

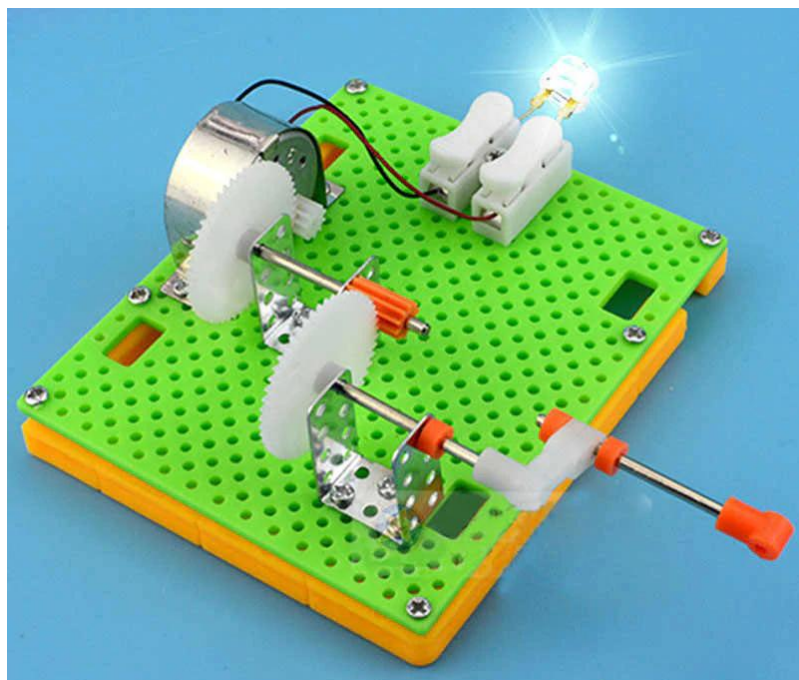
B01 – B03

STEM Hands-on Experiments

Activity/Experiment title:	Electromagnetism
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p>To demonstrate the experiments of the physics of electromagnetism</p> <p>Lorentz force is the force exerted on a moving charge of current by a magnetic field. The force provides the rotating torque that turn the conductor coils that are placed in between two opposite magnetic poles of in the motor.</p> <p>In electromagnetic induction, the Faraday's Law says that the an induced emf can be produced in the conductor coils if there is a change of magnetic flux through the coils while the Lenz's Law tells that the emf would be in such direction as to oppose the change of magnetic flux. When the generators are turned (by electric motor or manually), the its internal coils that are placed in between opposite magnetic poles experience changing magnetic flux and thus this sets up an induced emf that lighten up the external LED.</p> <p><u>Electric Motor – Generator</u></p> <ol style="list-style-type: none">1. Turn on the switch of the electric motor.2. Observe and explain to visitors the Lorentz force that rotate the electric motor.3. Observe and explain to visitors the Faraday's Law and Lenz's Laws that provide the induced electric current to the LED in the generator. 

Manual Induction Generator

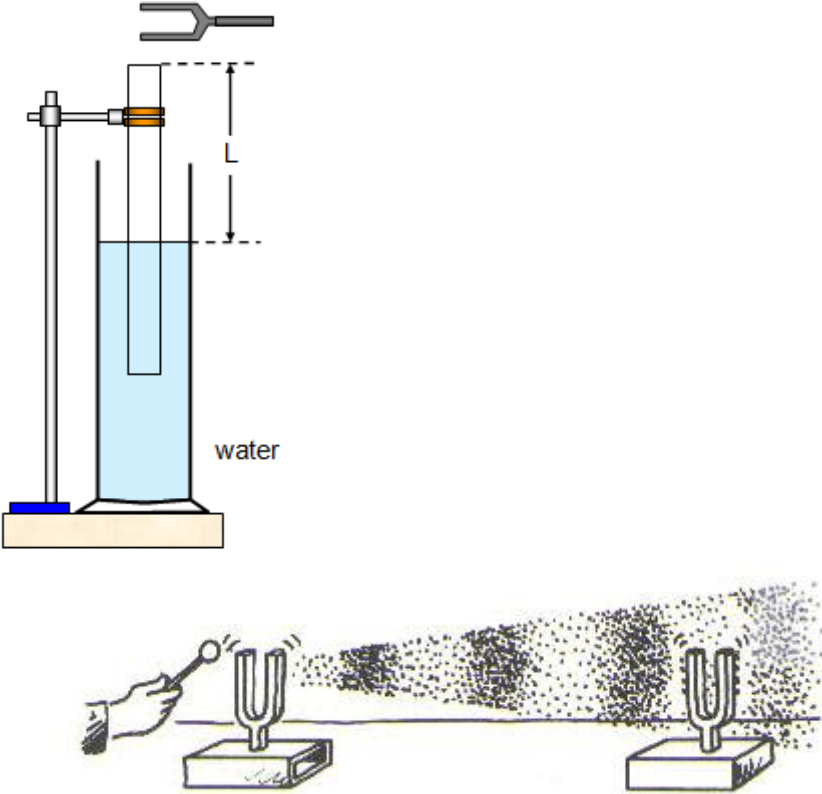
1. Rotate the lever of the generator manually.
2. 3. Observe and explain to visitors the Faraday Law and Lenz Laws that provide the induced electric current to the external LED in the generator.



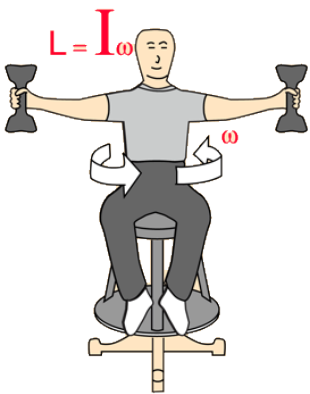
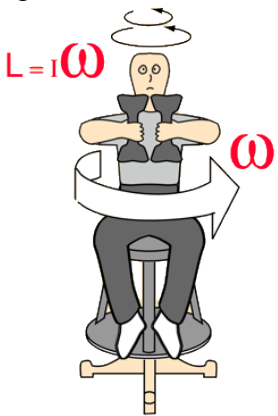

Time frame:

15 min




STEM Hands-on Experiments

<p>Activity/Experiment title:</p>	<p>Resonance</p>
<p>Activity owner: (Name of School/ Institution/University/Organization)</p>	<p>Centre for Foundation Studies (Kampar Campus)</p>
<p>Description of activity/experiment: (objective, content, etc)</p>	<p>To demonstrate the resonance in fixed end string and tuning fork</p> <p>An object free to vibrate tends to do so at a specific rate called the object's natural, or resonant, frequency. (This frequency depends on the size, shape, and composition of the object.) Such an object will vibrate strongly when it is subjected to vibrations or regular impulses at a frequency equal to or very close to its natural frequency. This is the phenomena of resonance.</p> <ol style="list-style-type: none"> 1. The speaker is connected to frequency generator. 2. Place the speaker near the tuning fork and adjust the frequency until the tuning fork starts to resonate. 3. Lightly knock the tuning fork and place it near the open end of the air column (in graduated cylinder) to listen to the resonance. 4. Lightly knock the tuning fork and place it near another tuning fork to observe resonance in the second tuning fork. 
<p>Time frame:</p>	<p>15 min</p>

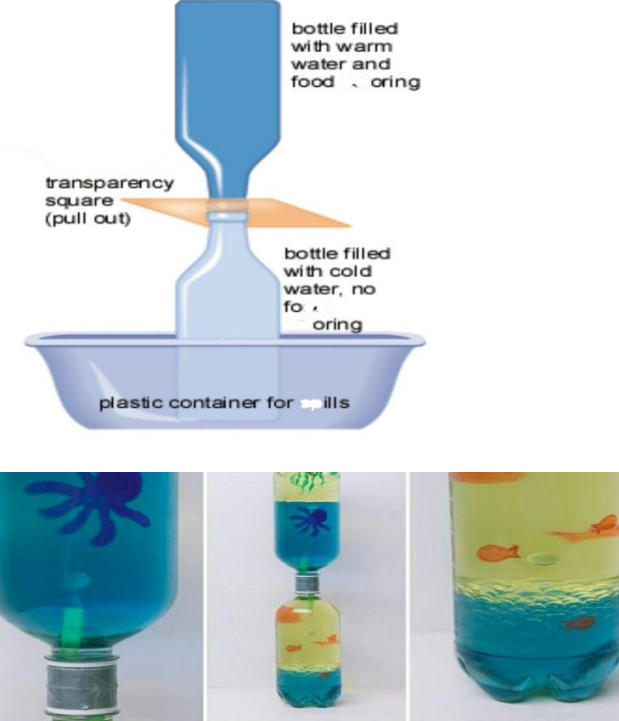
STEM Hands-on Experiments

<p>Activity/Experiment title:</p>	<p>Angular Momentum</p>
<p>Activity owner: (Name of School/ Institution/University/Organization)</p>	<p>Centre for Foundation Studies (Kampar Campus)</p>
<p>Description of activity/experiment: (objective, content, etc)</p>	<p>To demonstrate the conservation of angular momentum and the application of angular momentum in real life</p> <p>Conservation of angular momentum is a physical property of a spinning system such that its spin remains constant unless it is acted upon by an external torque; put another way, the speed of rotation is constant as long as net torque is zero.</p> <ol style="list-style-type: none"> 1. Participant is to be seated on the bar swivel stool with each of their hands holding a dumbbell. 2. The participant will be asked to extend his hands out and fold his hand in front of his chest when he is set to rotate on the swivel stool to experience the change in the angular speed. 3. After that, the participant will be asked to hold a bicycle wheel. 4. A electric drill will be used to spin the bicycle wheel. 5. Once the bicycle wheel is spinning, the participant can change to orientation of the bicycle to experience the effect due to conservation of angular momentum. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="text-align: center; margin-top: 20px;">  </div>
<p>Time frame:</p>	<p>15 min</p>

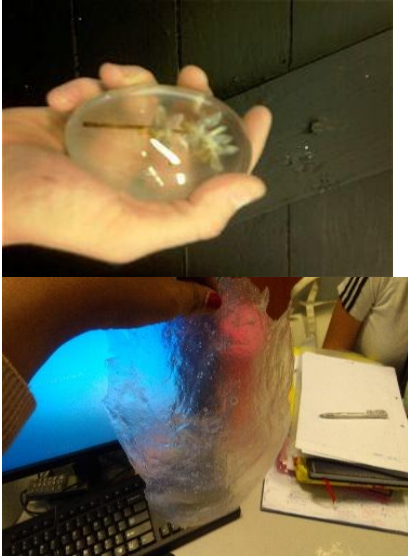
(B) STEM Hands-on Experiments

Activity/Experiment title:	Chemical Bell Peppers
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p>To observe redox reactions in alkaline solution.</p>    <p>Swirl the solution to see all the three traffic light colours.</p>
Time frame:	±20 minutes

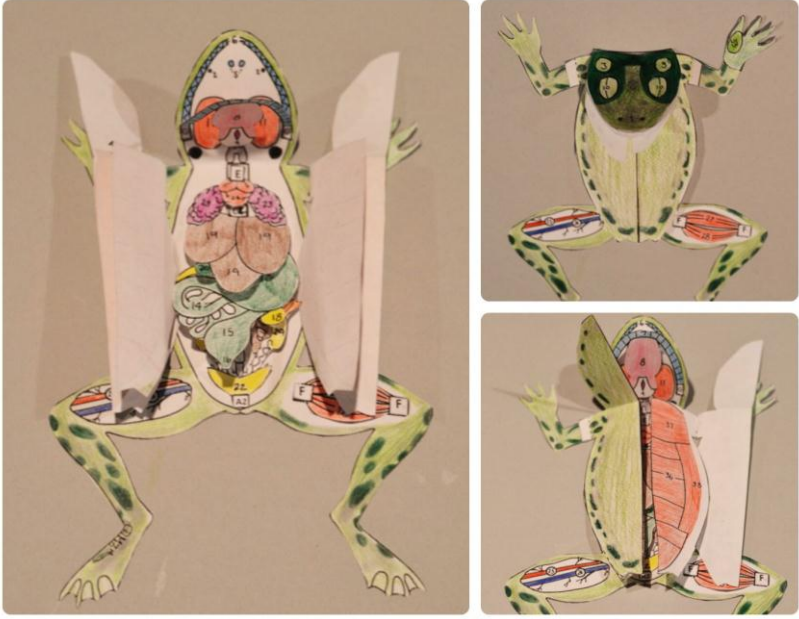
(B) STEM Hands-on Experiments

<p>Activity/Experiment title:</p>	<p>Antigravity Moving Colours Magic</p>
<p>Activity owner: (Name of School/ Institution/University/Organization)</p>	<p>Centre for Foundation Studies (Kampar Campus)</p>
<p>Description of activity/experiment: (objective, content, etc)</p>	<p>To observe heat transfer using different temperatures of water.</p>  <p>Let the hot water from lower glass to flow against the gravity through the CD to fill up into the upper glass. Add oil into the hot coloured water to give an attractive impact.</p>
<p>Time frame:</p>	<p>±20 minutes</p>


STEM Hands-on Experiments / Demo

Activity/Experiment title:	Homemade Biodegradable Plastic
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p>Now there are a lot of products made out of plastics and plastics are made of non-biodegradable polyethene which remains on Earth's surface area for thousands of years causing unwanted pollution. This homemade biodegradable plastic is a plastic that decomposes naturally in the environment. This is achieved when microorganisms in the environment metabolize and break down the structure of biodegradable plastic. Thus the biodegradable plastic made of flour is harmless to the environment compared to the traditional plastics. This activity is to show the steps on how to make biodegradable (environment friendly) plastic with simple ingredients and methods at home.</p> 
Time frame:	±15 minutes


STEM Hands-on Experiments

Activity/Experiment title:	Paper Dissection of Vertebrates
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p>This workshop enables the participants to experience dissection without sacrificing animals.</p>  <p>The image displays three paper dissection models of a frog, illustrating the internal anatomy. The largest model on the left shows a dorsal view with the body open, revealing internal organs such as the lungs, liver, stomach, and intestines, which are color-coded and labeled with numbers (1-22) and letters (A, B, C, D, E, F). The two smaller models on the right show the frog from a ventral perspective, highlighting the mouthparts, throat, and the arrangement of the legs and feet.</p>
Time frame:	±30 minutes


STEM Hands-on Experiments

Activity/Experiment title:	Forensics: Blood spatter experiments
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p>The size and shape of blood droplets tell detectives quite a bit about how the person lost the blood. From blood spatter, detectives can determine how crimes are committed. This experiment demonstrates the principles behind blood spatter patterns analysis.</p> 
Time frame:	10 – 15 minutes


STEM Hands-on Experiments

Activity/Experiment title:	Mock Crime Scene
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p>A mock crime scene was created with various evidences to be collected and analyzed to link to the murder weapon and the perpetrator of the particular crime. Students will able to think out of box and use various bio-chemical techniques to solve the puzzle regarding the mock crime scenes.</p> 
Time frame:	±30 minutes

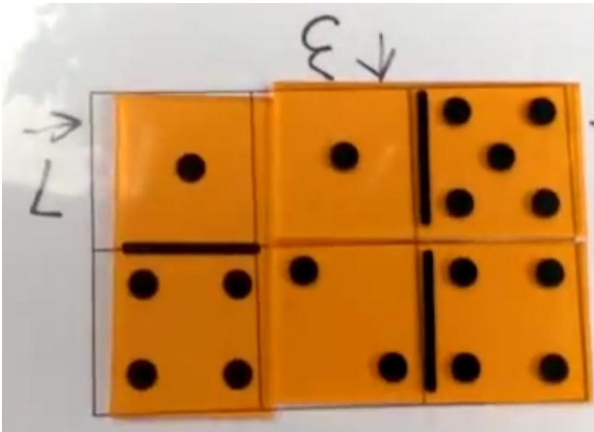
STEM Hands-on Experiments / Demo

Activity/Experiment title:	Gummy Bear Osmosis Experiment
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p>Osmosis is the spontaneous net movement of solvent molecules through a selectively permeable membrane into a region of higher solute concentration, in the direction that tends to equalize the solute concentrations on the two sides. The activity is to demonstrate and simulate the osmosis process and its effects on cells and tissues.</p> 
Time frame:	±30 minutes

(B) STEM Hands-on Experiments / Demo

<p>Activity/Experiment title:</p>	<p>Immortal vegetables</p>
<p>Activity owner: (Name of School/ Institution/University/Organization)</p>	<p>Centre for Foundation Studies (Kampar Campus)</p>
<p>Description of activity/experiment: (objective, content, etc)</p>	<p>Many animals and plants regenerate tissues or even whole organs after injury. Typically, specialized cells at the wound site revert to a ‘pluripotent’ state–via a process called dedifferentiation; which means they regain the ability to develop into the various cell types required for regeneration. This demo is to demonstrate the ability of vegetables to regenerate themselves and the molecular underpinnings behind this ability.</p> 
<p>Time frame:</p>	<p>±10 minutes</p>

STEM Hands-on Experiments

Activity/Experiment title:	Math puzzles
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p><u>Objective:</u> To stimulate students' creative mind in formulating shape and constraints</p> <p><u>How to play:</u> A player will be given different shape of puzzles with labeled numbers 1 – 6 and player has to arrange those puzzles on the board to satisfy the constraint stated on row/column on the board.</p> 
Time frame:	5 minutes

STEM Hands-on Experiments

Activity/Experiment title:	Math scrabble game
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<u>Objective:</u> To stimulate students' creative in constructing equation <u>How to play:</u> 2 – 4 players required and players earn points by constructing equation with numbers and mathematics operators and placing them on a grid board.
Time frame:	10 minutes

STEM Hands-on Experiments


Activity/Experiment title:	Who got the least?
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<u>Objective:</u> To exercise on basic mathematical operations with apply to real life applications. <u>How to play:</u> <ol style="list-style-type: none">1. All player will be given a card written with different amount.2. Players will be given 1 minute to think and decide how to spend the amount given on purchasing the display items.3. The player with the least amount balance wins the game.
Time frame:	8 minutes

STEM Hands-on Experiments

Activity/Experiment title:	Total 9
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p><u>Objective:</u> To learn the utilisation of simple addition operator and numbers memorization the fun and strategic ways.</p> <p><u>How to play:</u></p> <ol style="list-style-type: none"> 1. 3 to 4 players needed and each will be given 4 numbered cards. 2. Players take turns dealing a card out and add up the number on the card with the previous dealt cards. 3. On whoever's turn, if the dealt card number added up more than 9 loses.
Time frame:	5 minutes

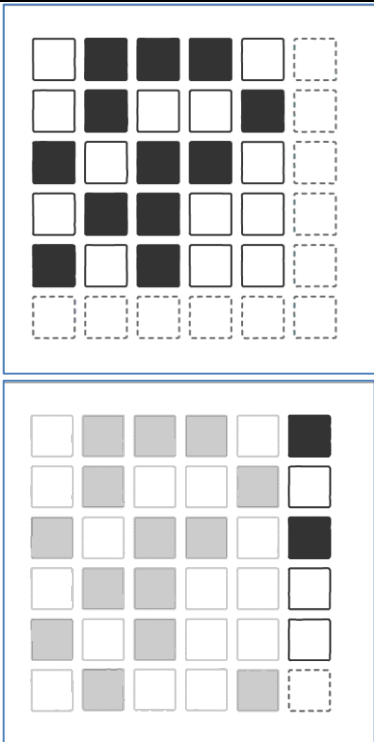
STEM Hands-on Experiments

Activity/Experiment title:	Code the Way
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p><u>Objective:</u> To learn how to write, test, and fix algorithmic instructions.</p> <ol style="list-style-type: none"> 1. Set up a board with grids and place a few figurines on the grid as obstacles. 2. Choose a starting location for a figurine. 3. Choose a location for the second figurine. 4. Write out the instructions for the first figurine to reach the second figurine by using the directional cards. The player is encouraged to write the shortest path to reach the second figurine. 5. Test the instructions using the first figurine. If the first figurine could not reach the second figurine, amend the instructions and test them again.

	
Time frame:	15 minutes

(B) STEM Hands-on Experiments

Activity/Experiment title:	Parity Magic
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p>Objective: To learn how to identify error by using parity check.</p> <ol style="list-style-type: none"> 1. Make a grid of 5 by 5 of black and white cards with random patterns. 2. Place an extra row and column to even the numbers of black and white cards. 3. Flip a card to make the 'error'. 4. Detect the flipped card and correct the error.

	
Time frame:	15 minutes

(B) STEM Hands-on Experiments

Activity/Experiment title:	IoT LED Acrylic Sign
Activity owner: (Name of School/ Institution/University/Organization)	Centre for Foundation Studies (Kampar Campus)
Description of activity/experiment: (objective, content, etc)	<p>Objective: To introduce the usage of Internet of Things by using the application of smartphone to control the LED light.</p> <ol style="list-style-type: none"> 1. Design a Logo and carve it into the acrylic sheet using engraving pen. 2. Make a base for LED light strip to sit on. 3. Add a frame to the base to hold the sign. 4. Insert the led strip into the base. 5. Slide on the acrylic sheet standing up position. 6. Plug in the remote receiver of the LED strip to the WiFi Wireless Smart Switch Module and the other side of the module to the power adapter. 7. Install EweLink app in the smartphone. 8. Follow instruction as stated in the app.
Time frame:	15 minutes