Effectiveness of a Hand Sanitizer	<ul style="list-style-type: none"> <li>• 1 cup of water</li> <li>• 1 bouillon cube</li> <li>• 2 teaspoons of sugar</li> <li>• 1 tablespoon of agar or 2 (8-ounce) packages of plain, unflavored gelatin</li> <li>• a 1-quart microwaveable container</li> <li>• oven mitts</li> <li>• a measuring cup</li> <li>• 4 ½-cup (75 mL) plastic containers (snack-sized or mini food containers)</li> <li>• liquid hand soap</li> <li>• clean towel</li> <li>• alcohol-based hand sanitizer</li> <li>• 4 cotton swabs</li> <li>• masking tape or sticky notes</li> <li>• pen or pencil</li> <li>• disinfectant (such as bleach)</li> <li>• rubber gloves (dishwashing gloves)</li> </ul>
2	Course Activity: Reproduction in Cabbage Plants	Modeling Reproduction in Cabbage	<ul style="list-style-type: none"> <li>• 1 head green cabbage (stem attached)</li> <li>• small steak knife</li> <li>• cutting board</li> <li>• 3 gallon-size clear plastic bags</li> <li>• spray bottle and water (about 1 cup)</li> <li>• 3 paper towels</li> </ul>
2	Course Activity: Identifying Reproductive Structures in Plants	Task 1: The Parts of a Flower	<ul style="list-style-type: none"> <li>• a microscope (preferred) or a magnifying glass</li> <li>• 1 flower from a flowering plant of your choice (a flower with large parts, such as a daylily or a tulip, is preferred)</li> <li>• 2 microscope slides</li> <li>• 2 coverslips</li> <li>• a glass plate (if using a magnifying glass instead of a microscope)</li> <li>• a scalpel or a small steak knife</li> </ul>

Unit	Activity Name	Task	Equipment List
		Task 2: Characteristics of Pinecones	<ul style="list-style-type: none"> <li>• 2 pinecones (from nature or a craft store)</li> <li>• 2 clear 16-ounce glasses</li> <li>• 1 cup cold water</li> <li>• 1 cup hot water</li> </ul>
2	Unit Activity: The Life Cycle	Create a Venn Diagram	None
3	Course Activity: Human Nutrition	Tracking and Analyzing Your Food Intake	<ul style="list-style-type: none"> <li>• a notebook (preferably a pocket-sized notebook that is easy to carry around)</li> <li>• kitchen measuring cups (1/4 cup, 1/2 cup, 1/3 cup, and 1 cup), optional</li> <li>• kitchen measuring spoons (1/2 teaspoon, 1 teaspoon, and 1 tablespoon), optional</li> </ul>
3	Course Activity: Yeast Fermentation	Task 1: Factors That Cause Fermentation	<ul style="list-style-type: none"> <li>• 6 latex balloons (any shape, as long as they're all the same)</li> <li>• 2 cups hot tap water</li> <li>• 2 cups cold (refrigerated) water</li> <li>• 2 cups lukewarm tap water</li> <li>• 6 (24-ounce) plastic bottles</li> <li>• 6 (0.25 ounce) packets active dry yeast</li> <li>• 1/2 cup sugar</li> <li>• measuring spoon</li> </ul>
		Task 2: Planning a Yeast Investigation	None
3	Unit Activity: Nutrition and Energy	Writing a Research Paper	None