EDC The After-School INSTITUTE NPASS2 Taking NPASS to Scale

NPASS2 Alignment with the Maryland State Science[1] Standards[2]

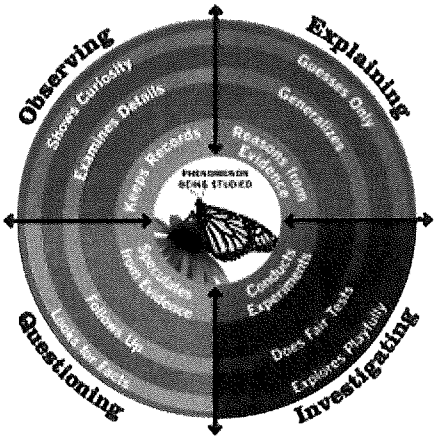
The goals of the NPASS2 professional development project in Maryland are well aligned with the state's standards for elementary science. NPASS trainings focus strongly on science skills and processes as listed in the Maryland "Voluntary State Curriculum" standards. Furthermore, most of the NPASS curriculum projects address topics listed in the Physical Science stream of the National Science Education Standards and the Maryland Science Content standards and indicators. While OST workers should not be expected to "teach" content standards (concepts, facts,) it is well within their skill level to facilitate students in learning to do science *as scientists do it*—using the skills and processes of science described here—while investigating interesting and engaging science phenomena and ideas that relate to the content standard for their age.

Maryland Skills and Processes - Grades Pre-Kindergarten – 2	Maryland Skills and Processes - Grades 3 – 5	Maryland Skills and Processes - Grades 6 – 8
Constructing Knowledge: • Raise questions about the world around them and be willing to seek answers to some of them by making careful observations and trying things out. **Applying Evidence and Reasoning:** • People are more likely to believe your ideas if you can give good reasons for them. **Communicating Scientific Information:** • Ask, "How do you know?" in appropriate situations and attempt reasonable answers when others ask them the same question. **Technology:** • Design and make things with simple tools and a variety of materials. • Practice identifying the parts of things and how one part connects to and affects another. • Examine a variety of physical models and describe what they teach about the real things they are meant to resemble.	**Constructing Knowledge:** • Gather and question data from many different forms of scientific investigations which include reviewing appropriate print resources, observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments. **Applying Evidence and Reasoning:** • Seek better reasons for believing something than "Everybody knows that . . ." or "I just know" and discount such reasons when given by others. **Communicating Scientific Information:** • Recognize that clear communication is an essential part of doing science because it enables scientists to inform others about their work, expose their ideas to criticism by other scientists, and stay informed about scientific discoveries around the world. **Technology:** • Develop designs and analyze the products: "Does it work?" "Could I make it work better?" "Could I have used better materials?" • Investigate a variety of mechanical systems and analyze the relationship among the parts. • Examine and modify models and discuss their limitations.	**Constructing Knowledge:** • Design, analyze, or carry out simple investigations and formulate appropriate conclusions based on data obtained or provided. **Applying Evidence and Reasoning:** • Review data from a simple experiment, summarize the data, and construct a logical argument about the cause-and-effect relationships in the experiment. **Communicating Scientific Information:** • Develop explanations that explicitly link data from investigations conducted, selected readings and, when appropriate, contributions from historical discoveries. **Technology:** • Explain that complex systems require control mechanisms. • Analyze, design, assemble and troubleshoot complex systems. • Analyze the value and the limitations of different types of models in explaining real things and processes.

[1] The term "Science" is used in NPASS programs to denote most aspects of Science Technology, Engineering and Mathematics [STEM]
[2] http://mdk12.org/assessments/vsc/index.html

The focus on the Science Content and Science Characteristic standards in Maryland matches the pedagogical approach to informal science that NPASS trains OST providers to adopt when leading afterschool science projects. All the Habits of Mind listed in the Maryland Performance Standards for Science in Grades K – 8 are practiced throughout NPASS science projects. For ease of recognition by OST workers, a manageable selection of these skills is represented in the *Observation Tool for OST Science Process Skills* (at right). This tool represents a snapshot of the main skills one would expect to see students using while actively engaged in a science inquiry.

Observation Tool for OST Science Process Skills



NPASS professional development training in Maryland and seven other states will prepare a cadre of expert OST Science Trainers to teach afterschool workers in their state or region how to recognize and value these habits and skills and how to create afterschool learning environments that encourage students to practice using them in science investigations. The choice of topics, the simple materials used and the relaxed and enjoyable nature of the project challenges facilitate engagement in this learning. And the fact that NPASS projects *continually urge students to reflect on and share their experiences, their ideas, their frustrations and their conclusions* takes these project beyond mere hands-on science, to become substantial science learning experiences for both students and OST staff.

While NPASS is most obviously aligned with Maryland's *Science Skills and Process* standards, it is also aligned with many of the state's *Physical Science Content* standards. A representative, *but by no means complete,* list of physical science content areas the students might experience during NPASS programming includes examples below:

Second grade students will:
- Identify the devices that use electricity to produce light, heat, and sound. (Students should be cautioned not to experiment with sources of electricity without adult supervision).

Third grade students will:
- Cite evidence from observations to describe the motion of an object using position and speed.
- Using information from multiple trials, compare the speeds (faster or slower) of objects that travel the same distance in different amounts of time.
- Recognize and describe that heat is transferred between objects that are at different temperatures.
- Identify and describe the relationships between a sound and the vibrations that produce it.

Fourth grade students will:
- Investigate and provide evidence that electricity requires a closed loop in order to produce measurable effects.
- Describe and compare the path of electricity (circuit) within this system that caused (a) light or the buzzer to sound ....

Please feel free to contact me for more information.

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