The Open Universe

A periodic investigation into Vermont Science…

VERMONT
AGENCY OF EDUCATION

September 2018
Volume 2, Issue 1



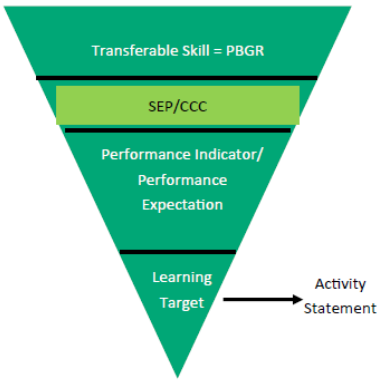
Welcome to the second volume of The Open Universe, a periodic investigation into Vermont Science. In this issue, we will spend some time investigating transferable skills and models showing grain size from PBGRs down to Learning Targets. We'll discuss some lessons learned from a recent Unpacking Workshop that occurred this past August 17, 2018 and finally we'll do some science learning!

Next issue we will be going into the practices and discuss more phenomena.

Transferable Skills as Science PBGRs

Hopefully by now you are familiar with Act 77 and the Educational Quality Standards (EQS) which serve as the rules for Vermont's Personalized Learning and Flexible Pathways Law. (If not, look for upcoming workshops!) Aside from speaking about flexible pathways, personalized learning plans, and assessment systems, EQS states that students need to demonstrate proficiency in transferable skills.

Think of transferable skills as skills that will enable students to be successful in today's world, particularly in college and modern careers. While the EQS states that science PBGRs are based on content and practice, many different types of models have popped up around the state. There are some districts that have chosen to use transferable skills as their Proficiency-based Graduation Requirements (PBGRs) and funnel content through them.



Example:

Creative and Practical Problem Solving **District/School PBGR** *(Performance Indicator(s): b, c, d, e and g.)*

Developing and Using Models (HS): Modeling in 9-12 builds on K-8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). **SEP**

HS-ESS2-1: Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. **PI/PE**

I can make a model that will help me explain how Earth's processes work to create continental and oceanic features. **LT**

Graphically correlate the age of a volcanic island chain and an island's longitude to infer the location of the pacific hotspot, future archipelago islands and calculate the rate of plate movement. **AS**

This can be confusing for educators who are working with the (Next Generation Science Standards (NGSS). How can HS-PS1-2 (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) align with Clear and Effective Communication, a PBGR from the Agency's sample transferable skill PBGR performance indicators?

A sample crosswalk has been attempted between the sample transferable skills and the Science and Engineering Practices (SEP) which can be found housed on OERCommons. Each Performance Expectation (PE) of the is built with an embedded SEP, which can link that PE to a transferable skill. Take a look at the crosswalk and consider whether you agree with this interpretation or not. It may be valuable to do your own crosswalk!

NGSS: A K-12 Sequence Map

On August 17, 2018, Unpacking the NGSS through a Proficiency-based Lens was brought down to Burr and Burton Academy and brought together around 20 educators from the southern region to talk about the NGSS and learn about proficiency scales.

While most of the discussion centered on the formation of proficiency scales, many participants wanted to spend more time discussing issues surrounding the implementation of K-12 standards.

They had known that the NGSS was built K-12, meaning that it was successive in nature. However, when confronted with a visual representation of that, much discussion was around how to support elementary educators and drive home the necessity of good, solid elementary science education.

This was the example that came from that meeting:

High School A- This HS has decided to teach standard HS-LS1-1 as a learning target that will connect with their science PBGRs.

							HS
							HS-LS1-1

To support students in their journey to master HS-LS1-1, the Middle School also teaches MS-LS1-1.

						MS	HS
						MS-LS1-1	HS-LS1-1

To ensure that students are prepared for both MS-LS1-1 and HS-LS1-1, the Elementary School ensures to include the strand LS1-1 throughout a student's K-5 experience. LS1-1 does not show up in all grades- but as the NGSS are built three dimensionally, students will still be able to engage in science that will support their scientific literacy.

K	1	2	3	4	5	MS	HS
K-LS1-1	1-LS1-1		3-LS1-1	4-LS1-1	5-LS1-1	MS-LS1-1	HS-LS1-1

A student graduating high school might have to show proficiency in HS-LS1-1 once, but if built correctly, they have shown seven years of LS1-1 proficiency.

Science Phenomena

These past few weeks have seen seven named storms churning around our planet, Florence, Helene, Joyce, Isaac, Olivia, Mangkhut and Barijat and a few more systems that are being watched for future development.

All this science offers up great opportunities for natural phenomena to be brought into your classrooms!

Here are two other great videos that I found that are either great launch pads for discussion, great phenomena or simply really cool science.

Flying into the eye of Hurricane Irma (Category 5) - start at minute: 02:17

A time lapse Microburst

Would you like to see some professional development surrounding Phenomena? Let me know by filling out this google form: Professional Development Questionnaire.

STEM Teaching Tool: Tool 34 Spotlight

STEM Teaching Tools is a funded website from the National Science Foundation (NSF) devoted to tools to help you teach science, technology, engineering and math (STEM). Each tool has been developed based on what teachers are interested in learning regarding STEM and has been reviewed and authored by teachers and researchers.

This month, we'll spotlight tool 42 - Using Phenomena in NGSS-designed Lessons and Units. Tool 42 explores the significance and nuances of using phenomena in instruction aligned with the vision in the National Research Council (NRC) Framework and NGSS.

The Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST)

This past school year, three finalists for the K-6 Presidential Awards for Excellence in Science and Mathematics Teaching were announced for Vermont:

Sharon Davison from Allen Brook School, Christine Depatie from Swanton School and Susan Koch from Union Elementary School.

These women had fierce competition and it was a privilege to sit on the committee and listen to master teachers doing what they do best - teaching engaging science lessons and motivating young minds to think big.

This year's PAEMST award will be looking for outstanding and masterly 7-12 Science, Computer Science, STEM educators. The award recognizes excellence in teachers who develop and implement high-quality instructional programs that is informed by content knowledge and practice which enhance student learning. NSF administers PAEMST on behalf of the White House Office of Science and Technology Policy. For more information, please go to PAEMST website.

Look for the opening of the application window coming later this fall!

Margaret Carrera-Bly
Science Content Specialist
Proficiency-Based Learning Team

Vermont Agency of Education
219 N. Main Street, Suite 402
Barre, VT 05641

Events and Announcements

Understanding the NGSS and Building Systems and Sequences, and Building Proficiency Scales

The Agency of Education will be offering two workshops around the state this coming fall. These workshops work sequentially with one another but if you are proficient in reading the NGSS or building proficiency scales, please feel free to register for one.

For more information and to register for these workshops, please visit the NGSS Workshop registration page.

The Vermont Academy of Science and Engineering (VASE) Grants

For in classroom science - The VASE Small Equipment Grants are made to K-12 teachers in Vermont schools to support hands-on science and engineering in the classroom. These $500-$1,000 grants can be used to purchase equipment (hardware, software, chemicals, etc.) that exceed the normal budgets available for classroom instruction. **The deadline is October 1, 2018**.

For extracurricular science: The VASE HOST grants are intended to support project based technical learning and experimentation outside of a traditional school classroom setting**.** These $500-$1,000 grants can be used to support activities such as Robotics teams engaged in local, state, national, or international competitions. School-based extracurricular activities such as Lego robot teams, technical challenges, or other special projects, projects within "maker" organizations or any other clubs or organizations involved in technical or scientific pursuits. **The deadline is October 1, 2018.**
For more information, please visit the VASE website.

OMEGA's Incredible Youth Engineering Contest Supports Student Innovation

Do you have students working on an incredible project but have a limited budget? Omega would like to help with our Incredible Youth Engineering Contest. They can submit their project for a chance to win products, resources and expertise to make their idea come to life. For more information, visit OMEGA's website.

Sally Ride EarthKAM Mission

Sign up for this unique fall opportunity that allows your students to observe Earth from above via a camera on the International Space Station! The Sally Ride Earth Knowledge Acquired by Middle School Students (EarthKAM) program invites students to request images of specific targets on Earth taken by a camera placed in the window of the space station. EarthKAM can be used in any K-12 classroom setting, and is a great way to show students a new perspective of Earth. Visit Sally Ride EarthKAM website to learn more and register for this free program.

Margaret Carrera-Bly
Science Specialist
Proficiency-Based Learning Team
Telephone: 802-479-1097
Email: Margaret.carrera-bly@vermont.gov

VERMONT
AGENCY OF EDUCATION