# San Diego Jewish Academy K-12 Science Program

The overarching goal of the K-12 science curriculum at SDJA is to ensure that by the end of 12th grade, all students will appreciate the wonder of science; possess sufficient knowledge of science to be engaged global citizens; and have the skills and content knowledge to address a scientific question through data collection, analysis, and designing a conclusion based on evidence.

SDJA's science education is grounded in the "5E" model of instruction:

- **E*ngagement*** - The teacher provides an opportunity for students to engage in dialog that explores what the students' prior knowledge or experiences are with the topic at hand.
- ***Exploration*** - The students combine their prior knowledge and experience with research coupled with guidance from the teacher to explore the topic.
- ***Explanation*** - The students synthesize their exploration and generate an explanation of the topic.
- ***Elaboration*** - The students' understanding of the topic is challenged and deepened through further research and experimentation.
- ***Evaluation*** - The students and teacher reflect on the development and growth of the students' skill development and content knowledge of the topic.

## Lower School (K-5)

In the lower school, the science curriculum encourages student excitement for learning by incorporating hands-on activities and using the "5E" model. In this learning environment, students become involved with Physical, Life, and Earth scientific ideas by using both inquiry techniques and science thinking processes that encourage exploration and reflective thinking.

### Kindergarten

During the kindergarten year, students learn to observe, measure, make predictions, and formulate conclusions to understand the physical world around them. Utilizing their five senses, students can describe the physical properties (color, shape, weight, etc.) of various objects like clay, cloth and water. Students also learn to describe the similarities, differences and characteristics of plants, animals, and geologic formations like rivers and deserts. Through this process, kindergarten students learn to conduct investigations and formulate meaningful questions.

### Grade 1

First grade students further develop their observation and analytic skills by delving deeper in the specific properties of solids, liquids and gases. Students begin using simple tools like thermometers to measure weather conditions and using that data to understand changes they feel in terms of warmth and rain, for example. Students learn that plants and animals inhabit different kinds of environments and why water and food are required for growth. Students also understand the heliocentric model of the solar system, know the difference between terrestrial and gas planets, and understand that Earth is the only planet that can sustain life.

**Grade 2**

Second grade students expand their use of tools to measure length, weight, volume and temperature. Through the use of measurable data, students enhance their ability to make accurate observations and conclusions. Students understand how adaptations allow animals to survive in different habitats, learn about different eating strategies, and the importance of food chains for environmental stability. Students learn about the life cycle of plants and animals and how environmental components like light and gravity affect the life cycle.

**Grade 3**

Third graders use simple machines to measure and observe the motion of objects like waves, rock, wind and water and learn to understand the resulting reactions of push-pull. It is during this year that students learn that the earth is made of materials that have distinct properties, understand the difference between rocks and minerals, and different types of volcanoes. During the year the students investigate how these materials provide resources for human activities such as energy. Learning that energy and matter have many forms connects the physical world to human activity for the students.

**Grade 4**

Fourth grade curriculum is embedded in the principles of the Scientific Method. The students conduct a number of inquiry-based activities designed to teach observational skills, follow the procedure for the experiment, and learn how to draw data-driven conclusions. Electricity and magnetism are also investigated by fourth grade students and are used as the foundation to understanding how electricity is converted to heat, light, and motion. Students build on their knowledge of the plant life cycle and learn how living organisms depend on one another for survival. Anatomy, metamorphosis, and the role of insects, as well as their habitat are investigated and introduced as an example of the interconnection of living organisms. Students explore other topics such as ecosystems, space travel, and the solar system during this year.

**Grade 5**

The fifth graders investigate the processes of plant and animal life like respiration, digestion, and energy generation. During this year, students learn the major parts of the human nervous system, the brain’s role in processing information, and the circulatory and digestive systems. The students concentrate on the sensory organs, as the body’s tools for communicating with the outside world. They also learn the anatomy of animal/human cells, specifically, the neuron, as an integral part of the nervous system.