BASIC TECHNOLOGY JSS1

SCHEME OF WORK

- Woodwork Hand Tools
- Woodwork Hand Tools II
- Metalwork Hand Tools
- Metalwork Hand Tools II
- Maintenance of Tools and Machine
- Basic Electricity
- Basic Electricity II
- Basic Electricity III

WEEK 1 LESSON PLAN

Class: JSS1

Sex: Mixed

Age: 11–13 years

Topic: Woodwork Handtools

Objectives:

By the end of the lesson, students should be able to:

1. Identify and name common woodwork handtools.
2. Explain the purpose of each handtool in woodworking.
3. Understand the safety measures when using woodworking tools.

Instructional Materials:

- Pictures or actual samples of woodwork handtools (e.g., saw, hammer, chisels, planes)
- Demonstration of tool usage (using samples)
- A model workbench

Instructional Techniques:

- Lecture and demonstration
- Interactive discussion and questioning
- Hands-on practice with tools (if available)

Set Induction:

Ask the class:

- "How many of you have seen a carpenter at work before?"
- "What tools do you think a carpenter uses to cut wood or make furniture?"
  This opens up the discussion on woodworking handtools.

Summary:

The teacher will summarize the different tools used in woodworking, emphasizing the importance of using the right tool for each task.

Evaluation:

- **Objective Questions:**
    1. Which of these tools is used for cutting wood?
       a) Hammer
       b) Saw
       c) Plane
       d) Chisel
    2. What is the main function of a wood chisel?
       a) To smooth wood surfaces
       b) To cut through wood
       c) To carve and shape wood
       d) To measure wood
- **Theory Question:**
    1. Name five woodwork handtools and describe their uses.

NOTE: WOODWORK HANDTOOLS

Introduction:
Woodworking is an essential skill in many construction and craft-related activities. Woodworking handtools are tools used to cut, shape, and finish wood. They are often used in furniture making, carpentry, and various crafts. The correct use and maintenance of these tools are vital for quality work and safety.

Common Woodwork Handtools:

1. **Saw:**
    - A saw is used to cut wood into pieces. There are various types of saws, including the **hand saw** for general cutting and the **back saw** for precision cutting.
    - **Purpose:** Cutting wood across the grain (ripping) or with the grain (cross-cutting).
2. **Hammer:**
    - A hammer is used to drive nails into wood.
    - **Purpose:** To fasten pieces of wood together, to knock wooden joints into place, or to break up wood.
3. **Chisel:**
    - A chisel is a sharp tool used for carving or shaping wood.
    - **Purpose:** To cut, shape, or carve wood surfaces or joints.
4. **Plane:**
    - A plane is used to smooth or level the surface of wood.
    - **Purpose:** To make wood surfaces flat, smooth, and even.
5. **Tape Measure:**

    - A tape measure is used to measure the length of wood or the distance between points.
    - **Purpose:** For accurate measurement when cutting or placing pieces.
6. **Square:**
    - A square is a tool used to measure and mark right angles on wood.
    - **Purpose:** Ensuring corners and edges are 90 degrees for proper joint fitting.
7. **Screwdriver:**
    - A screwdriver is used for driving screws into wood.
    - **Purpose:** To fasten pieces of wood together using screws.
8. **Coping Saw:**
    - A coping saw is used for cutting curves and intricate designs in wood.
    - **Purpose:** To make detailed and curved cuts in wood.

Safety Measures When Using Woodwork Handtools:

1. **Always wear safety goggles** to protect your eyes from sawdust, flying wood chips, and potential splinters.
2. **Wear gloves** (if necessary) to protect your hands, but avoid thick gloves when using saws.
3. **Keep tools sharp** to ensure efficient and safe cutting. Dull tools require more force, which increases the chance of accidents.
4. **Work in a well-lit area** so that you can see clearly and avoid accidents.
5. **Store tools properly** after use to prevent tripping hazards and damage to tools.
6. **Keep hands clear of the cutting area** when using saws or chisels.
7. **Check for loose parts** on tools like hammers and screwdrivers before use to ensure they are in good condition.

Conclusion:

Woodworking handtools are essential for anyone working with wood. Understanding the proper use and safety measures when using these tools will ensure both high-quality work and safety. Proper maintenance of tools also ensures their longevity and effectiveness.

WEEK 2 LESSON PLAN

Class: JSS1

Sex: Mixed

Age: 11–13 years

Topic: Woodwork Handtools II

Objectives:

By the end of the lesson, students should be able to:

1. Identify and describe additional woodwork handtools.
2. Understand the proper maintenance and care for woodwork tools.
3. Demonstrate the safe use of the tools discussed in class.

Instructional Materials:

- Pictures or actual samples of woodwork handtools (e.g., files, clamps, mallets, rasp).
- Wood pieces for demonstration purposes.
- A workbench and tool storage unit.

Instructional Techniques:

- Lecture and demonstration
- Group work for hands-on practice
- Safety drills on tool handling

Set Induction:

Begin by asking:

- "What are some of the tools we used last week in woodwork?"
- "What do you think are the other tools we may need to work with wood on more detailed projects?"
  This will segue into the new tools introduced this week.

Summary:

Summarize the importance of using the right tools and maintaining them for quality work, alongside safety practices.

Evaluation:

- **Objective Questions:**
    1. Which of these tools is used to smooth rough wood surfaces?
       a) Mallet
       b) File
       c) Clamp
       d) Saw
    2. The primary function of a wood clamp is:
       a) To hold wood pieces together while gluing
       b) To cut wood
       c) To hammer nails into wood
       d) To polish the surface of wood
- **Theory Question:**
    1. Describe the purpose and use of a wood file in woodworking.

NOTE: WOODWORK HANDTOOLS II

Introduction:
As students advance in woodworking skills, they need to learn about more specialized tools that aid in finer details and precision. These tools help smooth, shape, and hold wood during cutting, carving, or joining tasks. Understanding the proper use and maintenance of these tools is crucial for both efficiency and safety.

Additional Woodwork Handtools:

1. **File:**
    - A file is a tool used to smooth and shape wood surfaces. It has a rough texture and comes in various sizes, shapes, and grades of coarseness.
    - **Purpose:** To smooth rough edges or remove excess material from wood surfaces.
2. **Clamp:**
    - A clamp is used to hold wood pieces together while they are being worked on or glued. It ensures that the wood pieces stay in place.
    - **Purpose:** To keep wood steady and prevent shifting during operations like gluing or cutting.
3. **Mallet:**
    - A mallet is a type of hammer with a large, flat head made of wood or rubber, which prevents damage to the wood when striking.
    - **Purpose:** To gently strike chisels, dowels, or other tools without damaging them or the work surface.
4. **Rasp:** A rasp is a coarse tool with rough teeth, typically used for shaping wood or removing material. It's effective for rougher tasks and carving.

- **Purpose:** To smooth and shape rough wood edges or surfaces, especially in fine detail work.

5. **Crosscut Saw:**
   - This saw has teeth designed for cutting wood across the grain. It is slightly different from a rip saw, which is made for cutting with the grain.
   - **Purpose:** To cut wood across the grain, producing smooth edges and precise cuts.

Maintenance and Care of Woodwork Tools:

1. **Cleaning Tools:**
   - After each use, tools should be cleaned to remove sawdust, dirt, or sticky residues. For example, saw blades can be wiped with a dry cloth or oiled to prevent rusting.
2. **Sharpening Tools:**
   - Regular sharpening ensures that tools like chisels, saws, and files stay effective. Use sharpening stones or files to maintain sharp edges.
3. **Storage:**
   - Store tools in a dry, safe place to prevent rust or damage. A toolbox or wall-mounted holder is ideal for keeping tools organized.
4. **Oil and Lubrication:**
   - Regularly oil the moving parts of tools, such as saws or mallets, to keep them functioning smoothly. This also helps to prevent rust.

Safety Measures When Using Woodwork Handtools:

1. **Check for Damage:** Always inspect tools before use to ensure they are in good working condition. A broken handle or loose blade can cause accidents.
2. **Use Tools Correctly:** Always use tools for their intended purpose. For example, do not use a mallet to drive nails—it could damage both the tool and the work surface.
3. **Wear Protective Gear:** Gloves, goggles, and safety aprons should be worn to prevent injury from sharp tools or flying wood chips.
4. **Work in a Stable Area:** Ensure your workbench or surface is stable and at the proper height to prevent accidents.

Conclusion: Woodworking requires a variety of tools that are essential for different tasks. Knowing how to use these tools correctly and maintain them is critical for safety, precision, and the quality of the work produced. Proper care and handling will extend the life of tools, making them reliable for all your woodworking projects.

WEEK 3 LESSON PLAN

Class: JSS1

Sex: Mixed

Age: 11–13 years

Topic: Metalwork Handtools

Objectives:

By the end of the lesson, students should be able to:

1. Identify common metalwork handtools used in metalworking.
2. Understand the purpose and proper use of these tools.
3. Demonstrate safe handling of metalworking tools.

Instructional Materials:

- Pictures or actual samples of metalwork handtools (e.g., hammer, file, pliers, vice, hacksaw).
- Metal pieces for demonstration purposes.
- A workbench designed for metalworking.

Instructional Techniques:

- Lecture and demonstration
- Hands-on practice with metalwork tools
- Group discussion on tool maintenance and safety

Set Induction:

Begin with a question:

- "What do you think is the difference between tools used for woodwork and those used for metalwork?"
  This will get students thinking about the tools' functions and materials used in metalworking.

Summary:

Summarize the importance of metalworking tools and their application in everyday life.
Reinforce safety practices and maintenance.

Evaluation:

- **Objective Questions:**
    1. Which of these tools is used for cutting metal?
        a) File
        b) Hacksaw
        c) Chisel
        d) Plane
    2. What is the main purpose of a vice in metalworking?
        a) To smooth surfaces
        b) To hold metal pieces in place
        c) To measure metal pieces
        d) To sharpen tools
- **Theory Question:**
    1. Describe the function and proper use of a file in metalworking.

NOTE: METALWORK HANDTOOLS

Introduction:
Metalworking involves shaping, cutting, and joining metal to create tools, parts, or structures. The tools used in metalworking are different from those used in woodworking because they are designed to handle the hardness and toughness of metal. These tools are typically stronger and require more careful handling.

Common Metalwork Handtools:

1. **Hammer:**
    - A hammer is a tool used for striking objects, particularly in metalworking to shape, bend, or form metal.
    - **Purpose:** To drive nails, break or shape metal, or fit pieces together.
2. **Hacksaw:**
    - A hacksaw is a tool used for cutting metal, plastic, and wood. It consists of a fine-toothed blade mounted on a frame.
    - **Purpose:** Cutting metal into pieces or specific shapes. It is primarily used for cutting through rods, pipes, or flat metal pieces.
3. **File:**
    - A file is used for smoothing rough edges on metal surfaces. It can also be used to shape metal pieces by filing away excess material.
    - **Purpose:** Smoothing, shaping, and removing burrs (sharp edges) from metal parts.
4. **Pliers:** Pliers are used to grip, twist, or bend metal. They come in various types, such as needle-nose, slip-joint, and locking pliers.

- **Purpose:** To hold metal pieces firmly or twist, bend, or pull wire.

5. **Vice:**
   - A vice is a clamping tool used to hold metal pieces securely while they are being worked on. It consists of two parallel jaws that clamp down on the object to keep it in place.
   - **Purpose:** To hold metal pieces still while cutting, filing, or shaping.
6. **Chisels:**
   - Chisels are used in metalworking for cutting, shaping, and removing metal from a work-piece. They are especially useful for engraving or fine adjustments.
   - **Purpose:** To carve or cut metal to precise shapes.
7. **Center Punch:**
   - A center punch is used to mark the center point on a metal piece before drilling or cutting. It creates a small indentation to guide the drill bit.
   - **Purpose:** To mark metal for accurate drilling.

Safety Measures When Using Metalwork Handtools:

1. **Wear Protective Gear:**
   - Always wear gloves to protect your hands from sharp edges, goggles to protect your eyes from flying metal debris, and ear protection when working with noisy equipment.
2. **Work in a Well-Ventilated Area:**
   - Ensure that the workspace has proper ventilation, especially if you're using tools that produce dust or sparks.
3. **Use Tools Correctly:**
   - Each tool has a specific function. For example, don’t use a hammer to cut metal or a hacksaw to bend metal. Using the right tool for the job will prevent accidents.
4. **Secure the Workpiece:**
   - Always secure the metal workpiece in a vice or clamp before cutting, filing, or shaping. This will prevent it from moving and causing injuries.
5. **Inspect Tools Regularly:**
   - Always check tools before use to make sure they are in good working condition. Replace worn or damaged tools immediately.
6. **Keep the Work Area Clean:**
   - A cluttered workspace can cause accidents. Always clean up after using tools and store them properly.

Conclusion: Metalworking tools are vital for shaping, cutting, and finishing metal materials. Like all tools, they require careful handling, proper maintenance, and safety awareness. By understanding the function and proper use of each tool, students will be able to carry out metalworking tasks efficiently and safely.

Here is **Week 4**:

WEEK 4 LESSON PLAN

Class: JSS1

Sex: Mixed

Age: 11–13 years

Topic: Metalwork Handtools II

Objectives:

By the end of the lesson, students should be able to:

1. Identify more advanced metalworking handtools and their uses.
2. Demonstrate the correct procedure for using each tool.
3. Apply safe handling techniques when working with these tools.

Instructional Materials:

- Pictures or actual samples of advanced metalwork tools (e.g., pipe wrench, cutting pliers, screwdrivers, metal rulers).
- Metal pieces for demonstration purposes.
- Workbench designed for metalworking.

Instructional Techniques:

- Demonstration and practice
- Group activity for hands-on experience
- Safety discussions and drills

Set Induction:

Ask the class:

- "Last week, we learned about some basic metalworking handtools. What tools do you think are used for more specific tasks in metalworking, like cutting metal pipes or tightening bolts?"
  This will lead into the introduction of new tools this week.

Summary:

Reinforce the importance of using the correct tool for the task at hand. Review key safety tips and the need for regular maintenance of tools.

Evaluation:

- **Objective Questions:**
    1. What tool is used to tighten or loosen bolts in metalworking?
       a) Hacksaw
       b) Pipe wrench
       c) Ruler
       d) File
    2. Which of these tools is primarily used for cutting wires or small metal parts?
       a) Screwdriver
       b) Cutting pliers
       c) Hammer
       d) Mallet
- **Theory Question:**
    1. What safety measures should be taken when using a pipe wrench or cutting pliers?

NOTE: METALWORK HANDTOOLS II

Introduction:
In this lesson, we will be exploring more advanced metalworking handtools. These tools are used for more specialized tasks in metalworking and come in various shapes and sizes, depending on the job they are designed for. Understanding their purpose and correct use is crucial for both safety and efficiency.

Additional Metalwork Handtools:

1. **Pipe Wrench:**
    - A pipe wrench is a tool used to grip and turn pipes or tubes. It has serrated jaws that provide a firm grip on round objects.
    - **Purpose:** To tighten or loosen pipes, often used in plumbing or metalworking tasks that involve metal tubing.
2. **Cutting Pliers:**
    - Cutting pliers, also known as wire cutters, are used for cutting wires, nails, and other small metal parts.
    - **Purpose:** To cut through small metal objects like wires or nails, usually by applying pressure to the handle to slice through the metal.
3. **Screwdrivers:**

- Screwdrivers are tools used to turn screws and bolts. They come in different types: flathead and Phillips, among others.
- **Purpose:** To insert or remove screws in metal parts, a common task in assembly or repair work.

4. **Metal Ruler or Caliper:**
   - A metal ruler or caliper is a tool used for measuring the length or thickness of metal parts. It is designed for precise measurements.
   - **Purpose:** To measure the dimensions of metal objects to ensure accurate cuts or fittings.
5. **Taps and Dies:**
   - Taps are tools used to cut threads inside a hole, while dies are used to cut external threads on a rod or wire.
   - **Purpose:** To create threaded holes for screws or bolts in metal parts, allowing them to be fastened together.

Safety Measures When Using Metalwork Handtools II:

1. **Inspect Tools Before Use:**
   - Always check the condition of the tools before use. Ensure that handles are secure, blades are sharp, and no parts are worn out or damaged.
2. **Use Proper Gripping Technique:**
   - When using tools like pipe wrenches or cutting pliers, ensure that you are gripping the tool correctly to avoid slipping or causing strain on your hands.
3. **Keep Hands and Tools Clean:**
   - Clean tools after each use to remove any metal filings or dirt that may have built up. Also, keep your hands dry to prevent slippage during use.
4. **Work in a Secure Position:**
   - Make sure that the workpiece is properly secured in a vice or clamp before applying force with tools like pipe wrenches or screwdrivers.
5. **Wear Protective Gear:**
   - Always wear gloves, goggles, and aprons when working with metal to protect against sharp edges, flying debris, and sparks.
6. **Avoid Overexertion:**
   - Do not use excessive force when using tools. If a tool seems stuck or difficult to operate, stop and reassess. Forcing tools can result in breakage or injury.

Conclusion: Advanced metalworking handtools are essential for completing detailed tasks in metalworking. Understanding how to use each tool properly, maintaining them, and following safety protocols ensures efficient work and reduces the risk of accidents.

WEEK 5 LESSON PLAN

Class: JSS1

Sex: Mixed

Age: 11–13 years

Topic: Maintenance of Tools and Machines

Objectives:

By the end of the lesson, students should be able to:

1. Understand the importance of regular maintenance of handtools and machines.
2. Identify common maintenance practices for metalworking tools and machines.
3. Perform basic maintenance on tools and machines safely and effectively.

Instructional Materials:

- A variety of metalworking tools (hammers, pliers, files, etc.).
- Samples of machines used in metalworking (or pictures of machines).
- Oil, cloth, and small tools for demonstrations.
- Workbench with metalworking tools.

Instructional Techniques:

- Demonstration of maintenance techniques.
- Group activity for hands-on tool and machine maintenance.
- Discussion on the importance of maintenance for safety and efficiency.

Set Induction:

Start with the question:

- "How do you think a tool or machine works effectively and lasts longer? What do you think would happen if we never took care of them?"
  This will engage the students and highlight the importance of maintenance.

Summary:

Reiterate that regular maintenance extends the lifespan of tools and machines, ensures safety, and helps maintain efficiency. Also, emphasize that maintenance can be simple and involves basic cleaning, lubrication, and proper storage.

Evaluation:

- **Objective Questions:**
    1. What is the purpose of oiling a metalworking tool?
       a) To make it shiny
       b) To prevent rust
       c) To sharpen it
       d) To clean it
    2. Which of the following is a recommended practice for tool maintenance?
       a) Using a damaged tool
       b) Leaving tools in a dirty state
       c) Keeping tools clean and stored properly
       d) Using tools for purposes other than intended
- **Theory Question:**
    1. Explain why regular maintenance of tools and machines is essential for safety and efficiency in the workshop.

NOTE: MAINTENANCE OF TOOLS AND MACHINES

Introduction:
Proper maintenance of tools and machines is crucial in metalworking, as it ensures that these tools operate safely and efficiently. Neglecting maintenance can lead to tool failure, poor-quality work, and accidents. In this lesson, we will explore how to maintain tools and machines effectively.

Why Maintenance is Important:

1. **Extends the Lifespan of Tools and Machines:**
   Regular maintenance ensures that tools and machines function properly for a longer period, avoiding costly repairs or replacements.
2. **Ensures Safety:**
   Maintaining tools reduces the likelihood of accidents, such as broken tools causing injury or machines malfunctioning during use.
3. **Improves Efficiency:**
   Well-maintained tools and machines perform better, allowing for faster and more accurate work. This increases productivity in the workshop.

4. **Reduces Downtime:**
   When tools and machines are properly maintained, there are fewer unexpected breakdowns or issues, minimizing downtime and disruptions.

Common Maintenance Practices for Tools and Machines:

1. **Cleaning Tools:**
   - After each use, clean tools to remove dirt, metal filings, and grease. A dirty tool can wear out quickly and cause accidents.
   - Use a wire brush, cloth, or cleaning solution to wipe down tools. For more delicate tools, use a soft cloth.
2. **Oiling and Lubrication:**
   - Apply oil or lubrication to moving parts of tools and machines. This helps prevent rust and ensures smooth operation.
   - Use light oil or machine lubricant for tools like hammers, pliers, and saws. Lubricate the joints of machines to avoid friction that may cause damage.
3. **Sharpening Tools:**
   - Tools like chisels, files, and saw blades become dull after repeated use. Regular sharpening ensures they remain effective and safe to use.
   - Use sharpening stones or specialized sharpening machines to keep the edges of tools sharp.
4. **Storage of Tools:**
   - Proper storage of tools is essential to prevent damage. Tools should be stored in a dry, clean place to avoid rust.
   - Use toolboxes or wall-mounted racks to keep tools organized and easily accessible.
5. **Inspecting Tools and Machines:**
   - Always check tools and machines before use to ensure they are in good condition. Look for cracks, loose parts, or worn-out sections.
   - Any damaged tools or machines should be repaired or replaced immediately to avoid accidents.

Maintenance of Specific Metalworking Machines:

1. **Lathe Machines:**
   - Regularly clean the lathe to remove metal shavings.
   - Lubricate moving parts, such as the spindle and carriage, to ensure smooth operation.
   - Check the alignment of the cutting tools and adjust as necessary.
2. **Drill Press:**
   - Clean the drill press after each use to remove metal dust.
   - Lubricate the drill press's moving parts, including the feed mechanism.

    - Check the drill bits for dullness and replace them if necessary.
3. **Bench Grinder:**
    - Clean the grinding wheel to prevent build-up of metal dust.
    - Ensure that the tool rest is properly adjusted for accurate grinding.
    - Regularly check the grinding wheel for cracks or damage and replace when necessary.

Conclusion:

Maintaining tools and machines is a simple but important aspect of metalworking. It ensures safety, prolongs the life of your tools, and enhances the overall quality of work. By keeping tools clean, well-oiled, and properly stored, you can work efficiently and safely in the workshop.

WEEK 6 LESSON PLAN

Class: JSS1

Sex: Mixed

Age: 11–13 years

Topic: Basic Electricity I

Objectives:

By the end of the lesson, students should be able to:

1. Understand the basic concepts of electricity, including voltage, current, and resistance.
2. Identify and explain the function of basic electrical components such as conductors, insulators, batteries, and light bulbs.
3. Perform a simple circuit experiment to demonstrate the flow of electricity.

Instructional Materials:

- Battery (1.5V or 9V)
- Light bulbs (small)
- Wires (insulated)
- Electrical tape
- Switch
- Conductors (e.g., copper wire)
- Insulators (e.g., rubber or plastic)
- Diagrams of simple circuits

Instructional Techniques:

- Demonstration through hands-on activities
- Group activities to build circuits
- Visual aids (diagrams, pictures) for better understanding
- Question and answer sessions

Set Induction:

Begin by asking:

- "What happens when you flip the switch of a lamp on? Why does the light come on, and how do you think the electricity reaches the light bulb?"

This will introduce students to the flow of electricity and the components of a basic electrical circuit.

Summary:

Conclude by reviewing the key concepts of electricity, including the basic components and how a simple electrical circuit functions. Emphasize safety when working with electricity and the importance of understanding its components.

Evaluation:

- **Objective Questions:**
    1. What is the purpose of a battery in a circuit?
       a) To store electricity
       b) To provide electrical energy
       c) To increase resistance
       d) To switch off the circuit
    2. Which of the following is an example of an insulator?
       a) Copper wire
       b) Rubber
       c) Iron
       d) Aluminum
- **Theory Question:**
    1. Explain the relationship between voltage, current, and resistance in an electrical circuit.

NOTE: BASIC ELECTRICITY I

Introduction:
Electricity is a form of energy that powers many of the devices we use daily. In this lesson, we will explore the basics of electricity, how it flows through a circuit, and the components involved in simple electrical systems.

Key Concepts in Basic Electricity:

1. **Voltage (V):**
    - Voltage is the force or pressure that pushes electrical current through a circuit. It is measured in volts (V).
    - **Example:** A battery provides a voltage that drives the current through a light bulb.
2. **Current (I):**

    - Current is the flow of electric charge through a conductor (wire). It is measured in amperes (A).
    - **Example:** When the switch of a light is turned on, current flows through the circuit, lighting the bulb.
3. **Resistance (R):**
    - Resistance is the opposition to the flow of electric current. It is measured in ohms (Ω).
    - **Example:** A light bulb offers resistance to the flow of electricity, which causes the bulb to light up. More resistance can reduce the current in a circuit.

Basic Electrical Components:

1. **Battery:**
    - A battery is a source of electrical energy that supplies voltage to the circuit. It converts chemical energy into electrical energy.
    - **Function:** To provide power to the circuit.
2. **Light Bulb:**
    - A light bulb is a device that converts electrical energy into light energy.
    - **Function:** To provide light when electrical current passes through it.
3. **Wires:**
    - Wires are conductors that allow the flow of current from one component to another.
    - **Function:** To connect various components in a circuit and facilitate the movement of electricity.
4. **Switch:**
    - A switch is a device that opens or closes a circuit, controlling the flow of current.
    - **Function:** To turn a device (like a light bulb) on or off.
5. **Conductors and Insulators:**
    - **Conductors:** Materials that allow electricity to pass through easily (e.g., copper, aluminum).
    - **Insulators:** Materials that do not allow electricity to flow through them easily (e.g., rubber, plastic).
    - **Function:** Conductors are used to carry current, while insulators are used to protect against electrical shocks and prevent short circuits.

Building a Simple Circuit:

To understand how electricity flows, let's build a simple circuit.

- **Components needed:** Battery, wires, light bulb, switch.
- **Steps:**
    1. Connect one wire to the positive terminal of the battery.

2. Attach the other end of the wire to one terminal of the light bulb.
3. Use another wire to connect the other terminal of the light bulb to the switch.
4. Connect the switch back to the negative terminal of the battery.
5. Flip the switch to complete the circuit and observe the light bulb turning on.

Safety Precautions in Electrical Work:

1. **Always Handle Electrical Components with Care:**
   - Never work with electricity when hands or equipment are wet, as water can conduct electricity and cause shock.
2. **Avoid Overloading Circuits:**
   - Do not connect too many devices to a single power source, as it may cause the circuit to overheat or short-circuit.
3. **Proper Insulation:**
   - Ensure that all wires are properly insulated to avoid accidental contact with live electrical parts.
4. **Switch Off Power Before Working on a Circuit:**
   - Always turn off the power before working on a circuit to avoid electrical shocks.

Conclusion:

Understanding the basic concepts of electricity, such as voltage, current, and resistance, is essential in electrical work. Knowing how to build a simple circuit and safely handle electrical components is key to performing practical electrical tasks. In the next lesson, we will continue to explore more advanced concepts and techniques in electricity.

WEEK 7 LESSON PLAN

Class: JSS1

Sex: Mixed

Age: 11–13 years

Topic: Basic Electricity II

Objectives:

By the end of the lesson, students should be able to:

1. Define and explain electrical circuits in series and parallel.
2. Understand the differences between series and parallel circuits.
3. Identify the advantages and disadvantages of each type of circuit.
4. Draw simple diagrams of series and parallel circuits.

Instructional Materials:

- Batteries (1.5V or 9V)
- Light bulbs
- Wires (insulated)
- Switches
- Electrical tape
- Diagrams of series and parallel circuits

Instructional Techniques:

- Demonstration through practical activities
- Visual aids (charts, diagrams, and drawings)
- Group work to create circuits
- Question and answer sessions
- Problem-solving exercises

Set Induction:

Start by asking:

- "What happens if you add more bulbs to the same circuit? Do they all still light up the same, or does it change?"

This question introduces the idea of different circuit configurations, leading into the lesson on series and parallel circuits.

Summary:

Conclude the lesson by reviewing the key concepts of series and parallel circuits. Emphasize the practical uses of both types of circuits and the importance of understanding their differences in real-life applications (e.g., household wiring vs. Christmas lights).

Evaluation:

- **Objective Questions:**
  1. Which type of circuit is most commonly used in household wiring?
     a) Series circuit
     b) Parallel circuit
     c) Both
     d) None
  2. In a series circuit, if one bulb goes out, what happens to the other bulbs?
     a) They all go out
     b) Only the broken bulb goes out
     c) They stay on
     d) They flicker
- **Theory Question:**
  1. Draw and explain a parallel circuit with two bulbs connected to a 9V battery.

NOTE: BASIC ELECTRICITY II

Introduction:
In the previous lesson, we explored the basic concepts of electricity, including how electricity flows in a simple circuit. In this lesson, we will explore two important types of circuits—series and parallel circuits. These circuits are used in different situations, and understanding their properties is crucial for electrical work.

Types of Electrical Circuits:

1. **Series Circuit:**
   - **Definition:** A series circuit is one in which the components (such as bulbs, resistors, etc.) are connected end-to-end, so the current flows through each component in turn.
   - **Diagram:**

2. `[Battery] --- [Bulb 1] --- [Bulb 2] --- [Bulb 3] --- [Switch]`

   - **Properties:**

        - Current is the same throughout the circuit.
        - Voltage is divided across each component.
        - If one component fails (e.g., a bulb burns out), the entire circuit is broken, and all components stop working.
3. **Parallel Circuit:**
    - **Definition:** A parallel circuit is one in which the components are connected in such a way that each component has its own path to the power source. Current can flow through multiple paths simultaneously.
    - **Diagram:**

```
    [Battery]
      |
  [Bulb 1]   [Bulb 2]   [Bulb 3]
     |          |          |
  [Switch]   [Switch]   [Switch]
```

    - **Properties:**
        - Voltage is the same across all components.
        - Current is divided among the components based on their resistance.
        - If one component fails, the others continue to work, as they have their own paths.

Differences Between Series and Parallel Circuits:

Feature	Series Circuit	Parallel Circuit
Current	Same current flows through all components.	Current is divided among the branches.
Voltage	Voltage is divided among components.	Voltage is the same across all branches.
Effect of Failure	If one component fails, the whole circuit stops working.	If one component fails, the others continue to work.
Application	Used in simple circuits, like string lights.	Used in most household wiring for appliances.

Advantages and Disadvantages:

1. **Advantages of Series Circuits:**
    - Simple to construct.
    - Requires fewer wires.
2. **Disadvantages of Series Circuits:**
    - If one component fails, the entire circuit is disrupted.
    - Voltage drop can be significant across each component.
3. **Advantages of Parallel Circuits:**
    - If one component fails, the others continue to work.
    - Constant voltage across each component, leading to more efficient performance.

    - Used in practical applications like household lighting and appliances.
4. **Disadvantages of Parallel Circuits:**
    - Requires more wires and is more complex to construct.
    - The total current in the circuit increases as more components are added, which may require a more powerful power source.

Building a Series Circuit:

To demonstrate a series circuit, follow these steps:

1. Connect the positive terminal of a battery to one end of a light bulb using a wire.
2. Connect the other end of the bulb to the positive terminal of another light bulb.
3. Continue this pattern to add more light bulbs.
4. Finally, connect the last bulb to the negative terminal of the battery.
5. Switch on the circuit and observe the behavior of the bulbs.

Building a Parallel Circuit:

To demonstrate a parallel circuit, follow these steps:

1. Connect the positive terminal of the battery to one terminal of each light bulb using separate wires.
2. Connect the other terminal of each light bulb to the negative terminal of the battery using another set of wires.
3. Switch on the circuit and observe the behavior of the bulbs.

Safety Precautions:

1. **Turn off Power Before Working:** Always ensure the power is turned off before making any changes to the circuit to prevent electric shocks.
2. **Check Components:** Make sure all components, such as wires and light bulbs, are rated for the circuit's voltage to prevent damage.
3. **Avoid Short Circuits:** Never allow wires to touch inappropriately as this could cause a short circuit, leading to sparks or fires.

Conclusion:

In this lesson, we learned about series and parallel circuits, their properties, and how to build them. Understanding the differences between these two types of circuits helps us to apply them in different electrical setups, from simple toys to complex household wiring systems. Next time, we will explore more advanced concepts in electricity, including the role of resistors and conductors.

WEEK 8 LESSON PLAN

Class: JSS1

Sex: Mixed

Age: 11–13 years

Topic: Basic Electricity III

Objectives:

By the end of the lesson, students should be able to:

1. Explain the concepts of conductors and insulators.
2. Identify materials that are good conductors and insulators of electricity.
3. Understand the role of resistors in an electrical circuit.
4. Perform a simple experiment to identify conductors and insulators.

Instructional Materials:

- Copper wire
- Rubber wire
- Insulating materials (e.g., plastic, rubber, wood)
- Batteries (1.5V or 9V)
- Light bulbs
- Switches
- Multimeter (for measuring resistance)
- Resistors (different types)
- Paper and pencils for notes

Instructional Techniques:

- Hands-on activities with experiments
- Demonstration using simple electrical components
- Discussion and Q&A
- Visual aids (charts, diagrams, and materials)
- Group work to conduct experiments

Set Induction:

Ask:

- "What happens when you touch a metal object in a circuit? Do you feel anything? What about when you touch a rubber or wooden object in the circuit?"
  This question will introduce the concept of conductors and insulators, setting the stage for the lesson.

Summary:

Conclude by reviewing the role of conductors and insulators in electrical circuits and the importance of resistors in controlling the flow of electricity. Reinforce the idea that knowing which materials are good conductors or insulators is essential for safe and efficient electrical work.

Evaluation:

- **Objective Questions:**
  1. Which of the following is a good conductor of electricity?
     a) Rubber
     b) Copper
     c) Wood
     d) Plastic
  2. What is the primary function of a resistor in an electrical circuit?
     a) To increase the current
     b) To decrease the current
     c) To allow the current to flow freely
     d) To create light
- **Practical Question:**
  1. Conduct a simple experiment to identify conductors and insulators. List the materials you tested and the results you observed.

NOTE: BASIC ELECTRICITY III

Introduction:
In the previous lessons, we learned about series and parallel circuits, as well as the behavior of electricity in these circuits. In this lesson, we will focus on the types of materials that allow electricity to flow (conductors) and those that do not (insulators). We will also explore the role of resistors in controlling the current within a circuit.

Conductors and Insulators

1. **Conductors:**

- **Definition:** A conductor is a material that allows electricity to flow easily through it. These materials have free electrons that can move, allowing electrical current to pass.
- **Common Conductors:**
  - **Copper:** Widely used in electrical wiring because of its excellent conductivity.
  - **Aluminum:** Used in power transmission lines.
  - **Gold and Silver:** Excellent conductors but are expensive.
- **Properties of Conductors:**
  - Conductors have low resistance.
  - They allow electricity to pass through with minimal energy loss.

2. **Insulators:**
   - **Definition:** An insulator is a material that does not allow electricity to flow through it easily. The electrons in insulators are tightly bound to atoms, preventing them from moving freely.
   - **Common Insulators:**
     - **Rubber:** Used to insulate wires.
     - **Plastic:** Often used in electrical appliances to prevent short circuits.
     - **Wood and Glass:** These materials do not conduct electricity under normal conditions.
   - **Properties of Insulators:**
     - Insulators have high resistance.
     - They prevent the flow of electricity, ensuring safety.

Role of Resistors in a Circuit:

1. **What is a Resistor?**
   - A resistor is a component used in electrical circuits to limit the amount of current that flows through the circuit.
   - Resistors are essential for controlling the flow of electricity and preventing damage to other components.
2. **How Do Resistors Work?**
   - When a resistor is placed in a circuit, it "resists" the flow of current. This resistance causes some of the electrical energy to be converted into heat.
   - The amount of resistance in a resistor is measured in **ohms (Ω)**.
   - **Formula for Resistance (Ohm's Law):**
     $V=I\times R$ V = I \times R
     Where:
     - V V is voltage (in volts),
     - I I is current (in amperes),
     - R R is resistance (in ohms).
3. **Different Types of Resistors:**
   - **Fixed Resistors:** These resistors have a set value of resistance and do not change.

- **Variable Resistors:** Also known as potentiometers, these resistors allow the user to adjust the resistance in the circuit.
- **Wire-Wound Resistors:** These are resistors made from a wire wound around an insulating core and are used for high power applications.

Experiment: Identifying Conductors and Insulators

1. **Objective:** To identify materials that are good conductors and insulators of electricity.
2. **Materials Needed:**
   - Battery (1.5V or 9V)
   - Light bulb
   - Wires
   - Various materials (e.g., copper wire, rubber, plastic, wood, metal, glass)
3. **Procedure:**
   1. Connect a battery to a light bulb using a wire. The light bulb should light up.
   2. Replace one of the wires with different materials (e.g., copper, plastic, rubber) to see if the light bulb still lights up.
   3. Observe which materials cause the light bulb to light up (conductors) and which do not (insulators).
4. **Results:**
   - Conductors will allow the light bulb to light up.
   - Insulators will prevent the light bulb from lighting up.
5. **Conclusion:**
   - Materials like copper and aluminum are conductors because they allow electricity to flow easily.
   - Materials like plastic, rubber, and wood are insulators because they prevent the flow of electricity.

Safety Precautions:

1. **Never touch live wires** or electrical components with bare hands to avoid electric shock.
2. **Handle batteries and electrical components carefully** to prevent short circuits and sparks.
3. **Ensure the power is turned off** when working with electrical circuits.

Conclusion: In this lesson, we explored the properties of conductors and insulators, learning how they behave in electrical circuits. We also learned about the role of resistors in controlling the current in a circuit. Understanding these concepts helps us design safe and effective electrical systems, both at home and in various applications.