



## LEGO™ Education Program

### Overview

The Bruce County Museum & Cultural Centre has lots of LEGO™! During this hands-on program, students will create with LEGO to respond to design challenges. Following the steps of the design process, students will work in small groups using their problem solving skills and creativity. This program is delivered with an emphasis on growth-mindset and celebrates the variety of strengths, gifts and ideas that exist in the classroom. Every design challenge connects to “Understanding Structures and Mechanisms” or “Understanding Matter and Energy” (for grade 6).

### Activities

#### Introductory Discussion

For kindergarten our introduction discussion focuses on the features of the bricks (shapes, colours), the basics of connecting bricks together, and how everyone has different ways to solve problems. We talk about what teamwork looks, sounds and feels like and then dive right in to the Tall Tower challenge.

For all other grades, we discuss what STE(A)M is (science, technology, engineering, art, math) and make real world connections to how people use STEAM in everyday life. Students will collaboratively review the design process as it relates to problem solving for an engineering challenge. After an introduction to the materials they will be using, students are then given a building challenge to complete using the design process with a small team.



## **Sample design challenges/themes:**

### **Tall Towers**

Students will begin with a discussion about the types of structures that help cities deal with having so many people live in there. After a quick demonstration using their bodies to learn about stability, students will work in teams to create a tall tower completely out of LEGO™ that can withstand an earthquake (shaking table). If there is time we do some estimating with standard or non-standard units of measurement and then measure the towers.

### **Egg Drop**

Like a team airdropping emergency supplies to a community during a disaster, teams of students will each create a structure or system out of LEGO, felt, popsicle sticks, and rubber bands with the goal of keeping an egg from breaking when it is dropped.

### **Simple Machines**

The Museum has Simple Machines LEGO™ Education Kits! Combine free exploration of these kits with another building challenge, or let students respond to a building challenge that requires the use of pulleys, gears, or levers. This activity is recommended for grades 4 and up.

### **NEW! Little Bits Circuitry and Inventions**

This new challenge features our Little Bits kits, a modular platform of easy-to-use electronic building blocks empowering everyone to create inventions. After examining some of the inventions that have shaped Bruce County, and then teams of students will design an invention of their own using LEGO and the kits.

## **Conclusion**

The last step in the design process is to share the knowledge we have gained. The teams of students will share their creation with the rest of the class, discussing their design process and how their design might have changed as they ran into challenges. Each team will test their creation after sharing with the class.

## **Curriculum Expectations**

### **Grade One**

#### ***Understanding Structures and Mechanisms - Materials, objects, and everyday structures***

- 2) Investigate structures that are built for a specific purpose to see how their design and materials suit the purpose

3) Demonstrate an understanding that objects and structures have observable characteristics and are made from materials with specific properties that determine how they are used.

## **Grade Two**

### ***Understanding Structures and Mechanisms - Movement***

- 2) investigate mechanisms that include simple machines and enable movement.
- 3) demonstrate an understanding of movement and ways in which simple machines help to move objects.

## **Grade Three**

### ***Understanding Structures and Mechanisms - Strong and stable structures***

- 1) Assess the importance of form, function, strength, and stability in structures through time.
- 2) Investigate strong and stable structures to determine how their design and materials enable them to perform their load-bearing function.
- 3) Demonstrate an understanding of the concepts of structure, strength, and stability and the factors that affect them.

## **Grade Four**

### ***Understanding Structures and Mechanisms - Pulleys and Gears***

- 2) Investigate ways in which pulleys and gears modify the speed and direction of, and the force exerted on, moving objects.
- 3) Demonstrate an understanding of the basic principles and functions of pulley systems and gear systems.

## **Grade Five**

### ***Understanding Structures and Mechanisms - Forces Acting on structures and mechanisms***

- 2) investigate forces that act on structures and mechanisms.
- 3) identify forces that act on and within structures and mechanisms, and describe the effects of these forces on structures and mechanisms.

## **Grade 6**

### ***Understanding Matter and Energy - Electricity and Electrical Devices***

- 2) investigate the characteristics of static and current electricity, and construct simple circuits;
- 3) demonstrate an understanding of the principles of electrical energy and its transformation into and from other forms of energy