Eye of a Scientist

Research methods program for Higher Elementary (HE)

Spring 2025 Syllabus and Program Benefits

Program Overview:

Eye of a Scientist's Spring 2025 program for students in HE is designed to engage students aged 8-11 years of age in science research lessons. Students learn the fundamentals of how the scientific method is applied across the following science fields: geology, physics, biology and neuroscience.

Each lesson will guide students through the scientific method, starting with the observation and hypothesis that sparked the topic in question. Students will have the opportunity to create and test their own hypotheses as they perform activities that will help to develop their fine motor skills in a laboratory setting. Students will model in 2D and 3D, measure various substances and their units of measurements, compare, categorize, collect nominal and numerical data, categorize and quantify data collected, and conclude their experiment's results. Some lessons will include introductions to graphing. Most importantly, students will be exposed to age-dependent laboratory research tools that include, but not limited to, microscopes, magnifying glasses, pipettes, beakers, graduated cylinders, personal protective equipment (PPE), and more. Every lesson is

summarized with the lesson's application of the skill and topic to expand on how the lesson applies in their everyday life.

The following syllabus provides an outline of the Spring 2025 topic lesson schedule. The pre-planned schedule provides a plan that can be subjected to change depending on each group's learning style and educational level. Eye of a Scientist adjusts the lesson content and skills developed to meet a student's abilities. Our main goal is to provide a laboratory setting where students can explore abstract science topics and bring them to life with hands-on projects. Parents will receive a summary sheet of all of the topics and skills covered in each class. Some lessons will include extensions for parents to reinforce at home. Both summaries and extensions will help students and parents to continue to explore topics and skills learned in class throughout the Spring 2025 semester.

Semester Goals:

- Development of the scientific method used in all investigations, and improved application of scientific measurement tools.
- Manipulation and use of various properties of matter, including the advantages of their chemical structures.
- Application of types of energy to power constructed spacecrafts used for space exploration.
- Develop patience, teamwork and peer support in a laboratory setting.
- Learn redesigning original ideas from observed data that promotes problem-solving and critical thinking skills.
- Encourage students to trust and apply their inquiry-based and problem-solving skills in their daily lives.

Spring 2025 Schedule:

A. Weeks 1-3: Earth's structures

a. **Week 1. January 6-10, 2025.** Water Filtration: Designing a water filtration apparatus using different materials to observe their effectiveness in removing impurities from wastewater.
b. **Week 2. January 20-24 2025.** Water Pressure: Exploring the relationship between the changes in pressure and water depth through the construction of a water pump with recycled materials.
c. **Week 3 February 3-7, 2025.** Natural paint: The use of plants to create paint and use for a modeling exercise.

B. Weeks 4-6: The nature of life

a. **Week 4. February 17-21, 2025.** Bee Memory: Exploration of the memory mechanism used by honeybees to collect nectar.
b. **Week 5. March 3-7, 2025. V**ertebrates vs Invertebrates: Classification game of animals into groups based on their skeletal structures, and similarities/differences within their groups.
c. **Week 6. March 17-21, 2025.** Water's refraction properties: Active investigation of factors that affect water's refraction properties.

C. Week 7-8: Using energy

a. **Week 7. March 31-April 4, 2025.** Sound Energy: Explore how sound waves travel through air versus water, and construct a sound cone.
b. **Week 8. April 14-18, 2025.** Magnetic and Light Energy: Building an electrical circuit in the shape of a star constellation

D. Week 9-10: My body's nervous system

a. **Week 9. April 28-May 2, 2025.** Proteins: Creating 3D models of cells with functional description of all of the proteins within animal and plant cells.
b. **Week 10. May 12-16, 2025.** Microscopy: Learning about motor neurotransmission and advanced use of a light microscope to identify fine structures used for touch perception.

Assessment during semester:

- **Openness and participation in using newly presented scientific tools.**
- **Participation of personal ideas and interpretation of the presented science topic.**
- **Teamwork and peer support across paired/group activities.**
- **Ideas of redesigning solutions to a problem presented**
- **Understanding experimental results from mainly nominal data to express the meaning of their results and topic covered within their age-dependent vocabulary abilities.**