

# S.T.E.A.M. Labs in Schools

## What are S.T.E.A.M. Labs?

TMBUK2 Education S.T.E.A.M. Labs are curriculum aligned educational workshops geared towards learners from kindergarten through grade 8. They are intended to provide opportunities for learners to participate in engaging, hands-on and cooperative S.T.E.A.M. (Science Technology Engineering Art and Math) activities. The labs are designed to keep learners occupied with multiple S.T.E.A.M. tasks that are often make cross-curricular connections. We aim for **less talking and more doing**. Lastly, TMBUK2 Education actively attempts to apply principles of sustainable and eco-friendly practices when possible. We make the best attempt to ensure that materials used in each STEAM Lab are reused, reduced and recycled.

## How should educators prepare:

- Feel free to observe and document learning outcomes as they relate to the expectations highlighted in the chosen lab for your student assessment
- Assist Learning Strategist(s) in guiding learners through the various activities
- Expect high energy and engagement and sometimes some mess (learning can get messy)

## Pricing

In celebration of our official launch all S.T.E.A.M. Labs are being offered for a special launch pricing at \$300 for the 2019-20 school year. Further discounts are available to when multiple sessions at the same school are booked simultaneously. While S.T.E.A.M. are offered throughout the entire school year, availability is dependant upon pre-booking. If you are interested in acquiring more information or booking a Lab please email [info@tmbuk2edu.ca](mailto:info@tmbuk2edu.ca) with the subject "RE: school booking" at which point a booking form will be emailed back to you.

| # of STEAM Labs Sessions | Discount | Cost per STEAM Lab Session<br>(Special Launch Pricing) |
|--------------------------|----------|--|
| 1-2                      | -        | \$300.00   |
| 3-6                      | 5%       | \$285.00   |
| 7+                       | 10%      | \$270.00   |

## S.T.E.A.M Labs

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## Kindergarten to Grade 1

| Busy Bees (Code: G1BB)  |  |  |
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| <p>Why do bees tend to hover in and around gardens? This is the guiding question that will launch learners into an exploration and inquiry of the interdependence of organisms.</p> <p><b>Activities:</b> Create a classroom garden with a 3D beehive, bees and paper flowers</p>   | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>• Up to 30 students</li> <li>• 2-3 older student helpers</li> </ul>  |  |
| Curriculum Connections  |  |  |
| <p><b>GRADE 1 – SCIENCE &amp; TECHNOLOGY</b><br/>Understanding Life Systems<br/>Needs and Characteristics of Living Things</p> <p>1.2 describe changes or problems that could result from the loss of some kinds of living things that are part of everyday life<br/>2.4 investigate the physical characteristics of plants (e.g., basic parts, size, shape, colour) and explain how they help the plant meet its basic needs<br/>3.5 describe how showing care and respect for all living things helps to maintain a healthy environment</p> | <p><b>GRADE 1 – THE ARTS</b><br/>Visual Arts</p> <p>D1.1 create two- and three-dimensional works of art that express feelings and ideas inspired by personal experiences<br/>D1.2 demonstrate an understanding of composition, using principles of design to create narrative art works or art works on a theme or topic</p> | <p><b>GRADE 1 – MATHEMATICS</b><br/>Geometry</p> <p>– identify and describe common two-dimensional shapes and sort and classify them by their attributes, using concrete materials and pictorial representations<br/>– build three-dimensional structures using concrete materials, and describe the two-dimensional shapes the structures contain</p> |

| Reduce, Reuse, Recycle, Repurpose (Code: G14R)   |   |  |
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| <p>What better way to get young learners to understand the three R's than to put it into practice. In this workshop young learners will learn about how reducing, reusing and recycling helps to maintain the wellbeing of our planet.</p> <p><b>Activities:</b> Create recycled paper; Create miscellaneous items for everyday use by repurposing recycled materials</p>  | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>• Up to 30 students</li> <li>• 2-4 older student helpers</li> </ul> |  |
| Curriculum Connections   |   |  |
| <p><b>GRADE 1 – SCIENCE &amp; TECHNOLOGY</b><br/>Understanding Structures and Mechanisms<br/>Materials, Objects, and Everyday Structures</p> <p>1.1 identify the kinds of waste produced in the classroom, and plan and carry out a classroom course of action for minimizing waste, explaining why each action is important<br/>2.4 use technological problem-solving skills, and knowledge acquired from previous investigations, to design, build, and test a structure for a specific purpose<br/>3.5 identify the materials that make up objects and structures</p> | <p><b>GRADE 1 – THE ARTS</b><br/>Visual Arts</p> <p>D1.4 use a variety of materials, tools, and techniques to respond to design challenges</p>                            |  |

## Harnessing Energy (Code: G1HE)

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| <p>The Boy that Harnessed the Wind provides a prime example of how we can repurpose used materials to take advantage of natural sources for the purpose of generating energy. This book will launch students into a full investigation of repurposing materials in their everyday lives to create paper windmills.</p> <p><b>Activities:</b> Read aloud of The Boy that Harnessed the Wind; create paper windmills</p> | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>Up to 30 students</li> <li>2-4 older student helpers</li> </ul> |
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| <b>Curriculum Connections</b>  |  |
| <p style="text-align: center;"><b>GRADE 1 – SCIENCE &amp; TECHNOLOGY</b><br/>Understanding Matter and Energy<br/>Energy in our Lives</p> <p>1.2 describe how the everyday lives of different people and other living things would be affected if electrical energy were no longer available<br/>2.3 design and construct a device that uses energy to perform a task</p> | <p style="text-align: center;"><b>GRADE 1 – THE ARTS</b><br/>Visual Arts</p> <p>D1.4 use a variety of materials, tools, and techniques to respond to design challenges</p> |

## Colour Creation (Code: G1CC)

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| <p>In the Colour Creation lab students get to experience colour as an active and flowing phenomenon. Students will experience firsthand how the primary colours are used to create other colours.</p> <p><b>Activities:</b> Bubbling Colours; Walking Rainbow; Colour Creation; Magic Milk</p> | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>3-4 older student helpers</li> <li>Up to 30 students</li> </ul> |
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| <b>Curriculum Connections</b>   |  |
| <p style="text-align: center;"><b>GRADE 1 – SCIENCE &amp; TECHNOLOGY</b><br/>Understanding Matter and Energy<br/>Energy in our Lives</p> <p>2.1 follow established safety procedures during science and technology investigations<br/>3.1 demonstrate an understanding that energy is what makes the things they do or see happen</p> | <p style="text-align: center;"><b>GRADE 1 – THE ARTS</b><br/>Visual Arts</p> <p>D1.3 use elements of design in art works to communicate ideas, messages, and personal understandings<br/>D2.2 explain how elements and principles of design are used to communicate meaning or understanding in their own and others' art work</p> |

# TMBUK2 Education

## Through the Air (Code: G1AIR)

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| <p>Do your students ever wonder how things stay in the air? Students will learn about different scientific principles that allow for flight and then engage in a series of STEAM activities that highlight various principles of flight.</p> <p><b>Activities:</b> Catapults; Straw Rockets; Whirly Birds; Hoop Flyers</p> | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>3-4 older student helpers/parent volunteers</li> <li>Up to 30 students</li> </ul> |
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| Curriculum Connections  |   |
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| <p style="text-align: center;"><b>GRADE 1 – SCIENCE &amp; TECHNOLOGY</b></p> <p style="text-align: center;">Understanding Structures and Mechanisms<br/>Materials, Objects, and Everyday Structures</p> <p>1.2 assess objects in their environment that are constructed for similar purposes</p> <p>2.4 use technological problem-solving skills, and knowledge acquired from previous investigations, to design, build, and test a structure for a specific purpose</p> <p>3.7 describe the properties of materials that enable the objects and structures made from them to perform their intended function</p> | <p style="text-align: center;"><b>GRADE 1 – MATHEMATICS</b></p> <p style="text-align: center;">Measurement</p> <p>– estimate, measure (i.e., by placing nonstandard units repeatedly, without overlaps or gaps), and record lengths, heights, and distance</p> <p>– construct, using a variety of strategies, tools for measuring lengths, heights, and distances in non-standard units</p> |

## Things that React (Code: G1REACT)

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| <p>Student reactions to these reactions will say it all. Student will learn about physical properties of substances as well as create and observe exciting chemical reactions to learn about chemical changes.</p> <p><b>Activities:</b> Colour Changing Oobleck; Magic Milk; Zombie Worms; Creating Minerals</p> | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>3-4 older student helpers/parent volunteers</li> <li>Up to 30 students</li> </ul> |
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| Curriculum Connections  |  |
|---|--|
| <p><b>GRADE 1 – SCIENCE &amp; TECHNOLOGY</b></p> <p style="text-align: center;">Understanding Matter and Energy<br/>Energy in our Lives</p> <p>2.1 follow established safety procedures during science and technology investigations</p> <p>3.1 demonstrate an understanding that energy is what makes the things they do or see happen</p> |  |

## S.T.E.A.M. Artists (Code: G1ART)

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| <p>Your young STEAM enthusiasts will have the opportunity to show off their artistic talents as they design and create science infused art masterpieces. Students will focus on geometric shapes in art, and create a clock powered by the sun.</p> <p><b>Activities:</b> Mosaic art; Sundial; Geometric Shape Art</p> | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>3-4 older student helpers/parent volunteers</li> <li>Up to 30 students</li> </ul> |
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| Curriculum Connections   |   |  |
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| <p><b>GRADE 1 – SCIENCE &amp; TECHNOLOGY</b><br/>Understanding Structures and Mechanisms<br/>Materials, Objects, and Everyday Structures</p> <p>1.2 assess objects in their environment that are constructed for similar purposes in terms of the type of materials they are made from, the source of these materials, and what happens to these objects when they are worn out or no longer needed<br/>2.2 investigate characteristics of various objects and structures, using their senses<br/>3.4 describe the function/purpose of the observable characteristics of various objects and structures, using information gathered through their senses</p> | <p><b>GRADE 1 – THE ARTS</b><br/>Visual Arts</p> <p>D1.4 use a variety of materials, tools, and techniques to respond to design challenges<br/>D3.2 demonstrate an awareness of a variety of works of art from diverse communities, times, and places</p> | <p><b>GRADE 1 – MATHEMATICS</b><br/>Geometry and Spatial Sense</p> <p>– identify and describe common two-dimensional shapes and sort and classify them by their attributes, using concrete materials and pictorial representations<br/>– build three-dimensional structures using concrete materials, and describe the two-dimensional shapes the structures contain</p> |

## One person’s trash is another person’s... orchestra? (Code: G1MUSIC)

|   |   |
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| <p>Oh, the sweet sound of music. Students will have the opportunity to design and build creative and eco-friendly instruments out of recyclable materials while also exploring the history of them.</p> <p><b>Activities:</b> DIY harmonicas, tin can drum, maracas and castanets; sound wave machine</p> | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>3-4 older student helpers/parent volunteers</li> <li>Up to 30 students</li> </ul> |
|---|---|

| Curriculum Connections  |  |
|---|--|
| <p><b>GRADE 1 – SCIENCE &amp; TECHNOLOGY</b><br/>Understanding Structures and Mechanisms<br/>Materials, Objects, and Everyday Structures</p> <p>1.1 identify the kinds of waste produced in the classroom, and plan and carry out a classroom course of action for minimizing waste, explaining why each action is important<br/>2.2 investigate characteristics of various objects and structures, using their senses<br/>3.5 identify the materials that make up objects and structures</p> | <p><b>GRADE 1 – THE ARTS</b><br/>Music</p> <p>C1.4 use the tools and techniques of musicianship in musical performances<br/>C2.2 describe ways in which the elements of music are used for different purposes in the music they perform, listen to, and create<br/>C3.1 identify and describe musical experiences in their own lives</p> |

## Circle of Life (Code: G2CL)

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| <p>Life cycles are... well, they're a part of life. In this workshop students will get a chance to investigate the science of life cycles through an arts lens.</p> <p><b>Activities:</b> Investigate three-part animal life cycles through tableau representations and 3D creations</p> | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>2-3 older student helpers or volunteers</li> <li>Up to 30 students</li> </ul> |
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| <u>Curriculum Connections</u>   |  |   |
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| <p><b>GRADE 2 – SCIENCE</b><br/>Understanding Life Systems<br/>Growth and Changes in Animals</p> <p>2.3 investigate the life cycle of a variety of animals (e.g., butterflies, frogs, chickens), using a variety of methods and resources</p> | <p><b>GRADE 2 – THE ARTS</b><br/>Drama</p> <p>B1.3 plan and shape the direction of a dramatic play or role play, building on their own and others' ideas both in and out of role, with support</p> | <p><b>GRADE 2 – THE ARTS</b><br/>Visual Arts</p> <p>D1.1 create two- and three-dimensional works of art that express feelings and ideas inspired by activities in their community</p> |

## Get it There (Code: G2GT)

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| <p>People are constantly in motion, so much so that it becomes easy to take for granted the structures that allow us to travel from one point to another. Learners will focus on the mechanism behind movement of objects.</p> <p><b>Activities:</b> design a simple bridge and balloon powered car to cross it</p> | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>2-3 older student helpers or volunteers</li> <li>Up to 30 students</li> </ul> |
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| <u>Curriculum Connections</u>   |  |  |
|---|--|--|
| <p><b>GRADE 2 – SCIENCE &amp; TECHNOLOGY</b><br/>Understanding Structures and Mechanisms<br/>Movement</p> <p>1.1 assess the impact on society and the environment of simple machines that allow movement<br/>2.4 use technological problem-solving skills, and knowledge and skills acquired from previous investigations, to design, build, and test a mechanism that includes one or more simple machines<br/>3.5 identify simple machines used in devices that move people</p> | <p><b>GRADE 2 – THE ARTS</b><br/>Visual Arts</p> <p>D1.4 use a variety of materials, tools, and techniques to respond to design challenges</p> | <p><b>GRADE 2 – MATHEMATICS</b><br/>Measurement</p> <p>– estimate and measure length, height, and distance, using standard units (i.e., centimetre, metre) and non-standard units<br/>– estimate, measure, and record the capacity and/or mass of an object, using a variety of non-standard units</p> |



## Things that React (Code: G2REACT)

|   |   |
|---|---|
| <p>Student reactions to these reactions will say it all. Student will learn about physical properties of substances as well as create and observe exciting chemical reactions to learn about chemical changes.</p> <p><b>Activities:</b> Colour Changing Oobleck; Magic Milk; Zombie Worms; Creating Minerals</p> | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>3-4 older student helpers/parent volunteers</li> <li>Up to 30 students</li> </ul> |
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| <p><u>Curriculum Connections</u></p> <p><b>GRADE 2 – SCIENCE &amp; TECHNOLOGY</b><br/>         Understanding Matter and Energy<br/>         Energy in our Lives</p> <p>1.2 assess the impacts of changes in state of solids and liquids on individuals and society<br/>         2.1 follow established safety procedures during science and technology investigations<br/>         3.2 describe the properties of solids (e.g., they maintain their shape and cannot be poured) and liquids</p> |
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## S.T.E.A.M. Artists (Code: G2ART)

|   |   |
|---|---|
| <p>Your young STEAM enthusiasts will have the opportunity to show off their artistic talents as they design and create science infused art masterpieces. Students will focus on creating 3D images that highlight the impact of water and air on life.</p> <p><b>Activities:</b> Mosaic art and/or Geometric Shape Art; 3D Environmental Images</p> | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>3-4 older student helpers/parent volunteers</li> <li>Up to 30 students</li> </ul> |
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|---|---|--|
| <p><u>Curriculum Connections</u></p>  |   |  |
| <p><b>GRADE 2 – SCIENCE &amp; TECHNOLOGY</b><br/>         Understanding Earth and Space Systems<br/>         Air and Water in the Environment</p> <p>1.1 assess the impact of human activities on air and water in the environment, taking different points of view into consideration<br/>         3.3 describe ways in which living things, including humans, depend on air and water</p> | <p><b>GRADE 2 – THE ARTS</b><br/>         Visual Arts</p> <p>D1.1 create two- and three-dimensional works of art that express feelings and ideas inspired by activities in their community or observations of nature<br/>         D1.3 use elements of design in art works to communicate ideas, messages, and understandings</p> | <p><b>GRADE 2 – MATHEMATICS</b><br/>         Geometry and Spatial Sense</p> <p>– identify and describe various polygons and sort and classify them by their geometric properties, using concrete materials and pictorial representations<br/>         – compose and describe pictures, designs, and patterns by combining two-dimensional shapes</p> |

# TMBUK2 Education

## Grade 3 S.T.E.A.M Labs

### Build a Bridge and Get Over it (Code: G3BR)

Structures have played an integral role in helping humans to travel and move across the globe. In this lab learners will be tasked with designing and constructing a simple structure to aid in transportation.

**Duration:** 2-2½ hours

**Requirements:**

- Up to 30 students
- 1-2 volunteers

**Activities:** Design and build a bridge to support vehicle crossing

#### Curriculum Connections

**GRADE 3 | Science & Technology**  
Strong and Stable Structures

1.1 assess effects of strong and stable structures on society and the environment  
2.4 use technological problem-solving skills, and knowledge acquired from previous investigations, to design and build a strong and stable structure that serves a purpose  
3.9 describe ways in which different forces can affect the shape, balance, or position of structures

**GRADE 3 | The Arts**  
Visual Arts

D1.4 use a variety of materials, tools, and techniques to respond to design challenges

**GRADE 3 | MATHEMATICS**  
Measurement, Geometry

#### Measurement

– estimate, measure, and record length, height, and distance, using standard units  
– estimate, measure, and record the mass of object

#### Geometry

– identify and compare various polygons and sort them by their geometric properties  
– identify and describe the two-dimensional shapes that can be found in a three-dimensional figure

### Just a bit of Dirt (Code: G3SO)

\*What is soil? Why is there so much it? Why is it so important? Learners will have a close-up investigation of the composition of soil and learn about why soil is an essential renewable resource on earth. Learners will also learn why and how-to compost.

**Duration:** 2-2½ hours

**Requirements:**

- Up to 30 students
- 1-2 older student helpers

**Activities:** Create a classroom compost; investigate bacteria in soil; prepare a soil profile.

#### Curriculum Connections

**GRADE 3 | SCIENCE & TECHNOLOGY**  
Soils in the Environment

1.1 assess the impact of soils on society and the environment, and suggest ways in which humans can enhance positive effects and/or lessen or prevent harmful effects  
2.2 investigate the components of soil (e.g., nonliving things such as pebbles and decaying matter; living things such as organic matter, bacteria, earthworms, and insects), the condition of soil (e.g., wet, dry), and additives found in soil (e.g., pesticides, fertilizers, salt), using a variety of soil samples (e.g., sand, clay, loam) from different local environments, and explain how the different amounts of these components in a soil sample determine how the soil can be used  
3.3 describe the interdependence between the living and non-living things that make up soil

# TMBUK2 Education

| Soil (Code: G3PL)   |  |
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| <p>More than a pretty flower? Learners will investigate the important role plants have in the sustainability of life for living things.</p> <p><b>Activities:</b> Create seedling pots out of recycled paper; plant art</p>   | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>● Up to 30 students</li> <li>● 1-2 older student helpers</li> </ul>  |
| Curriculum Connections  |  |
| <p style="text-align: center;"><b>GRADE 3   SCIENCE &amp; TECHNOLOGY</b><br/>GROWTH AND CHANGES IN PLANTS</p> <p>1.1 assess ways in which plants are important to humans and other living things, taking different points of view into consideration</p> <p>2.6 use appropriate science and technology vocabulary, including stem, leaf, root, pistil, stamen, flower, adaptation, and germination, in oral and written communication</p> <p>3.6 describe ways in which plants and animals depend on each other</p> | <p style="text-align: center;"><b>GRADE 3   THE ARTS</b><br/>VISUAL ART</p> <p>D1.2 demonstrate an understanding of composition, using principles of design to create narrative art works or art works on a theme or topic</p> <p>D1.4 use a variety of materials, tools, and techniques to respond to design challenges</p> |

| Use the Force (Code: G3FO)  |   |
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| <p>Forces are the sources of movement. This lab places students in a position to investigate the various degrees of movement created by contact and contactless forces.</p> <p><b>Activities:</b> elastic airplanes and cars; magnetic slime</p>  | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>● Up to 30 students</li> <li>● 1-2 older student helpers</li> </ul> |
| Curriculum Connections  |   |
| <p><b>GRADE 3   SCIENCE &amp; TECHNOLOGY</b><br/>Forces Causing Movement</p> <p>2.2 investigate forces that cause an object to start moving, stop moving, or change direction</p> <p>2.4 use technological problem-solving skills, and knowledge acquired from previous investigations, to design and build devices that use forces to create controlled</p> <p>3.5 identify ways in which forces are used in their daily lives</p> |   |

# TMBUK2 Education

## Grade 4 S.T.E.A.M Labs

### Community Ties (Code: G4CT)

Learners will learn about the composition of habitats and communities. They will also investigate the human impact on changing habitats and the interdependence of living and non-living things in different habitats.

**Duration:** 2-2½ hours

**Activities:** Creating pre and post human contact habitats; Food chain activities

**Requirements:**

- Up to 30 students
- 1-2 older student helpers

#### Curriculum Connections

**GRADE 4 | SCIENCE & TECHNOLOGY**  
Habitats and Communities

**GRADE 4 | THE ARTS**  
Drama

**GRADE 4 | THE ARTS**  
Visual Arts

1.1 analyse the positive and negative impacts of human interactions with natural habitats and communities (e.g., human dependence on natural materials), taking different perspectives into account (e.g., the perspectives of a housing developer, a family in need of housing, an ecologist), and evaluate ways of minimizing the negative impacts  
2.2 build food chains consisting of different plants and animals, including humans  
3.4 demonstrate an understanding of a community as a group of interacting species sharing a common habitat

B1.2 demonstrate an understanding of the element of role by selectively using a few other elements of drama (e.g., time and place; relationship; focus and emphasis) to build belief in a role and establish its dramatic context

Visual Arts  
D1.4 use a variety of materials, tools, and techniques to respond to design challenges

### Pulley and Gears (Code: G4PG)

Simple yet mighty, simple machine have been designed to assist with human activity. Learners will investigate simple machines that use pulleys and gears and identify the impact this has on the efficiency of human activities. Learners will use their knowledge of pulleys and gears to design their own simple machines.

**Duration:** 2-2½ hours

**Activities:** Design a model elevator and/or drawbridge

**Requirements:**

- Up to 30 students
- 1-2 older student helpers

#### Curriculum Connections

**GRADE 4 | SCIENCE & TECHNOLOGY**  
Pulleys and Gears

**GRADE 4 | THE ARTS**  
DRAMA

1.2 assess the environmental impact of using machines with pulleys and gears, taking different perspectives into account  
2.3 use technological problem-solving skills (see page 16) to design, build, and test a pulley or gear system that performs a specific task  
3.1 describe the purposes of pulley systems and gear systems

B1.2 demonstrate an understanding of the element of role by selectively using a few other elements of drama (e.g., time and place; relationship; focus and emphasis) to build belief in a role and establish its dramatic context

# TMBUK2 Education

## Light and Sound (Code: G4LS)

Sound is the energy we can hear; light is the energy we can see. Learners will learn about light and sound as a form of energy. They will investigate sources of light and sounds as well as explore the impact of light and sound on society and the environment.

**Activities:** Make a wave machine; phone speaker; make a diorama or periscope/kaleidoscope

**Duration:** 2-2½ hours

**Requirements:**

- Up to 30 students
- 1-2 older student helpers

### Curriculum Connections

**GRADE 4 | SCIENCE & TECHNOLOGY**

Light and Sound

- 1.2 assess the impacts on society and the environment of light and/or sound energy produced by different technologies, taking different perspectives into account
- 2.4 use technological problem-solving skills to design, build, and test a device that makes use of the properties of light (e.g., a periscope, a kaleidoscope) or sound
- 3.8 identify devices that make use of the properties of light and sound

**GRADE 4 | – THE ARTS**

Drama

B1.2 demonstrate an understanding of the element of role by selectively using a few other elements of drama (e.g., time and place; relationship; focus and emphasis) to build belief in a role and establish its dramatic context

# TMBUK2 Education

## Grade 5 S.T.E.A.M Labs

### Use the Force (Code: G5FR)

Force are the source of movement. Learners will investigate the various degree of movement created by contact and contactless forces. They will further develop their understanding on how forces act on and within structures.

**Activities:** Gravity Testing; Build a structure to withstand forces

**Duration:** 2-2½ hours

**Requirements:**

- Up to 30 students

**Additional:** If you would like students can collect the following recyclable materials to be used in this STEAM Lab:

- Cans
- Plastic bottles
- toilet/paper towel rolls

#### Curriculum Connections

##### GRADE 5| SCIENCE & TECHNOLOGY

Forces Acting on Structures and Mechanisms

- 1.2 evaluate the impact of society and the environment on structures and mechanisms, taking different perspectives into account
- 2.4 use technological problem-solving skills (see page 16) to design, build, and test a frame structure (e.g., a bridge, a tower) that will withstand the application of an external force (e.g., a strong wind or simulated vibrations from a train) or a mechanical system that performs a specific function (e.g., a building crane)
- 3.2 identify external forces acting on a structure

### ICE CREAM ... YOU CREAM! Let's all make Ice Cream! (Code: G5IC)

Ice Cream anyone? Learners will become master ice-cream makers as they create delicious ice cream without any equipment. Learns will investigate and understand the different states of matter as well as the chemical reactions that exist between ice and salt to produce and remove heat from substances.

**Activities:** make ice cream

**Duration:** 2-2½ hours

**Requirements:**

- Up to 30 students

#### Curriculum Connections

##### GRADE 5| SCIENCE & TECHNOLOGY

Properties of and Changes in Matter

- 1.2 assess the social and environmental impact of using processes that rely on chemical changes to produce consumer products, taking different perspectives into account
- 2.3 use scientific inquiry/experimentation skills (see page 12) to investigate changes of state and changes in matter
- 3.6 explain how changes of state involve the release of heat

## Sum of the Parts.... Organ Systems (Code: G5OS)

The Whole is Greater than the Sum of its Parts. This is a true reflection of the human organ systems. In this lab learners will participate in activities to understand the different organ systems in the human body and further understand the interdependence of these systems in maintain life.

**Activities:** Experiment tracking heart rate; create a model organ system (model working hand, heart, brain, lungs model)

**Duration:** 2-2½ hours

**Requirements:**

- Up to 30 students

### Curriculum Connections

GRADE 5 | UNDERSTANDING LIFE SYSTEMS HUMAN ORGAN SYSTEMS

- 1.2 evaluate the effects, both beneficial and harmful, of various technologies on human body systems, taking different perspectives into account
- 2.3 design and build a model to demonstrate how organs or components of body systems in the human body work and interact with other components
- 3.1 identify major systems in the human body

## Energy Change (Code: G5EC)

Learners will investigate and develop their understanding of renewable and non-renewable energy sources as well as learn about how energy is transformed from one form to another. Learners will engage in discussion on the importance of conservation of energy as a form of environmental sustainability.

**Activities:** Electric spinner; design a device that transforms energy (rubber band car, wind powered car or balloon powered car)

**Duration:** 2-2½ hours

**Requirements:**

- Up to 30 students

### Curriculum Connections

GRADE 5 | UNDERSTANDING EARTH AND SPACE SYSTEMS CONSERVATION OF ENERGY AND RESOURCES

- 2.3 use technological problem-solving skills to design, build, and test a device that transforms one form of energy into another
- 3.1 identify a variety of forms of energy (e.g., electrical, chemical, mechanical, heat, light, kinetic) and give examples from everyday life of how that energy is used
- 3.3 describe how energy is stored and transformed in a given device or system

# TMBUK2 Education

## Grade 6 S.T.E.A.M Labs

| Up, Up and Away (Code: G6UP)   |  |
|--|--|
| <p>Flight is one of the most remarkable achievements of humankind. But how did we manage to get these megaton metal flying giants into the air in the first place? Learn about and explore the physics of flight in this fast-paced and challenging aviation lab.</p> <p><b>Activities:</b> Double Cup flyer; Supersonic Straw rockets; Construct various paper airplanes for the purpose of competing various challenges</p>  | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>Up to 30 students</li> </ul> |
| <p><b>Curriculum Connections</b></p> <p>GRADE 6 – SCIENCE &amp; TECHNOLOGY</p> <p>Flight</p> <p>1.1 assess the benefits and costs of aviation technology for society and the environment, taking different social and economic perspectives into account</p> <p>2.4 use technological problem-solving skills to design, build, and test a flying device</p> <p>3.3 identify and describe the four forces of flight – lift, weight, drag, and thrust</p>  |  |
| Electrifying (Code: G6EL)  |  |
| <p>Electricity often comes with a negative connotation of danger. But it is also an integral component of the modern society. This lab will highlight how electricity is harnessed and used to perform important day-to-da activities.</p> <p><b>Activities:</b> Create lemon battery, a simple circuit and/or an electric spinner</p>   | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>Up to 30 students</li> </ul> |
| <p><b>Curriculum Connections</b></p> <p>GRADE 6 – SCIENCE &amp; TECHNOLOGY</p> <p>Electricity and Electrical devices</p> <p>1.2 assess opportunities for reducing electricity consumption at home or at school that could affect the use of non-renewable resources in a positive way or reduce the impact of electricity generation on the environment</p> <p>2.2 design and build series and parallel circuits, draw labelled diagrams identifying the components used in each, and describe the role of each component in the circuit</p> <p>3.6 explain the functions of the components of a simple electrical circuit</p>   |  |
| Solar System (Code: G6SS)  |  |
| <p>What better way to explore and understand the universe than to create it yourself? This lab will allow students to reconstruct our solar system with a sun that lights up.</p> <p><b>Activities:</b> create solar system over a simple circuit</p>  | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>Up to 30 students</li> </ul> |
| <p><b>Curriculum Connections</b></p> <p>GRADE 6 – SCIENCE &amp; TECHNOLOGY</p> <p>Space</p> <p>1.2 evaluate the social and environmental costs and benefits of space exploration, taking different points of view into account</p> <p>2.2 use technological problem-solving skills to design, build, and test devices (e.g., a sundial, a model of the earth’s rotation around the sun) for investigating the motions of different bodies in the solar system</p> <p>3.1 identify components of the solar system, including the sun, the earth, and other planets, natural satellites, comets, asteroids, and meteoroids, and describe their physical characteristics in qualitative terms</p> <p><b>GRADE 6 – SCIENCE &amp; TECHNOLOGY</b></p> <p>Electricity and Electrical devices</p> <p>2.2 design and build series and parallel circuits, draw labelled diagrams identifying the components used in each, and describe the role of each component in the circuit</p> <p>3.6 explain the functions of the components of a simple electrical circuit</p> |  |



# TMBUK2 Education

## Grade 7 S.T.E.A.M Labs

| If you build it... (Code: G7IF)   |  |
|---|--|
| <p>Draw bridges help to preserve multiple means of transportation. Elevators help to improve the practicality of apartment buildings. This lab will help students explore how simple and complex structures add convenience to our lives through hands on building activities.</p> <p><b>Activities:</b> Elevator; suspension tower; Suspension/draw bridge</p>   | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>● Up to 30 students</li> </ul> |
| <b>Curriculum Connections</b>   |  |
| GRADE 7 – SCIENCE & TECHNOLOGY  |  |
| Form and Function   |  |
| <p>1.1 assess the benefits and costs of aviation technology for society and the environment, taking different social and economic perspectives into account</p> <p>2.4 use technological problem-solving skills to design, build, and test a flying device</p> <p>3.3 identify and describe the four forces of flight – lift, weight, drag, and thrust</p> <p>3.6 identify and describe factors that can cause a structure to fail</p>  |  |
| Ecosystems and Habitats (Code: G7EH)  |  |
| <p>How might the ocean look without phytoplankton? How might our land look if humans not settled on it? These are some of the guiding questions that encourage students to examine ecosystems with a critical lens.</p> <p><b>Activities:</b> create ecosystems using various materials to highlight pre and post impact of different organisms</p>   | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>● Up to 30 students</li> </ul> |
| <b>Curriculum Connections</b>   |  |
| GRADE 7 – SCIENCE & TECHNOLOGY  |  |
| Interactions in the Environment   |  |
| <p>1.1 evaluate the importance for individuals, society, the economy, and the environment of factors that should be considered in designing and building structures and devices to meet specific needs</p> <p>2.2 design, construct, and use physical models to investigate the effects of various forces on structures</p>   |  |
| Solutes, Solvents and Solutions (Code: G7SO)  |  |
| <p>From the naked eye water often looks pure, but how can we know for certain that the water we are looking is free of any substances. This lab will have students explore saturation and filtration through hands on activities.</p> <p><b>Activities:</b> investigate solute and solvent mixtures and/or create and test water filtration system</p>  | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>● Up to 30 students</li> </ul> |
| <b>Curriculum Connections</b>   |  |
| GRADE 7 – SCIENCE & TECHNOLOGY  |  |
| Pure Substances and Mixtures  |  |
| <p>1.2 assess the impact on society and the environment of different industrial methods of separating mixtures and solutions</p> <p>2.3 investigate processes used for separating different mixtures</p> <p>3.5 describe the processes (e.g., evaporation, sifting, filtration, distillation, magnetism) used to separate mixtures or solutions into their components, and identify some industrial applications of these processes</p> |  |

# TMBUK2 Education

## Grade 8 S.T.E.A.M Labs

| Cells (Code: G8CE)  |  |
|---|--|
| <p>This lab will introduce learners to the cell theory. They'll then take that information to observe and construct 3D cell models.</p> <p><b>Activities:</b> Build model cells</p>   | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>• Up to 30 students</li> <li>• Projector and screen</li> </ul> |
| <p><b>Curriculum Connections</b></p> <p>GRADE 8 – SCIENCE &amp; TECHNOLOGY</p> <p>Cells</p>   |  |
| <p>1.1 assess the role of selected technologies (e.g., the development of the electron microscope, the ability to infuse dyes into cells, in vitro fertilization) in enhancing our understanding of cells and cellular processes</p> <p>2.2 use a microscope correctly and safely to find and observe components of plant and animal cells</p> <p>3.2 identify structures and organelles in cells, including the nucleus, cell membrane, cell wall, chloroplasts, vacuole, mitochondria, and cytoplasm, and explain the basic functions of each</p> |  |

| Hydraulic and Pneumonic Work (Code: G8HP)   |  |
|---|--|
| <p>This lab will allow students to explore the properties of fluids and how they can be used to ease work and create mechanical advantages.</p> <p><b>Activities:</b> Build an elevator; build a mechanical arm for grabbing and/or lifting a load</p>  | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>• Up to 30 students</li> <li>• Projector and screen</li> </ul> |
| <p><b>Curriculum Connections</b></p> <p>GRADE 8 – SCIENCE &amp; TECHNOLOGY</p> <p>Fluids</p>  |  |
| <p>1.1 assess the social, economic, and environmental impacts of selected technologies that are based on the properties of fluids</p> <p>2.6 use technological problem-solving skills (see page 16) to design, build, and test devices that use pneumatic or hydraulic systems</p> <p>3.4 explain the difference between liquids and gases in terms of their compressibility (e.g., gases are more compressible than liquids) and how their compressibility affects their usage</p> |  |

| Density Does It (Code: G8DE)   |  |
|--|--|
| <p>From buoyancy to viscosity, this lab will allow students to investigate the various properties of fluids with the goal of applying their understanding to complete various fluid experiments.</p> <p><b>Activities:</b> Ooblek; Create a density tower and lava lamp</p>  | <p><b>Duration:</b> 2-2½ hours</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>• Up to 30 students</li> </ul> |
| <p><b>Curriculum Connections</b></p> <p>GRADE 8 – SCIENCE &amp; TECHNOLOGY</p> <p>Fluids</p>   |  |
| <p>1.1 assess the social, economic, and environmental impacts of selected technologies that are based on the properties of fluids</p> <p>2.3 investigate and compare the density of a variety of liquids</p> <p>3.3 explain the difference between solids, liquids, and gases in terms of density, using the particle theory of matter</p> |  |