You've probably heard of S.T.E.M, the term used to group together the academic disciplines of, "Science, Technology, Engineering and Mathematics", but have you heard of S.T.E.A.M? The added 'A' stands for "Art".

S.T.E.M is important, as without it, the conveniences we enjoy every day throughout the world for safety, security and leisure would not exist. As the world is becoming more technologically dependent, S.T.E.M education is becoming increasingly necessary to understand and respond to the global problems we face. When it comes to planning and designing for these problems, creativity is an essential component to the development of effective solutions in engineering and science. Art curriculum is the educational vehicle that fosters the development of creativity. By bridging together, the left (logic/reasoning) and right (abstraction/imagination) hemispheres of the brain, students can become more impactful problem solvers. In order to advance this goal, Innovate Canmore, in partnership with artsPlace, developed several S.T.E.A.M summer camps in Canmore this year, (Tech Pirates, Time Travelers, & Eco-Warriors).

The first summer 2019 camp, 'Tech Pirates', was well attended this July by kids from as far away as Edmonton. The week long camp was an introduction to engineering program for two age groups, 6-8 and 9-12-year olds. The goal of the week was for students to design and build a 3D model of a pirate's island using the concepts of S.T.E.A.M and to walk away knowing more about the many types of engineering disciplines that factor into solving real world problems. Every day the students would gather in the theater, after the morning ice breaker games. The concepts of the day were introduced with relevant videos, pictures and a short lesson. The instructions and goals of the day were explained and then the 'technology pirates' were given the freedom in the visual arts room to execute the plan using their creative imagination.

Day 1 (Problem Solving): Engineering disciplines and the necessary steps around effective problem solving were introduced to the two groups. A map of an island was drawn out on a 6 ft. x 6 ft. paper and divided into sections, so every student got a piece. The students colored in their land and water, planned out their mountains, volcanoes, trees, animals and buildings. Students began to understand the designing and planning stages of engineering and worked together to draft their island layout in preparation for the lessons of the days ahead.

Day 2 (Modeling): The concepts of scales and 2D vs 3D was taught. Every student was given a thick piece of plaster wood. They used their map to draw the border lines and rivers on their new material that would become their 3D model. Tissue paper, pipe cleaners, cotton balls, even tiles and clay were used to add the dimension of height to the island water waves, tree leaves, volcano fire, sea monsters and castles that were built on the model throughout the week.

Day 3 (Mechanical Engineering): A history of technology was presented, and students began to see that the most complicated scientific inventions of today, like rockets and smart watches, began from fundamental understanding of simple tools, like wheels and sun dials. But before students could add technology (tools) to their islands they had to do research first, just like engineers in the real world. They studied density, buoyancy, saw a time lapse video of a yacht being built and then made boats for their model out of clay that actually floated. To supplement their boats, each student had the opportunity to build a compass out of nails and magnets.

Day 4 (Civil Engineering): Continuing the lesson of technology, students were introduced to four different types of bridges (beam, truss, arch and suspension), and concepts including forces, tension, compression, statics, and dynamics. They watched videos in the theater of how the world's best bridges were built, how other bridges from the past have failed, followed up with a bridge building competition! Students were limited in their bridge designs such that only popsicle sticks, cardboard and tape were allowed. This limitation helped introduced the students to the idea of economics in engineering, material constraints and budgets. The winning bridge, despite the difficulty of the task, survived a 20 lb. container of liquid paint that was dropped from 2 feet above three times in a row. Impressive, eh?!

Day 5 (Electrical Engineering): The concepts of electricity, circuits, and power generation were introduced on the final day. First principles of the structure of an atom were presented, including the nucleus (protons and neutrons), and electrons. The idea of an atom was then used to explain how copper atoms pass electrons to each other which then creates what we call 'current'. Resistance and voltage were also introduced in the days lesson of circuit theory. This built the foundation to explain how power is generated, the turning of a turbine and the production of electricity from a generator using magnets. Finally, the delivery of power via transmission lines to our homes and schools was explained. To solidify each of the above concepts, students worked together and built a potato battery that actually powered an LED light, one that could fit on their island model.

At the end of the week, every student took home their 3D island model and a better understanding of what S.T.E.A.M stands for.

If you're interested in future S.T.E.A.M summer camps please reach out to Innovate Canmore for details or register now for our two upcoming camps (Time Travelers & Eco-Warriors) listed on the artsPlace website:
https://artsplacecanmore.com/programs/camps

-Abra O'Leary
Innovate Canmore Ambassador Program Coordinator