

BUILDING AN ELECTRIFYING QUIZ BOARD (LEVEL 3)

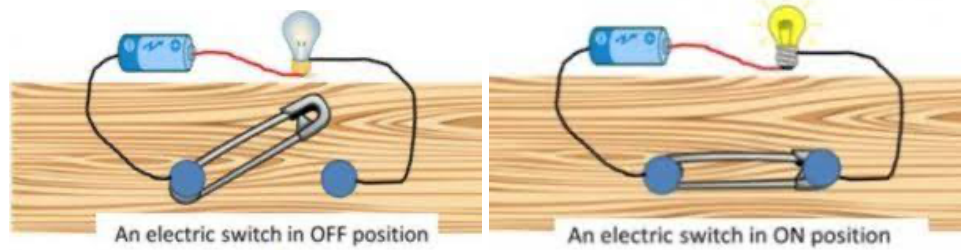
Description	Learners understand the concept of electricity, electric circuits, conductors and insulators to design their own quiz board. They will then create a manual or host a game to demonstrate and present their quiz board.
Leading question	Can you make an exciting game using electric circuits?
Subjects covered	Science, Art and Design
Total time required	40-50 minutes a day for 5 days
Resources required	a battery, a small light bulb (an LED light), wires (insulated) Alternate for wire - fold aluminium foil into a wire's shape.
Learning outcomes:	By the end of this project, learners will be able to: Knowledge Based Outcomes: <ol style="list-style-type: none"> 1. Identify various sources of electricity. 2. Classify good and bad conductors. 3. Identify the materials required to build an electric circuit. 4. Draw a labelled diagram of a circuit. 5. Build an electric circuit 21 st Century Skill Outcomes: <ol style="list-style-type: none"> 1. Demonstrate critical thinking skills while building an electric circuit using minimal resources. 2. Show creativity in designing the quiz board game. 3. Collaborate with friends and family to test and iterate designs. 4. Communicate effectively by creating a clear and easy-to-understand instruction manual, and while presenting their quiz boards.
Previous Learning	Importance and uses of electricity in our lives.
Supervision required	High

Day 1 -

Today, you will revise the basic concepts of electricity through experimentation.

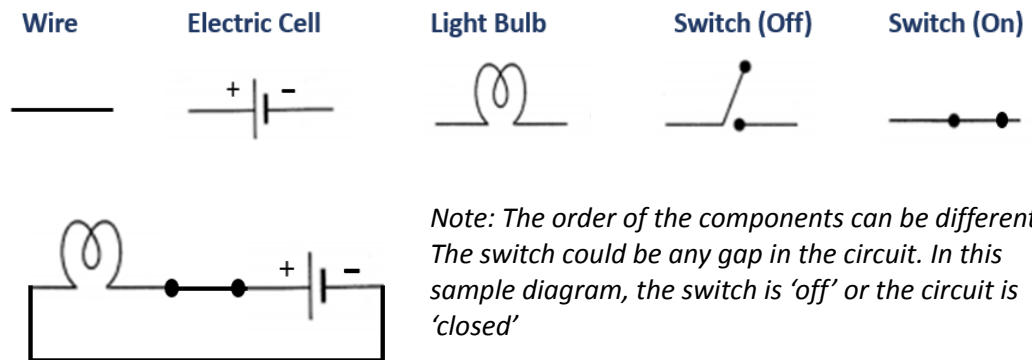
Time	Activity and Description
10 minutes	Introduction Can you name some household items that use electricity to work? Think of the following questions and share them with an adult. <ul style="list-style-type: none"> - Imagine a life without these electricity-powered household items, what would it be like? Before they were invented, what alternatives did people use? - If you could invent one electricity-powered household item to make your life easier, what would it be? Why?
20 minutes	Light It Up! Notes: Gather a battery/cell, 2 wires, some tape and a small bulb to create an electric circuit. Connect them to each other, leaving space for an object. For example, the object in

the image shows a safety pin. Let learners know that the wires are insulated (i.e, has a covering). To make electricity flow, scrape off the ends of the wire.



- Observe the battery. Do you see the + and – signs?
(These are called the positive and negative terminals of the cell.)
- Flip the cell in your circuit – does the bulb still glow?
(The circuit provides a path for current to flow. Current flows positive to negative terminals.)
- Does the bulb still glow if there is a gap in the circuit?
(A switch controls the flow of the current. If there is a gap, the switch is 'off'. If it is closed, the switch is 'on'.)

Make a note of the symbols given below and draw the circuit on paper using the following symbols.

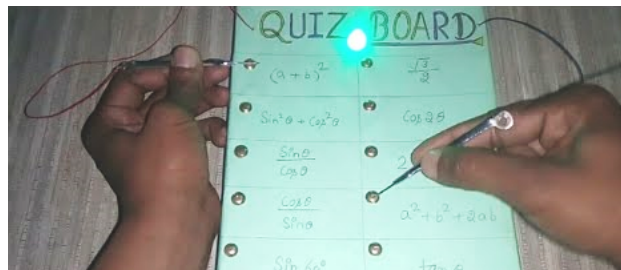


10 minutes

Script Your Own Game!

If you could make their own game using an electric circuit with a light bulb, what would it be?


In this project, we will create our own Quiz Boards. In a quiz board, there will be a list of questions and answers. The player has to match the question with the answer. If it is correct, the light bulb will glow!



	<i>Tip: The quiz board can also be made with aluminium foil if wires are not available.</i>
Optional Literacy Activity	Interview two or three older family members to understand their experiences with power cuts or to learn about stories from their childhood at a time when they did not have as many electrical gadgets as we have today. Use their responses as an inspiration to write a fictional story or poem.

Day 2

Today, you will explore conductors and insulators and begin working on your game.

Time	Activity and Description
15 minutes	<p>Conductors and Insulators</p> <p>Place objects made of different materials (such as paper, erasers, metal pins, glass, wooden pencils, etc) as part of a circuit to observe if they are conductors (allow current to pass through) or insulators (do not allow current to pass through).</p> <p>List down the items that were conductors and insulators.</p> <ul style="list-style-type: none"> - Is the human body a conductor or an insulator? <i>(Our bodies are conductors of electricity. This is why we must protect ourselves from shocks.)</i> - Why do you think screwdrivers have plastic handles? <i>(When screwdrivers are used to fix plugs or devices which use electricity, the plastic acts as an insulator and protects the human holding it.)</i> - Have you noticed that during rains you are advised to switch off electric devices? Why do you think so? <i>Hint: Water is a conductor of electricity.</i> - Umbrellas mostly have metal parts which are conductors. Water from rains are also the conductors of electricity. Would it be a good idea to open umbrellas during a thunderstorm with lightning? - If you had to alter the design of umbrellas, which materials would you use? 
10 minutes	<p>Use vegetables and fruits that are available around you to check if they conduct electricity or not.</p> <p>Note down any patterns you observe on the type of fruits/vegetables that are conductors. <i>(Citrus fruits like oranges and lemons are good conductors. Potatoes, onions, and tomatoes are too!)</i></p>
15 minutes	<p>Design Your Own Quiz Board</p> <p>Start to think of an idea for the quiz board and the questions for it. Answer the following questions to get started:</p> <ul style="list-style-type: none"> - Who are you designing it for? <i>(consider the age of the contestants; remind them that the quiz should not be too easy, else it will not be fun!)</i>

- What topic would you want to create it for?
- How can they make it an interesting experience for the player? (Eg: using images, offering a small prize/token, etc.)
- Write down at least 5 questions and their answers on the topic selected.

Examples for inspiration:



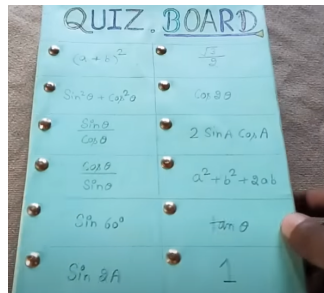
Tip: Learners can also consider using a pencil to write questions and answers to be able to change them!

Day 3 –

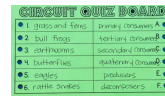
Today, you will build your quiz boards and test it with your friends and family.

Time	Activity and Description								
10 minutes	<p>Share the idea for the quiz board and the questions and answers for the quiz with an adult. They can provide feedback on the following:</p> <ul style="list-style-type: none"> - Were the questions challenging enough? - Are the answers correct? <p>Finalise your questions and answers based on the feedback.</p>								
30 minutes	<p>Make Your Quiz Board</p> <p>Note: Below, there are two ways to create a basic quiz board. These are basic instructions. Learners can adapt it based on their quiz board design.</p> <ul style="list-style-type: none"> - Option 1 is if wires and pins are available. (www.youtube.com/watch?v=m4jqSSJ6KKw&t=498s) - Option 2 is if they do not have enough wires/pins and can use aluminium foil and tape instead. (www.youtube.com/watch?v=uzSCdThP25Y) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Option 1 (with wires)</th> <th style="width: 50%;">Option 2 (with foil)</th> </tr> </thead> <tbody> <tr> <td colspan="2">1. Check if all the materials required to create the quiz board is available. Get all the materials ready.</td> </tr> <tr> <td colspan="2">2. Cover the cardboard/shoebox lid with paper.</td> </tr> <tr> <td colspan="2">3. Make two columns on paper – one with the questions, the other with answers jumbled up so that the player can match one with the other.</td> </tr> </tbody> </table>	Option 1 (with wires)	Option 2 (with foil)	1. Check if all the materials required to create the quiz board is available. Get all the materials ready.		2. Cover the cardboard/shoebox lid with paper.		3. Make two columns on paper – one with the questions, the other with answers jumbled up so that the player can match one with the other.	
Option 1 (with wires)	Option 2 (with foil)								
1. Check if all the materials required to create the quiz board is available. Get all the materials ready.									
2. Cover the cardboard/shoebox lid with paper.									
3. Make two columns on paper – one with the questions, the other with answers jumbled up so that the player can match one with the other.									

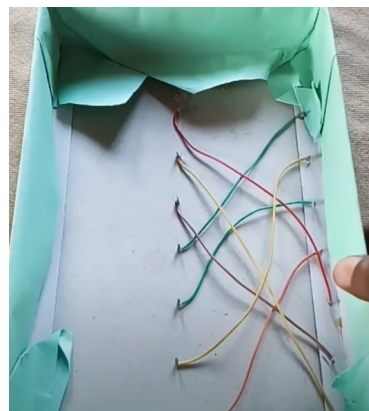
4. Place metal pins next to each question and answer:



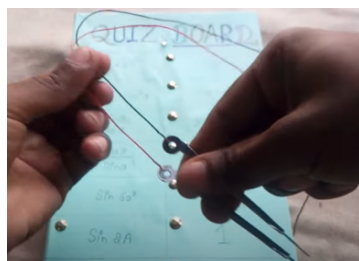
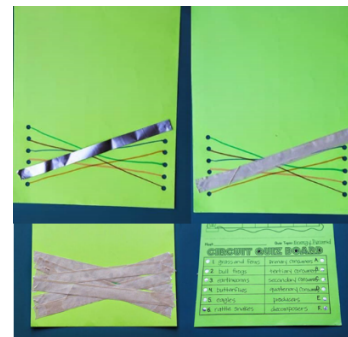
4. Punch holes next to each question and answer.



5. Flip the cardboard and connect the question and its correct answer with a wire using the pins.



5. Flip the cardboard and connect the question and its correct answer with a folded piece of foil. Make sure that the holes are covered with foil. **After each connection, they must put masking tape over the foil to insulate it.**

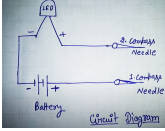



6. Unscrew the divider to get two separate needles and connect them using a long wire.

(Instead of the divider's needles, safety pins can also be used.)

7. Place an LED bulb at the top centre of the quiz board. Tape a battery at the back of the cardboard.


8. Connect the positive terminal of the battery to the 1st compass needle using a wire. Connect the positive terminal of the bulb to the 2nd compass needle using a wire.

	<div style="text-align: center;">   </div> <p>9. Place the needles to the correct question and answer and check if the bulb lights up. Test it for all questions. It should not light up if the matching is incorrect.</p> <p>Tip: If the model is not working, ask learners to check for these common errors:</p> <ul style="list-style-type: none"> - The correct terminals are connected. - The circuit has no gaps/ loose connections (ensure wires are twisted together). - The battery is working (check with a different one, if needed).
At home activities	Draw, colour, decorate and finalise the quiz board.

Day 4 –

Today, you will create an instruction manual for players that will use your quiz boards.

Time	Activity and Description
15 minutes	<p>Note: Some learners are comfortable communicating verbally and some through a written medium or art. To use their quiz board, learners can either create a manual or host a game show with their friends or family.</p> <p>Based on their choice, provide the following instructions:</p> <p>Creating A Manual</p> <p>Create a manual on how to play with the quiz board. Imagine that there would be nobody to explain to the participant on how to use it, therefore, the manual should be clear and easy to understand.</p> <p>Below is a sample structure:</p> <ul style="list-style-type: none"> - Name of the Game: Give a catchy title - Objective: How do you ‘win’ the game? - No. of players: How many players can participate? - Age Group: What age group is this designed for? - Topic: What is the topic of this quiz? - Game Play: How do you play the game? Provide sequential instructions. - Rules: Are there any specific rules? - Safety Precautions <p>OR</p>

	<p><u>Hosting Your Own Game Show</u> Write a script for your game show with the correct sequence of events.</p> <ul style="list-style-type: none"> - What would the prize money for each correct answer be? (Learners do not use real money.) - Are there levels? What happens in case an incorrect response is selected? - How can you build suspense as a host? - Are there sound effects you can use to make it more fun? 												
15 minutes	<p>'Testing' the Manual Ask an adult to test their manual and quiz board. They follow the instructions on the manual, exactly as given, and see if it is effective. Based on their experience, they share ideas for improvement.</p> <p>OR</p> <p>Hosting the Game Show - Practice Practise 'hosting' the game show using the quiz board with family or friends. They can provide feedback on the game experience.</p>												
10 minutes	<p>Creating A Feedback Form The next day will be a showcase of the quiz board to an audience of friends/family. This is also an opportunity to collect feedback!</p> <p>Design a feedback form with at least two types of questions:</p> <ul style="list-style-type: none"> - A closed-ended question: <i>In their responses, participants select an option. This could be emojis, stars (out of five), numeric score, etc.</i> (See figure for an example) - An open-ended question: <i>These are questions where participants are free to write their own responses without any forced options or scales.</i> (Eg: What did you like most about the game? How can I improve the board?, etc.) <p>Tip: The feedback form can just be a simple rating scale.</p> <div style="text-align: center;"> <p>How satisfied are you with the quiz board?</p>  <table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 10%;">RATING SCORE</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>USER MOOD</td> <td>Very unsatisfied</td> <td>Unsatisfied</td> <td>Neutral</td> <td>Satisfied</td> <td>Very Satisfied</td> </tr> </table> </div>	RATING SCORE	1	2	3	4	5	USER MOOD	Very unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied
RATING SCORE	1	2	3	4	5								
USER MOOD	Very unsatisfied	Unsatisfied	Neutral	Satisfied	Very Satisfied								

Day 5 -

Today, you will have your friends or family try out the quiz board with the help of a manual or through a game show.

Time	Activity and Description
------	--------------------------

10 minutes	<p>Preparation: Gather all the materials required for the quiz. This would include:</p> <ul style="list-style-type: none"> - The quiz board - The manual/ the script for hosting the game - Any music/sound effects (if possible)
20 minutes	<p>Quiz Fair Get your friends or family to play the game with the quiz boards and collect feedback through the form.</p>
10 minutes	<p>Reflection: Take 5 minutes to go through the guest feedback. Note down responses to the following reflection questions individually:</p> <ul style="list-style-type: none"> - What did you enjoy most about the project? - Which part did you find most challenging? - What did your friends and family enjoy the most? - What did they not enjoy? - If you were to do this project again, what would you have done differently? Why? <p>Congratulate learners on building an electronic device and appreciate their effort!</p>

Additional enrichment activities:	<p>Design Your Own Game: Students can ideate and design their own game using an electric circuit.</p> <p>You Light Up My Life! - Greeting Card Challenge Create a greeting card for someone in your life who “lights up your life”. As a part of this challenge, students create a functioning circuit inside the card that will light up when your friend or family member opens it.</p>
Modifications for simplification	<p>The whole project can be done in groups, if it is too challenging for students.</p> <p>If enough materials are not available, this can be done by a full-class with each group having a role to play - preparing questions, drawing the circuit diagram, designing the game, etc.</p>

ASSESSMENT CRITERIA

A majority of my students were able to:

- Learn about the components of an electric circuit and how current flows in the circuit
- Identify materials based on conductivity
- Build a basic electric circuit and demonstrate how switches work
- Creates and presents a functioning quiz board

