

STEM CAMP

# PARENTS GUIDE TO ACTIVITIES

What will your child be doing this summer at STEM Camp?

...and why?

...and how?

...and why do we do it that way?



Introducing...

# THE STEM CAMP PHILOSOPHY

- **STEM Camp believes in the power of curiosity and wonder**
- **STEM Camp believes that children need to explore the world around them**
- **STEM Camp believes that curious kids become confident, creative adults, who can think critically and help change the world**

STEM Camp provides learning experiences through fun, engaging programming that encourages children to explore their sense of wonder. Children are introduced to hands-on, engaging STEM activities that promote discovery, reward curiosity, and leave children amazed at what they can do.

STEM Camp encourages a child's curiosity and sense of wonder, and inspires them to explore and learn about the world around them.

Our philosophy is to give children a problem, some materials, and let them figure out multiple solutions to a problem. We don't believe in step by step instruction and we do believe that STEM is not just technology and robots - it's an approach to problem-solving and critical thinking

At STEM Camp...

- there is something new and cool to discover every day
- activities and projects are based on things you know and love (robots, space, non-newtonian fluids, etc.)
- you can try things yourself. Work in pairs or a small group. Make a mess. Clean up. Make a mess again. Have fun.
- you will work on fun projects and make new friends

Why do we do it this way?

It is important for children to develop critical thinking, problem solving skills early in life. At STEM Camp we believe campers should be provided with some tools to help figure out problems but then use their imagination and skills to actually solve the problem. More than one solution can usually be found and it is okay if you need to change a design or start again!

# WHAT DOES A WEEK AT STEM CAMP LOOK LIKE?

TIME	MONDAY TO FRIDAY
8:00am	Before Care Begins: 8:00am-8:30am (Additional \$5.00 per day)
8:30am to 9:00am	Campers arriving prior to the start of programming will be engaged in a game or activity
9:00am to 10:15am	STEM Activity
10:15am to 11:00am	Snack and Movement Break
11:00am-12:15pm	STEM Activity
12:15pm to 1:15pm	Campers Lunch and Movement Break
1:15pm to 2:30pm	Afternoon Electives: Campers have the opportunity to rotate between 3-4 different activities based on their interests.
2:30pm to 3:15pm	Snack and Movement Break
3:15pm to 3:45pm	Afternoon Electives Continued
3:45pm to 4:00pm	Clean up and prepare campers for home time
4:00pm to 4:30pm	Campers staying past the time of regular programming will be engaged in a game or activity
4:30pm to 5:00pm	After Care Begins: 4:30pm-5:00pm (Additional \$5.00 per day)

Discover...

# STAR WARS WEEK

Robotics will be featured this week in such activities as “Programming an Edison (small robot) to help the Jedi” while campers will also enjoy STEM activities such as designing their own Millennium Falcon from simple materials, protecting space with the Naboo N-1 Starfighter, Levitating Objects using The Force and working with Molten Lava Slime. There are also some activities focussing on engineering by building rocket launchers, robotic arms and pod racing. Boys and girls will have tons of FUN this week but enrol early for this one as it traditionally sells out!



# PROTECT SPACE WITH THE NABOO N-1 STARFIGHTER

**Activity:** Learn about basic programming language while protecting the skies in your Starfighter

**Why are we doing this activity?** To expand on campers critical thinking and problem solving abilities while introducing basic programming language and coding concepts.

**How are we doing this activity?** Campers will learn basic coding skills and have a robot (Naboo N-1 Starfighter) follow a simple command. Campers with coding experience design a space scene and have their Starfighter coded to miss obstacles.



# BUILD AN RPS-6 ROCKET LAUNCHER

**Activity:** Learn about the importance of stability in flight by launching camper made rockets with air compression.

**Why are we doing this activity?** To engage campers through the engineering design process with respect to stability and flight. Campers will consider variables such as wind and angle measurements.

**How are we doing this activity?** Campers will each build rockets from simple materials. Older campers will be responsible for building and operating the launch pad.



# BUILD YOUR OWN ROBOTIC ARM

**Activity:** Learn about the importance of structures and mechanisms by building a robotic arm from simple materials.

**Why are we doing this activity?** To engage campers through mathematics and technology while encouraging them to apply algebraic and physical principals to their robotic arm.

**How are we doing this activity?** Campers will build their own robotic arm and complete various challenges to test their design. Older campers will face more difficult challenges and must include measurement in their design.



# EXPERIMENT WITH ANA-KIN'S POD RACER

**Activity:** Learn about the principles of force and motion while pod racing.

**Why are we doing this activity?** To encourage campers to apply elements of mathematics to discover how different variables influence the speed of our pod racers. Campers will take track angle and surface texture into consideration.

**How are we doing this activity?** Campers will create a series of test tracks for their pod racer while developing their own hypothesis. Older campers will record their findings in a data table and learn to calculate velocity.





# CAN YOU MAKE A LIGHTSABER?

**Activity:** Learn about electricity and circuits while using your lightsaber to deflect incoming blaster bolts.

**Why are we doing this activity?** To create a simple circuit and learn about electron movement.

**How are we doing this activity?** Campers will identify the components of a circuit before building their own lightsaber complete with energy source, conductor, electrical load and switch. Older campers will apply their knowledge to new concepts such as Ohm's Law.

Be amazed by...

# MINECRAFT

# WEEK

Watch out for the Hostile Spider! But you don't need to worry. If you come this week you will learn how to build a STEM-based web to catch it! If you prefer to not be one of the 'good guys', you can design your own Creeper pin and wreak havoc inside your own Minecraft world of imagination. Other activities this week include a Grass Block Challenge, Minecraft Swamps, TNT, Mine Carts, Cannons and much more. Something new and cool to discover every day!



# PARACHUTE MOD

**Activity:** Design a working parachute using limited supplies and test your design against different variables.

**Why are we doing this activity?** To encourage campers to apply elements of mathematics and science to discover how different variables influence the success of their parachute. Campers will take probability, flight knowledge and their understanding of structures and mechanisms into consideration.

**How are we doing this activity?** Campers will design and build their own parachute and release system. Their designs will be tested and observations will be recorded. Older campers will learn concepts such as data correlation and air resistance.



# READY, SET, MINECRAFT WORLD AMUSEMENT PARK

**Activity:** Learn about Gravitational Force, Kinetic Energy and Potential Energy while showing off your STEM Skills and having fun creating your own Minecraft amusement park.

**Why are we doing this activity?** To engage campers through mathematics and the engineering design process with respect to geometry, spatial sense and understanding structures and mechanisms.

**How are we doing this activity?** Campers will create their own amusement park ride or work in a small group if preferred. All camper attractions will be combined to form an amusement park. Campers will calculate the height and speed of each ride. Older campers will be challenged to find the greatest potential energy in the amusement park.



# SOLAR OVEN S'MORES

**Activity:** Learn about the concept of Solar Energy and use your knowledge to design and build a working solar oven capable of making s'mores.

**Why are we doing this activity?** To expand on campers knowledge of matter and energy as well as develop data management, patterning and observation tracking skills.

**How are we doing this activity?** Campers will brainstorm various design ideas and build solar ovens in small groups. Campers will need to record time, temperature and any observations in a chart for group discussion. Older campers will learn to graph temperature as a function of time on a scatterplot, study their collected data and discuss concepts such as rate of change, calculating averages and linear temperature changes.



# ULTIMATE TOWER CHALLENGE

**Activity:** Campers will build a tower with limited materials in a set amount of time testing their knowledge of stable structures and spatial sense.

**Why are we doing this activity?** To have campers build a tower making observations about what makes structures strong and stable.

**How are we doing this activity?** In this timed challenge, using simple materials camper will have to create the tallest free-standing tower. Older campers will create their own blueprints before constructing their tower as well as find the average, largest and smallest tower height.



# MINECRAFT SWAMPS

**Activity:** Learn about the concept of particle attraction and viscosity by creating your own slime.

**Why are we doing this activity?** To encourage campers to apply elements of measurement and chemistry to make a viscous substance using materials provided. To test campers knowledge of temperature influences, particle attraction and to engage campers in a discussion on the different properties of their slime. Campers will take stretch, stickiness, viscosity, etc. into consideration.

**How are we doing this activity?** Campers will be given access to various materials and different sizes of measuring cups. Without a recipe, campers will need to determine the appropriate quantities of each ingredient needed to make slime found in Minecraft swamps. Older campers will be asked to document their observations and share their findings with other campers. Please note: This activity uses 1/2 teaspoon of borax.

Have fun at...

# SUPER HEROES WEEK

Have you ever wondered if you have Superhero DNA? Come to this week and find out! While at STEM Camp you can Catch a Super Villain, build your own Bat Cave, learn about Superhero strength and build your own BatMobile. Superheroes that we will focus on this week include Wonder Woman, The Flash and Batman. Come dressed as your favourite Superhero and make tools and gadgets that a Superhero may use. Your super power is your curiosity!

Personally, we think Moms and Dads are the unsung Superheroes of today by helping their kids with homework, driving them to early morning practices, making sure they have lunches and making sacrifices so their kids can have things in life (like a week at STEM Camp!).





# DO YOU HAVE A SUPER HERO DNA?

**Activity:** Learn about the principles of structures and life systems while creating a DNA model.

**Why are we doing this activity?** To have campers discover different bonding patterns to discover how different patterns determine different elements of our DNA such as hair colour, eye colour, and even behaviour and mannerisms. Campers will take chemical base pairs such as Adenine, Thymine, and Cytosine, Guanine into consideration.

**How are we doing this activity?** Using simple materials to represent the backbone and chemical bases of your DNA model, campers will assemble their models based on specific DNA sequences. Older campers will be challenged with specific sequences and asked to build a model that reflects the sequence given. Each camp will build one large model and each camper will build their own individual models.



# BUILD AN ANEMOMETER FOR WONDER WOMAN

**Activity:** Learn about the importance of earth and space systems by building an anemometer to measure air current for Wonder Woman.

**Why are we doing this activity?** Build an instrument to accurately measure wind speed.

**How are we doing this activity?** Campers will each build anemometers from simple materials. Older campers will be challenged with calculating the velocity of the wind.



# ROBOT CITY RESCUE MISSION

**Activity:** Learn about programming and robotics through barcode scanning while Edison helps you with your rescue mission.

**Why are we doing this activity?** To expand on campers critical thinking and problem solving abilities while introducing basic programming language and coding concepts.

**How are we doing this activity?** Campers will create a road map that Edison can navigate and must include a barcode containing instructions for Edison to follow in order to complete the mission. Older campers will be challenged with their own mission and using advance functions of the Edison robot.



# SUPER HERO ZIP LINE

**Activity:** Learn about the importance of structures and mechanisms by creating a zip line that can quickly transport objects from one location to another.

**Why are we doing this activity?** To expand on campers critical thinking and problem solving abilities while taking the engineering design process into consideration.

**How are we doing this activity?** Camper will design and build a system that can carry a ping pong ball from the top of a zip line rope to the bottom. Campers will be challenged to make a series of test lines out of different materials, carrying different weights and asked to discuss their findings. Older campers will be given timed challenges and given the opportunity to develop a system tip the zip line bucket at the end of the course, dropping their object on a target.



# BUILD YOUR OWN BATCAVE

**Activity:** Use Makedo materials to design and build Batman's secret headquarters.

**Why are we doing this activity?** To encourage campers to apply elements of mathematics and engineering.

**How are we doing this activity?** Campers will create a technical drawing and build their Batcave following blueprints and using a variety of materials.

Be inspired at...

# TRANSFORMERS WEEK

On no! Bumblebee lost his hand in a battle with the Decepticons and we need campers to help develop a new one for him! Can you help? If you come this week you can. While you are there you can help Optimus Prime escape the Decepticons by building a STEM-powered boat and/or a Propeller-Powered Autobot Vehicle while avoiding corrosive slime that you created. Since you are now a valued member of the Autobot Team you will also develop your own personalized Transformer Insignia! Coding, using Ozobots, will also be featured this week as part of our robotics unit. Your child will be amazed by the world of STEM!



# BUILD A PROTECTIVE SHIELD FOR OPTIMUS PRIME

**Activity:** Learn about the concept of viscosity and how it changes with different ingredient ratios by seeing which campers can create the strongest shield for Optimus Prime.

**Why are we doing this activity?** To encourage campers to apply elements of measurement and chemistry to make a viscous substance using materials provided. To test campers knowledge of temperature influences, particle attraction and to engage campers in a discussion on the different properties of their bubbles. Campers will take temperature, wind and humidity into consideration.

**How are we doing this activity?** Campers will be given access to various materials and different sizes of measuring cups. Creating their own recipe, campers will need to determine the appropriate quantities of each ingredient needed to make the strongest bubble shield for Optimus Prime. Older campers will be asked to document their observations and share their findings with other campers.



# GEAR UP FOR A TOUGH CHALLENGE

**Activity:** Learn about gears and how they work by creating your own and combining them into a complete gear and pulley system.

**Why are we doing this activity?** To encourage campers to apply elements of structures and mechanisms together with concepts of data management and probability to create gears and pulleys that interact when placed in sequence.

**How are we doing this activity?** Using simple materials, campers will build their own gears and pulleys and team up with other campers to test their design. Older campers will face more difficult challenges such as creating compound gears and designing a working elevator.





# CREATE YOUR OWN TRANSFORMERS INSIGNIA

**Activity:** Learn about the principles of patterning and algebra while creating your own Transformers insignia.

**Why are we doing this activity?** To encourage campers to apply elements of patterning, geometry and melting points.

**How are we doing this activity?** Campers will develop a design for their insignia and will be provided with an assortment of perler beads to recreate their design. Older campers will be challenged with various restrictions such as size limit or bead limit and must plan to overcome these challenges.



# CAN YOU TRANSFORM WHITE LIGHT?

**Activity:** Learn about the science behind changing coloured light into white light. Discover what white light really is!

**Why are we doing this activity?** To expand on campers understanding light absorption and refraction.

**How are we doing this activity?** Campers will each build a colour wheel from simple materials and experiment with their flashlights to try and create white light. Campers will walk through a series of discussion questions where they will share their observations and conclusions.



# DESIGN OPTIMUS PRIME'S HELMET

**Activity:** Learn about the important components of the human brain and the engineering design process to create the best helmet for Optimus Prime.

**Why are we doing this activity?** To discuss safety of the brain in simple terms and build a helmet to protect Optimus Prime. This activity has components of budgeting dollars for campers capable of the challenge. Campers will consider variables such as design, implementation and budget.

**How are we doing this activity?** Campers will discuss the human brain and its importance before using simple materials within their set budget to create the perfect helmet for Optimus Prime. Campers will be given the opportunity to reflect upon their design, make any changes and try again.



**SEE YOU NEXT SUMMER!**