



BNS Purple Room Science 2016-2017

PHYSICAL SCIENCE

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 Physical Science. **Physical Science emphasizes an understanding of the nature and structure of matter, and the characteristics of energy.**

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

- Structure and Properties of Matter
- Chemical Interactions
- Motion and Stability
- Forces and Interactions
- Energy
- Wave Properties
- Electromagnetic Radiation

*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 in the sciences. 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.

Summary of Skills Emphasized & Practiced in Purple Room Science

- the scientific method of inquiry or testing hypotheses: observation, inference, then testing
- critical thinking: considering resources, experimental design, and conclusions
- scientific writing: use of the current journal standard, i.e. abstract, introduction, methods, results, discussion
- making connections between prior knowledge and new concepts, as well as fitting new knowledge into the "big picture" of science
- safe lab techniques
- use of scientific instruments, such as microscopes
- familiarity with and recall of important terminology
- quantitative measuring and the metric system
- collaborative inquiry and teamwork
- listening and speaking skills
- test-taking strategies and practice
- short and long term planning for assignments
- presentation techniques
- computer skills such as data entry/graphing (Excel) and presentation of research (Power Point)

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 Scores		15%
Quiz, and Minor Project Performance:		20%
Lab Reports, Tests, and Major Project Performance:		45%

Physical Science Plan

Unit 1: Structure and Properties of Matter	Unit 2: Chemical Interactions
<ul style="list-style-type: none"> • The particle theory of matter • Characteristics of matter: physical and chemical properties • Atomic structure • The periodic table • Formation of compounds 	<ul style="list-style-type: none"> • Physical changes in matter • Chemical changes in matter • Forms of energy • Potential and kinetic energy • Thermal energy transfer
Unit 3: Motion and Stability: Forces and Interactions	Unit 4: Energy
<ul style="list-style-type: none"> • Speed, velocity, and acceleration • Newton's laws of motion • Mechanical advantage, efficiency, and power • Applications of work, force, and motion • Types of interactions: <ul style="list-style-type: none"> ○ Gravitational ○ Electrical ○ Magnetic forces 	<ul style="list-style-type: none"> • Definitions of Energy • Conservation of Energy and Energy Transfer • The Relationship between Energy and Forces • Energy in Chemical Process and Everyday Life
Unit 5: Wave Properties	Unit 6: Electromagnetic Radiation
<ul style="list-style-type: none"> • Wave structure and measurement • Sound waves (compression waves) • Light waves (transverse waves) • Lenses and mirrors 	<ul style="list-style-type: none"> • Electromagnetic Spectrum • Applications in Information Technologies and Instrumentation
6th & 7th Grade Science Fair: Scientific Inquiry	8th Grade Science Fair: Engineering design
<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 	<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