## BNS Purple Room Science 2023-2024

**Earth & Space Science Curriculum**

Instructor: Molly Lucier

The BNS middle school science curriculum reflects a three year rotation between the life science, physical science, and earth science. This year we are studying Earth and Space Science. **Space Science includes a brief focus on the study of the universe and Earth’s position in it.** **Earth Science emphasizes the study of the Earth’s composition, structure, processes, and history; its atmosphere, fresh water, and oceans; and its environment in space. Examines the interconnections among Earth’s many different systems of geosphere, hydrosphere, atmosphere, cryosphere, and biosphere, as well as the anthroposphere. We will also include historical contributions in the development of scientific thought about the Earth and space.**

Students will build on basic principles related to these concepts by exploring:

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| * Earth, Sun, Moon relationship
* Astronomy
* Weather and Climate
 | * Ocean and Fresh Water
* Geology
* Earth’s Resources
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\*See the detailed syllabus on the reverse side, which is subject to change as the year progresses.

The middle school program’s underlying framework reflects the National Science Teachers Association’s notion that scientific inquiry, or hypothesis testing, is a critical thinking process necessary for students learning science in the 21st century. The content and terminology of the program is based on both Virginia’s Standards of Learning (S.O.L.) and the National Science Education requirements for middle school science.

The program’s broad goal is to encourage and nurture students’ natural curiosity and growth in their understanding of the nature of science. The curriculum emphasizes the scientific method and includes practices such as observation, experimentation, models, evidence collection, logical thinking, systematic processes, journaling, scientific writing, the reading of multiple resources in print and electronic, group discussion/debate, as well as lab and field research. We will learn that the nature of science includes the concept that science can provide explanations about nature, can predict potential consequences of actions, but cannot be used to answer all questions. Also, that the sciences are subject to refinement and change with the addition of new scientific evidence.

**Writing in Science**

Writing will occur frequently and most comprehensively in lab reports. Students will practice the scientific writing style, which is detailed and thorough, but also succinct. Reports will be required to be in standard MLA format, as is consistent throughout the BNS Middle School program.

**Science Fair**

Sixth and Seventh grade students will conduct a single-variable scientific experiment. Students will determine a scientific question and make a hypothesis. They will identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded in order to collect data. They will conduct an investigation, revising the experimental design to produce reliable data, evaluate the data, and draw conclusions. Eighth grade students will conduct an engineering design project. Students will define a problem by precisely specifying criteria and constraints for solutions as well as potential impacts on society and the natural environment, systematically evaluating alternative solutions, analyzing data from tests of different solutions and combining the best ideas into an improved solution, and developing a model and iteratively testing and improving it to reach an optimal solution. All students will present their projects through a formal written report, a display board, and by presenting their project at our science fair night.

**Earth & Space Science Grading Policy – High School Credit**

\*This is a high school level course. Students will all take a graded (as part of their course grade) Earth Science elective with a focus on climate and Earth’s waters. Transfer of the credit and grade to the high school is optional.

The following shows the break-down used to generate trimester and year-end grades for students:

Organization: 5%

In Class Participation (15%) -Lab Participation: 10%

 -Discussion and other: 5%

Homework Performance: 15%

Quiz and Minor Project Performance: 20%

Lab Reports, Tests, and Major Project Performance: 45%

**Earth & Space Science Plan**

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| **Unit 1: The Solar System*** Earth as a planet
* Moon as a satellite
* Sun as our star
* Seasons
* Tides
 | **Unit 2: The Universe*** The Solar System
* Stars
* Black Holes
* The Universe
* Space Exploration
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| **Unit 3: Weather and Climate*** Atmosphere
* Weather
* Water Cycle
* Climate (Elective Focus)
* Water Resources (Elective Focus)
 | **Unit 4: Earth Geology*** Plate Tectonics
* Geologic Features
* Minerals and Resources
* Earth’s Changing Surface
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| **6th & 7th Grade Science Fair: Scientific Inquiry*** Inquiry and research
* Experimental design and refinement
* Conducting the experiment
* Collection and interpretation of data
* Final writing of the lab report
 | **8th Grade Science Fair: Engineering design*** Definition of a problem
* Research
* Design & modeling of a solution
* Test and refine prototype
* Final writing of engineering design report
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Summary of Skills Emphasized & Practiced in Purple Room Science

-the scientific method of inquiry and the engineering design process

-critical thinking: considering resources, experimental design, and drawing conclusions

-scientific writing: use of the current journal standard, i.e. abstract, introduction, methods, results, discussion

-making connections between prior knowledge and new concepts, fit new ideas into the “big picture”

-safe lab techniques and using scientific instruments,

-quantitative measuring and the metric system

-familiarity with and recall of important terminology,

-test-taking strategies and practice

-collaborative inquiry and teamwork

-listening and speaking skills, presentation techniques

-short and long term planning for assignments

-computer skills such as data entry/graphing and presentation of research