SCARFE Digital Sandbox – Come Play!

PRACTICE

When it comes to high tech tinkering, coding and hacking fall into the category of high tech tinkering. With the explosion of kid and user friendly 'coding apps', Coding Clubs are appearing in local schools and many classroom teachers are exposing their students to code through 'The Hour of Code'.

View this article in Edutopia for more information and a list of 7 apps to teach children coding
http://www.edutopia.org/blog/7-apps-teaching-children-coding-anna-adam

Something to ponder:
"Although the practice of planning and carrying out investigations has always been a part of good science instruction, the student focus often has been more on carrying out than on planning, with teacher-structured investigations far outnumbering student opportunities to develop their own research questions. Giving students opportunities to design and plan investigations allows them to truly experience the excitement of science and better understand the nature of scientific inquiry." (Science Teacher, an NSTA publication)
http://nstacommunities.org/blog/2014/02/14/planning-and-carrying-out-investigations/

How can you put the planning and development of investigations into the hands of your students? How can hands-on learning be supported across curriculum? Consider hands-on manipulative investigations and project-based learning to help elicit prior knowledge, spark interest and deepen learning! Consider engaging your students in a makerspace… a 'take-apart' station, tinkering, inventing, coding…

Squishy Circuits

Students can have fun with playdough to create their own simple machines and figures as they explore and discover the basics of electric circuitry.

Consider an inquiry-based teaching approach (rather than providing the complete 'instructions' in advance to your students!). Use some guiding questions to prompt and extend learning. See Lynda's blog: http://excellenceinteachingscience.blogspot.ca/2014/08/fun-with-squishy-circuits-with.html

Try having students use an online forum (blog, Padlet wall, etc) to share their ideas and questions as they work… or the teacher can circulate and record what he/she sees and hears (projecting the information on the wall as students work)

Recipe:
http://courseweb.stthomas.edu/apthomas/SquishyCircuits/conductiveDough.htm

(just a few) Making Resources

STEM http://www.edutopia.org/blog/stem-engagement-maker-movement-annmarie-thomas

Makey Makey http://makeymakey.com/

Maker Labs http://www.makerlabs.com/

Makezine
http://makezine.com/projects/squishy-circuits/

Local Making
http://www.meetup.com/Vancouver-Maker-Education-Community/

Robot Test Kitchen
http://robottestkitchen.com/

Other Resources for Tinkering, Exploring and sparking learning!

Exploratorium:
http://exploratorium.edu/
The Tinkering Studio
http://tinkering.exploratorium.edu/

RESEARCH

Makerspace and Tinkering
Hands on learning in a digital world...

"In our digitally interconnected world, it is possible to forget the importance of children touching and making things as a key element of enhancing their learning. Touching and making sparks their imaginations and excited them (about science and engineering)."
Shirley Ann Jackson, Ph.D., President, Rensselaer Polytechnic Institute

The power of play in learning has long been emphasized in the early years. More and more, educators are seeing the potential for play in intermediate, middle and high school as a vehicle for engagement and deeper learning. Hands-on manipulative activities across disciplines – in particular STEM (Science, Technology Education, Math) are beginning to be seen as essential for student success. The Maker Movement is growing with maker spaces popping up across North America. We even have a Maker space in Vancouver and Victoria! This, along with the associated 'Tinkering' movement has the potential to catalyze creativity and innovation in both formal and informal education environments. (Petrich, Wilkinson, Bevan, 2013)

Tinkering and Making have recently been recognized in the field of education. School Districts are beginning to see the value and are hosting workshops and even providing grants for innovative projects. The beauty of this, from an economic standpoint, is that teachers and students can use inexpensive common materials and even 'recycled' materials in their projects. Tinkering typically blends high and low-tech tools of science along with a strong aesthetic dimension that supports children's (and adults) self-expression. Since making and tinkering help us explore innovation and invention, the less 'packaged' or 'directed' the materials the better! There are, however, several Tinkering resources and kits available to support teaching in bringing lifelong learning, creativity and excitement to the classroom!

The changes afoot in education in BC as a result of the BC Ed Plan support or, I would say, even require, shifts in the way we look at teaching and learning including a move towards more inquiry based learning. Inquiry-based learning mirrors how scientists view and interact with the world. Through scientific inquiry, we can come to understand the world around us and the scientific processes at play. The NSTA (National Science Teachers Association) recommends that all students (in K – 16) have opportunities to participate in scientific inquiry. To support this, play-based, hands-on activities need to gain greater emphasis across the grade levels. Integrating curriculum is essential to this. Through a combination of fewer specific content based learning outcomes (i.e. a focus on Core Competencies) and greater cross-subject collaboration, this should even be possible at Secondary School and beyond. Recently, I attended a conference for Innovators in Post-Secondary Education at SFU. Among the many participants were Deans of Universities and Colleges – many calling for a breaking down or easing of the specific subject area boundaries that define faculties at the University level to afford a broader, more hands-on and relevant educational experience!

References:

Petrich, M., Wilkinson K., & Bevan, B. (2013). It looks like fun, but are they learning? In M. Honey & D. Kanter (Eds.), Design, Make, Play: Growing the Next Generation of STEM Innovators. New York and Abingdon, Oxon., Eng.: Routledge.

http://www.nsta.org/

http://tinkering.exploratorium.edu/

http://www.edutopia.org/blog/stem-engagement-maker-movement-annmarie-thomas