



monarch

Curriculum Catalog

Biology

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UNIT 1: TAXONOMY: KEY TO ORGANIZATION

Assignment	Summary	Video Demo	Supplies
Experiment: Fruit	In this experiment, you will create and utilize a dichotomous key to classify a variety of fruits.	No	<ul style="list-style-type: none"> a variety of fruits
*Activity: Keying Plants	In this assignment, you will select ten flowers to make a dichotomous key.	No	Optional <ul style="list-style-type: none"> a microscope magnifying glass razor blade, tweezers dissecting needles.
*Activity: Keying Animals	In this assignment, you will select ten to twenty animals to construct a dichotomous key.	No	<ul style="list-style-type: none"> research resources
Project: Research	In this assignment, you will write a report on the origin of life.	No	<ul style="list-style-type: none"> research resources
*Project: Origins	In this assignment, you will choose one of three projects on origins to complete.	No	Depends upon the project chosen. <ul style="list-style-type: none"> paper pen stamped envelope or <ul style="list-style-type: none"> a recorded lecture or debate on the subject of origins or <ul style="list-style-type: none"> materials of your choice to help you design and construct an interest center or display on the subject of origins
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

UNIT 2: CHEMISTRY OF LIFE

Assignment	Summary	Video Demo	Supplies
Experiment: Static Electricity	In this assignment, you will perform an experiment of ionic bonding.	Yes	<ul style="list-style-type: none"> • two inflated balloons • piece of material (nylon, wool, or fur) • thread • nylon stocking • string • piece of white paper
*Experiment: Temperature Control	In this experiment, you will investigate water as a temperature control.	Yes	<ul style="list-style-type: none"> • two flat aluminum cake pans (disposable) • a liter measure • sand • aluminum foil • thermometer
Experiment: Water Properties	In this investigation, you will observe what happens to two different solutes when added to water and then filtered.	Yes	<ul style="list-style-type: none"> • chalk • calcium hydroxide • filter paper • phenolphthalein • heat source • two Pyrex beakers
*Experiment: Indicators	In this experiment, you will determine acidity and basicity of common household products utilizing indicators.	Yes	<ul style="list-style-type: none"> • litmus paper • vinegar • bicarbonate of soda • fruit juice • tomato juice • other varied household liquids • soup
*Experiment: Starch	In this experiment, you will perform investigations for presence of starch or sugar.	Yes	<ul style="list-style-type: none"> • powdered starch • Glucose test strips (urine) • beakers, tumblers, or small disposable cups • iodine • fresh fruits and veggies • fruit juices • processed food: • sugar (Karo syrup)
*Experiment: Digestion	In this experiment, you will perform investigations to explore the action of enzymes on digestion.	Yes	<ul style="list-style-type: none"> • two jars with lids • crackers • diluted hydrochloric acid • cornstarch • ground beef (raw) • Glucose test strips • iodine
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

UNIT 3: CELLS

Assignment	Summary	Video Demo	Supplies	
Experiment: Introducing the Microscope	Write a 125-word summary of what you have learned in "Introducing the Microscope".	V-Lab	N/A	
Experiment: Plant, Animal, and Algae Cells	In this project, you will observe an animal cell—a human cheek cell, a plant cell - Elodea, and two algae cells - Spirogyra and Chlamydomonas.	V-Lab	N/A	
*Experiment: The Onion Cell	In this experiment, you will prepare and observe a slide of onion cells.	No	<ul style="list-style-type: none"> • microscope • single-edged razor blade or exacto knife • coverslip • medicine dropper 	<ul style="list-style-type: none"> • iodine stain • forceps • onion • slide (clear) • paper towel • water
Project: Virtual Lab - Osmosis	Analyze how different concentrations of solutes in a solution can affect organism's cells.	V-Lab	N/A	
Experiment: Osmosis	In this experiment, you will perform an experiment that demonstrates osmosis.	No	<ul style="list-style-type: none"> • 3 eggs • 2 cups tap water 	<ul style="list-style-type: none"> • 4 cups vinegar • 2 cups corn syrup
*Experiment: Tissues	In this experiment, you will observe several types of tissue cells using a microscope.	Yes	<ul style="list-style-type: none"> • microscope • prepared slides of tissues 	
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A	

UNIT 4: CELL DIVISION AND REPRODUCTION

Assignment	Summary	Video Demo	Supplies
Experiment: Mitosis	In this experiment, you will observe slides of onion root and whitefish blastula for mitosis.	Yes	<ul style="list-style-type: none"> • microscope • prepared slide of onion (<i>Allium</i>) root stained to show chromosomes • prepared slide of whitefish blastula stained to show chromosomes
*Experiment: Regeneration	In this experiment, you will perform an experiment of regeneration on flatworms.	Yes	<ul style="list-style-type: none"> • a small glass jar or a culture jar • a razor blade, a scalpel, or a very sharp knife • a dissection microscope or a good hand lens • eight or ten individual <i>Planaria</i> or flatworms • a small piece of fresh liver about 2 cm on a side placed in fresh water which is just the depth of the height of the liver • blunt ended tweezers or forceps
*Experiment: Bulb Structure	In this experiment, you will be using an onion, make observations of a bulb.	No	<ul style="list-style-type: none"> • a hand lens or dissection microscope • a knife or razor blade • a fresh onion or some other kind of bulb
*Experiment: Cuttings	In this experiment, you will perform investigations of different types of cuttings.	No	<ul style="list-style-type: none"> • one glass jar of 16-ounce, or larger, size • two or more flower pots of 4-inch, or larger, diameter • rich loamy soil or potting mix • toothpicks • a sweet potato
*Experiment: Sexual Reproduction	In this experiment, you will make observations of an egg cell and a sperm cell using prepared slides.	Yes	<ul style="list-style-type: none"> • a compound microscope • one or more prepared slides of egg cells from an animal • one or more prepared slides of animal sperm, preferably from the same species as the slides of the egg cell
Experiment: Tissue Structure	In this experiment, you will observe different types of cells.	Yes	<ul style="list-style-type: none"> • microscope • prepared slide of muscle tissue • prepared slide of some internal organ such as the kidney, liver, or heart • prepared slide of erythrocytes, or leukocytes (from blood)

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*Experiment: Ferns and Pines	In this experiment, you will prepare a slide of sporangia from a fern leaf and observe.	Yes	<ul style="list-style-type: none"> • hand lens or dissection microscope • forceps • microscope • medicine dropper • fern leaves with sori 	<ul style="list-style-type: none"> • clean glass slides • pine cone (green and unopened would be best) • coverslip
*Experiment: Flowers	In this experiment, you will examine a variety of flowers and identify the parts.	Yes	<ul style="list-style-type: none"> • microscope • razor blade or sharp knife • hand lens or dissection microscope • medicine dropper 	<ul style="list-style-type: none"> • microscope • clean glass slides • teasing needle • coverslips • several kinds of fresh flowers
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A		N/A

UNIT 5: GENETICS: GOD'S PLAN OF INHERITANCE

Assignment	Summary	Video Demo	Supplies
Experiment: Probability	In this experiment, you will perform an experiment on probability.	No	<ul style="list-style-type: none"> • 2 coins • box (cardboard shoebox is good)
Experiment: Molecular Genetics	In this experiment, you will perform an experiment on molecular genetics.	No	<ul style="list-style-type: none"> • 60 radish seeds • 2 petri dishes or flat covered containers • sand-peat mixture • medicine dropper • box to cover 1 petri dish
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

UNIT 6: MICROBIOLOGY

Assignment	Summary	Video Demo	Supplies
Experiment: Fungus All Around (Part 1)	In this experiment, you will grow and observe several different fungi.	No	<ul style="list-style-type: none"> a compound microscope or 5X or 10X hand lens slice of hard cheese 3 sealable sandwich bags slice of bread sharp knife or razor blade microscope slide a flashlight
Experiment: Fungus All Around (Part 2)	In this experiment, you will grow and observe a number of different fungi.	Yes	<ul style="list-style-type: none"> compound microscope sugar 5X or 10X hand lens fresh whole mushroom flashlight depression slide methylene blue stain tweezers medicine dropper pin cover slip baker's yeast packet cup or glass sharp knife or razor blade spoon
Experiment: Protozoan Culture	In this experiment, you will grow and observe several different protozoans taken from a "dirty" water source.	Yes	<ul style="list-style-type: none"> 1 water collection container (quart jar) "dirty" water source 1 tsp rich black soil (NOT potting soil) 6 grains of rice 4 small glass jars handful of hay or grass clippings pinch of hard-boiled egg yolk
Activity: Pathogenic Bacteria Report	Write a 500-word research report on a pathogenic bacterium that is not discussed in this unit.	No	<ul style="list-style-type: none"> research resources
*Experiment: Algae Observations	In this experiment, you will examine prepared slides of nostoc and spirogyra.	Yes	<ul style="list-style-type: none"> a microscope with a high power lens a slide of nostoc a slide of spirogyra paper and pencil for sketches
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

UNIT 7: PLANTS: GREEN FACTORIES

Assignment	Summary	Video Demo	Supplies
Experiment: Seeds	In this experiment, you will collect four different types of seeds and perform the investigation.	Yes	<ul style="list-style-type: none"> four different types of seeds (at least one grass such as corn and one bean such as a pinto bean) --at least four seeds of each kind magnifying glass (hand lens) four Styrofoam cups razor blade (single edge) soil mixture: 2/3 potting soil and 1/3 sand water
*Experiment: Terrarium	In this experiment, you will construct a terrarium	No	<ul style="list-style-type: none"> Large glass or plexiglass container washed gravel, sand and/or rock aquarium charcoal potting soil A few assorted plants
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

UNIT 8: HUMAN ANATOMY AND PHYSIOLOGY

Assignment	Summary	Video Demo	Supplies
Experiment: Heart Rate	In this experiment, you will perform and experiment on heart rate.	No	<ul style="list-style-type: none"> a partner to complete the experiment with you a clock with a second hand
*Experiment: Muscle Types	In this experiment, you will observe slides of the three muscle types.	Yes	<ul style="list-style-type: none"> microscope raw chicken leg blunt probe scissors prepared slides of smooth muscle, skeletal muscle, and cardiac muscle latex gloves
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

UNIT 9: ECOLOGY, POLLUTION, AND ENERGY

Assignment	Summary	Video Demo	Supplies
Experiment: Habitats	In this experiment, you will select a habitat and set up a living community. Study your habitat for several weeks to observe and record any changes. In a 250 report, describe your habitat and answer the following questions.	No	<ul style="list-style-type: none"> • gallon jar (or other large, glass container) • Choose one habitat to visit: <ul style="list-style-type: none"> o Freshwater aquarium o Woodland terrarium o Marine aquarium o Desert terrarium o Aqua-terrarium
*Experiment: Biomes	Explain what part of the ecosystem each living organism fulfills	No	<ul style="list-style-type: none"> • research resources
*Experiment: Quadrats	In this experiment, you will choose a quadrat location and count and list different plant and animal species in the quadrat.	No	<ul style="list-style-type: none"> • a quadrat in a location that represents your field study • a meter stick • large nails • string or twine
*Experiment: Inventory	This activity will give you some experience in taking an inventory and in learning about the plants and animals of your area.	No	<ul style="list-style-type: none"> • nearby plants and animals to observe
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

UNIT 10: PRINCIPLES AND APPLICATIONS OF BIOLOGY

Assignment	Summary	Video Demo	Supplies
*Special Project	Use this Special Project template to create your own assignment for this unit.	N/A	N/A

* indicates an alternative assignment