



IGNITE MY FUTURE

LESSON TITLE

Get Moving!

Guiding Question: How could we improve the world?

SUBJECTS

Engineering
Health

COMPUTATIONAL THINKING PRACTICE

Creating Computational
Artifacts

COMPUTATIONAL THINKING STRATEGIES

Find Patterns
Building Models

MATERIALS

[Health and Fitness](#)
student capture sheet

Pens, markers and/or pencils

Drawing paper

[Finding Patterns in Faulty Fitness](#)
student capture sheet

Computers with access to the
Internet (optional)

[Prototype Design](#)
student capture sheet

Ignite Curiosity

- Wearable fitness trackers are really popular, but do they work?
- Do you know how to get and stay healthy?
- Why might it be hard for people to be active every day?
- What are some of common health issues you know or have heard about?

In this lesson, students will use the computational thinking strategies of finding patterns and building models to assess the effectiveness of various sports and exercise tools such as wearable tech, apps, and analog methods of tracking exercise.

In **THINK**, students will simulate the role of public health researchers who have identified an alarming trend: childhood obesity is increasing and teenagers are exercising less and less, leading to an increasingly unhealthy adult population that needs significant medical care. To do this, they will study the most effective forms of exercise tracking, decomposing the elements of these tools that make them more appealing and habit-forming. In **SOLVE**, students will find patterns in data from many different types of fitness trackers (including wearables, apps, and analog methods). Students will evaluate what characteristics of these tools appeal most to children and teens. They will then create a hybrid health and fitness tracker with features selected from the most successful trackers. In **CREATE** students will use the computational thinking strategy of building models to design a prototype of a fitness tracker that appeals to teenagers. This prototype may or may not be tech-based, but it must be based on students' findings on the most habit-forming fitness tracking systems. In **CONNECT**, students discuss how doctors and other health professionals design outreach programs that help the general population to get healthier.

Students will be able to:

- **Apply** the scientific method to research tools for tracking exercise,
- **Evaluate** data to redesign or reimagine a tool for tracking exercise, and
- **Create** a prototype of a fitness tracker that appeals to teenagers.



Students act as public health researchers challenged to produce an appealing and habit-forming exercise tracking system to combat obesity.

- 1 Introduce** the lesson by reading the following scenario to students:

Every year, it seems like there's a new "gadget" designed to get people moving. From heart rate monitors to fitness apps, you'd think that we're getting healthier and healthier. You will work as public health researchers who have identified an alarming trend: despite new fitness technology, childhood obesity is increasing and teenagers are exercising less. Your team has been challenged to produce an appealing and habit-forming exercise tracking system that will motivate people to exercise regularly. You will help people track their movement to stay on track to reach their fitness goals. Read more about the benefits of tracking your activity [here](#).

- 2 Distribute** the [Health and Fitness](#) student capture sheet. Ask students to work in small groups to brainstorm responses concerning the issue of technology tools and analog methods designed to help people be active in their daily lives.
- 3 Next**, allow individual members to identify a specific fitness tracker or exercise program based on their brainstormed responses from the [Health and Fitness](#) student capture sheet that they would like to research for their group.
- 4 Allow time for students to conduct** their individual research. Encourage students to use a wide variety of research methods as they obtain their data. In addition, remind students that there are several ways that the field of health can treat the problem of inactivity. Encourage students to consider all options that may involve technology processes.

Optional Extension: Lead students in a study where the class conducts field experiments on their own fitness habits by journaling over a set amount of time. You may also lead a field trip to a local gym or community centre in order to record data on different activity types.

- 5 Once students have collected data**, ask students to share their information with their groups and conduct an analysis of the combined data. Students will begin to decompose the problems and benefits of using existing technology tools and analog methods to maintain healthy lifestyles. Distribute the [Finding Patterns in Faulty Fitness](#) student capture sheets. Ask students to record both positive and negative points for each fitness tracker in one- to three-word statements that they discovered during their individual research.



Students evaluate characteristics of appealing and effective fitness trackers to design a hybrid health and fitness tracker.

- 1 Using a large space on the wall, create the following table:

Fitness Trackers

POSITIVE POINTS	NEGATIVE POINTS
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- 2 Ask student groups to add the one-to three-word positive and negative points they discovered during their data analysis in [Think](#) to the table on the wall shown in their [Finding Patterns in Faulty Fitness](#) student capture sheets.
- 3 Once all groups have added their information, review all positive points and negative points. Ask groups to clarify any statement that does not make sense.
- 4 Tell students that their group will use this information to generalize characteristics they want to include in their design for a hybrid health and fitness tracker. Allow time for groups to meet and generalize characteristics for their group's project. Remind students that their new design can be some new type of technology, a new analog method, or a combination of technology and analog method based on the characteristics of multiple existing systems. They must consider how the new tracking system will appeal to teenagers and be an effective method for promoting regular physical activity. For example, if students identify a characteristic of "fun," they may want to consider a gamification method for a hybrid health and fitness tracker.



Student groups will use the computational thinking strategy of building models to design a prototype of a fitness tracker that appeals to teenagers.

- 1 Ask** students to prioritize the characteristics they identified in Step 2 of [Solve](#) based on which they think are the most important to include as they develop a prototype for their model fitness tracker.
- 2 Inform** students that this list of characteristic priorities and corresponding method should become the parameter for building their prototype.
- 3 Distribute** the [Prototype Design](#) student capture sheets. Ask students to design their fitness tracker prototype based on these parameters. Remind students to consider what type of input and output their fitness tracker will require. Also, remind students to consider any limitations for their prototype. For example, if the prototype includes heavy cardio exercise, there may be a physical restriction for people with a heart condition placed on the prototype. Each prototype should also estimate the cost of production.
- 4 Once students have a basic design** for their fitness tracker, allow groups to share their ideas as a soundboard or focus test group for their prototype. Encourage students to discuss each prototype after a group presents their design.
- 5 Allow students time to modify their design** as needed based on possible issues raised during the class discussion.



Select one of the strategies listed below to help students answer these questions:

- How do this problem and solution connect to me?
- How do this problem and solution connect to real-world careers?
- How do this problem and solution connect to our world?

- 1 Write** the three questions on PPT or flip chart slides and invite students to share out responses.
- 2 Distribute** chart paper around the room, each with one question written on it. Ask students to write down their ideas on each sheet.
- 3 Assign** one of the questions to three different student groups to brainstorm or research, and then share out responses.
- 4 Invite** students to write down responses to each question on a sticky note, and collect them to create an affinity diagram of ideas.

How does this connect to students?

Building a healthy lifestyle and understanding the tools available to support a fitness plan can help students maintain healthy behaviours and improve their personal health. Programs like the [Participaction](#) provide students with a fun and accessible way to stay active, regardless of economic status or ability.

In addition, the chance to conduct research, collect and evaluate data, and make recommendations to enhance a product design is a valuable skill in today's labour force.

How does this connect to careers?

Athletic Trainers design individual exercise programs that inspire the general population to work out more.

Occupations in the **Health Professions** (such as **Physicians, Registered Nurses, and Physical Therapists**) treat medical conditions and injuries and help people make lifestyle choices to stay healthy.

Health Educators and **Community Health Workers** teach people about behaviours that promote wellness. They develop and implement strategies to improve the health of individuals and communities.

Industrial Designers develop concepts for manufacturing products. They consider the function, aesthetics, production costs, and usability of products when they develop plans.

How does this connect to our world?

Increasing exercise throughout society is a concern for many professions, most notably those involving health and medicine.

Advancements in society often come from collaborative activities. By working together, people can develop solutions more quickly and with more insight than by working alone. A collaborative design process brings incremental changes that spur growth.

Many fields require the ability to transfer concepts into drawings that can be shared, simulated, tested, and modified. This process of design allows us to choose the best initial idea, develop prototypes, and consider alternatives before developing a final solution.

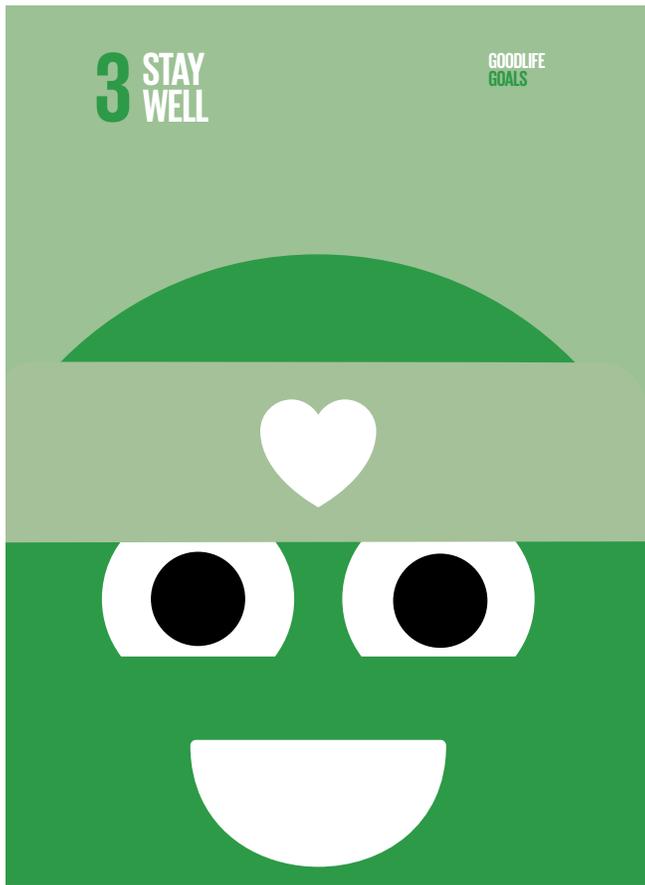
Curriculum Connections

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS



“For the goals to be reached, everyone needs to do their part: governments, the private sector, civil society and **people like you.**”
-The United Nations

“The Sustainable Development Goals are the blueprint for a better future. And together we can reach them. By following the Good Life Goals, we can all help make tomorrow better than today. Let’s do this! #GoodLifeGoals”



STAY WELL
Actions

3

1 **Learn about, and share, ways to stay healthy**

2 **Wash your hands and exercise regularly**

3 **Stay safe on or near roads**

4 **Value mental health and well-being**

5 **Demand medical care and vaccinations for all**



Ensure healthy lives and promote well-being for all at all ages.

SUSTAINABLE DEVELOPMENT GOALS

Source:

[The Good Life Goals by Futerra Sustainability Communications Ltd and 10-Year Framework of Programmes on Sustainable Lifestyles and Education Programme](#) is licenced under CC BY-ND 4.0.

Find more easy-to-implement resources to integrate computational thinking practices into your classroom by visiting ignitemyfutureinschool.ca

Global Competencies

CMEC (Council of Ministers of Education, Canada) Pan-Canadian Global Competencies Descriptions

Highlighted sections apply to this lesson

Global Competency	Definition	Student Descriptors
Collaboration	Collaboration involves the interplay of the cognitive (including thinking and reasoning), interpersonal, and intrapersonal competencies necessary to participate effectively and ethically in teams. Ever-increasing versatility and depth of skill are applied across diverse situations, roles, groups, and perspectives in order to co-construct knowledge, meaning, and content, and learn from, and with, others in physical and virtual environments.	<p>Students participate in teams by establishing positive and respectful relationships, developing trust and acting co-operatively and with integrity.</p> <p>Students learn from and contribute to the learning of others by co-constructing knowledge, meaning, and content.</p> <p>Students assume various roles on the team, respect a diversity of perspectives, and address disagreements and manage conflict in a sensitive and constructive manner.</p> <p>Students network with a variety of communities/groups and use an array of technology appropriately to work with others.</p>
Communication	Communication involves receiving and expressing meaning (e.g., reading and writing, viewing and creating, listening and speaking) in different contexts and with different audiences and purposes. Effective communication increasingly involves understanding both local and global perspectives, societal and cultural contexts, and adapting and changing using a variety of media appropriately, responsibly, safely, and with regard to one's digital footprint.	<p>Students communicate effectively in different contexts in oral and written form in French and/or English through a variety of media.</p> <p>Students communicate using the appropriate digital tools and create a positive digital footprint.</p> <p>Students ask effective questions to acquire knowledge, listen to understand all points of view, voice their own opinions, and advocate for ideas.</p> <p>Students gain knowledge about a variety of languages and understand the cultural importance of language.</p>

Global Competencies cont.

Highlighted sections apply to this lesson

Global Competency	Definition	Student Descriptors
Global Citizenship and Sustainability	Global citizenship and sustainability involve reflecting on diverse worldviews and perspectives and understanding and addressing ecological, social, and economic issues that are crucial to living in a contemporary, connected, interdependent, and sustainable world. It also includes the acquisition of knowledge, motivation, dispositions, and skills required for an ethos of engaged citizenship, with an appreciation for the diversity of people, perspectives, and the ability to envision and work toward a better and more sustainable future for all.	<p>Students understand the ecological, economic, and social forces, their interconnectedness, and how they affect individuals, societies, and countries.</p> <p>Students take actions and responsible decisions that support quality of life for all, now and in the future.</p> <p>Students recognize discrimination and promote principles of equity, human rights, and democratic participation.</p> <p>Students understand Indigenous traditions and knowledge and its place in Canada, learn from and with diverse people, develop cross-cultural understanding, and understand the forces that affect individuals, societies, and nations.</p> <p>Students engage in local, national, and global initiatives to make a positive difference.</p> <p>Students contribute to society and to the culture of local, national, global, and virtual communities in a responsible, inclusive, accountable, sustainable, and ethical manner.</p> <p>Students as citizens participate in networks in a safe and socially responsible manner.</p>

Global Competencies cont.

Highlighted sections apply to this lesson

Global Competency	Definition	Student Descriptors
Critical Thinking and Problem Solving	Critical thinking and problem solving involve addressing complex issues and problems by acquiring, processing, analysing, and interpreting information to make informed judgments and decisions. The capacity to engage in cognitive processes to understand and resolve problems includes the willingness to achieve one's potential as a constructive and reflective citizen. Learning is deepened when situated in meaningful, real-world, authentic experiences.	<p>Students will solve meaningful, real-life, complex problems by taking concrete steps to address issues and design and manage projects.</p> <p>Students will engage in an inquiry process to solve problems as well as acquire, process, interpret, synthesize, and critically analyse information to make informed decisions (i.e., critical and digital literacy).</p> <p>Students will see patterns, make connections, and transfer what they have learned from one situation to another, including in real world applications.</p> <p>Students will construct, relate, and apply knowledge to all domains of life such as school, home, work, friends, and community.</p> <p>Students will analyze the functions and interconnections of social, economic, and ecological systems.</p>
Innovation, Creativity and Entrepreneurship	Innovation, creativity, and entrepreneurship involve the ability to turn ideas into action to meet the needs of a community. The capacity to enhance concepts, ideas, or products to contribute new-to- the-world solutions to complex economic, social, and environmental problems involves leadership, taking risks, independent/unconventional thinking and experimenting with new strategies, techniques, or perspectives, through inquiry research. Entrepreneurial mindsets and skills involve a focus on building and scaling an idea sustainably.	<p>Students formulate and express insightful questions and opinions to generate novel ideas.</p> <p>Students contribute solutions to complex economic, social, and environmental problems or to meet a need in a community in a number of ways including; enhancing concepts, ideas, or products through a creative process, taking risks in their thinking and creating, making discoveries through inquiry research, and by hypothesizing and experimenting with new strategies or techniques.</p> <p>Students demonstrate leadership, initiative, imagination, creativity, spontaneity, and ingenuity in a range of creative processes and motivate others with an ethical entrepreneurial spirit.</p>

Global Competencies cont.

Highlighted sections apply to this lesson

Global Competency	Definition	Student Descriptors
<p>Learning to learn and to be self-directed and self-aware</p>	<p>Learning to learn and to be self-directed and self-aware, means: becoming aware and demonstrating agency in one's process of learning, including the development of dispositions that support motivation, perseverance, resilience, and self-regulation. Belief in one's ability to learn (growth mindset), combined with strategies for planning, monitoring and reflecting on one's past, present, and future goals, potential actions and strategies, and results. Self-reflection and thinking about thinking (metacognition) promote lifelong learning, adaptive capacity, well-being, and transfer of learning in an ever-changing world.</p>	<p>Students learn the process of learning (metacognition) (e.g., independence, goal-setting, motivation) and believe in their ability to learn and grow (growth mindset).</p> <p>Students self-regulate in order to become lifelong learners and reflect on their thinking, experience, values, and critical feedback to enhance their learning. They also monitor the progress of their own learning.</p> <p>Students develop their identity in the Canadian context (e.g., origin and diversity) and consider their connection to the environment. They cultivate emotional intelligence to understand themselves and others. They take the past into account to understand the present and approach the future.</p> <p>Students develop personal, educational, and career goals and persevere to overcome challenges to reach these goals. They adapt to change and show resilience to adversity.</p> <p>Students manage various aspects of their lives: physical, emotional (relationships, self-awareness), spiritual, and mental well-being.</p>

Finding Patterns in Faulty Fitness

(Insert name of fitness tracker or analog method researched here)

POSITIVE POINTS	NEGATIVE POINTS

Prototype Design

Priority #1

Characteristic:

Method:



Priority #2

Characteristic:

Method:



Priority #3

Characteristic:

Method:

Provide a description of how the prototype works:

What limitations may exist with this prototype?

Estimated costs associated with production for this prototype:

Estimated costs associated with the use of this prototype:

Sketch a drawing of the prototype (if possible) on the back side of this paper.