

SPCPA SCIENCE 2022-2023

At SPCPA we believe:

No tuition, no audition: just as any student can be (and already is) a performing artist (with varying levels of experience/ability), all students already are curious, inquisitive, observant, mindful scientists.

Science Teachers will:

1. Emphasize the process of science over product (having answers/solutions)
2. Support and facilitate inquiry, curiosity, and wonderment centered on the state and [national science standards](#).
3. Emphasize safety and respect (ie. physical, emotional, intellectual) in the classroom.
4. Promote behaviors, habits, and routines that allow students to practice vulnerability and making mistakes.
5. Inspire and promote a growth mindset among both students and faculty.
6. Accept, support and model risk taking/ making mistakes!

Upon graduation from SPCPA a science student will:

1. Sufficiently meet all 2019 Minnesota state learning standards in Science.
2. Demonstrate collaboration and effective communication while problem solving.
3. Have developed respect for and a deeper appreciation for the process of science.
4. Be able to critically interpret and analyze data and its method of collection and presentation.
5. Have disrupted traditional narratives about what a “scientist” looks like/does/concerns themselves with.
6. Noticed cohesion/connections between science and other disciplines (especially their arts/performance track)

Priority [State](#) Standards in Science

Chemistry (and Advanced) (10th grade)

- Students will be able to identify how pressure, volume, temperature, and mass of a gas are related to each other, to predict the effect on a system of changing one of those variables.
- Students will be able to construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
- Students will be able to use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.

Physics (12th grade)

- Students will be able to design and conduct investigations in the classroom, laboratory, and/or field to test students’ ideas and questions, and will organize and collect data to provide evidence to support claims the students make about

phenomena.

- Students will be able to use mathematics to represent physical variables and their relationships, compare mathematical expressions to the real world, and engage in computational thinking as they use or develop algorithms to describe the natural or designed worlds.
- Students will be able to develop, revise, and use models to represent the students' understanding of phenomena or systems as they develop questions, predictions and/or explanations, and communicate ideas to others.

Earth & Physical Science (use MCA IV) (9th)

- Students will be able to represent observations and data in order to recognize patterns in the data, the meaning of those patterns, and possible relationships between variables
- Students will be able to design and conduct investigation of the properties Earth phenomena or carrying out investigations in the classroom, laboratory, and/or field to test students' ideas and questions, and will organize and collect data to provide evidence to support claims the students make about phenomena
- Students will be able to engage in argument from evidence for the explanations the students construct, defend and revise their interpretations when presented with new evidence, critically evaluate the scientific arguments of others, and present counter argument

Biology (11th)

- Students will be able to construct an explanation based on evidence that the process of evolution primarily results from four factors: reproduction within a species, heritable genetic variation of individuals in that species, competition for limited resources, and increased survival and reproduction of the individuals best suited for the environment.
- Students will be able to construct an explanation based on evidence for how the structure of DNA determines the structure of the proteins that carry out the essential functions of life.
- Students will be able to develop and use a model to illustrate the levels of organization of interacting systems and how that translates into specific functions in multicellular organisms.

Academic Resources for Science Students (texts, websites)

General:

[Crash Course](#) - YouTube videos explaining Big Ideas in Science

Chemistry:

[Annotated Periodic Table](#)

[Ideal Gas Simulator](#)

[Khan Academy - Chemistry Library](#)

[Tyler DeWitt \(Chemistry\) - YouTube Channel](#)

Physics:

[Khan Academy - AP/College Physics](#)

[The Physics Classroom](#)

Biology:

[Minnesota Department of Natural Resources](#)

[Amoeba Sisters](#) - YouTube Cartoon Explanations of Biological Concepts

[PhET Natural Selection Simulator](#)