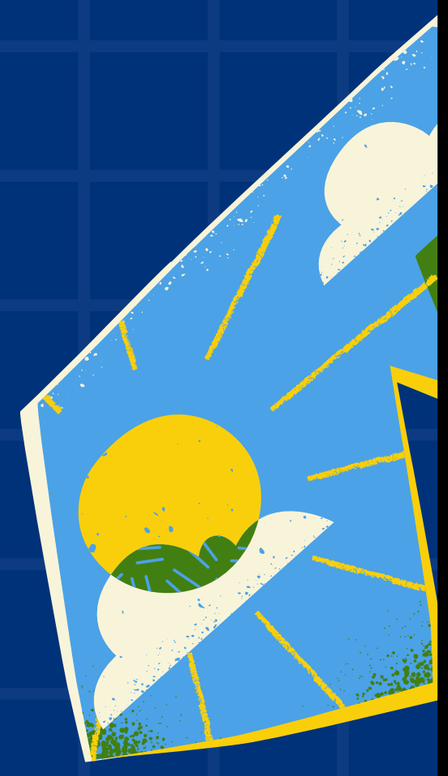
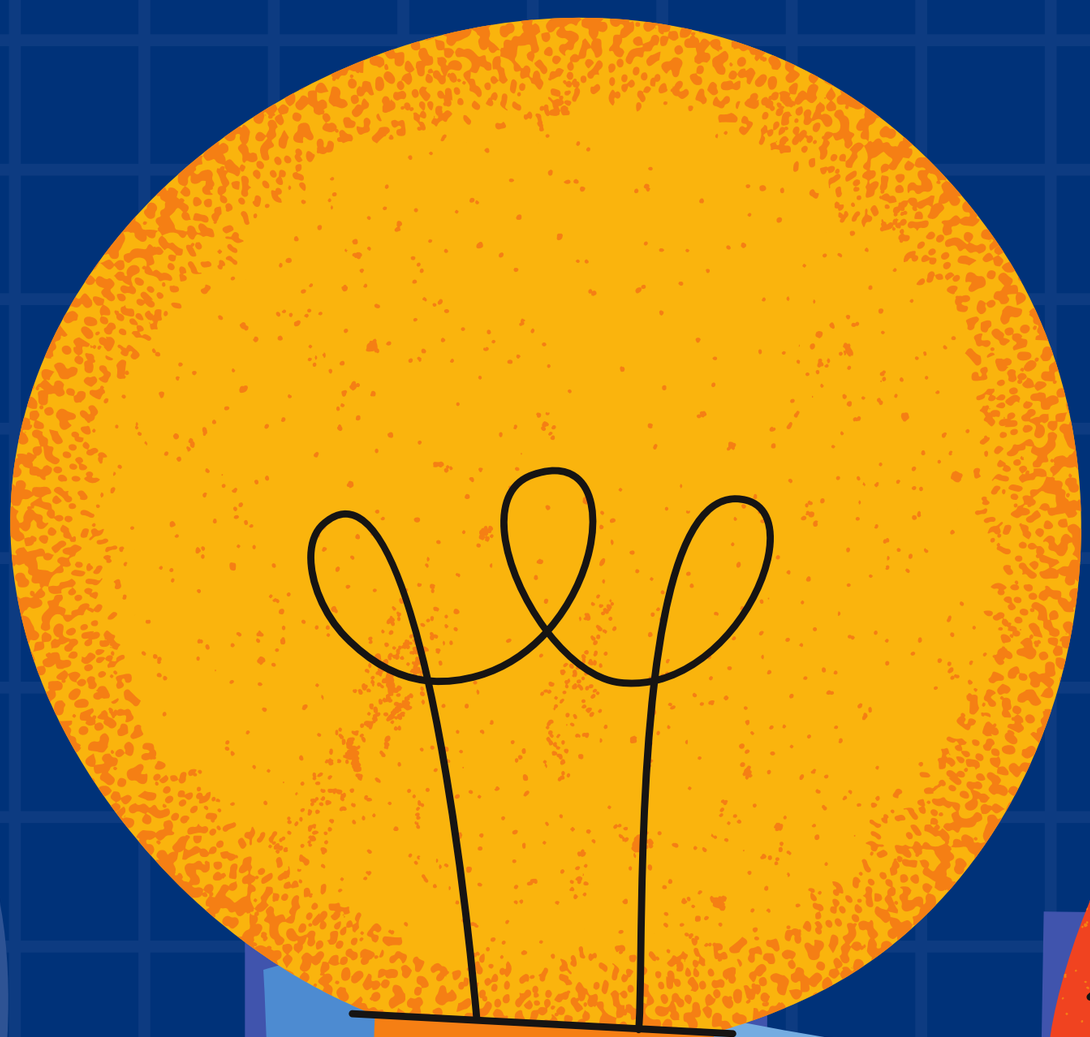
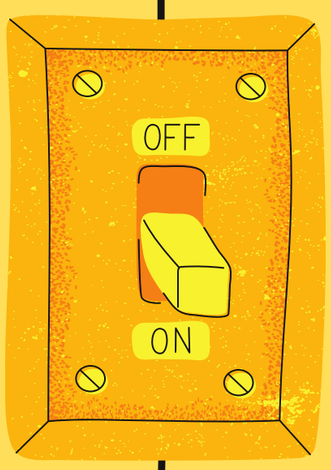
CIRCUIT MAZE





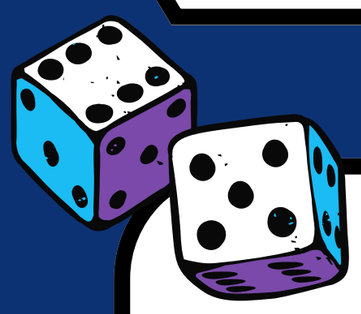


Circuit Maze

Game Theme
Electric Circuits

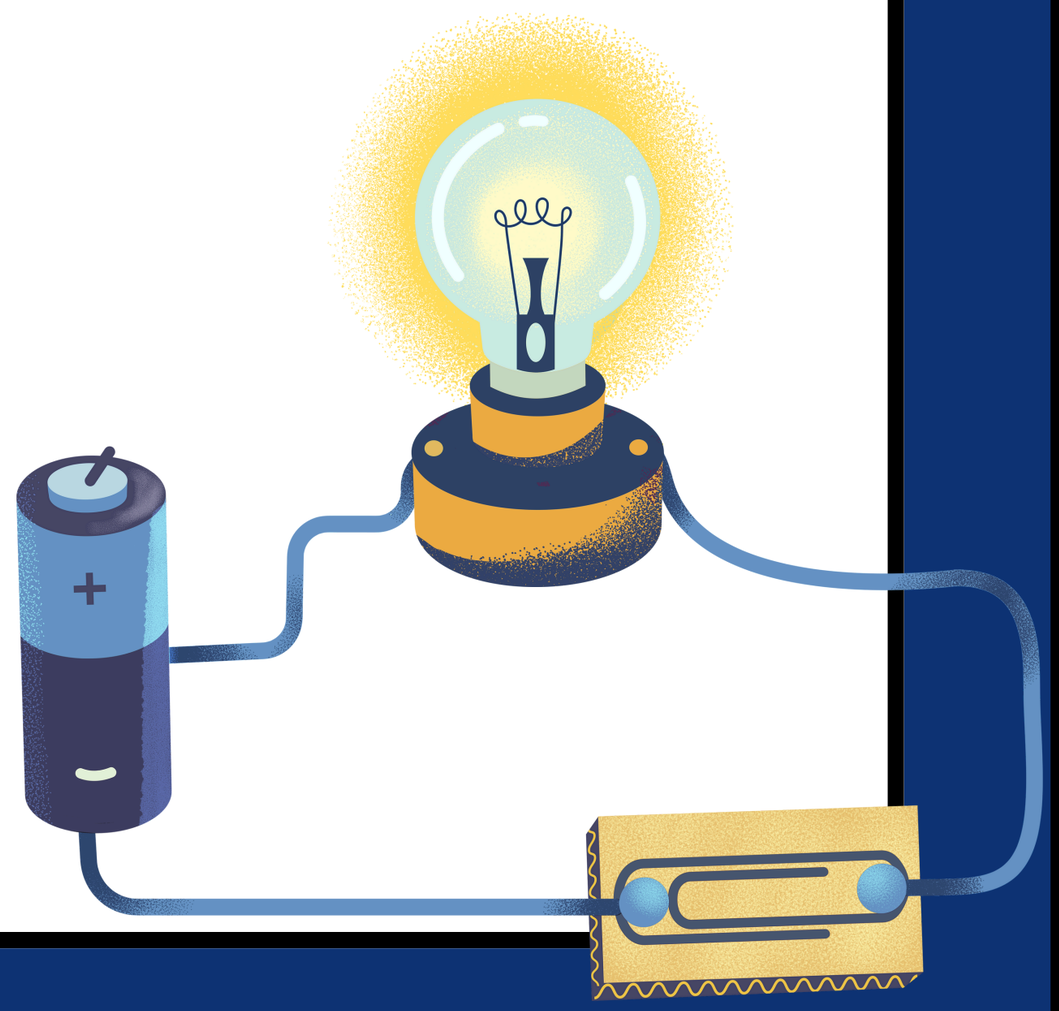
Grade Level
VI-VIII

Game Type
Board Game



Game Overview

- Circuit Maze is a hands-on board game designed to strengthen students' understanding of electric circuits while developing their analytical and problem-solving skills. By stepping into the role of an electrical engineer, students work through levels of challenges that involve identifying components, understanding current flow, and building various types of circuits.
- Players advance across a game board and complete activities based on three levels:
  - Level 1: Introduction to electricity and basic circuit components
  - Level 2: Application of concepts and diagram construction
  - Level 3: Problem-solving, circuit identification, and hands-on circuit building
- By the end of this game, students will be able to identify different components of a circuit, explain how electric current flows, differentiate between open and closed circuits, and create both series and parallel circuits.
- A complete game set, for one group, includes the following materials:
  - 1 game board
  - Card set for each level (40 cards in total):
    - Level 1: 10 cards
    - Level 2: 10 cards
    - Level 3: 20 cards
  - Artificial money or points
  - Game material for circuit construction
    - Wires = 10
    - Bulbs =10
    - Switches = 10
    - Batteries = 10
  - Answer sheet for verification
  - Dice and coloured counters



Gameplay Instructions

- Divide students into small groups of 4–5. Distribute the complete game set to each group.
- Each player selects a coloured counter and places it on the Start space of the board.
- Shuffle the deck of cards and keep the components (bulbs, wires, batteries) ready for later use.
- The game will be played in levels, starting from Level 1 and progressing to Level 3.
- Players take turns rolling the dice and moving their counters accordingly.
- When a player lands on a space, they draw a card from the corresponding level's deck.
- The card contains a task, challenge, or question related to the concept of circuits.
- Upon correct response or task completion, the player earns a reward.
    - In Level 1, rewards are points, which can be used to purchase circuit components (bulbs, wires, batteries) from a supply shop.
    - In Level 2, players earn actual components as rewards.
    - In Level 3, players use their components to build functional circuits, including series, parallel, open, and closed types.
- The group that builds the maximum correct circuits by the end of the game is declared the winner.

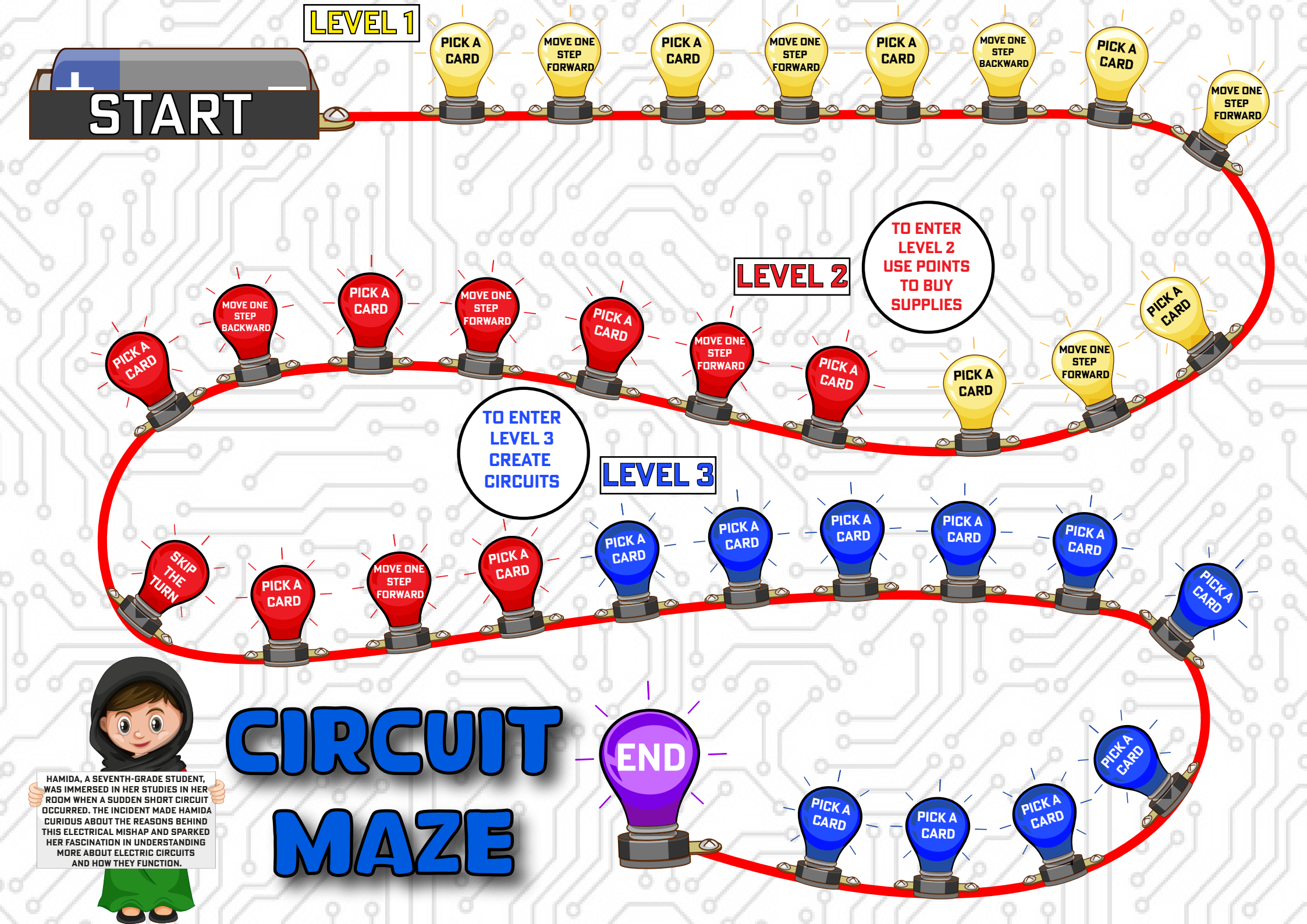
Debriefing and Reflection

Conclude the game with a whole-class reflection to reinforce learning. Suggested discussion prompts:

- Ask students to summarise the do’s and don’ts they learned while building circuits (e.g., proper connection of components, importance of a complete path, avoiding short circuits).
- Reflect on tasks or questions that were challenging. Ask students to explain what made them difficult and clarify any misconceptions.
- Discuss how the flow of current changes in series vs. parallel circuits, and connect these concepts to real-life applications (e.g., home wiring, battery usage in devices).
- Encourage students to share what they found most enjoyable or surprising, reinforcing both conceptual learning and engagement.

Adaptations for Gamplay

- **For Lower Grades:** Simplify the cards to focus on identifying basic components and understanding simple closed circuits. Limit the game to Level 1 or Level 2. Use printed illustrations if real materials are unavailable
- **For Higher Grades:** Include cards that require students to build or draw more complex circuits. Add challenges involving short circuits, circuit diagrams, or predicting circuit outcomes based on configurations. Extend Level 3 to include problem-solving scenarios.


LEVEL 1
START
PICK A CARD
MOVE ONE STEP FORWARD
PICK A CARD
MOVE ONE STEP FORWARD
PICK A CARD
MOVE ONE STEP BACKWARD
PICK A CARD
MOVE ONE STEP FORWARD
TO ENTER LEVEL 2 USE POINTS TO BUY SUPPLIES
LEVEL 2
PICK A CARD
MOVE ONE STEP BACKWARD
PICK A CARD
MOVE ONE STEP FORWARD
PICK A CARD
MOVE ONE STEP FORWARD
PICK A CARD
PICK A CARD
MOVE ONE STEP FORWARD
PICK A CARD
TO ENTER LEVEL 3 CREATE CIRCUITS
LEVEL 3
SKIP THE TURN
PICK A CARD
MOVE ONE STEP FORWARD
PICK A CARD
PICK A CARD
PICK A CARD
PICK A CARD
PICK A CARD
PICK A CARD
PICK A CARD
END
PICK A CARD
PICK A CARD
PICK A CARD
PICK A CARD
CIRCUIT MAZE
HAMIDA, A SEVENTH-GRADE STUDENT, WAS IMMERSED IN HER STUDIES IN HER ROOM WHEN A SUDDEN SHORT CIRCUIT OCCURRED. THE INCIDENT MADE HAMIDA CURIOUS ABOUT THE REASONS BEHIND THIS ELECTRICAL MISHAP AND SPARKED HER FASCINATION IN UNDERSTANDING MORE ABOUT ELECTRIC CIRCUITS AND HOW THEY FUNCTION.

LEVEL 1

READ THE CARD 1

WHAT IS ELECTRICITY?

Electricity is a form of energy resulting from the existence of charged particles (such as electrons or protons).

YOU EARN A 100 POINTS

LEVEL 1

READ THE CARD 2

ELECTRIC CURRENT

Electric current refers to the flow of electric charge, typically carried by moving electrons in a conductor.

Think of electric current like a river made not of water, but of tiny charged particles called electrons. When you turn on a device, it's like opening a dam; electrons start t o flow down the river path, which is the wire, bringing energy from one place to another to power your device.

YOU EARN A 100 POINTS

LEVEL 1

DO THE TASK 3

Inflate a balloon. Vigorously rub the balloon against your hair for a few seconds. Hold the balloon near small pieces of paper. What do you observe and why this happen?

YOU EARN A 100 POINTS

LEVEL 1

READ THE CARD 4

WHAT IS AN ELECTRIC CIRCUIT?

A closed path through which electric current can flow. Electrons have a one-way street in a circuit. They travel from the negative side of the battery (their home), through the wires and light bulbs (the sights along their journey), and back home to the positive side of the battery. It's a round trip for them every time you close the switch!

YOU EARN A 150 POINTS

LEVEL 1

DO THE TASK

5

MAKE HUMAN CIRCUIT

Stand in a circle holding hands, with one person representing a battery, another a light bulb, and the rest wires. Squeeze the hand of the person next to you to represent the flow of electrons. When the 'battery' starts the squeeze, the 'electrons' travel until they reach the 'light bulb', who then jumps to show the bulb lighting up.

YOU EARN A 200 POINTS

LEVEL 1

READ THE CARD

6

Example of Plugging in your phone to charge it connects it to a circuit. The charger acts as the bridge between the power source (outlet) and your phone's battery. It ensures that a safe and correct amount of electricity reaches the battery, illustrating how circuits can be designed to control the flow of electricity for specific tasks.

YOU EARN A 50 POINTS

LEVEL 1

ANSWER THE CARD

7

What do we call a complete path for electricity to flow?

YOU EARN A 100 POINTS

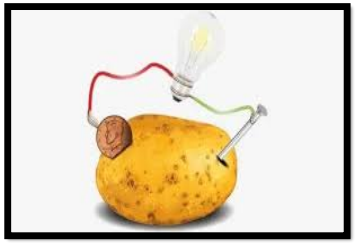
LEVEL 1

READ THE CARD

8

FUN FACT

Do you know potatoes can conduct electricity if you connect two metallic strips to different sides of a potato, you can make a very weak battery.



YOU EARN A 100 POINTS

LEVEL 1

ANSWER THE CARD

9

From which part of a battery does electricity initially flow?

- **The positive terminal**
- **The negative terminal**
- **The side terminal**
- **It doesn't flow from batteries.**

YOU EARN A 100 POINTS

LEVEL 1

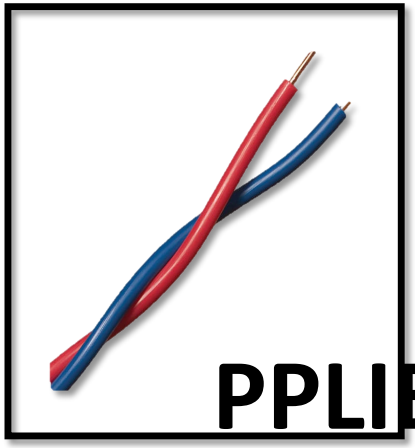
READ THE EXAMPLE

10

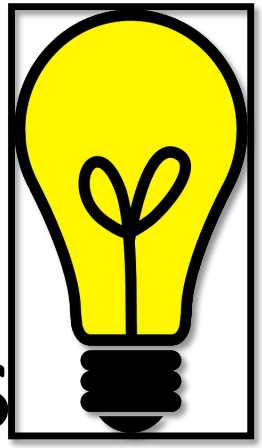
A flashlight lights up a dark room when you press its switch. By pressing the switch, you close the circuit, allowing electricity to flow from the batteries through the wires to the bulb. When you release the switch, the circuit opens, and the light goes out because the flow of electricity is stopped

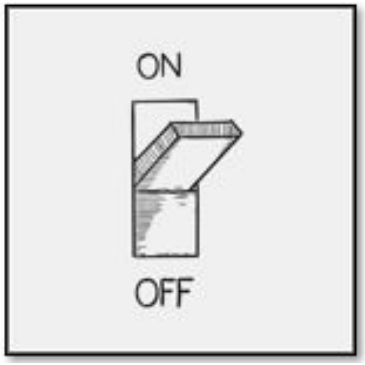
YOU EARN A 100 POINTS

SHOP TO BUY ELECTRICAL SU



PPLIES





Points	Supplies
50 Points	1 Wire
100 Points	Bulb
100 Points	Battery
50 Point	Switch

LEVEL 2

SOLVE THE CARD

11

CASE STUDY

Hamida found that all the electrical appliances are working in the room except for a bulb, which is not working. She called the electrician and checked the bulb; she found that the bulb was working in the other socket but not on the socket where it was fixed previously. What is the reason behind it?

YOU EARN A BATTERY

LEVEL 2

READ THE CARD

12

HOW IS CIRCUIT FORMED

A circuit is formed by creating a path for electric current to flow. This is typically done by connecting electrical components in a specific arrangement so that electricity can travel from a power source, through the components, and back to the power source.

YOU EARN A BATTERY

LEVEL 2

READ THE CARD

13

A circuit has the following components:

BATTERY: Every circuit needs a power source, like a battery or a power supply, which provides the electrical energy needed to make the circuit work. The power source has two terminals: positive and negative. In simple words, the battery is the heart of a circuit, pumping energy into it. Just like a heart pumps blood, a battery pumps electricity through the circuit.

WIRE: A circuit needs a path (a road).
Wires are used to connect the components of a circuit and create a pathway for electricity to flow. In simple words, wire is like a highway for electricity, allowing it to travel from one part of the circuit to another. It is made of materials that electricity can move through easily.

BULBS: When electricity flows through a bulb, it lights up the room!

SWITCHES: Many circuits include a switch, which can open or close the circuit. When the switch is closed, the circuit is complete, and electricity flows. When the switch is open, it creates a gap in the circuit, stopping the flow of electricity. In simple words, switches are like doors in the walls of your electrical highways.
They can open to stop the flow or close to let the electricity through.

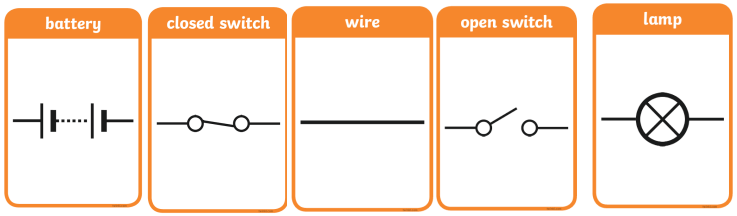
YOU EARN A WIRE

LEVEL 1

READ THE CARD

14

LEARN SYMBOLS



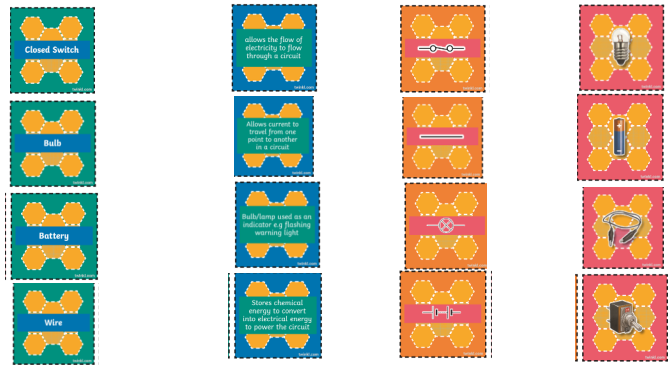
YOU EARN A WIRE

LEVEL 2

MATCH THE CARD

15

MATCH THE CARD: Match the Components of an electric circuit using a pencil



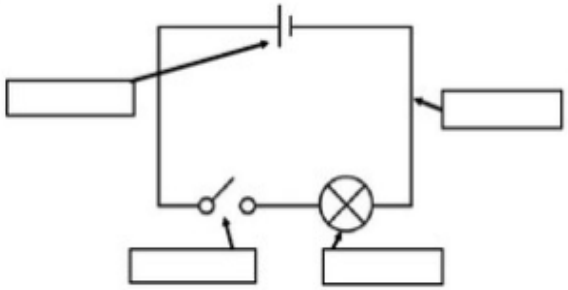
YOU EARN A SWITCH

LEVEL 2

DO THE TASK

16

Label parts of the electrical circuit given below.



YOU EARN A SWITCH

LEVEL 2

SOLVE THE CARD

17

Riddles

1. I store the spark, the hidden light,
Ready to leap, with all my might.
To power devices, both young and old.
Who am I?

2. I have two legs, but cannot walk.
I carry energy but never talk. Connect me
to friends, and a light appears,
Without me, the circuit is incomplete.

YOU EARN ABULB

LEVEL 2

DO THE TASK

18

DRAW A DIAGRAM

Use the circuit symbols you have learnt to draw
your own circuit diagram that contains
a bulb, battery, wire and open switch

YOU EARN A BULB

LEVEL 2

DO THE TASK

19

DRAW A DIAGRAM

Use the circuit symbols you have learnt to draw
your own circuit diagram that contains
a bulb, battery, wire and close switch

YOU EARN A WIRE

LEVEL 2

READ THE EXAMPLE

20

CREATE A CIRCUIT

With the material provided to you, create a real circuit

YOU EARN A BULB

LEVEL 3

21

READ THE CARD

WHAT IS OPEN CIRCUIT?

An open circuit is a type of electrical circuit that has a break or gap in the conducting path, which prevents the flow of electric current. This break can be intentional, such as when a switch is turned off, or unintentional, like a broken wire or a burnt-out component.

In an open circuit, the electrical circuit is incomplete, so electricity cannot flow from the battery to the bulb and back again. As a result, any devices or components connected in the circuit will not operate when the circuit is open

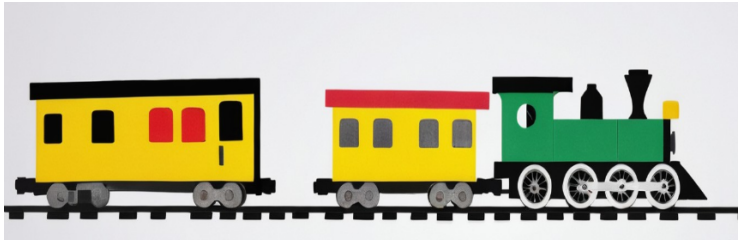
YOU EARN A WIRE

LEVEL 3

22

READ THE CARD

Think of a train with a missing piece. The train cannot reach its destination because the track is incomplete., similar to how electricity cannot reach its destination in an open circuit



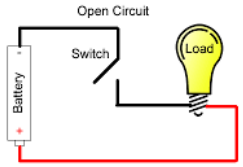
YOU EARN A WIRE

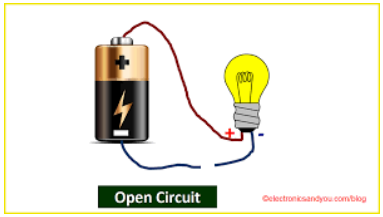
LEVEL 3

23

IDENTIFY THE ISSUE

All the images below are of open circuit, can you give a reason why?





YOU EARN A WIRE

LEVEL 3

24

READ THE CARD

WHAT IS CLOSED CIRCUIT?

A closed circuit is an electrical circuit where the path through which electric current flows is complete and unbroken. This means that all components in the circuit, including the power source (like a battery) and light bulb, are connected through a conducting material (usually wires) in such a way that electricity can travel through them continuously.

Example: In a home when a light switch is turned on. Electricity will flow through the switch and all the components in the circuit.

YOU EARN A WIRE

LEVEL 3

READ THE CARD

25

Imagine a series of ringing bell hanging in a circle. When you pull the first bell the sound travels through all the bells in the loop, just like electricity flows through all the components in a closed circuit.

YOU EARN A BATTERY

LEVEL 3

DO THE ACTIVITY

26

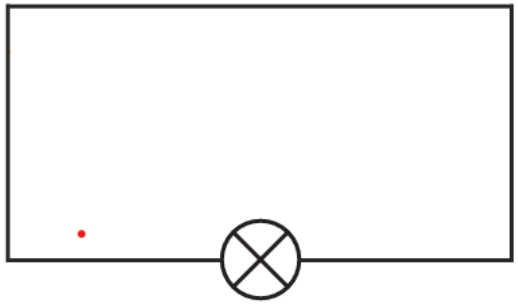
Divide students into two teams and line them up, holding hands. Each team represents a circuit. Ask them to close their hands representing a closed circuit and then open their hands representing an open circuit.

YOU EARN A BATTERY

LEVEL 3

27

What is the problem with this circuit?

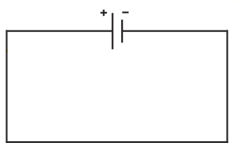


YOU EARN A BATTERY

LEVEL 3

28

What is the problem with this circuit?



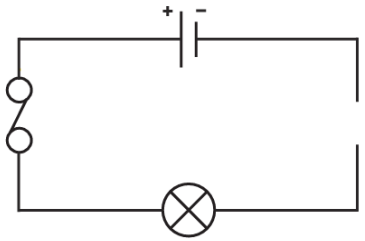
YOU EARN A BATTERY

LEVEL **29**

3

QUIZ CARD

Will the bulb light in the below circuit?



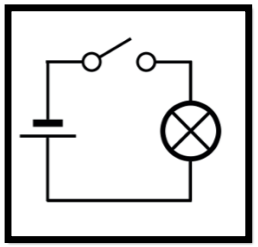
YOU EARN A BULB

LEVEL **30**

3

QUIZ CARD

Will the bulb light in the below circuit?



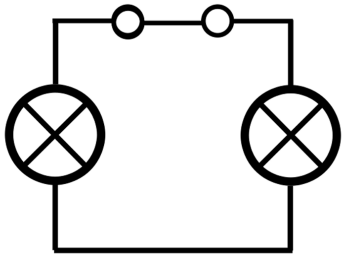
YOU EARN A BULB

LEVEL **31**

3

QUIZ CARD

Will the bulb light in the below circuit?



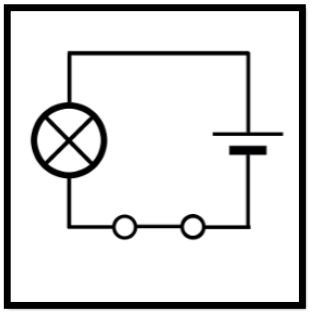
YOU EARN A BULB

LEVEL **32**

3

QUIZ CARD

Will the bulb light in the below circuit?



YOU EARN A BULB

LEVEL 3

READ THE CARD

33

WHAT IS SERIES CIRCUIT

A series circuit is a type of electrical circuit where all the components are connected end-to-end in a single path. In a series circuit, the current flows through each component sequentially. This means that the same current flows through each component in the circuit, one after the other

For example: Series circuit is used in flashlights, refrigerator, lamps etc.

YOU EARN A SWITCH

LEVEL 3

READ THE CARD

34

Think of a series of traffic lights on a busy street. The cars have to stop at each red light before continuing similar to how electricity passes through each components in a series circuit one by one

YOU EARN A SWITCH

LEVEL 3

35

COMPLETE THE TASK

Draw a series circuit with a battery, an open switch, 2 bulbs

YOU EARN A WIRE

LEVEL 3

36

COMPLETE THE TASK

Draw a series circuit with 1 cell, 2 bulbs and a closed switch.

YOU EARN A WIRE

LEVEL 3

READ THE CARD

37

PARALLEL CIRCUIT

A parallel circuit is a type of electrical circuit in which the components are connected across common points or junctions, forming branches, so that there are multiple paths for the electric current to flow

For example: Parallel circuit is used in wiring system of a house, washing machine etc.

YOU EARN A BULB

LEVEL 3

READ THE CARD

38

Imagine several rivers merge into a large one. Each river carries water independently just like electricity flows through each branch of a parallel circuit without affecting the others

YOU EARN A SWITCH

LEVEL 3

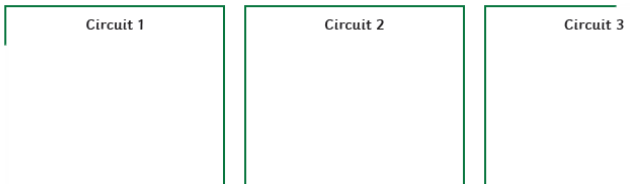
39

COMPLETE THE TASK

You will need the following equipment: 6 wires, 1 battery, 4 bulbs, 1 switch.

Using the equipment, you will need to build and draw the following circuits:

- Circuit 1 - A parallel circuit with 1 battery, 1 switch, 2 bulbs.
- Circuit 2 - A parallel circuit with 1 battery, 1 switch, 3 bulbs.
- Circuit 3 - A parallel circuit with 1 battery, 1 switch, 4 bulbs.



YOU EARN A 500 POINTS

LEVEL 3

DO THE TASK

40

PARALLEL AND SERIES CIRCUIT CONTRUCTION

Students will be divided into two teams each team should have same number of members.One team will be asked to construct a parallel circuit using a wire, three bulbs and one battery. Second team will construct series circuit using a wire, 3 bulbs and a battery. There would be ten minutes allotted for this activity.

YOU EARN A WIRE

Level 1 - Answers

3. When you rub the balloon on your hair, it picks up extra electrons and becomes negatively charged. The pieces of paper, which are positively charged, are attracted to the negatively charged balloon. This is because opposite charges attract. The movement of electrons from your hair to the balloon creates static electricity. This simple activity demonstrates how static electricity works in everyday life.

7. Electric circuit

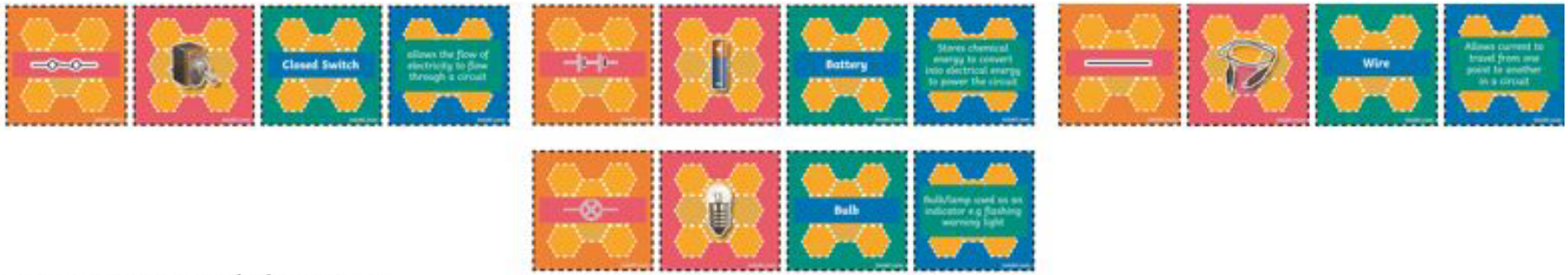
9. The negative terminal

5. Electricity

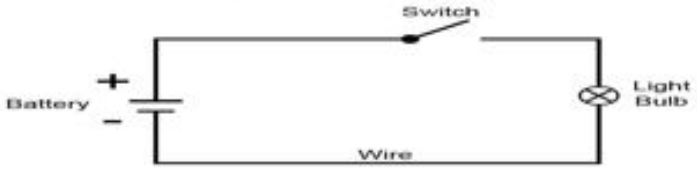
9 – Negative terminal

Level 2 – Answers

11. The electric circuit is damaged because the current is not passing through the wire.
12. Battery, switch, wire and bulb
15.



16. Battery, open switch, lamp, wire
17. 1. A battery 2. Wire
18.



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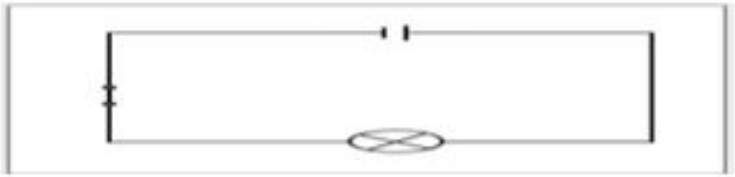


Level 3 - Answers

23. In the first image, the switch is open.

In the second image, the wire is damaged.

27. There is no battery and switch connected to the wire and lamp.

28. There is no switch and lamp connected to the wire and battery.

29. No, because the wire is damaged.

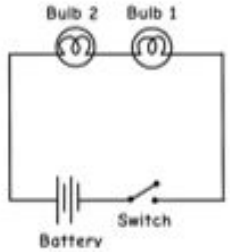
30. No, because the switch is open.

31. No, because the battery is not there in the circuit.

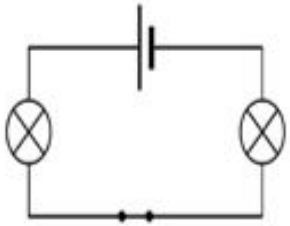
32. Yes, because the circuit is complete.

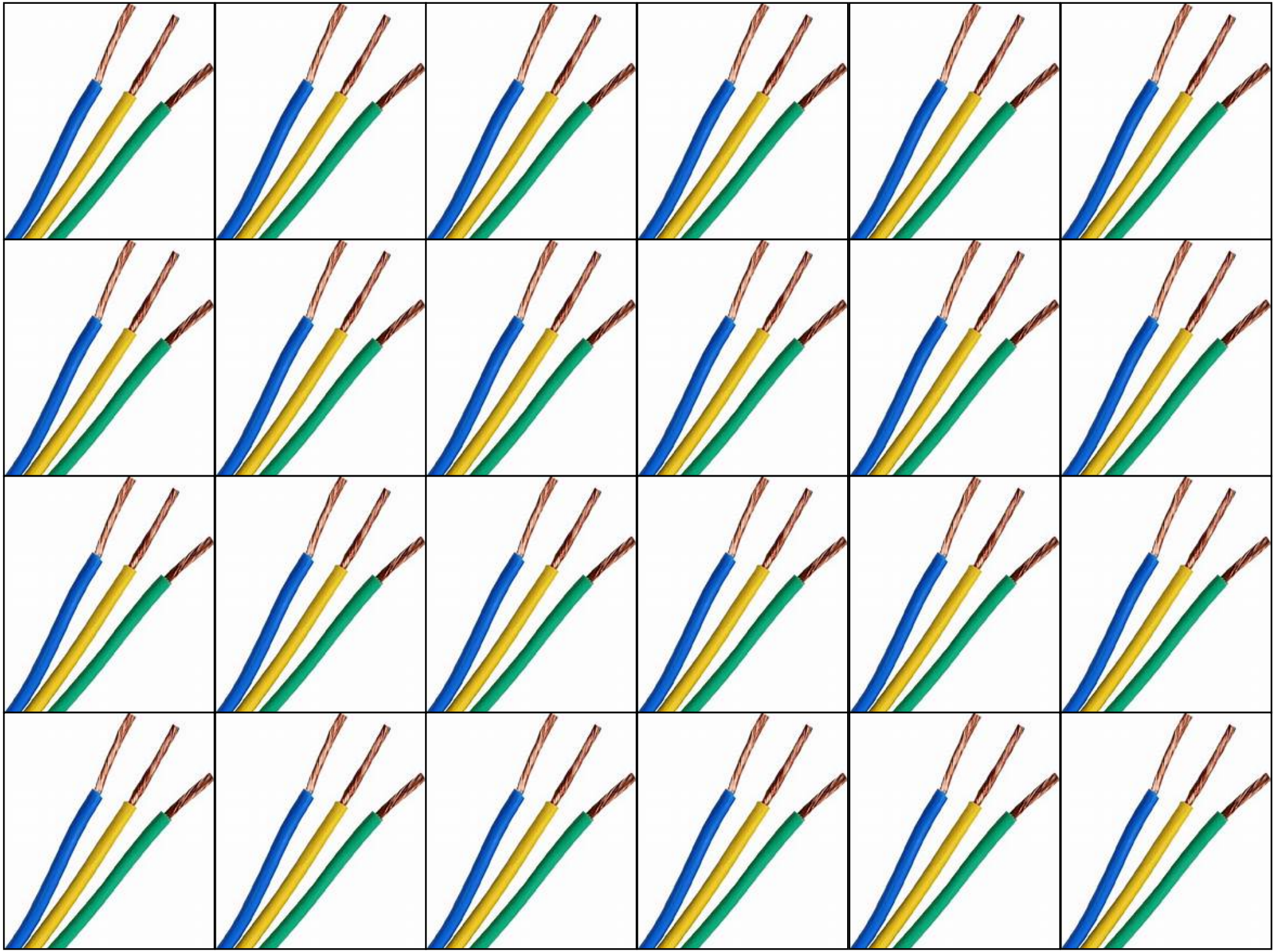
Level 3 - Answers

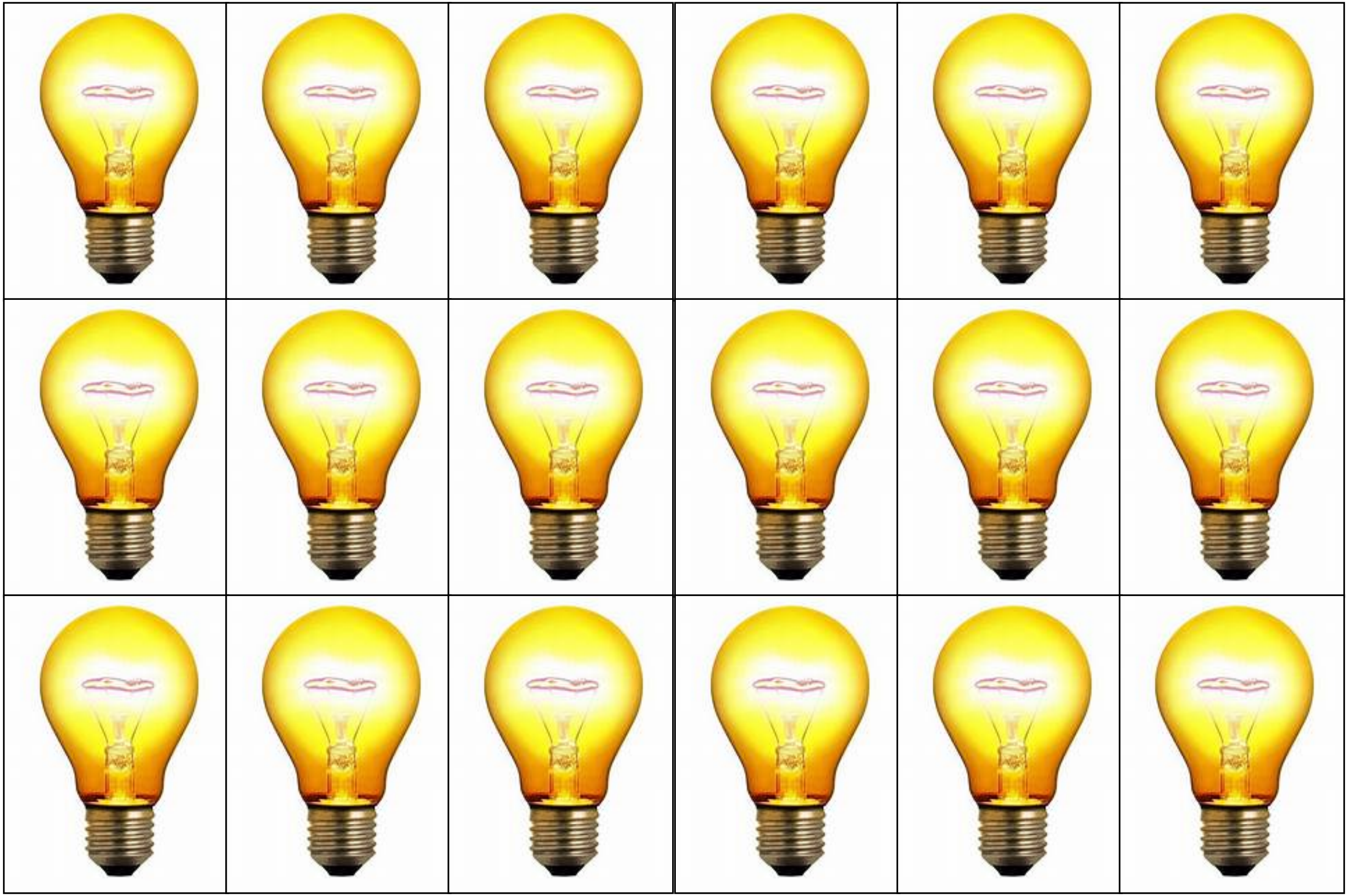
35.

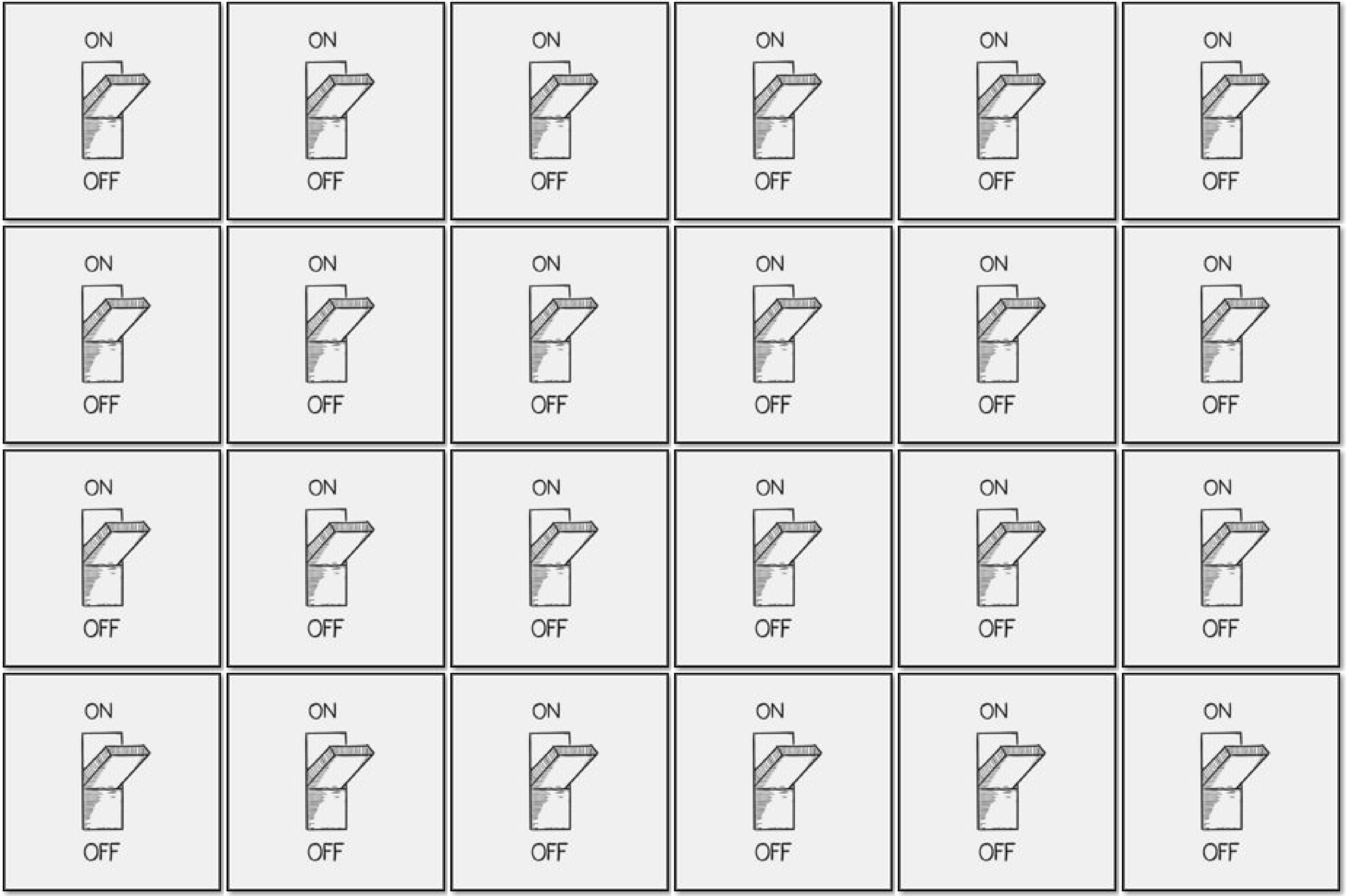


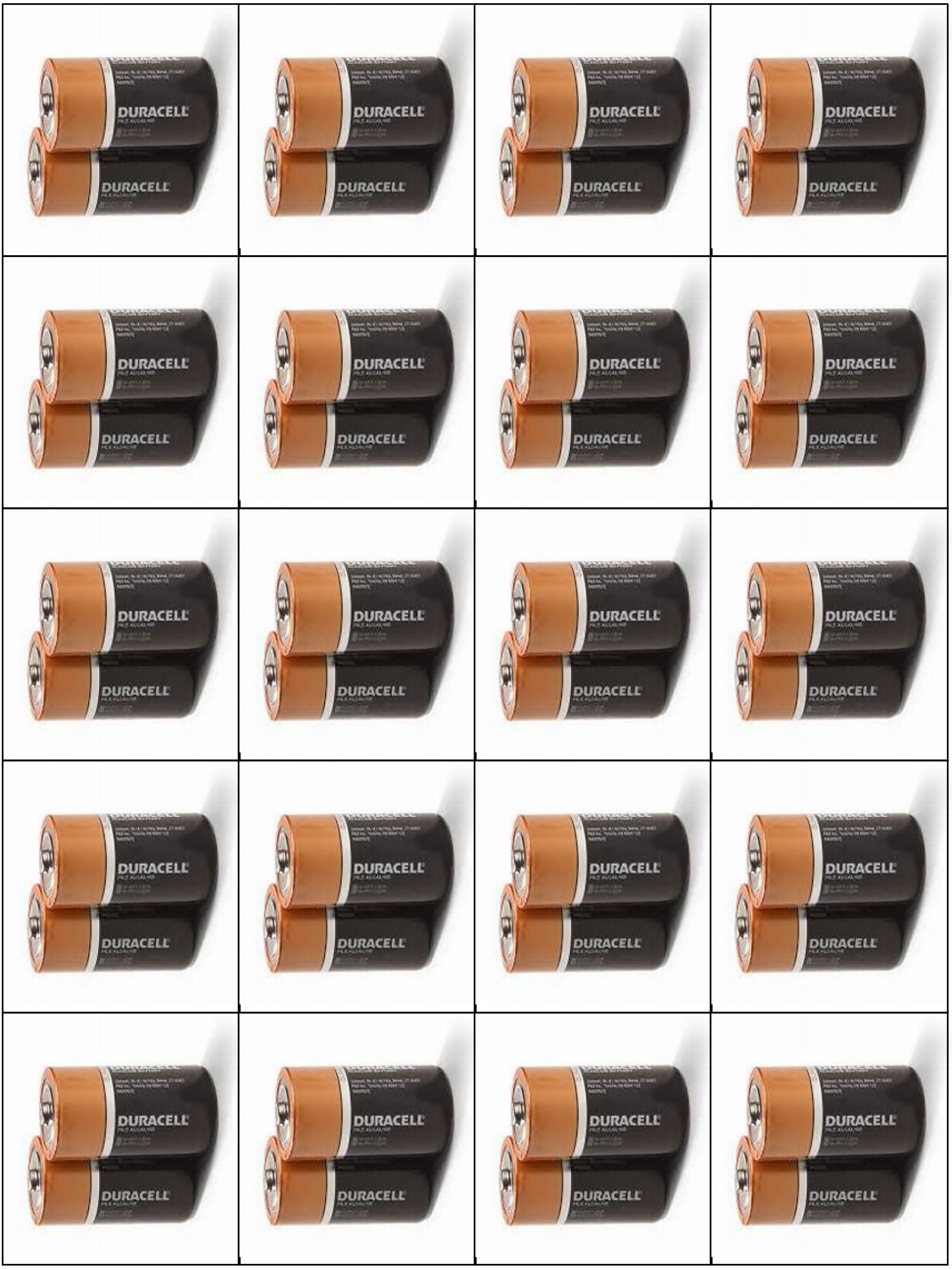
36.








ON
OFF


DURACELL

Points	Supplies
50 Points	1 Wire
100 Points	Bulb
100 Points	Battery
50 Point	Switch

LEVEL 1 - ANSWERS

3. When you rub the balloon on your hair, it picks up extra electrons and becomes negatively charged. The pieces of paper, which are positively charged, are attracted to the negatively charged balloon. This is because opposite charges attract. The movement of electrons from your hair to the balloon creates static electricity. This simple activity demonstrates how static electricity works in everyday life.

7. Electric circuit

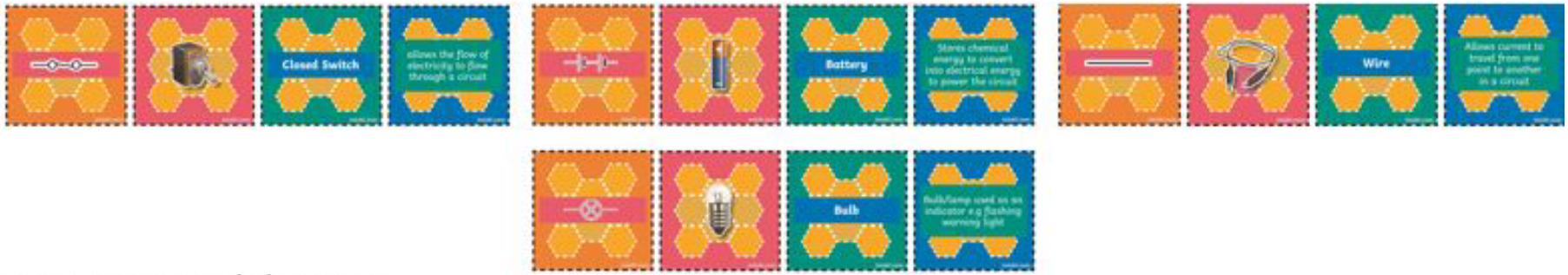
9. The negative terminal

5. Electricity

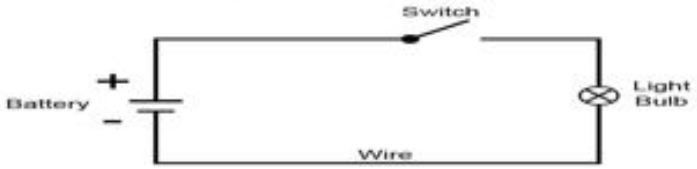
9 – Negative terminal

LEVEL 2 - ANSWERS

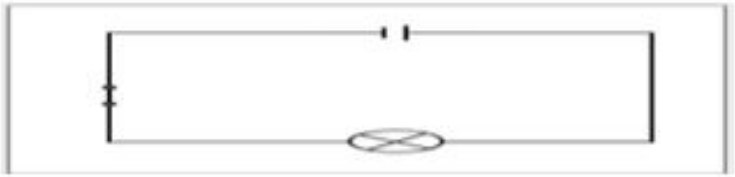
11. The electric circuit is damaged because the current is not passing through the wire.
12. Battery, switch, wire and bulb
15.



16. Battery, open switch, lamp, wire
17. 1. A battery 2. Wire
18.



19



LEVEL 3 - ANSWERS

23. In the first image, the switch is open.

In the second image, the wire is damaged.

27. There is no battery and switch connected to the wire and lamp.

28. There is no switch and lamp connected to the wire and battery.

29. No, because the wire is damaged.

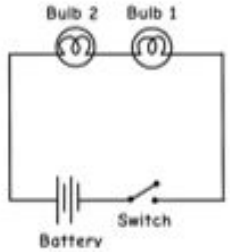
30. No, because the switch is open.

31. No, because the battery is not there in the circuit.

32. Yes, because the circuit is complete.

LEVEL 4 - ANSWERS

35.



36.