



BNS Purple Room Science 2024-2025

Life Science

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The BNS middle school science curriculum reflects a three year rotation between the life, physical, and earth sciences. This year we are studying Life Science. Life Science emphasizes a complex understanding of change, cycles, patterns, and relationships to the living world.

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

- Origins, evolution, and classifications of life;
- The cellular organization and classification of organisms;
- The concept of change as a result of the transmission of genetic information from generation to generation;
- The dynamic relationships among organisms, populations, communities, and ecosystems;
- The study of phenology - periodic plant and animal life-cycle events that are influenced by climate and seasonal change in the environment.

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, we stress that the sciences are subject to refinement and change with the addition of new scientific evidence.

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

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 Grading Policy

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

Organization:		5%
In Class Participation:	-Lab Participation:	10%
	-Discussion and other:	5%
Homework Performance:		15%
Quiz and Minor Project Performance:		20%
Lab Reports, Tests, and Major Project Performance:		45%

Life Science Plan

In addition to the topics listed below, throughout the year we will have a regular focus on **phenology** (the study of cyclic and seasonal natural phenomena, especially in relation to climate and plant and animal life). We will host different animals in our classroom, raise insects to study their life cycles, conduct dissections of various organisms, and in the spring we will incubate eggs and raise chicks.

<p><u>Unit 1: Living Organisms</u></p> <ul style="list-style-type: none"> • Geologic Time • Origins of life: From molecules to organisms • Evolution and the fossil record • Classifying organisms • Phenology: living organisms & life cycles • Viruses, Bacteria, Protists, and Fungi 	<p><u>Unit 2: Ecology: Matter and Energy in Organisms and Ecosystems</u></p> <ul style="list-style-type: none"> • Cycles of matter in an ecosystem • Energy transfer in an ecosystem • Populations and communities • Interdependent Relationships within ecosystems • Resources and competition • Adaptation, Natural Selection, Extinction
<p><u>Unit 3: The Cellular Level</u></p> <ul style="list-style-type: none"> • Cell structure & function • Cell growth & development • Cell organization for matter and energy flow • Photosynthesis and plants • Information processing in the cell 	<p><u>Unit 4: Growth, Development, & Reproduction</u></p> <ul style="list-style-type: none"> • Sexual and asexual reproduction • DNA • Genes and chromosomes • Traits and heredity • Genetic engineering
<p><u>6th & 7th Grade Science Fair: Scientific Inquiry</u></p> <ul style="list-style-type: none"> • Inquiry and research • Experimental design and refinement • Conducting the experiment • Collection and interpretation of data • Final writing of the lab report 	<p><u>8th Grade Science Fair: Engineering design</u></p> <ul style="list-style-type: none"> • Definition of a problem • Research • Design & modeling of a solution • Test and refine prototype • Final writing of engineering design report