



Science Olympiad 3-4 Syllabus

Course Goals

1 Beginner Investigative Techniques

Students learn scientific techniques and topics from an investigative perspective. Beginning scientists are encouraged to ask the questions 'why' and 'how' through experiments and group discovery.

1.1 Safety and Lab Procedure

With in-class experiments and activities, students learn about laboratory safety and the necessity of maintaining procedure in scientific study. In the Science Olympiad context, these skills are utilized in note-taking, recording problem solving, and maintaining of rules and regulations for each S.O. event.

2 Teamwork and Cooperative Learning

Teamwork is critical to success in Science Olympiad. In events, students combine their knowledge and experience to solve problems. Students in this course will work together in small groups and as a class to form hypotheses, utilize knowledge, and solve problems.

3 Active Science Learning

Through hands-on experience and introduction of real-world applications to the techniques covered in class, students can expand their knowledge both of science in the classroom setting and how that applies to the outside world. Students are encouraged to see science as a wide range of topics that actively affect many aspects of the world around them.

Course Topics

1 Reading Scientific Instruments

Students are introduced to reading scientific instruments such as thermometers and scales. Through reading and utilizing units, student develop their understanding of measurement and practical experience.

2 Categorizing Objects

Students develop their skills of identifying characteristics of objects and organisms and categorizing. A key skill for scientific study, students are learning to use their observational skills as well as making connections between characteristics.

3 Pattern Recognition

Students learn to make connections between one object and similar objects through investigation.

4 Systems Recognition

Students learn to connect parts of a system and recognize the pathways through the system.

5 Science Facts and Information

Students learn important facts and information about important science topics. Students are introduced to a wider vocabulary of science-related terms and concepts.

6 Hands-On Discovery

Students learn about important concepts through student-led discovery and activities. Through individual exploration with simple guidelines, students learn through their own style and discovery.

7 Functional Awareness

Students are shown not only the structure relating to scientific topics, but also the relationship to their lives and the world around them through real-world applications and interactive lessons.

Course Schedule

Day 1

"Weather or Not" Warm-Up

Students use a real-time weather report to learn about reading thermometers, the water cycle, and weather patterns.

The Water Cycle

Students learn about the water cycle and how clouds are formed. Students create visual aids to explain concepts.

Cloud Demonstration

Students are shown a demonstration of how to make clouds in a jar, using water, ice, and a little heat.

Cloud Visual Aid

Students create a visual aid to describe different types of clouds. Depending on weather, this activity may include real-life observation of clouds.

Temperature

Students learn to read thermometers through practical application, as well as identify landmarks for the Celsius and Fahrenheit scales.

Thermometer Practice

Students use thermometers to determine temperatures of water samples in Fahrenheit and Celsius.

Day 2

"Disease Detective" Introduction

Students learn the basic concepts regarding infectious disease, pathogens, and transmission.

Disease Transmission and Prevention

Students discuss how pathogens and diseases are transmitted.

Spread of Disease

Students learn about the spread of disease through a (literally) hands-on activity. (Washable paint will be used.)

Day 3

Simple Machines

Students learn about simple machines and their functions in everyday life.

Screws as Inclined Planes

Students use hands-on activities to discover the relationship between different simple machines.

"Jumping Levers"

Students use levers to determine the effect of changing the location of the fulcrum.

Simple Machines in My Life

Students search for simple machines in their daily lives and share their findings with classmates.

Day 4

"Crime Busters" Warm-Up

Students are presented with a "crime scene" and given photos and other evidence from the scene. The following activities guide students to use the clues to solve the crime.

Safety Lesson

Students learn about how to be safe in the lab setting, including how to handle materials, and what precautions to take.

Ink Fingerprinting

Students learn about using fingerprinting to identify people through matching fingerprint types. Students use ink pads and paper to mark their fingerprints. Using a Science Olympiad worksheet, students identify the shapes of their fingerprints: whorl, plain arch, or tented arch. Students also compare prints from a "crime scene" to identify a suspect.

Handwriting Recognition

Students use handwriting samples to compare a "crime scene" note to samples from suspects.

Paper Chromatography

Use paper chromatography to identify ink from different pens. Students learn about capillary action of solvent that separates solutes in the ink. Students will compare the ink of pens to the "crime scene" ink sample.

Day 5

Exercise and Heart Rate

In this lesson, students learn about the circulatory system and beginning graphing through activities related to exercise.

Circulatory System Activity

Students learn about the process of the circulatory system through a full-class activity.

Circulatory System Game

Students play a board game while learning the path of the circulatory system.

Exercise

Students learn the mechanics of heart rate and how to make graphs.

Pictographs and Pie Charts

Students learn about different types of graphs using data gathered from their classmates, in regard to sports and healthy eating.

Day 6

"No Bones About It" Introduction

Students learn about different systems in the human body, including the skeletal, muscular, digestive, and nervous

systems through creating visual aids for anatomy and experiments for function and mechanics.

Bones Lesson

Students learn about the structure, function, and names of bones.

Muscles

Students learn about different types of muscles and make an animatronic hand to see how ligaments and muscles work.

Muscle Movement Activity

Students make an animatronic hand to demonstrate how muscles work.

Day 7

Stars and Constellations

Students learn about the composition, location, and legends of stars through constellation exploration and fact-finding.

Moon Phases

Students learn about the moon phases and make a flipbook to demonstrate the cycle of the moon.

The Solar System

Students learn about the planets and organization of the solar system, using a full-class activity to understand the scale of the solar system.

Day 8

Energy and Power

Students learn about energy and its sources through lessons on fossil fuels, wind energy, hydropower, and solar.

Wind Power

Students learn about wind power using pinwheels and balloon-powered turbine demonstrations.

Balloon Turbine

Students make a balloon turbine.

Solar Energy Lesson

Students learn about solar energy and photovoltaic cells.

Solar Oven

Students learn about solar energy by developing a solar oven and heating water. Students also practice reading thermometers using the solar oven.

Day 9

Estimation Introduction

Students learn about estimation and scale comparison through an interactive activity about animals and ecosystems.

Estimation Relay

Students practice conceptualizing large numbers, classifying, estimating sizes, and using scales with animal models.

Ecosystems

Students learn about ecosystems, food webs, and habitats.

Day 10

"Straw Bridge" Warm-Up

Students learn about bridges and geometry through an investigative engineering activity.

Bridge Lesson

Students learn the basics of bridge construction through study of famous bridges; types of bridges; and the strength of geometry.

Straw Bridges

Students use plastic straws and masking tape to construct bridges over a 35 cm span.

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