Quantum Leaps

KAST

Mentor's Guide

Inspiring STEM careers in the Kootenays

A modular lesson plan adaptable to the interest and needs of the youth audience.

Science, Technology, Engineering and Math are everywhere in our lives. The things we do, use, and think about often have roots in STEM. Despite this fact, we often think of STEM as highly technical and analytical. Some may find STEM intimidating, uninteresting or unattainable because of these narrow definitions. For youth, these limited perceptions of STEM and STEM careers can affect their choices of careers and pursuits. STEM is everywhere and used in so many ways. Lowering internalized barriers and making STEM approachable is important as youth create their sense of self.

Quantum Leaps will generate classroom and peer discussions expanding perceptions of STEM and how it is applied in our lives. Combine the **STEM in Your Life** module with the two videos of **Stories of Kootenay Entrepreneurs** using STEM and entrepreneurship to pursue dreams which would not at first seem to fall into the narrow categories of Science, Technology, Engineering and Math. Encourage their vision with **Kid-preneurship: Develop a Comprehensive Lesson Plan** where they can visualize how they may bring their business ideas to fruition. These modules can stand alone or be used as a set to drive discussion around futures in the Kootenays.

Audience

For mentors, teachers or guardians to deliver to youth (target age 7 - 15) in the Kootenays.

Purpose

To inspire and encourage youth to pursue careers in entrepreneurship and STEM in the Kootenays.

Themes

STEM, entrepreneurship, leadership, mentorship, Kootenay careers

Learning Modules

Present individually or as a set for a full lesson or series

STEM in Your Life

30 - 45 min

Youth Workbook: STEM in Your Life

Stories of Kootenay Entrepreneurs

20 - 30 min

Viva Cacao - Beth Campbell **(5 min)**

HappyGut - Leeza Zurwick **(5 min)**

Kid-preneurship: Develop a Comprehensive Business Plan

25 - 35 min

Youth Workbook: Develop a Comprehensive Business Plan

STEM in Your Life

30 - 45 minutes

Youth Workbook: STEM in Your Life

Present as a stand alone lesson or pair with **Stories of Kootenay Entrepreneurs**

Objectives

1) Understand what STEM is and what each letter means
2) Recognize STEM in your daily life
3) Explore surprising examples of STEM
4) Consider STEM related careers

Introduction (5 min)

What does **STEM** stand for?

Science
Technology
Engineering
Math

What about **STEAM**? Why is it important to consider Arts ?

Science and Technology include aspects of design and creativity. Art often requires the use of STEM. They are more closely related than we may think.

Definitions and Examples (5 min)

Youth Workbook: STEM in Your Life - page 1

Science: Study of how the world works

- Biology: the study of living things
  E.g. animal biology, plant biology, ecology (how plants, animals and the environment interact), medicine, food production

- Chemistry: the study of matter
  E.g. medicine and pharmaceuticals, food production, creation of materials like plastics, treating and refining raw resources from industries like mining and forestry

- Physics: the study of physical properties
  E.g. transportation and safety (planes, cars etc.), weather and climate predictions, communications (phones, radio, internet), electricity

Technology: Application of science for a practical purpose or function. Using science and design to solve problems.

- Tools are technology! Learning to use tools is an application of thought and creativity.

- Pencils are technology. Paper is a technology that needed to be discovered, developed and refined.

- Computer programming to operate phones, traffic signals, etc.

- Energy production (solar, hydroelectric, nuclear, natural gas)

Engineering: Building and designing systems and structures.

- Mechanical engineering
  Design and maintenance of engines/machines and systems.

- Civil engineering:
  Design and construction of infrastructure, roads, bridges, water systems. Sustainability and safety of public structures.

- Electrical engineering
  Design and application of electrical systems.

- Chemical engineering
  Production and design of manufacturing processes using and creating chemicals. E.g. pharmaceuticals, food processing and production, chemical processing

- Industrial engineering
  Optimizing complex systems and processes, improve efficiency and productivity within industry. Workflows, resource management, and operational design.

- Software engineering
  Coding to build websites, apps and programs to run technology systems

Math: Use of numbers, patterns and logic. The theory of numbers and their properties, structure and relationships. Logical reasoning and calculation. This is a hard one. Math can be very practical or extremely abstract.

- Data management and analysis

- Computer programming, software development

- Statistics - anthropology, sciences, trend tracking, politics

- Economics, financial analysis, accounting

*** Reflection: It is hard to separate different aspects of STEM, isn't it? ***

<u>Youth-led Brainstrom</u> (5 min)

Youth Workbook: STEM in Your Life - page 2

To start the conversation, brainstorm as a class.
Generate some ideas and examples before letting the youth continue on their own.

1) Where do you find STEM in your life?

2) What about around the classroom? At home? Outside of school?

3) Try to encourage more broad/unexpected examples

4) Try to think of some things that do not use STEM

5) Can we think of how these things actually do use STEM?

<u>Secret STEM challenge</u> (15 - 25 min)

Youth Workbook: STEM in Your Life - page 3

1) Individually **(5 min)**
   Try to think of some things or activities that do not use STEM.
   Get creative, try to stump your classmates.

2) In pairs or small groups **(5 - 10 min)**
   Together can you find ways that the examples from part 1 actually do rely on STEM?
   What about other parts of STEM? (E.g. if something seems like it is math, how is it also technology or engineering?)

3) As a class **(10 min)**
   Were you surprised by how common/ubiquitous STEM is in our lives?
   What were some examples that surprised you and you would like to share?
   Did anyone have an example that they don't think uses STEM or was really hard? Try to find a STEM connection together.

STEM Scenario (5 - 10 min)

Youth Workbook: STEM in Your Life - page 4

Bonus activity, easily removed from lesson plan

Choose a routine from your daily life e.g. getting ready in the morning, grocery shopping, playing sports. Imagine the things you do during this scenario and try to find as many different ways that STEM is used.

Getting ready in the morning

Alarm clock:	Technology, engineering
Clothes:	Textile science, design
Toothbrush:	Medical science, manufacturing
Breakfast:	Agriculture, food science, transportation
Commute:	Roads, engines, infrastructure, GPS

Our day has barely started and STEM is everywhere!

Stories of Kootenay Entrepreneurs

20 - 30 min

Watch and discuss the two videos of local entrepreneurial leaders.

Present as a stand alone lesson or pair with **STEM in Your Life** or **Kid-preneurship: Develop a Comprehensive Lesson Plan** for a full lesson or series.

Videos (10 min)

Viva Cacao - Beth Campbell **(5 min)**

HappyGut - Leeza Zurwick **(5 min)**

Objectives

1) Demonstrate examples of entrepreneurship and leadership in the community
2) Expand expectations for what entrepreneurship may look like
3) Recognize the diverse pathways, opportunities and applicability of STEM
4) Lower barriers to pursuing entrepreneurship and STEM in the Kootenays

Introduction (5 min)

Lots of people in the Kootenays have started their own businesses and are using STEM in amazing and creative ways. Our communities rely on small businesses, and businesses rely on STEM. These videos feature two Kootenay entrepreneurs with unique products and creative careers.

<u>Class discussion</u> (10 - 15 min)

Watch the videos and use the following topics and questions to explore ideas of entrepreneurship, STEM, and career paths in the Kootenays.

1) What did you like, or what surprised you about these stories?

2) Have you seen these products in the community?
   Have you ever tried Viva Cacao chocolate or HappyGut drinks?
   Did you know about kefir water before the HappyGut video? Or maybe kombucha?

3) Did you expect these businesses to use STEM?
   What are some of the ways STEM was used by each business?
   Try to find examples of Science, Technology, Engineering and Math for each business.
   Were you surprised that a chocolatier and a beverage company used STEM?

4) Do you know any entrepreneurs or business owners in your community?
   Were Leeza and Beth what you imagined an entrepreneur would be like?
   What did you expect?
   What do you think Leeza and Beth were like as kids?

5) What was their inspiration and motivation?
   What were their first steps/early stages?
   What support did they receive and why were those resources important?
   What role does mentorship play in their journey?

6) Would you want to be an entrepreneur?
   What would that look like for you?
   What would your business or product be?
   What would you name your business?
   Check if your business name is available in BC!
   GovBC - Public Directory of Registered Organizations

7) Use the next module to explore these concepts.
   Kid–preneurship: Develop a Comprehensive Business Plan

Kid-preneurship:

Develop a Comprehensive Business Plan

35 - 50 minutes

Youth Workbook: Develop a Comprehensive Business Plan

Use the fantastic workbook created by Kid-preneurs to guide youth in creating their own business concept and exploring what it takes to bring their idea into the world.

Present as a stand alone lesson or pair with **Stories of Kootenay Entrepreneurs** for a full lesson or series.