

Department of Equity, Curriculum and Instruction

Science Olympiad

Science

Middle School - Grades 6 / 7/ 8

Students prepare for the largest and most recognized science and engineering-based competition held in the United States in *Science Olympiad*. This course is open to students who have tried out for a space on Glenfield's Science Olympiad competing team.

Delia Maloy Furer 8/10/19

Revised: July 2019

Approved by the Montclair Board of Education: August 2019



Montclair Public School Elective Overview

Instructional Plan

Course: Science Olympiad

Marking Period or Trimester: Full Year

Pacing: # of weeks: 40

NJSL

Next Generation Science Standards (NGSS):

Students prepare for events that run during multiple competitions during this class. The events held at the Science Olympiad change from year to year. Every event is aligned with specific NGSS, and most middle and high school NGSS are covered during a competition.

Framing the Learning

Timeframe	Big Ideas	Essential Questions	Enduring Understandings
40 weeks	<ul style="list-style-type: none"> Science is competitive. Perseverance and enduring curiosity are the factors that allow scientists to be successful. Mistakes are only regrettable when nothing is learned from them. Willingness to try something new may yield unexpected positive results. Don't limit yourself to events that sound interesting. You never know what might turn out to be a new avenue. 	<ul style="list-style-type: none"> What does it take to be a successful researcher? What is the engineering design process? How does it apply to more than engineering? What tools do I need to accomplish my goals? How can I use mistakes to my advantage? 	<ul style="list-style-type: none"> This is what it is like to be a scientist or an engineer. It is not beyond your capability, and it is not boring. Scientists are competitive, but they need to work together to accomplish great things. Losses can temporarily devastate you. Think about what may have caused the loss and try again. Winning, on the other hand, is exhilarating.

Evidence of Learning

<ul style="list-style-type: none"> Completion of preparation process Ability to discourse knowledgably on a very specific topic 	<ul style="list-style-type: none"> Ability to work with others on above grade level tasks Performance at the Science Olympiad competition
---	---

Activities

Students engage in activities specific to the preparation for their events. The events fall into several categories: test-based (academic), lab-based (scientific/engineering process), and engineering-based (students design and build a device prior to competition). Teams of eighteen students prepare for twenty five different events during the school year in this class. The following are examples of activities students engage in during the school year:

- *Anatomy and Physiology (academic)*: Students prepare for an extensive assessment testing their understanding of specific systems. They conduct thorough research, create a binder or document to organize their information, take and assess practice exams, and create a two sided cheat sheet that they can bring with them into their test on the day of competition.
- *Experimental Design (lab-based)*: Students become familiar with the extended scientific method. Students are given an assortment of materials. They must use these materials to design a scientific problem, construct a hypothesis, test the hypothesis, analyze data, and construct a conclusion. They run through this process until they fulfill every criterion that is part of the extended scientific method in preparation for this event.
- *Battery Buggy (engineering-based)* - Students design and construct a battery powered vehicle capable of stopping without being touched or controlled remotely. Their device needs to adhere to very specific parameters. The distance that the buggy must travel is given to competitors on the day of competition, so they must be able to adjust the braking distance on their vehicle.

DIFFERENTIATION

Special Education	ELL	Intervention	Acceleration
<ul style="list-style-type: none"> ● Prioritize instruction ● Ensure directions are clear and concise ● Utilize probing and clarifying questions ● Support instruction with scaffolding ● Model (provide step by step instructions) use of learning strategies ● Provide extended time for practice and review of learning strategies ● Create rubrics to develop assessments ● Vary assessments ● Provide individual help to all students ● Create opportunities for/Monitor peer collaboration ● Monitor student progress frequently ● Utilize flexible/cooperative grouping based on instructional goals ● Prioritize and chunk lengthy assignments ● Utilize assistive technology, when appropriate ● Provide ongoing, effective, specific feedback ● Model/Utilize graphic organizers 	<ul style="list-style-type: none"> ● Get to know student ● Set high expectations ● Allow electronic translator ● Reword, repeat, and clarify directions ● Determine student knowledge and level of understanding ● Research instruction that best matches student need ● Utilize ongoing informal assessments ● Refer to NJDOE Resources: https://www.state.nj.us/education/bilingual/resources/ ● NJDOE ELL Support Descriptions: https://www.state.nj.us/education/moelcurriculum/ela/ELLSupport.pdf <p>*Review Special Education list for additional recommendations.*</p>	<ul style="list-style-type: none"> ● Tiered Interventions following RtI framework ● RtI Intervention Bank ● Foundations Double-Dose (Tier II) ● LLI (Tier III) ● FFI Skill Report: DRA On-Line ● enVision intervention supports NJDOE resources 	<ul style="list-style-type: none"> ● Process should be modified: higher order thinking skills, open-ended thinking, discovery ● Utilize project-based learning for greater depth of knowledge ● Utilize exploratory connections to higher grade concepts ● Contents should be modified: abstraction, complexity, variety, organization ● Products should be modified: real world problems, audiences, deadlines, evaluation, transformations ● Learning environment should be modified: student-centered learning, independence, openness, complexity, groups varied