
STEAM NOTE FOR Grade 5

1. What does STEAM stand for?

STEAM stands for Science, Technology, Engineering, Arts, and Mathematics.

2. Write two safety rules while working with electricity.

- Do not touch wires or circuits with wet hands.
- Always turn off the power before changing connections.

3. What is a circuit?

A circuit is a path that allows electricity to flow.

4. What is a component? Write two examples.

A component is a part of an electrical or electronic circuit.

Examples: Resistor, LED.

5. What is a battery used for?

A battery provides the power (electricity) to run a circuit.

6. Define LED. Which leg is positive?

LED means Light Emitting Diode, which glows when current passes.

The long leg is positive (anode).

7. Why do we use breadboards?

We use breadboards to build and test circuits without soldering.

8. In Scratch, what is a sprite? Give one example.

A sprite is a character or object that performs actions in Scratch.

Example: The Scratch Cat.

9. What is a backdrop in Scratch?

A backdrop is the background of the stage in Scratch.

10. What is a conductor? Give two examples.

A conductor is a material that allows electricity to pass through.

Examples: Copper, Aluminum.

11. What is an insulator? Give two examples.

An insulator is a material that does not allow electricity to pass through.

Examples: Plastic, Rubber.

12. What does a resistor do?

A resistor controls or reduces the flow of current in a circuit.

13. How can we make a buzzer game?

- Make a wire maze and a metal loop.
- Connect them with a battery and buzzer.
- When the loop touches the wire, the circuit closes and the buzzer sounds.

14. Full Forms

- a. LED: Light Emitting Diode
- b. LCD: Liquid Crystal Display
- c. DPDT: Double Pole Double Throw
- d. AI: Artificial Intelligence
- e. DC: Direct Current
- f. CPU: Center Processing Unit
- g. AC: Alternative Current
- h. STEAM: Science, Technology, Engineering, Arts and Mathematics

Chapter 1–2: Introduction to STEAM & Circuits

- **STEAM:** Science, Technology, Engineering, Arts, Mathematics → helps us learn, create, and solve problems.
- **Safety Rules:**
 - Don't touch wires with wet hands.
 - Handle batteries carefully.
 - Check connections before switching on.
 - Don't look directly at bright LEDs.
- **Circuit:** It is a path for electricity to flow.
 - Open Circuit → path broken, electricity does not flow. (Switch OFF)
 - Closed Circuit → complete path, electricity flows.(Switch ON)

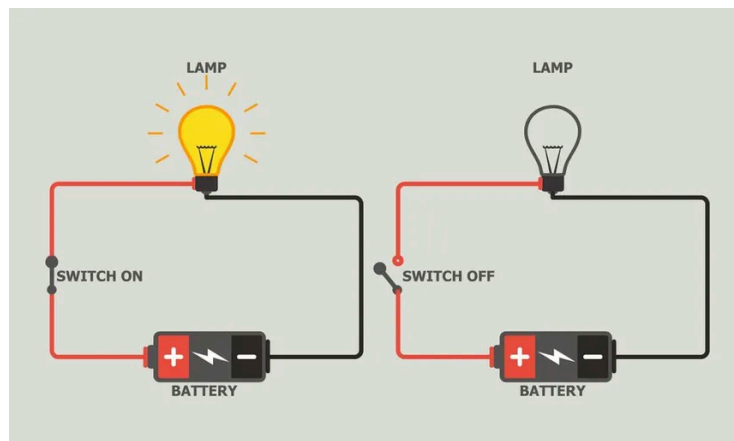


Figure: Closed and Open Circuit

- **Components:**
 - **Battery:** A battery is a device that stores electricity and gives power to things when needed.
 - **LED:** Small light that glows when current flows (long leg is positive also known as Anode , short leg is negative also known as Cathode).
 - **Motor:** A motor is a machine that converts electricity to motion.
 - **Breadboard:** Breadboard is a plastic board with many small holes used to connect wires and electronic parts to make circuits.

- **Resistor:** A **resistor** is an electronic part that **controls or reduces the flow of electricity** in a circuit.
- **Circuit Diagram:**

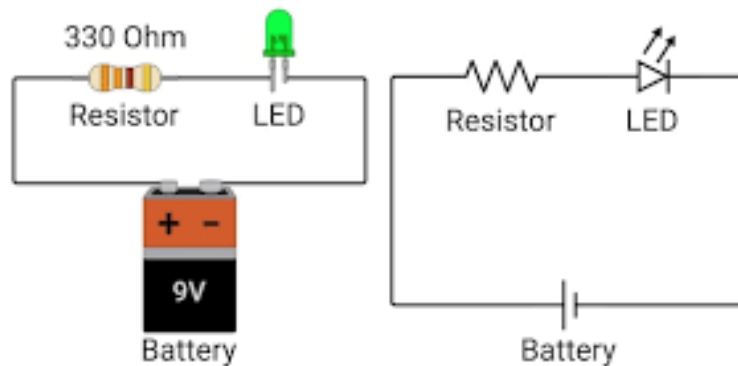


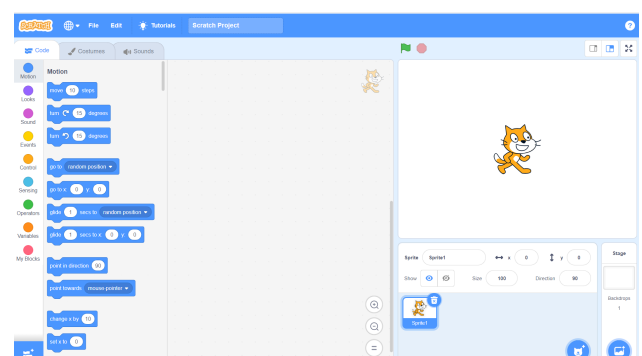
Figure: LED Circuit

Possible Exam Questions

1. What does STEAM stand for?
2. Write 2 safety rules for working with circuits.
3. What is the difference between an open and closed circuit? Draw diagrams.
4. Name two functions of a resistor.
5. Draw and label a simple LED circuit.

Chapter 3–4: Introduction to Scratch Programming

- **Scratch:** Block-based coding platform for games, animations, and stories.
- **Key Terms:**
 - **Sprite:** Character/object.
 - **Backdrop:** Background.
 - **Code Blocks:** Colorful commands to control sprites.



- **Scratch Interface:**

- Stage Area, Sprite List, Block Palette, Script Area.

Examples

- Make a sprite move: `when the green flag clicked → move 10 steps.`
- Make sprite dance: `forever → next costume → wait 0.3s.`

Possible Exam Questions

1. What is Scratch used for?
 2. Define Sprite and Backdrop.
 3. Write steps to make a sprite move and speak.
 4. What are code blocks in Scratch?
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Chapter 5–6: Conductors, Insulators & Crafting

Conductor: A conductor is a substance through which electric current or heat can flow freely because it has free-moving particles (like electrons).

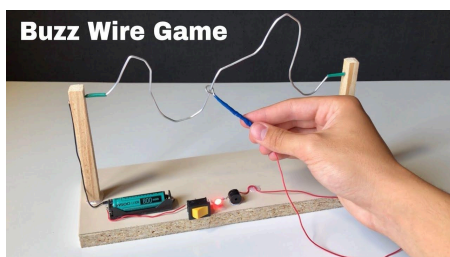
Examples: copper wire, iron rod, gold, seawater.

Insulator: An insulator is a substance that resists the flow of electric current or heat because it does not have free-moving particles.

Examples: plastic, rubber, glass, dry wood.



- **Buzzer Game:** Wire loop touches path → buzzer sounds.



- **Crafting:** Build models of Nepali houses using cardboard, paper, and glue.

Safety Tip: Use a hot glue gun with supervision.

Possible Exam Questions

1. Define conductor and give 2 examples.
 2. What is an insulator and give 2 examples.
 3. Explain how a buzzer game works.
 4. List materials used in a Nepali house model.
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Chapter 7–8: Variables & Loops in Scratch

- **Events:** Blocks that trigger scripts (**when green flag clicked**).
- **Variables:** Store values (like Score, Timer).
- **Loops:** Repeat actions.
 - **Repeat [n]:** Fixed times.
 - **Forever:** Runs endlessly.

Examples

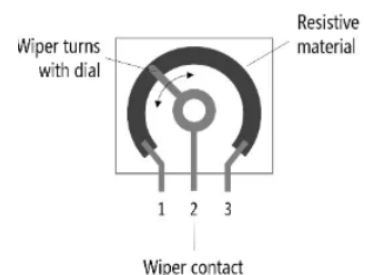
- **Click the Sprite Game:** **when sprite clicked** → **change score by 1**.
- **Self-drawing Pen:** Use pen extension + motion + repeat blocks.

Possible Exam Questions

1. What is a variable in Scratch?
 2. Name 2 types of loops in Scratch.
 3. Write steps to create a sprite-clicking game.
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Chapter 9–10: Potentiometer, Tinkercad & Robotics Components

- **Potentiometer:** potentiometer is a special knob that controls things like light, sound, or motor speed.

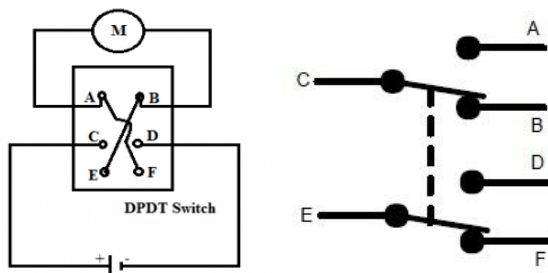
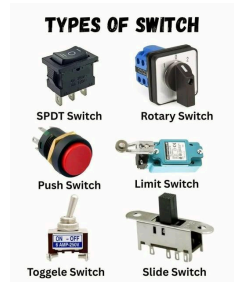


For example: Controlling LED brightness, Controlling Fan Speed

- **Switch:** A switch is a device that can turn electricity ON or OFF in a circuit.

Types of Switch:

- SPST, DPDT, Push Button, Toggle, Rotary.
- **DPDT Switch:** Double Pole Double Throw (DPDT) Switch can control 2 circuits and is used for motor direction.



- **Multimeter:** Measures voltage, current, resistance.



Figure: Multimeter

- **Tinkercad:** Tinkercad is a free online tool where you can design 3D objects and make electronic circuits on a computer. For example: Led blink, Traffic light system and Controlling led brightness with potentiometer.
- **AC:** Alternating Current (AC) changes the direction of electricity again and again. Example: Electricity from your home wall socket.
- **DC:** Direct Current(DC) flows electricity in only one direction. Example: Battery in a toy or remote.

Possible Exam Questions

1. What is a potentiometer? Give one use.
2. Write names of 3 types of switches.

3. What does a multimeter measure?
 4. What is Tinkercad used for?
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Chapter 11–12: Conditionals & Donut Collector Game

- **Conditional Statements:** Run code only if a condition is true.
 - If-Then
 - If-Then-Else
- **Sensing Blocks:** Detect interaction (touching sprite?, key pressed?).

Donut Collector Game

- Sprite collects donuts → score increases.
- Uses variables, loops, and conditionals.

Scratch Programming Quick Revision:

- **Sprite:** The character (e.g., Cat, Car)
- **Backdrop:** The background (e.g., City, Jungle)
- **Events Block:** When green flag clicked
- **Motion Block:** Move 10 steps
- **Looks Block:** Say "Hello"
- **Loops:** Repeat, Forever
- **Variables:** Store values like Score
- **Conditionals:** If-then, If-then-else