JSS 3 COMPUTER HARDWARE AND GSM REPAIRS LESSON NOTES

FIRST TERM

WEEK 1: REVIEW OF JSS 2 WORK



Content: (I) Recap of circuits, entrepreneurship, and software tools.

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

1. Recall the basic components of a mobile phone circuit (power, network, sound).
2. Define "entrepreneurship" and list three (3) qualities of a good GSM repair technician.

3. Identify common software repair tools and their functions (e.g., Flashing tools).
4. Summarize the key principles of customer service in a repair business.
5. Recap the basic steps of fault diagnosis (visual, power-on, multimeter).

Lesson Content:

1. Comprehensive Review of JSS 2 Technical Skills

- **Mobile Phone Circuits (Recap):**
  - A "circuit" is a complete path for electricity to flow.
  - **Power Section:** The "heart" of the phone. Includes the **Battery**, **Charging Port**, and **Power IC (Integrated Circuit)**. This section manages all power distribution.
  - **Network Section (RF Section):** The "communications" part. Includes the **Antenna**, **RF IC**, and **SIM card connections**. It handles making and receiving calls/data.
  - **Sound Section (Audio):** Includes the **Microphone** (to capture your voice), **Earpiece Speaker** (to hear calls), and **Loudspeaker/Ringer** (for music/ringing).
- **Fault Diagnosis (Recap):**
  - The logical process of finding a fault.
  - **Step 1: Visual Inspection:** Looking for physical damage (cracked screen, water damage, broken port).
  - **Step 2: Power-On Test:** Checking if the phone boots up, if the display works, etc.
  - **Step 3: Multimeter Test:** Using a multimeter to check for **Voltage** (e.g., is the battery charged?) and **Continuity** (e.g., is the charging port connection broken?).

2. Comprehensive Review of JSS 2 Software & Business Skills

- **Software Tools (Recap):**
  - **Flashing:** The process of reinstalling the phone's Operating System (OS).
  - **Why Flash?** To fix software problems like constant hanging, boot loops (stuck on logo), or virus infections.
  - **Factory Reset:** A "soft" reset that wipes user data but does not reinstall the OS.
- **Entrepreneurship & Customer Service (Recap):**

- **Entrepreneurship:** Identifying a need (e.g., "People in my area need phone repairs") and starting a business to solve it, taking a financial risk to make a profit.
- **Bookkeeping:** The *essential* process of recording all money in (Income) and money out (Expenses) to know if your business is profitable.
- **Customer Relations:** This is the key to a successful business.
  - **Honesty:** Telling the client the *real* problem and charging a *fair* price.
  - **Reliability:** Finishing the repair *when you said* you would.
  - **Communication:** Explaining the fault to the client in simple terms.

Evaluation:

1. What are the three (3) main sections of a mobile phone's circuit board?
2. What is the difference between a "Factory Reset" and "Flashing"?
3. What tool would you use to check if a battery has 3.7 volts?
4. Why is "honesty" the most important part of customer relations in the repair business?
5. What is "bookkeeping," and why is it important for an entrepreneur?

Assignment:

1. In your own words, describe the function of the "Power IC."
2. A customer brings a phone that is stuck on the Samsung logo. What is the *likely* problem (hardware or software), and what is the *likely* solution?
3. List three (3) qualities of a good GSM repair entrepreneur.
4. What is the "Network Section," and what are its main components?
5. Why is it important to perform a "visual inspection" *before* opening a phone?

WEEK 2: INTRODUCTION TO ADVANCED GSM REPAIRS

Content: (I) Identifying advanced faults (II) Board-level repairs.



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

1. Differentiate between "basic repairs" (Level 1 & 2) and "advanced repairs" (Level 3 & 4).
2. Define "Board-Level Repair."
3. Identify the key "Integrated Circuits" (ICs) on a motherboard.
4. Explain what a "short circuit" is and how it is identified.
5. List the additional tools required for advanced repairs.

Lesson Content:

1. The Levels of Mobile Phone Repair

- **Level 1 (Basic):** *Software Repairs.*
    - Factory resets, flashing, unlocking, removing viruses. No tools needed.
- **Level 2 (Hardware - "Swap-out"):**
    - Opening the phone to *replace* faulty components.
    - *Examples:* Changing a broken screen, replacing a bad battery, replacing a faulty charging port or speaker.
    - *Tools:* Screwdrivers, spudgers, multimeter. (This was the focus of JSS 2).
- **Level 3 & 4 (Advanced):** *Board-Level Repairs.*
    - This is what we are learning in JSS 3.
    - **Definition:** This involves repairing the *motherboard (PCB)* itself. Instead of replacing the whole charging port, you might just re-solder a broken pin. Instead of replacing the *whole board* because the sound is not working, you find and replace the *specific audio IC* on the board.
    - **This is micro-surgery for phones.**

2. Understanding the Motherboard (PCB - Printed Circuit Board)

- The "motherboard" (or "logic board") is the "brain" and "nervous system" of the phone.
- **Integrated Circuits (ICs):** These are the small, black "chips" soldered onto the board. They are tiny "mini-computers" that each perform one specific job.
    - **CPU (Central Processing Unit):** The *main brain* of the phone.
    - **Power IC:** The "manager" of all electricity.
    - **Flash IC / eMMC:** The permanent *memory* (storage) for the OS and your files.
    - **RF IC (Network IC):** The "radio" that controls all network signals.
    - **Audio IC:** The "sound card" that controls the mic and speakers.

3. Identifying Advanced Faults

- **Basic Fault:** "My screen is cracked." (Easy to see).

- **Advanced Fault:** "My phone is completely dead. I tried a new battery and a new charging port, and it still won't turn on."
    - **Conclusion:** The fault is not in the (Level 2) components; it is on the *motherboard* (Level 3).
    - **Possible Cause:** The **Power IC** might be damaged, or there is a **Short Circuit**.

4. What is a "Short Circuit"?

- **Definition:** A "short circuit" is an *abnormal, low-resistance path* for electricity. It's when electricity finds a "shortcut" and flows where it is not supposed to.
- **Analogy:** Imagine a water pipe that bursts. The water (electricity) goes *everywhere* instead of to the tap.
- **On a phone:** A tiny, faulty component (like a *capacitor*) can create a short, draining the battery instantly and preventing the phone from turning on.
- **Diagnosis:**
    - **Multimeter:** Used in "continuity" or "diode" mode to find the short.
    - **Thermal Camera:** (Very advanced) A camera that shows "heat." The shorted component will become very hot.
    - **Rosin Test:** (Common) Rosin (from solder flux) is "smoked" onto the board, turning it white. When power is applied, the *shorted component* gets hot and *melts* the rosin, revealing its location.

5. Additional Tools for Board-Level Repairs

1. **Soldering Iron:** (Week 3) To melt solder.
2. **Hot Air Rework Station:** (Week 3) Essential. Uses high-heat air to remove and replace ICs *without* touching them.
3. **Microscope:** (Digital or Optical) To *see* the tiny components.
4. **DC Power Supply:** To "force" voltage into a dead phone to find shorts.
5. **Schematic Diagrams:** The "map" of the circuit board, showing what each component is and where it connects.

Evaluation:

1. What is the difference between a "Level 2 Repair" and a "Level 3/4 Repair"?
2. What is a "Board-Level Repair"?
3. What are "ICs"? Name three (3) different ICs on a phone board.
4. In simple terms, what is a "short circuit"?
5. What is the *most important* new tool needed for board-level repairs, which uses hot air? (Hot Air Rework Station).

Assignment:

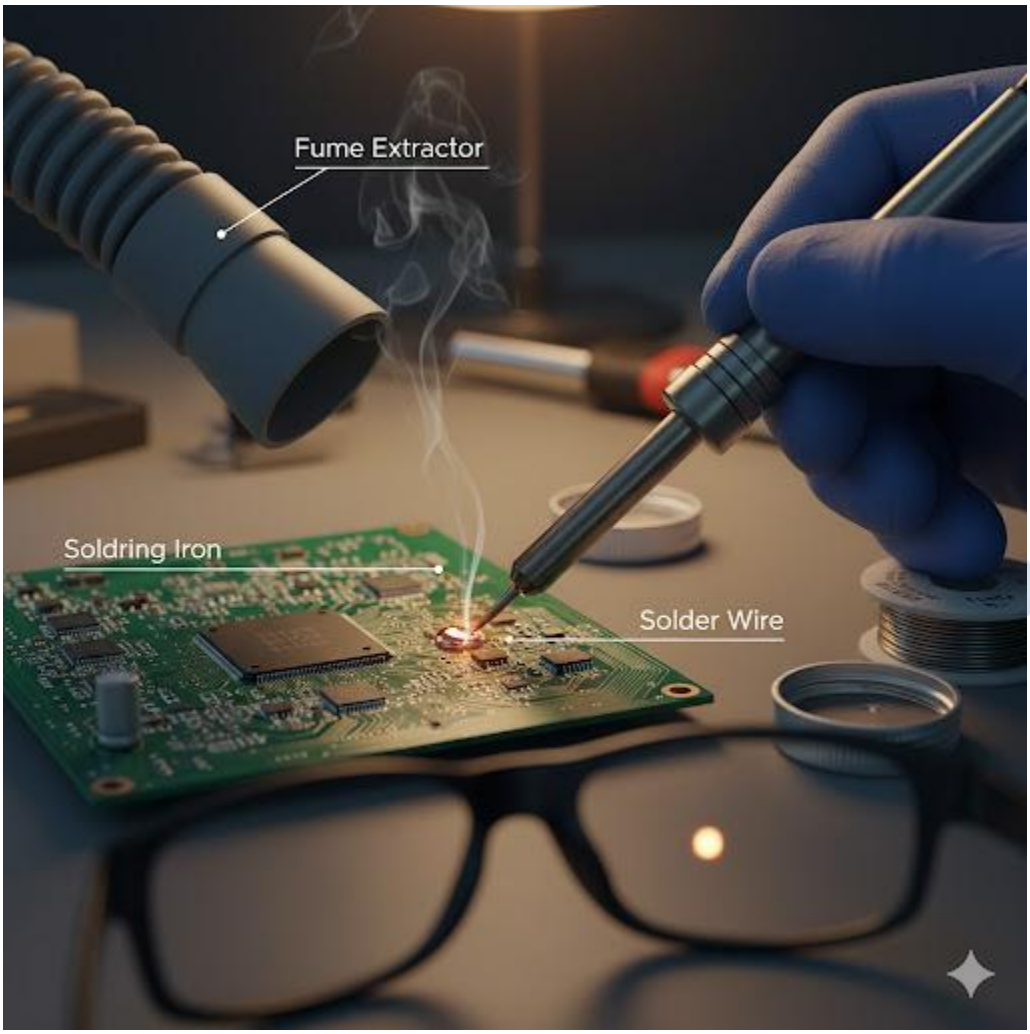
1. Define Board-Level Repair, Integrated Circuit (IC), and Short Circuit.
2. List the four (4) levels of mobile phone repair.
3. A customer brings a phone with no sound. You have already changed the speaker (a Level 2 repair), but it still doesn't work. What is the *likely* (Level 3) fault?
4. Briefly describe the "Rosin Test" for finding a short circuit.
5. List five (5) tools needed for advanced (board-level) repairs that are *not* needed for basic (Level 2) repairs.

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WEEK 3: SOLDERING AND DESOLDERING TECHNIQUES

Topic: Soldering and Desoldering Techniques

Content: (I) Tools for soldering (II) Safety precautions.



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

1. Define "Soldering" and "Desoldering."
2. Identify the tools and materials used in soldering (Soldering Iron, Hot Air Station, Solder, Flux).
3. Explain the *critical* role of "Flux" in soldering.

4. List and explain three (3) essential safety precautions for soldering.
5. Describe the basic process of "tinning" a soldering iron tip.

Lesson Content:

1. What is Soldering?

- **Definition:** Soldering is the process of joining two or more electronic components together by melting a special metal alloy (called **solder**) between them.
- **The "Glue":** Solder is the "metal glue" that conducts electricity. It melts at a low temperature, joining the components, and then hardens.
- **Desoldering:** The *opposite* process: removing components by *melting* the old solder.

2. Tools and Materials for Soldering

- **1. Soldering Iron:**
  - A hand tool that heats a metal *tip* to a high temperature (300°C - 450°C).
  - Used for "contact" soldering: replacing charging ports, pins, and small components.
- **2. Hot Air Rework Station (Critical for GSM):**
  - A station that blows a precise jet of *very hot air* (like a tiny, powerful hair dryer).
  - **Use:** This is for **desoldering** and **soldering** ICs (Week 2). You heat the *area* to melt the solder *underneath* the chip, allowing you to lift it off.
- **3. Solder (or Solder Wire):**
  - The "metal glue" itself. It's a wire made of metal alloys (like Tin/Lead or Tin/Silver/Copper).
  - **Leaded (Sn/Pb):** Melts at a lower temperature, easier to work with (but the lead fumes are toxic).
  - **Lead-Free (Sn/Ag/Cu):** Used in all modern phones. Melts at a higher temperature, harder to work with.
- **4. Flux (The "Magic Sauce"):**
  - **THIS IS THE MOST IMPORTANT MATERIAL.** Solder *will not* work without it.

- **Definition:** Flux is a chemical paste or liquid (it looks like a gel or grease).
- **Functions (The 3 "C"s):**
    1. **Cleans:** It removes *oxidation* (rust) from the metal pads, making them clean for the solder to stick.
    2. **Conducts (Heat):** It helps the heat from the iron/hot air transfer *evenly* to the board and component.
    3. **Flows (Solder):** It reduces the "surface tension" of the molten solder, making it flow smoothly and "stick" to the metal pads, not to itself.

- **5. Desoldering Tools:**
    - **Solder Wick (Desoldering Braid):** A braid of copper wire. You press it on the old solder with your iron, and it "sucks up" the molten solder.
    - **Solder Sucker (Vacuum Pump):** A small pump that sucks up liquid solder.

3. Soldering Safety Precautions (CRITICAL) Soldering is dangerous. You are working with high heat, toxic metal (lead), and harmful fumes.

1. **Ventilation (Fume Extraction):**
    - **Problem:** Solder flux (when heated) and lead (if used) create toxic smoke (fumes). Breathing this smoke daily can cause *serious lung damage and lead poisoning*.
    - **Solution:** *Never* solder in a closed room. You *must* have a **fume extractor** (a fan with a filter) to suck the smoke *away* from your face. At a minimum, work near an open window with a fan blowing *out*.
2. **Burn Prevention (Heat):**
    - A soldering iron (400°C) is *much hotter* than boiling water (100°C). It will give you a severe, instant burn.
    - **Solution:** *Never* touch the metal part. *Always* place the iron in its **safety stand** when not in your hand. Keep your work area clear.
3. **Eye Protection:**
    - **Problem:** Molten solder can (and will) "spit" or "splash" tiny hot balls of metal. Flux can bubble and splash.
    - **Solution:** *Always* wear **safety goggles** to protect your eyes.
4. **Hand Washing:**

- If you use leaded solder, the lead dust is a poison.
- **Solution:** *Always* wash your hands thoroughly with soap and water *after* soldering, especially before eating or drinking.

4. Practical: "Tinning" the Iron Tip

- **Purpose:** A new iron tip is "shiny" and will not hold solder. It must be "tinned" (coated with solder) first.
- **Process:**
  1. Heat the iron.
  2. Touch the *solder wire* (not the flux) to the tip until a small blob melts and *coats* the tip.
  3. Wipe the tip *quickly* on a damp sponge or brass wool to clean off the excess.
  4. The tip should now be clean, silver, and shiny, ready to transfer heat. *You must do this every time you use it.*

Evaluation:

1. What is "soldering"?
2. What is "desoldering"?
3. What are the three (3) main functions of "flux"? (The 3 "C"s).
4. What is the *most* important safety precaution for preventing lung damage? (Ventilation / Fume Extraction).
5. What tool is used to remove and replace ICs using hot air?

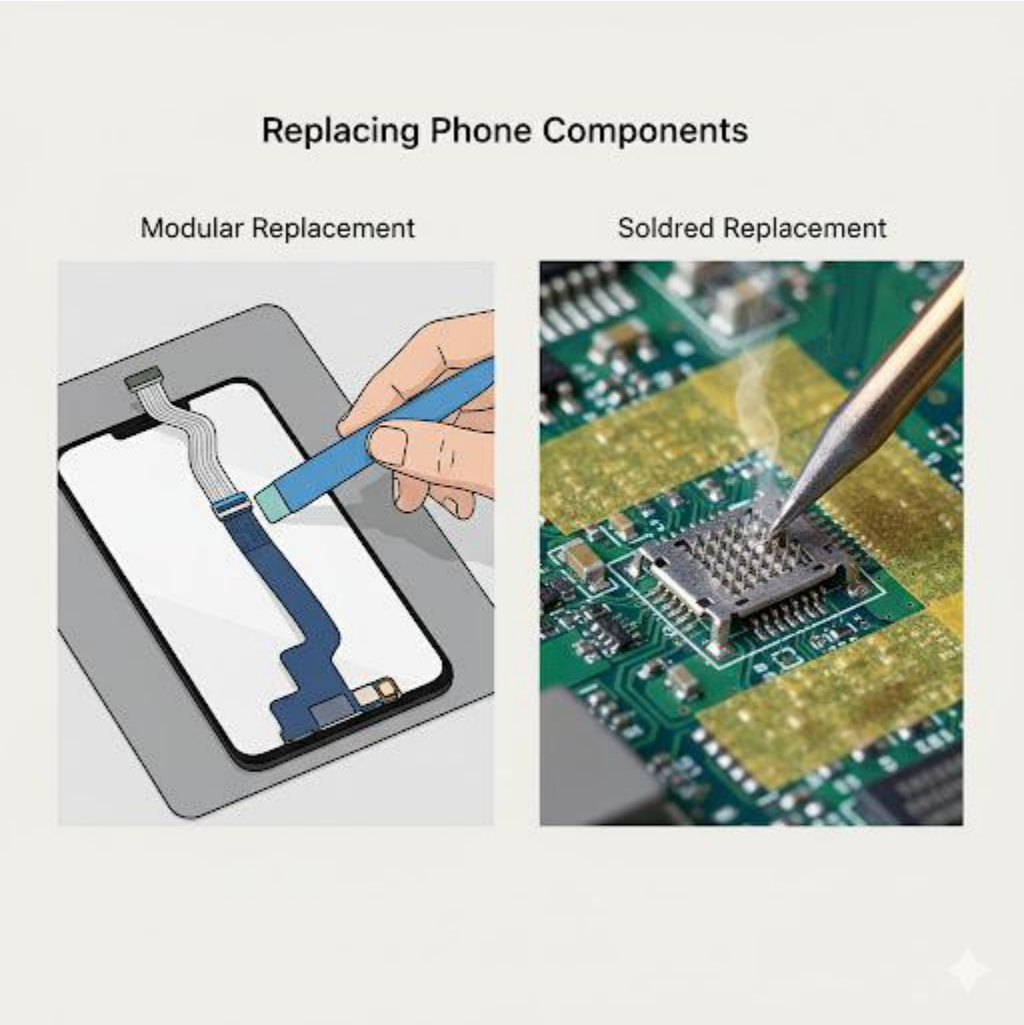
Assignment:

1. Define Soldering, Desoldering, Solder, and Flux.
2. List three (3) major safety hazards in soldering and the precaution for each.
3. What is the difference between a "soldering iron" and a "hot air rework station"? (What is each one used for?)
4. What is a "solder wick," and what is it used for?
5. Why is it critical to "tin" your soldering iron tip?

WEEK 4: REPLACING PHONE COMPONENTS

Topic: Replacing Phone Components

Content: (I) Replacing charging ports, screens, speakers, and buttons.



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

1. Differentiate between "Modular" replacement (JSS 2) and "Soldered" replacement (JSS 3).
2. Describe the process of replacing a *modular* screen.
3. Describe the process of replacing a *soldered* charging port.
4. Identify the tools needed for each type of replacement.

5. Explain the risks and precautions involved in component replacement.

Lesson Content:

This lesson covers Level 2 (modular) and Level 3 (soldered) component replacement.

1. Modular vs. Soldered Components

- **Modular Components (Level 2):**
  - These are parts that are easy to "swap." They connect to the motherboard using *press-fit connectors* (like small Lego bricks) or *ribbon cables*.
  - **Examples:** Batteries, screens (on most modern phones), speakers, cameras.
  - **Tools:** Screwdrivers, spudgers (plastic openers), tweezers.
- **Soldered Components (Level 3):**
  - These are parts that are *soldered* directly onto the motherboard.
  - **Examples:** Charging ports (on most phones), buttons, microphone, SIM/SD card slots, ICs.
  - **Tools:** *All* the Level 2 tools *plus* a **soldering iron**, **hot air station**, **flux**, and **solder**.

2. Practical Process 1: Replacing a Modular Screen (e.g., iPhone or modern Android)

1. **Power Off:** Always turn the phone off and (if possible) remove the battery.
2. **Open Phone:** Use the correct screwdrivers (e.g., pentalobe for iPhone) to remove the bottom screws.
3. **Heat:** *Gently* heat the *edges* of the screen with a heat gun or hot air station (on low, ~80°C) to *soften* the adhesive (glue).
4. **Pry:** Use a suction cup to lift the screen slightly and insert a *thin prying tool* (like a guitar pick or plastic spudger) to *slice* through the adhesive. *Go slowly to avoid cracking the glass.*
5. **Open:** Open the phone like a book. *Be careful* of the thin, flat *ribbon cables* connecting the screen to the board.

6. **Disconnect:** Use a *plastic* spudger (never metal) to *gently* "pop" off the press-fit connectors for the screen and battery.
7. **Remove Old Screen:** The old screen is now free.
8. **Install New Screen:** Connect the new screen's ribbon cables, press them firmly, and "test" the new screen *before* sealing the phone.
9. **Seal:** Re-apply adhesive (if needed) and press the phone back together.

3. Practical Process 2: Replacing a Soldered Charging Port (e.g., common Android) This is an advanced (Level 3) repair.

1. **Disassemble:** Open the phone completely (like in Process 1) and *remove* the motherboard from the phone's frame.
2. **Protect:** Place the motherboard on a heat-resistant mat. Cover nearby *plastic* components (like a microphone) with *heat-resistant tape (Kapton tape)*.
3. **Apply Flux:** Apply a generous amount of *flux gel* to the pins of the old charging port.
4. **Desolder:**
    - *Method 1 (Soldering Iron):* Add a blob of *new* solder to the *old* pins. This mixes with the old solder and makes it melt easier. Use a solder wick to clean the pins.
    - *Method 2 (Hot Air):* Use the *hot air station* from *underneath* the board to heat the area. When the solder melts, use *tweezers* to lift the old port off.
5. **Clean Pads:** Use *solder wick* to remove *all* the old solder from the board, leaving clean, flat mounting holes/pads.
6. **Install New Port:**
    - Place the new port in position.
    - **Anchor:** Solder the large "legs" first to hold it in place.
    - **Solder Pins:** Use a fine-tip soldering iron and a tiny amount of solder to connect each of the 5 (or more) small pins. *Flux is essential here.*
7. **Inspect:** Use a *microscope* or magnifying glass to check that *no pins are bridged* (touching each other).
8. **Clean:** Use a toothbrush and *isopropyl alcohol (IPA)* to clean off all the old, burnt flux.
9. **Test:** Reassemble the phone and test with a charger.

Evaluation:

1. What is the difference between a "modular" component and a "soldered" component?
2. What is the purpose of *heating* a phone screen before removing it?
3. What tool *must* you use to safely disconnect battery and screen connectors? (Plastic spudger).
4. What two (2) items are *essential* for desoldering and resoldering a charging port? (Flux and a soldering iron/hot air).
5. What should you use to clean the board after soldering? (Isopropyl Alcohol - IPA).

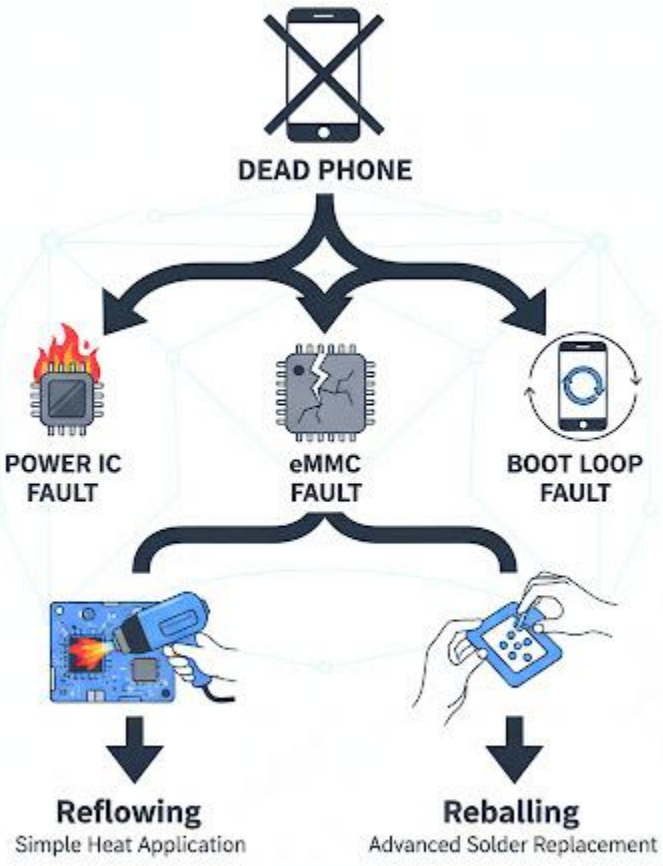
Assignment:

1. Make two columns. In one, list 3 "modular" components. In the other, list 3 "soldered" components.
2. Write the step-by-step process for a *modular screen replacement*.
3. Why should you *never* use a metal tool to disconnect a battery?
4. What is "Kapton tape" (heat-resistant tape) used for?
5. After soldering a new port, what is the *final check* you must do *before* reassembling the phone? (Inspect for bridges, clean the flux).

WEEK 6: TROUBLESHOOTING ADVANCED FAULTS

Topic: Troubleshooting Advanced Faults

Content: (I) Power IC, CPU, and memory-related issues.



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

1. Define "troubleshooting" as a logical process.
2. Describe the symptoms of a "Power IC" fault.
3. Describe the symptoms of a "Memory (eMMC)" fault.
4. Explain the concept of "reballing" and "reflowing."

5. Develop a logical troubleshooting "tree" for a "dead phone" fault.

Lesson Content:

1. What is Troubleshooting? Troubleshooting is the *logical, step-by-step process* of diagnosing a fault. You start with the *easiest* and *most common* solution first, and only move to the *hardest* solution last.

Example: Troubleshooting a "Completely Dead" Phone A customer brings a phone that will not turn on.

- **Step 1 (Ask):** "Did you drop it? Did it fall in water?" (Check for physical/water damage).
- **Step 2 (Level 2):** Try a *known good battery*. (Still dead).
- **Step 3 (Level 2):** Check the *charging port*. Plug it in. Does the charging symbol appear? (No). Use a multimeter to check for voltage at the battery terminals. (No voltage).
- **Step 4 (Level 2/3):** The port is likely bad. *Replace the charging port*. (Still dead).
- **Step 5 (Level 3):** The problem is on the *motherboard*. The new port is sending power, but the board is not using it.
- **Step 6 (Level 3):** Use a DC Power Supply to check for a *short circuit* (Week 2). (No short circuit).
- **Step 7 (Level 4):** The fault is likely the **Power IC**.

2. Advanced Component Faults

- **A. Power IC (PMIC) Faults:**
    - **Job:** The Power IC manages *all* power. It takes power from the battery and "distributes" it in different voltages to the CPU, screen, network IC, etc.
    - **Symptoms of a Fault:**
        - Phone is *completely dead* (even with a good battery and port).
        - Phone gets *very hot* in one spot (the PMIC) when you try to charge it.
        - Phone turns on, but then *shuts down* randomly.
        - Phone *will not charge* (and you have already replaced the port and battery).

    - **Repair:** (Very Advanced) The Power IC must be replaced. This involves using a *hot air station* to desolder the old IC and solder a new one.
- **B. Memory (eMMC / Flash IC) Faults:**
    - **Job:** This is the phone's "hard drive." It stores the Operating System (OS) and all your data.
    - **Symptoms of a Fault:**
        - The phone is stuck in a **"boot loop"** (e.g., shows the Samsung logo, reboots, shows the logo, reboots...).
        - You try to "flash" the phone (Week 8), but the software *fails* every time, often with a "memory error."
        - The phone works, but runs *extremely slowly* and *freezes* constantly.
    - **Repair:** (Most Advanced) The eMMC chip must be replaced and *re-programmed*.
- **C. CPU (Processor) Faults:**
    - **Job:** The "main brain." It runs everything.
    - **Symptoms of a Fault:** The phone is *completely dead*. This is the "worst-case scenario." Often caused by a very hard drop or severe water damage.
    - **Repair:** (Often not worth it) Requires replacing the CPU.

3. Repair Techniques: Reflowing vs. Reballing Sometimes, an IC (like a CPU or Power IC) stops working *not* because the chip itself is bad, but because the *solder balls underneath it* have cracked (from a drop or from overheating).

- **Reflowing:**
    - **What it is:** A "quick fix." You apply *flux* and use a *hot air station* to *re-melt* the existing solder balls under the chip, hoping they "re-flow" and fix the cracked connection.
    - **Problem:** Often a *temporary* fix. The fault may return.
- **Reballing:**
    - **What it is:** The *professional* fix.

2. Desolder (remove) the IC with a hot air station.
3. Clean *all* the old solder off the chip and the board.

4. Use a **stencil** (a thin metal plate with holes) to apply *new* solder balls to the bottom of the IC.
5. Solder the "re-balled" IC back onto the board.

- **Result:** A permanent, reliable repair.

Evaluation:

1. What is "troubleshooting"?
2. A phone is stuck in a "boot loop," and flashing it fails. What is the most likely faulty component?
3. A phone is completely dead, but the battery and charging port are good, and there is no short circuit. What is the most likely faulty component?
4. What is the difference between "reflowing" and "reballing" an IC?
5. Why is "reballing" the more professional repair?

Assignment:

1. Define Troubleshooting, Power IC, and eMMC (Memory IC).
2. What is a "boot loop"?
3. Create a "troubleshooting tree" (a step-by-step list) for a customer who brings a phone with "no sound from the earpiece speaker." (Start from easy fixes to hard ones).
4. Define "Reflowing" and "Reballing."
5. Why is a "reflow" often only a temporary fix?

WEEK 8: FLASHING AND UNLOCKING COMPLEX DEVICES

Topic: Flashing and Unlocking Complex Devices



Content: (I) Flashing Android and iPhones (II) IMEI repair (III) Avoiding software bricking.

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

1. Differentiate between the "flashing" process for Android and iPhone.
2. Identify the software tools used for each (e.g., Odin, SP Flash Tool, iTunes).
3. Define "bricking" (soft brick vs. hard brick) and how to avoid it.
4. Define "IMEI" and explain the *legal* and *ethical* implications of IMEI repair.

5. Explain the difference between "carrier unlocking" and "password unlocking."

Lesson Content:

1. Flashing: Android vs. iPhone "Flashing" is installing or upgrading the phone's Operating System (OS).

- **Flashing Android (An "Open" System):**
  - **Why?** To fix boot loops, remove viruses, or upgrade the OS.
  - **Key Concept:** Android phones use *different* CPUs, so they need *different* tools.
  - **Tools:**
    - **Odin:** For *Samsung* phones.
    - **SP Flash Tool (SmartPhone Flash Tool):** For phones with *MediaTek (MTK)* CPUs (e.g., Tecno, Infinix, Gionee).
    - **Fastboot/ADB:** For many other brands (e.g., Google Pixel, Motorola).
  - **The Process (MTK Example):**

    1. Install the correct *drivers* on your computer.
    2. Get the correct "firmware" (the OS file) *for that exact model*.
    3. Open SP Flash Tool, load the "scatter file" (the map of the firmware).
    4. Turn the phone *off*.
    5. Click "Download" in the tool and connect the phone. The flashing begins.
- **Flashing iPhone (A "Closed" System):**
  - **Why?** To fix a "disabled" phone, a boot loop (stuck on Apple logo), or to update/downgrade the OS.
  - **The *Only* Tool: iTunes** (on older PCs/Macs) or **Finder** (on newer Macs). Apple controls the *entire* process.
  - **The Process:**

    0. Put the iPhone into **Recovery Mode** or **DFU Mode** (a special diagnostic mode).
    1. Connect it to a computer with iTunes.
    2. iTunes will detect the phone in recovery and say "There is a problem..."

3. You have two options:
    - **Update:** Tries to fix the OS *without* erasing data.
    - **Restore:** *Completely erases* the phone and installs a fresh copy of iOS. This is the most common fix.

2. Phone Unlocking

- **A. Carrier Unlocking (Network Lock):**
    - **What it is:** A phone is "locked" to one network (e.g., an "AT&T" iPhone from America will not work with an MTN SIM).
    - **Solution:** The *carrier* (AT&T) can provide an "unlock code," or special *software boxes* (e.g., Octoplus Box) can be used to remove the lock.
- **B. Password Unlocking:**
    - **What it is:** A user forgot their pattern, PIN, or password.
    - **Solution (Android):** A **Factory Reset**. This *erases all data*.
    - **FRP (Factory Reset Protection):** A *major* problem. After a reset, the phone will ask for the *last Google account* that was on it. If the user forgot that, the phone is useless.
    - **FRP Bypass:** Advanced software tools are needed to bypass this Google lock.
    - **Solution (iPhone):** A **Restore** (via iTunes). This *erases all data*.
    - **iCloud Lock:** The iPhone version of FRP. If the user forgets their Apple ID, the phone is a *permanent brick*. This is *almost impossible* to bypass and is a major anti-theft feature.

3. "Bricking" a Phone

- **Definition:** "Bricking" is a term for a software repair that goes *wrong* and makes the phone as "useful as a brick" (i.e., it's dead).
- **Types:**
    - **Soft Brick:** The phone is *stuck* (e.g., boot loop, stuck in recovery). It *can* be fixed by re-flashing.

    - **Hard Brick:** The phone is *completely dead*. It shows *no signs of life*. This happens if you flashed the *wrong firmware* (e.g., a Tecno Spark 5 file on a Spark 4) or if the power went out *during* the flash.
- **How to Avoid Bricking:**

    1. **100% Correct Firmware:** *Always* double-check the *exact* model number.
    2. **Stable Power:** Use a laptop (with a good battery) and a reliable power source.
    3. **Good Cable:** Use a high-quality, original USB cable.
    4. **Follow Instructions:** Do *not* unplug the phone until the process is 100% complete.

4. IMEI Repair (Ethical Warning)

- **What is IMEI?** A 15-digit unique serial number for *every* phone. (Dial *#06# to see yours). It is the phone's "fingerprint."
- **Why "Repair" it?** Sometimes, flashing an MTK phone *accidentally* erases the IMEI ("Invalid IMEI"). The phone cannot make calls. "Repairing" it means restoring the *original* IMEI (which is legal).
- **The Crime (Ethical RED LINE):** It is a *serious crime* to *change* a phone's IMEI to a *different* number. This is done to *hide stolen phones*. A professional technician **NEVER** does this. You are only allowed to restore the *original* IMEI (found on the sticker under the battery).

Evaluation:

1. What is "flashing" a phone?
2. What is the main software tool for flashing Samsung phones? (Odin)
3. What is the main software tool for flashing iPhones? (iTunes)
4. What is "bricking" a phone? What is the difference between a "soft brick" and a "hard brick"?
5. What is an "iCloud Lock," and why is it so difficult to bypass?

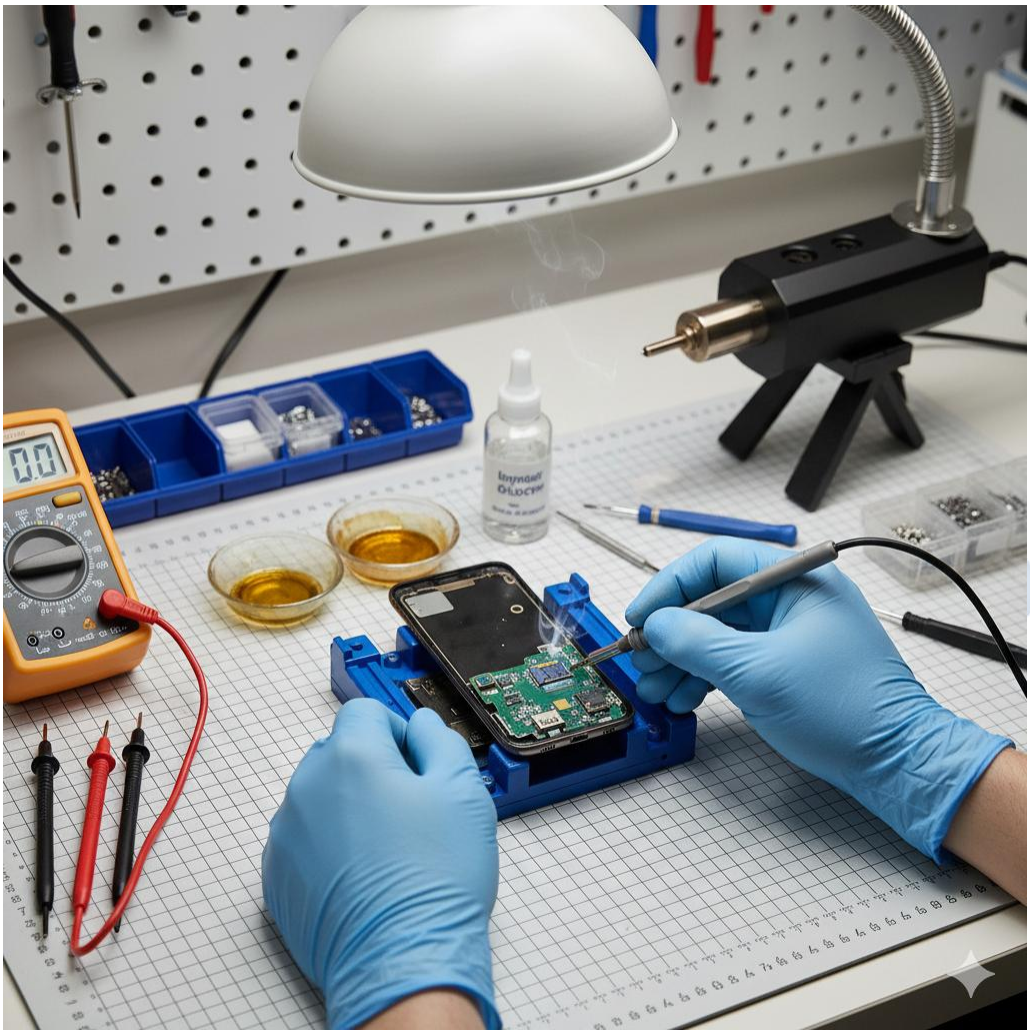
Assignment:

1. Define Flashing, Bricking, IMEI, and FRP (Factory Reset Protection).
2. What is the main difference between "flashing" an Android and "flashing" an iPhone?
3. What are the two (2) types of "unlocking"?
4. List three (3) rules for *avoiding* bricking a phone.
5. What is the *ethical* and *legal* rule about "IMEI repair"?

WEEK 9: PRACTICAL: COMPLEX FAULT REPAIR

Topic: Practical: Complex Fault Repair

Content: (I) Hands-on practice with multiple faults.



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

1. Select the correct tools for a complex repair job.
2. Follow a logical troubleshooting procedure.
3. Perform a Level 2 (modular) replacement (e.g., screen).
4. Perform a Level 3 (soldered) replacement (e.g., charging port).

5. Test and verify that all faults have been repaired.

Lesson Content:

1. Practical Objective To combine all the skills learned this term (Troubleshooting, Soldering, Component Replacement) to solve a multi-fault problem.

2. The Scenario (Group Project)

- **The "Patient":** A "dead" Android phone (a non-working phone provided by the school).
- **The "Symptoms" (Complaint):** "The phone was dropped. The screen is cracked, and it will not charge or turn on."
- **The Goal:** Diagnose *all* the faults and repair them in the correct order.

3. Tools Required (The "Workstation")

- **Disassembly:** Screwdriver kit, plastic spudgers, heat gun (for screen), tweezers.
- **Diagnosis:** Multimeter, DC Power Supply, USB tester.
- **Soldering:** Soldering iron, hot air station, flux, solder, solder wick, isopropyl alcohol (IPA), toothbrush, safety goggles, fume extractor.
- **Replacement Parts:** A new screen, a new charging port.

4. Logical Troubleshooting & Repair Process (Practical Steps)

- **Step 1: Visual Inspection (Diagnosis)**
  - Confirm the complaint. The screen is visibly cracked.
  - Check the charging port. Is it loose or full of dirt?
  - Check for water damage indicators (they turn pink/red).
- **Step 2: Disassembly**
  - Carefully open the phone (using heat on the back or front, depending on the model).
  - Disconnect the *battery* first (always).
  - Remove the motherboard and all components.
- **Step 3: Fault 1 - Power/Charging (Level 3)**

    - **Diagnosis:** Visually inspect the charging port. Let's assume the "drop" broke its solder joints.
    - **Repair (Soldering):**
        1. Apply flux to the old port.
        2. Use the *hot air station* to desolder and remove the old port.
        3. Use *solder wick* to clean the pads on the board.
        4. Place the new port.
        5. Use the *soldering iron* to solder the anchor legs and the 5 small pins.
        6. *Clean* the area with IPA.
    - **Test:** Use a *multimeter* to check for continuity on the new port.
- **Step 4: Fault 2 - The Screen (Level 2)**
    - **Diagnosis:** The screen is cracked.
    - **Repair (Modular):**
        1. (If it's a "screen-first" phone, this would have been done in Step 2).
        2. Disconnect the old screen's ribbon cable.
        3. Connect the *new screen* (temporarily).
- **Step 5: First Power-On Test**
    - With the new port soldered and the new screen connected, *connect the battery*.
    - Plug in a charger.
    - **Result:** The charging symbol *should* appear on the new screen. If it does, both repairs are successful. If it *doesn't*, you must go back to "Troubleshooting Advanced Faults" (Week 6) (e.g., check for a short, check the Power IC).
- **Step 6: Final Reassembly & Cleaning**
    - Re-assemble the phone, ensuring all screws and shields are back in place.
    - Clean all fingerprints off the new screen.

Evaluation (Practical Assessment): (The teacher will observe the students as they work, grading them on):

1. **Safety:** Are they using goggles? Is the fume extractor on?
2. **Tool Use:** Are they using a plastic spudger (not metal)? Are they tinning the iron?
3. **Process:** Did they apply flux before soldering? Did they clean with IPA after?

4. **Diagnosis:** Did they follow a logical order?
5. **Final Result:** Did the phone turn on and charge?

Assignment (Lab Report):

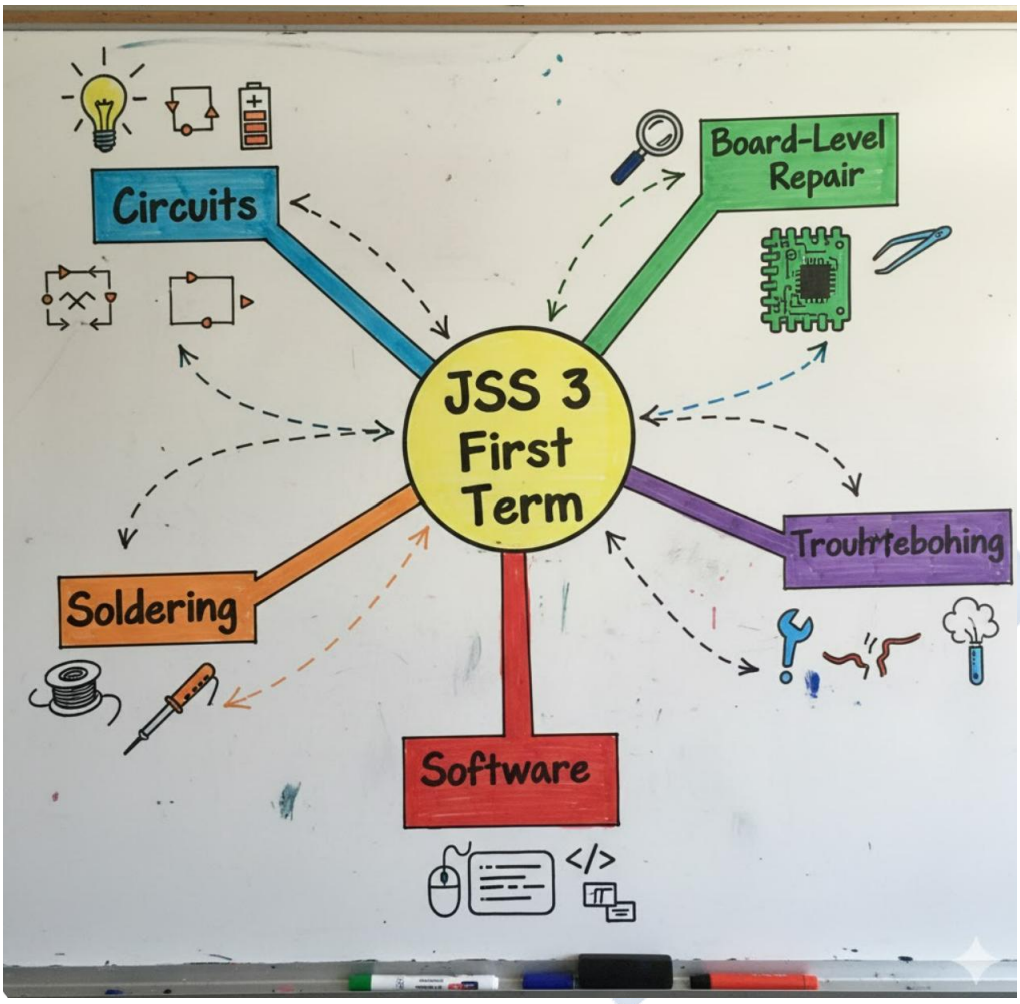
1. What was the "complaint" for your practical project phone?
2. List *all* the faults you and your group identified.
3. What was the *hardest* part of the repair (e.g., soldering the pins, opening the case)?
4. What was the *most important* tool you used, and why?
5. Was your repair successful? If not, what would be your *next* troubleshooting step?

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WEEK 10: REVISION

Topic: Revision

Content: Review of all topics covered during the term.



Note: This week is dedicated to a comprehensive review of all topics covered in the First Term, in preparation for the end-of-term examination.

Revision Checklist:

1. **Review of JSS 2 (Week 1):**
    - Phone circuits (Power, Network, Sound).
    - Diagnosis (Visual, Power-On, Multimeter).

- Entrepreneurship (Honesty, Bookkeeping).

2. **Advanced Repairs (Week 2):**
    - 4 Levels of Repair (Level 1-4).
    - Board-Level Repair (Definition).
    - ICs (CPU, Power IC, eMMC, RF IC).
    - Short Circuits (Definition and Rosin Test).
    - Tools (Hot air, Microscope, DC Power Supply).
3. **Soldering (Week 3):**
    - Definitions (Soldering, Desoldering, Solder, Flux).
    - 3 Functions of Flux (Clean, Conduct Heat, Flow).
    - Safety (Ventilation/Fumes, Burns, Goggles).
    - Tinning the iron.
4. **Component Replacement (Week 4):**
    - Modular (Press-fit, e.g., Screen) vs. Soldered (e.g., Charging Port).
    - Process for screen replacement (Heat, Pry, Disconnect).
    - Process for port replacement (Protect, Flux, Desolder, Clean, Solder, Inspect, Clean).
5. **Troubleshooting (Week 6):**
    - Logical process (easy to hard).
    - Symptoms of Power IC fault (dead, hot, no charge).
    - Symptoms of eMMC fault (boot loop, flash fails).
    - Reflowing (temporary) vs. Reballing (professional, with stencil).
6. **Software (Week 8):**
    - Flashing (Android vs. iPhone).
    - Tools (Odin, SP Flash Tool, iTunes).
    - Unlocking (Carrier vs. Password).
    - Bricking (Soft vs. Hard, how to avoid).
    - FRP (Google Lock) vs. iCloud Lock (Apple).
    - IMEI Repair (Ethical rules).

Activity:

- **Fault-Finding Quiz:** The teacher gives a "symptom" (e.g., "Phone is stuck on the Samsung logo"), and students must name the *most likely* cause (e.g., "eMMC fault or software corruption") and the *solution* (e.g., "Try to flash first, if it fails, check eMMC").
- Final Q&A session.

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JSS 3 COMPUTER HARDWARE AND GSM REPAIRS LESSON NOTES

SECOND TERM

WEEK 1: ENTREPRENEURSHIP IN GSM REPAIRS



Content: (I) Expanding repair services (II) Managing customers and suppliers.

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

1. Define "Entrepreneurship" in the context of GSM repairs.
2. Identify at least three (3) opportunities for expanding repair services beyond basic repairs.
3. Explain the importance of "Supplier Management" for sourcing parts.
4. Describe the key principles of "Customer Management" for building loyalty.

5. Differentiate between "Upselling" and "Cross-selling" as expansion strategies.

Lesson Content:

1. What is Entrepreneurship in GSM Repairs?

- **Definition:** Entrepreneurship in this field is the process of moving beyond being just a *technician* (who fixes phones) to becoming a *business owner*. It involves identifying new opportunities, managing resources (money, time, parts), taking calculated risks, and building a sustainable, profitable business.
- **The Mindset Shift:**
    - A *technician* worries about the *next repair*.
    - An *entrepreneur* worries about the *next month, next year, and next customer*.

2. Expanding Repair Services (Scaling Your Business) A successful business must grow. You cannot rely only on one type of repair.

- **1. Specialization (Level 3 & 4):**
    - Move from basic (Level 2) "swap-out" repairs (screens, batteries) to advanced (Level 3/4) *board-level repairs* (soldering, IC replacement).
    - *Benefit:* You can fix phones that other shops can't, allowing you to charge more and get referrals from other technicians.
- **2. Expanding Vertically (Related Products):**
    - **Sell Accessories:** This is a high-profit area. Sell chargers, screen protectors, phone cases, power banks, and headphones.
    - **Sell Refurbished Phones:** Buy, repair, and re-sell used phones.
- **3. Expanding Horizontally (Related Services):**
    - **Laptop/Computer Repairs:** The skills (diagnostics, component replacement, software) are very similar.
    - **Game Console Repairs:** (e.g., PlayStation, Xbox).
    - **Software Services:** Advanced flashing, unlocking, and data recovery services.
- **4. Upselling and Cross-selling:**

- **Cross-selling:** A customer comes to fix a screen. You *also* sell them a screen protector. ("You're buying a new screen, would you like to buy a protector to keep it safe?")
- **Upselling:** A customer wants a basic screen protector. You *convince* them to buy the more expensive, higher-quality "tempered glass" version.

3. Managing Suppliers (Your Parts Dealers) Your business is *nothing* without good, reliable parts. A supplier is the person or shop you buy your screens, batteries, and ICs from.

- **Why Supplier Management is Critical:**
  - **Quality:** A bad supplier gives you low-quality screens that break in a week, ruining your reputation.
  - **Price:** A good supplier gives you a fair price, which protects your profit.
  - **Reliability:** A good supplier *has* the part in stock when you need it.
- **Rules for Good Management:**

1. **Have Multiple Suppliers:** *Never* rely on only one. If he is out of stock or raises his price, your business stops. Have at least 2-3 trusted suppliers.
2. **Test Everything:** Test parts *before* you install them (if possible).
3. **Build Relationships:** Be a loyal, honest customer. Pay your debts on time. A good relationship can get you *credit* (parts now, pay later) or discounts.

4. Managing Customers (Your Most Valuable Asset) (Recap from JSS 2) Customer service is your *number one* marketing tool. A happy customer will bring you 2 new customers. An angry customer will tell 10 people to avoid you.

- **Honesty & Transparency (Ethical Practice):**
  - Tell the client the *exact* fault.
  - Give them a *clear price* (quotation) *before* you start the work.
  - If you find *another* fault during the repair, *STOP*. Call the client and explain. ("While fixing your port, I noticed your battery is swollen. It is a safety risk. It will cost ₦X to replace. Should I go ahead?")
- **Reliability:**

    - Finish the job *on time*. Do not promise "it will be ready today" if you know it will take two days.
- **Communication:**
    - Keep the customer informed. Send an SMS when the job is done.
- **After-Service:**
    - Offer a *warranty* (e.g., "This new screen has a 1-month warranty"). It shows you are confident in your work and builds massive trust.

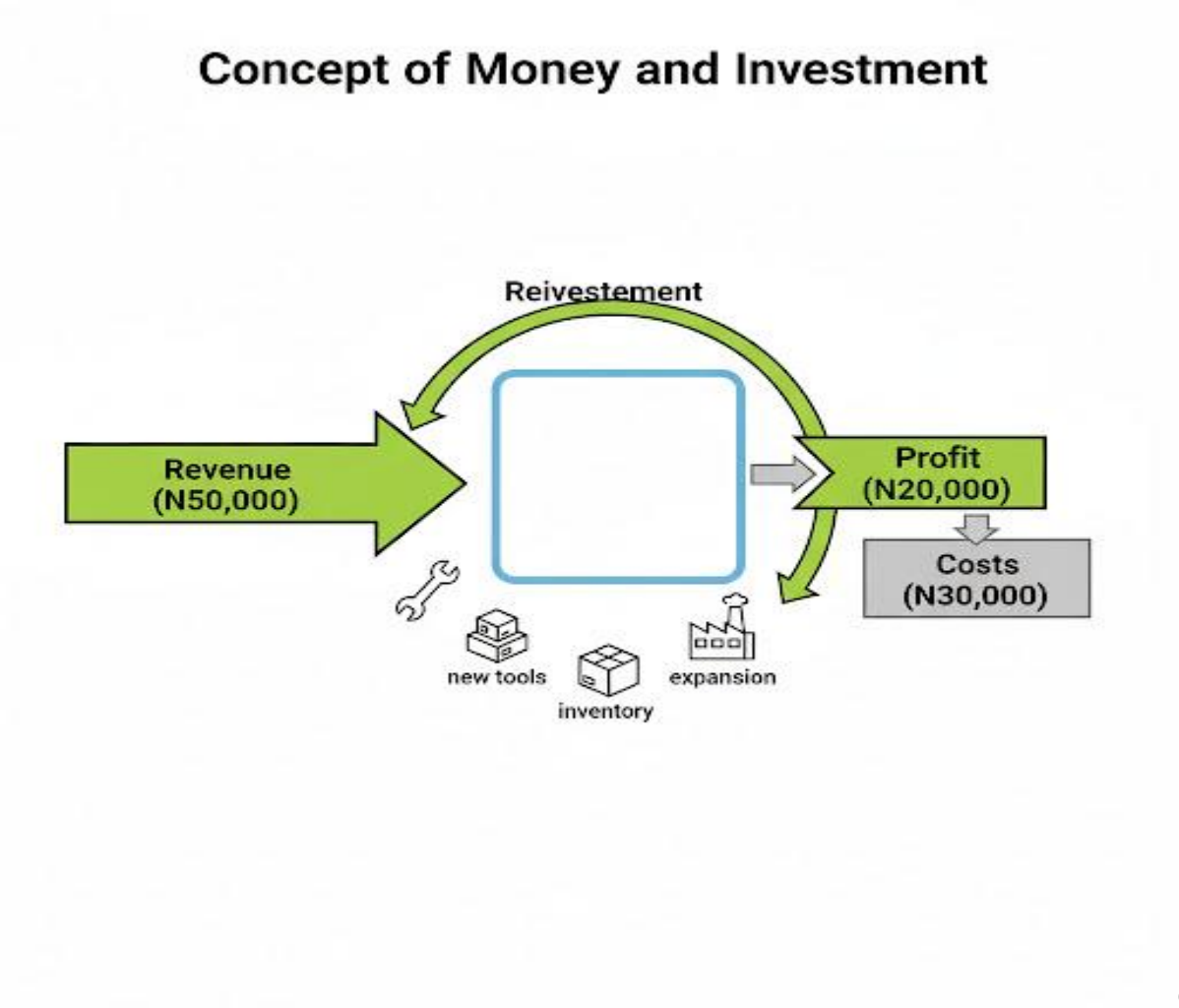
Evaluation:

1. What is the main difference between a "technician" and an "entrepreneur"?
2. List two (2) ways a GSM repair technician can *expand* their services.
3. What is "supplier management," and why should you always have *multiple* suppliers?
4. What is the difference between "upselling" and "cross-selling"?
5. What is the *most important* rule of customer management, and why?

Assignment:

1. Define Entrepreneurship (in GSM repairs), Upselling, and Cross-selling.
2. You have a small repair shop. You want to expand. Write down three (3) new services or products you could add and why.
3. A customer comes to fix a charging port. How can you *cross-sell* to them? How can you *upsell*?
4. Write three (3) rules for managing your parts suppliers.
5. Why is offering a "warranty" on your repairs a good business strategy?

WEEK 2: CONCEPT OF MONEY AND INVESTMENT



Co

ntent: (I) Reinvestment (II) Cost management (III) Profit calculation.

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

1. Define "Money" and "Investment" in a business context.
2. Differentiate between "Revenue," "Cost," and "Profit."
3. Calculate the profit from a simple repair transaction.
4. Define "Reinvestment" (Ploughing-back profit) and explain its importance for growth.
5. Explain "Cost Management" and identify two (2) areas to control costs.

Lesson Content:

1. What is Money in Business?

- **Definition:** In business, "money" is a tool. It is the **medium of exchange** used to run the business.
- **Cash Flow:** The *movement* of money *into* (Income) and *out of* (Expenses) the business. A business can be profitable but still fail if it has bad "cash flow" (e.g., all its money is owed by clients).

2. The 3 Key Calculations (Profit Calculation) Every entrepreneur *must* know these:

- **A. Revenue (or Income/Turnover):**
  - **Definition:** The *total amount of money* your business *receives* from sales in a period.
  - *Example:* You do 10 screen repairs at ₦5,000 each. Your **Revenue** is (10 x 5,000) = **₦50,000**.
- **B. Cost (or Expenditure):**
  - **Definition:** The *total amount of money* your business *spends* to operate.
  - **Cost of Goods Sold (COGS):** The direct cost of the parts. (e.g., You bought 10 screens at ₦2,000 each. Your COGS is ₦20,000).
  - **Operating Costs:** Other costs. (e.g., Rent, electricity, tools, transport. Let's say this is ₦10,000).
  - *Total Cost:* (₦20,000 + ₦10,000) = **₦30,000**.
- **C. Profit (or Net Income):**
  - **Definition:** The money *left over* after you have paid *all* your costs. This is the goal.
  - **Formula:** Profit = Total Revenue - Total Cost
  - *Example:* ₦50,000 (Revenue) - ₦30,000 (Cost) = **₦20,000 (Profit)**.
  - If Costs are *higher* than Revenue, you have a **Loss**.

3. What to do with Profit: Reinvestment

- **Definition:** Reinvestment (also called "ploughing-back profit") is the smart decision to take your *profit* (the ₦20,000) and put it *back into the business* to make it grow, instead of spending it on personal items.
- **Importance (Why Reinvest?):**
    1. **Growth:** You can use the profit to *buy better tools* (e.g., a hot air station, a microscope).
    2. **Expansion:** You can use it to *buy more inventory* (e.g., now you can buy 20 screens instead of 10, getting a bulk discount).
    3. **Stability:** It builds your "business savings" (cash reserves) for slow months or emergencies.
- **The Rule:** A wise entrepreneur "pays themselves a small salary" (as a cost) and "reinvests the profit" (as an investment).

4. Cost Management (How to Increase Profit) To increase profit, you can either (1) increase revenue or (2) *decrease costs*. Controlling your costs is essential.

- **Definition:** Cost Management is the process of *planning* and *controlling* your business expenses.
- **How to Manage Costs:**
    1. **Find Cheaper Suppliers:** (Week 1) Find a supplier with the *same quality* parts for a *lower price*. (e.g., finding screens for ₦1,800 instead of ₦2,000).
    2. **Reduce Waste:**
        - **Tools:** Don't spoil your tools. A good screwdriver can last for years.
        - **Parts:** Be *careful* during repair. If you break a *new* screen by accident, you have just lost all your profit.
        - **Time:** Work efficiently. Don't waste time you could be using for another repair.
    3. **Control Overheads:** Don't rent a huge, expensive shop when you are just starting. Keep your fixed costs (like rent) as low as possible.

Evaluation:

1. What is "Profit"? What is the formula to calculate it?
2. What is the difference between "Revenue" and "Cost"?
3. What is "Reinvestment," and why is it important for business growth?
4. What is "Cost Management"?
5. List two (2) ways a GSM repairer can control or manage their costs.

Assignment:

1. Define Revenue, Cost, Profit, and Reinvestment.
2. A technician does 5 charging port repairs in one day. He charges ₦3,000 for each repair. What is his **Total Revenue** for the day?
3. For the repairs in Q2, the new ports cost him ₦800 each. What was his **Total Cost of Goods Sold (COGS)**?
4. (Using Q2 and Q3) If his other costs for the day (transport, etc.) were ₦1,000, what was his **Total Profit** for the day?
5. What is the *smartest* thing for the technician to do with his profit?

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WEEK 3: BUSINESS START-UP PROCEDURES



Content: (I) Registration (II) Business name (III) Licensing.

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

1. Explain the difference between an "informal" and a "formal" business.
2. Define "Business Name Registration" and state its importance.
3. Identify the "Corporate Affairs Commission (CAC)" as the agency for registration.
4. Explain the purpose of "Licensing" and local permits.
5. List the first three (3) steps to formally start a repair business.

Lesson Content:

1. Informal vs. Formal Business

- **Informal Business (Unregistered):**
    - This is how most small repairs start (e.g., working from your backpack, under an umbrella).
    - **Pros:** Easy to start, no fees, no taxes.
    - **Cons:** You *cannot* open a business bank account, you *cannot* get a loan, you *cannot* get big jobs (e.g., from a company), and you can be harassed by local government.
- **Formal Business (Registered):**
    - This is a *legal entity* that is recognized by the government.
    - **Pros:** You get a registration certificate, you *can* open a corporate bank account, you *can* apply for loans (like from the Bank of Industry), and you build customer *trust*.
    - **Cons:** Costs money to register, you must pay taxes.

Goal: To be a professional entrepreneur, you *must* move from informal to formal.

2. Step 1: Choose a Business Name

- Your "brand" (Week 6) starts here. The name should be:
    - **Unique:** Not already taken.
    - **Memorable:** Easy to remember (e.g., "The Phone Clinic," "Tunde's Tech").
    - **Descriptive:** It should say what you do.
- **Action:** You must *check* if the name is available on the CAC website (a "name search").

3. Step 2: Business Registration (The CAC)

- **Agency: Corporate Affairs Commission (CAC)**. This is the *only* Federal Government agency that can register a business in Nigeria.
- **Process (for a small business):**
    1. **Register as a "Business Name" (Sole Proprietorship):** This is the cheapest and simplest form. It links the business directly to *you*, the owner.

2. **Application:** You fill out a form online (or via an agent) with your business name, address, and what your business does ("Objectives").
3. **Payment:** You pay the registration fees.
4. **Certificate:** The CAC approves your application and issues you a **Certificate of Registration**.

- **Result:** You are no longer "Tunde the repair boy." You are now the CEO of **"Tunde's Tech Clinic"**. This certificate is your "birth certificate" for the business.

4. Step 3: Licensing and Permits

- Registration (CAC) is *Federal*. Licensing is *Local*.
- **Definition:** A "license" or "permit" is *permission* from your **Local Government Council** (or state agency) to operate your business *in that location*.
- **Examples:**
  - **Shop/Tenement Permit:** A yearly fee paid to the Local Government for operating a shop.
  - **Signage Permit:** A fee you must pay to put up a sign (a "signboard") outside your shop.
- **Why?** This is a form of local tax. If you don't pay, the council can lock up your shop.

5. Other Start-up Steps (Recap)

- **Open a Business Bank Account:** Once you have your CAC certificate, you can open a bank account in your *business name* (not your personal name). This is *essential* for professional bookkeeping.
- **Find a Location:** Rent a shop.
- **Get Tools & Inventory:** Buy your equipment and first set of parts.

Evaluation:

1. What is the main difference between an "informal" and a "formal" business?
2. What does "CAC" stand for?
3. What is the *first* step you must take before registering your business name?

4. What is a "license" or "permit" (e.g., from the Local Government)?
5. Why is it important to open a *business* bank account, separate from your *personal* one?

Assignment:

1. List two (2) advantages of *formally* registering your business.
2. List two (2) disadvantages of staying *informal*.
3. What is the full name of the government agency responsible for registering businesses in Nigeria?
4. Think of a creative, professional "business name" for your own future GSM repair shop.
5. What is the difference between "Federal Registration" (CAC) and "Local Licensing" (Local Government)?

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WEEK 4: BOOKKEEPING AND FINANCIAL RECORDS



Content: (I) Ledger (II) Profit/loss (III) Financial reporting.

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

1. Define "Bookkeeping" and its importance.
2. Differentiate between "Income" and "Expenditure."
3. Define a "Ledger" and its purpose.
4. Prepare a simple "Profit and Loss (P/L) Statement" for a repair business.
5. Explain *why* these reports are needed (e.g., for getting loans, making decisions).

Lesson Content:

1. What is Bookkeeping?

- **Definition:** Bookkeeping is the *organized* and *systematic process* of **recording** all the financial transactions of a business. It is the "diary" of every naira that comes *in* or goes *out*.
- **Bookkeeper vs. Accountant:**
    - A *Bookkeeper* **records** the daily transactions.
    - An *Accountant* **analyzes** those records to prepare reports and give business advice.
- **Why it's essential:** A business *without* bookkeeping is "flying blind." You have no idea if you are winning (profit) or losing (loss).

2. Key Financial Records

- **A. The Cashbook (The "Diary"):**
    - This is the *first* book. It's a simple log of *every* transaction as it happens.
    - **Example (Simple Cashbook):**

Date	Description	Money In (Income)	Money Out (Expense)
Nov 4	Tecno Spark 5 Screen Repair	₦7,000	
Nov 4	Buy 1 new screen (stock)		₦3,000
Nov 4	Transport to buy part		₦500
Nov 5	Unlock iPhone 6	₦4,000	
Nov 5	Pay NEPA Bill		₦2,000
Total		**₦11,000**	**₦5,500**

- **B. The Ledger (The "Category" Book):**
    - A "Ledger" *sorts* the information from the Cashbook into categories (or "accounts"). This helps you see *where* your money is going.
    - **Example (Expenses Ledger):**

        - **"Parts" Account:** ₦3,000
        - **"Transport" Account:** ₦500
        - **"Utilities" Account:** ₦2,000
    - *Now you know you spent ₦3,000 on parts and ₦2,000 on NEPA, which is more useful than just a long list.*

3. Financial Reporting (The "School Report Card") At the end of a period (e.g., end of the month), you use your records to create a "Financial Report." The most important one is the Profit and Loss Statement.

- **The Profit and Loss (P/L) Statement:**
    - **Definition:** A summary report that shows your *total income*, *total expenses*, and your *net profit (or loss)* for a specific period (e.g., "for the month of November").
    - **Purpose:** To answer the #1 question: "Did I make money or lose money?"

4. How to Prepare a Simple P/L Statement (for one month):

1. **Calculate Total Revenue (Income):**
    - Add up *all* the "Money In" from your cashbook.
    - *Example:* (Repairs: ₦150,000) + (Accessory Sales: ₦40,000)
    - **Total Revenue = ₦190,000**
2. **Calculate Cost of Goods Sold (COGS):**
    - Add up the cost of *all the parts* you used for the repairs.
    - *Example:* (Screens, ports, ICs)
    - **Total COGS = ₦60,000**
3. **Calculate Gross Profit:**
    - Gross Profit = Revenue - COGS
    - *Example:* ₦190,000 - ₦60,000 = **₦130,000**
4. **Calculate Total Operating Expenses (Overheads):**
    - Add up *all other* "Money Out" from your ledger.
    - *Example:* (Shop Rent: ₦20,000) + (Salary: ₦50,000) + (NEPA: ₦5,000) + (Transport: ₦5,000)

    - **Total Expenses = ₦80,000**
5. **Calculate Net Profit (The "Bottom Line"):**
    - Net Profit = Gross Profit - Total Expenses
    - *Example:* ₦130,000 - ₦80,000 = **₦50,000 (Profit)**
    - *(If this number is negative, it is a **Net Loss**).*

- **Why do this?** This report is your "proof of success." You can use it to:
    - **Make Decisions:** "My profit is low because my NEPA bill is too high."
    - **Get Loans:** Show a bank that your business is *profitable* and you can *repay* the loan.

Evaluation:

1. What is "Bookkeeping"?
2. What is the difference between a "Cashbook" and a "Ledger"?
3. What is the "Profit and Loss (P/L) Statement"?
4. What is the formula for "Gross Profit"?
5. What is the formula for "Net Profit"?

Assignment:

1. Define Bookkeeping, Ledger, and P/L Statement.
2. List two (2) reasons why financial reports are important for an entrepreneur.
3. A technician has the following for one month:
    - Total Income from repairs = ₦200,000
    - Total cost of parts used = ₦70,000
    - Shop Rent = ₦25,000
    - Salary = ₦40,000
    - Other bills (NEPA, etc.) = ₦10,000
4. Calculate the **Gross Profit**.
5. Calculate the **Total Operating Expenses** and the **Net Profit (or Loss)** for the month.

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WEEK 6: MARKETING OF GSM REPAIR SERVICES



Content: (I) Advertising (II) Branding (III) Online presence.

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

1. Define "Marketing" and "Branding."
2. Explain the role of a "Brand Identity" (logo, name, colors) in attracting customers.
3. Differentiate between "Offline Advertising" and "Online Advertising."
4. List three (3) effective *online* marketing strategies for a repair shop.
5. Describe the *best* and *cheapest* marketing strategy of all (Word-of-Mouth).

Lesson Content:

1. What is Marketing?

- **Definition:** Marketing is the *process* of getting potential customers *interested* in your product or service. It's how you tell the world, "I am here, I am professional, and you should choose me."
- It's not just "advertising"; it's the *entire strategy*.

2. The Foundation: Branding

- You cannot market if you don't know *what* you are marketing. Your "brand" is your *reputation* and *identity*.
- **Brand Identity:** This is your *visual signature*.
    - **Business Name:** "Tunde's Tech Clinic" (sounds professional) vs. "Tunde Repairs" (sounds basic).
    - **Logo:** A simple, clean symbol (e.g., a phone with a plus sign +).
    - **Slogan:** A memorable phrase (e.g., "We bring your phone back to life.")
    - **Professionalism:** Your *brand* is also your clean shop, your honest price, and your on-time delivery.

3. Advertising (The Tools of Marketing)

- **A. Offline Advertising (Traditional):**
    1. **Word-of-Mouth (The BEST):** This is when your *happy customers* advertise for you *for free*. This is the *most powerful* marketing because people trust their friends more than an advert.
        - **How to get it:** Do excellent work, be honest, be reliable (Week 1).
    2. **Signage (Your Signboard):** Your shop sign must be *large, clean, and easy to read*. This is your #1 offline advert.
    3. **Flyers & Business Cards:** Professional cards with your name, phone number, and services. Give one to *every* customer.
- **B. Online Presence (Digital Marketing):** This is now *essential* for a modern repair business.
    1. **Google My Business (GMB):**

- **What it is:** The *most important* online tool. It's a *free* profile from Google that puts your business *on Google Maps*.
- **Why:** When someone near you searches "phone repair near me," your shop appears with your phone number, address, and *customer reviews*. This is a massive source of new customers.

2. **Social Media (Instagram/Facebook):**
   - **Use it as a *portfolio*:** Post "before and after" pictures of your repairs (e.g., a cracked screen vs. the new screen).
   - **Use it for *reviews*:** Post screenshots of happy customer reviews.
   - **Use it for *trust*:** Post videos of you *doing* a repair (a "how-it's-done" video). This shows you are a real expert.
3. **WhatsApp Business:**
   - Use a *dedicated business line*.
   - Use the "Catalog" feature to list your services and prices.
   - Post your "before and after" work on your WhatsApp Status.

Evaluation:

1. What is "Marketing"?
2. What is a "Brand Identity"? List its three (3) main components.
3. What is the *most powerful* and *cheapest* form of advertising?
4. What is "Google My Business," and why is it so important for a local repair shop?
5. List two (2) ways a technician can use *Instagram* to market their services.

Assignment:

1. Define Marketing, Branding, and "Google My Business."
2. What is the difference between "Offline Advertising" and "Online Presence"?
3. Imagine you are starting "Tunde's Tech Clinic." Design a simple *slogan* for the business.
4. What is a "Customer Review," and why is it so powerful on Google Maps or Facebook?
5. Create a 3-step *Online Marketing Plan* for a new GSM repair shop.

WEEK 8: RIGHTS AND DUTIES OF CITIZENS



Content: (I) Consumer protection laws (II) Integrity and accountability.

Performance Objectives: By the end of this lesson, students should be to:

1. Define "Consumer" and "Consumer Rights."
2. List the key rights of a consumer (e.g., right to safety, information, redress).
3. Explain the technician's *duty* (responsibility) that corresponds to each right.
4. Define "Integrity" and "Accountability" as a business owner.
5. Identify the role of consumer protection agencies (e.g., FCCPC).

Lesson Content:

1. Who is a Consumer?

- A **Consumer** is a person who *pays for* goods or services.
- In your business, the **client** is the consumer.
- **Consumer Protection Laws** are government laws designed to protect consumers from unsafe products and unfair business practices.

2. Key Consumer Rights (and Your Duties as a Technician) In Nigeria, the main agency is the **FCCPC (Federal Competition and Consumer Protection Commission)**. They enforce the consumer rights, which include:

- **1. The Right to Safety:**
  - **Consumer's Right:** To be protected from dangerous goods and services.
  - **Technician's Duty:**
    - You *must* use high-quality, safe parts (e.g., batteries that won't explode).
    - You *must* perform repairs safely (e.g., no loose wires).
    - You *must* warn the client of any dangers (e.g., "Your phone's frame is bent, so the new screen may not sit perfectly").
- **2. The Right to Information:**
  - **Consumer's Right:** To be given the *facts* needed to make an informed decision.
  - **Technician's Duty:**
    - You *must* be **honest** about the fault (no lying).
    - You *must* give a **clear price (quotation)** *before* starting the work.
    - You *must* be truthful about the parts (e.g., "This is an 'Original' screen, but this one is a cheaper 'copy'").
- **3. The Right to Choose:**
  - **Consumer's Right:** To choose from a variety of products and services at competitive prices.
  - **Technician's Duty:** You *cannot* force a customer to use your service. You must win them with good prices and service. (This is why *monopolies* are often illegal).
- **4. The Right to Redress (to be heard):**

- **Consumer's Right:** To receive *compensation* or a *solution* (like a refund or a free re-repair) if the service was bad or the part was faulty.
- **Technician's Duty:**
  - You *must* listen to complaints (Week 1).
  - You *must* honor your warranty. If you fixed a screen and it stops working a week later (due to your fault), you *must* fix it again for free.
  - If you fail, the consumer can report you to the **FCCPC**.

3. Integrity and Accountability These are the *ethics* that make the consumer rights work.

- **Integrity:**
  - **Definition:** Being *honest* and having strong *moral principles*.
  - **In Practice:**
    - *Not* stealing parts from a client's phone.
    - *Not* swapping a good original part for a fake one.
    - *Not* lying about the fault to charge more money.
    - *Protecting* the client's data (their photos and messages). A technician who *steals* client data is a *criminal*.
- **Accountability:**
  - **Definition:** Taking *responsibility* for your actions.
  - **In Practice:** If you make a *mistake* (e.g., you crack the back glass while opening the phone), you are *accountable*. You don't blame the client. You *admit* it, *apologize*, and *fix it* for free. This builds *massive* trust, even though you made a mistake.

Evaluation:

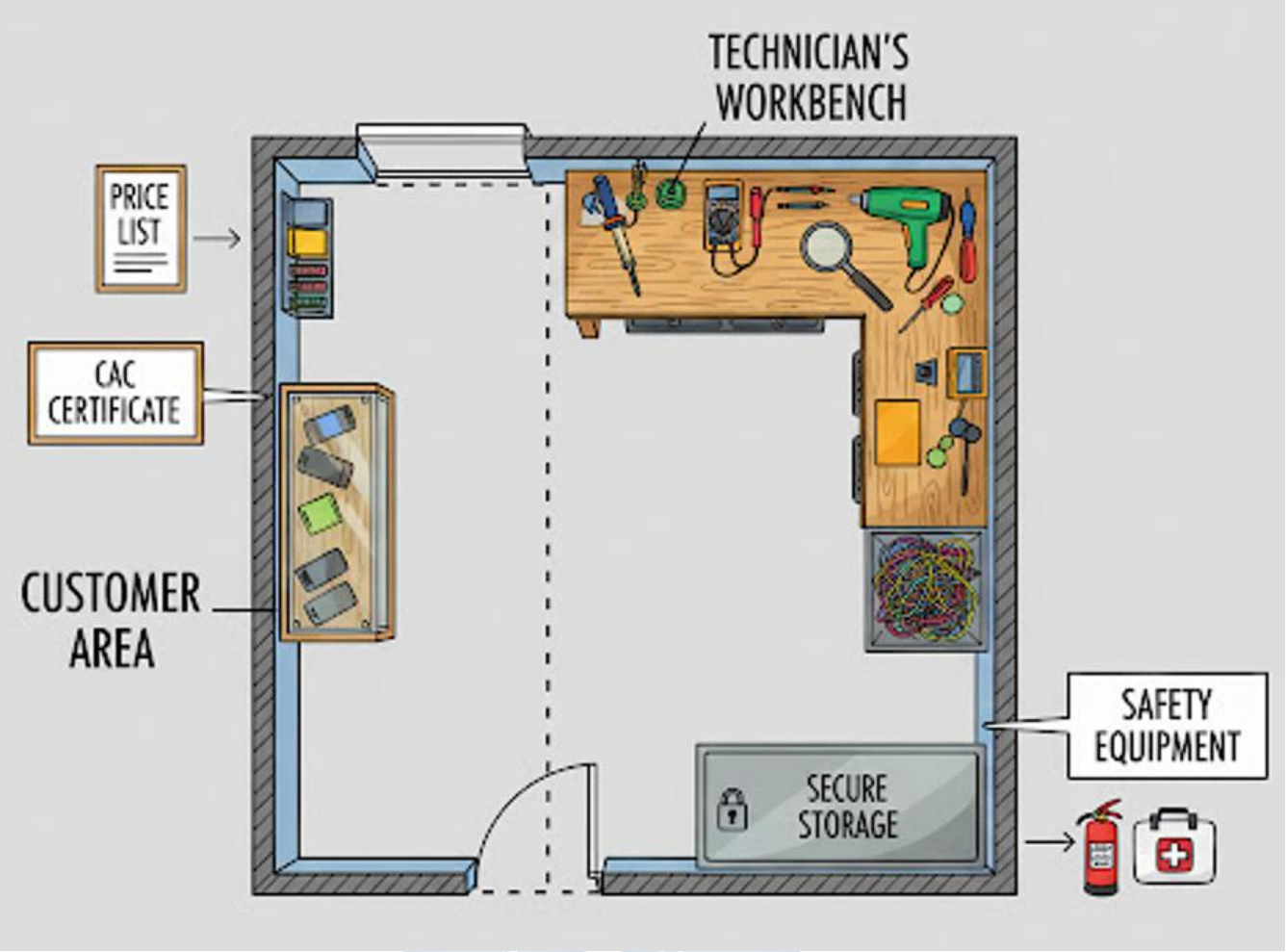
1. Who is a "consumer"?
2. What is the "Right to Redress"?
3. What is the main consumer protection agency in Nigeria?
4. What is "Integrity" for a GSM technician? Give one example.
5. What is "Accountability"? Give one example.

Assignment:

1. List and explain three (3) rights of a consumer.
2. For each right you listed, explain the matching "duty" or "responsibility" of the repair technician.
3. Define Integrity and Accountability.
4. A customer gives you a phone to fix the screen. You notice the battery is good and original. You are tempted to swap it with a fake one to sell the original. *Why* is this a bad (unethical and illegal) idea?
5. You are repairing a phone and you accidentally break the SIM tray. What is the *accountable* thing to do?

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WEEK 9: PRACTICAL: SETTING UP A MINI GSM SHOP



Content: (I) Designing a small-scale business plan (II) Designing a shop layout.

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

1. Work in a group to develop a simple business concept (name, slogan, services).
2. Create a basic one-page "Business Plan."
3. Design a functional and professional *layout* for a small "kiosk" or shop.
4. Create a basic *price list* for their shop based on cost-plus pricing.
5. Present their business plan and layout to the class.

Lesson Content:

1. The Project: Your "Mini-Shop" Business Plan

- **Objective:** To combine *all* the business topics from this term (Entrepreneurship, Money, Start-up, Bookkeeping, Marketing, Ethics) into one practical project.
- **Task:** In groups, you will design a complete, small-scale GSM repair business.

2. Part 1: The One-Page Business Plan A "Business Plan" is your *roadmap*. It explains your business to you and to potential investors (like a bank).

- **1. Business Name & Slogan:** (From Week 6)
  - *e.g., Name: "The Phone Doctors"*
  - *e.g., Slogan: "We bring your device back to life!"*
- **2. Mission Statement:** (What is your goal?)
  - *e.g., "To provide honest, reliable, and fast phone repairs for students and staff in our community."*
- **3. Services & Niche:** (From Week 1)
  - *e.g., "We will focus on Level 1 (Software) and Level 2 (Modular) repairs for Androids. We will also sell accessories (chargers, cases)."*
- **4. Target Market:** (Who are your customers?)
  - *e.g., "Students, teachers, and parents in the JSS3 campus."*
- **5. Marketing Plan:** (From Week 6)
  - *e.g., "A professional sign, Google My Business profile, and a 'Refer-a-Friend' program (10% off)."*
- **6. Basic Finances:** (From Week 2 & 4)
  - *Start-up Cost:* (e.g., "We need ₦100,000 for rent, tools, and parts").
  - *Sample Price:* (e.g., "Tecno Spark 5 Screen: ₦7,000 (Cost: ₦3,500, Profit: ₦3,500)").

3. Part 2: The Shop Layout (The "Physical" Plan)

- A good layout makes your shop look *professional*, *organized*, and *secure*.
- **Key Zones (for a small "kiosk"):**
  1. **Customer Area (Front):**

- A *service counter* (this is the barrier between you and the client).
- A glass *display case* (to show accessories for sale).
- Your *Price List* and *CAC Certificate* should be clearly visible on the wall.

2. **Technician's Workbench (Back):**
   - This is *your* sacred space. It must be *clean*, *well-lit*, and *organized*.
   - It should have your soldering station, hot air, microscope, and tools.
   - **CRITICAL:** It should be *out of reach* of customers.
3. **Secure Storage (Back):**
   - A *lockable cabinet* or *safe*.
   - **Why?** This is where you *must* store customers' phones overnight. You are *accountable* for their property.

4. Part 3: The Price List

- (Using the formula from Week 2: Price = Cost of Part + Your Labor/Time + Profit).
- **Example Price List:**
  - Software Flash (Android): ₦3,000
  - Charging Port (Soldered): ₦3,500
  - Tecno Screen (Modular): ₦7,000
  - iPhone Screen (Modular): ₦12,000
  - *Diagnosis Fee (if no repair): ₦500*

5. Group Activity:

- (Students spend the lesson in groups, on a large poster or cardboard, designing their plan and layout).
- They must present their plan to the class.

Evaluation: (This is a practical evaluation of the group projects, based on):

1. **Clarity:** Is the business name and mission clear?
2. **Viability:** Is the business plan realistic?
3. **Layout:** Is the shop layout professional and secure?

4. **Pricing:** Is the price list clear and (based on Week 2) profitable?
5. **Presentation:** Did the group present their idea confidently?

Assignment (The Project):

1. Finalize your "One-Page Business Plan" with all 6 sections.
2. Draw your "Shop Layout" on a sheet of paper and label the 3 main zones.
3. Create a "Price List" with at least 5 common services.
4. Write a 1-paragraph summary of *why* a customer should choose *your* shop over a competitor (this is your "Value Proposition").
5. (Optional) Design a simple *logo* for your business.

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WEEK 10: REVISION



Content: Review of all topics covered during the term.

Note: This week is dedicated to a comprehensive review of all topics covered in the Second Term, in preparation for the end-of-term examination.

Revision Checklist:

1. **Entrepreneurship (Week 1):**
    - Scaling up (Level 3/4 repairs, selling accessories).
    - Cross-selling vs. Upselling.
    - Supplier Management (Multiple suppliers, testing parts).

- Customer Management (Honesty, reliability, warranty).

2. **Money & Investment (Week 2):**
    - Revenue (Total money in).
    - Cost (Total money out).
    - Profit (Revenue - Cost).
    - Reinvestment (Ploughing-back profit for growth).
    - Cost Management (Reducing waste, finding better suppliers).
3. **Start-up Procedures (Week 3):**
    - Informal vs. Formal Business.
    - Business Name (Unique, memorable).
    - Registration (CAC - Corporate Affairs Commission).
    - Licensing (Local Government permits).
    - Business Bank Account.
4. **Bookkeeping (Week 4):**
    - Cashbook (The "diary" of transactions).
    - Ledger (The "category" book).
    - P/L Statement (The "report card" for a period).
    - Gross Profit (Revenue - COGS).
    - Net Profit (Gross Profit - Operating Expenses).
5. **Marketing (Week 6):**
    - Branding (Name, Logo, Slogan).
    - Offline (Word-of-Mouth, Signage, Business Cards).
    - Online (Google My Business, Instagram/Facebook, WhatsApp Business).
6. **Rights & Duties (Week 8):**
    - Consumer Rights (Safety, Information, Redress).
    - Technician's Duties (Use safe parts, give clear prices, honor warranties).
    - Agency (FCCPC).
    - Integrity (No stealing parts/data, no lying).
    - Accountability (Admitting and fixing your mistakes).

Activity:

- **Business Plan "Pitch":** Final groups present their Week 9 projects.
- **Financial Quiz:** Teacher gives a sample P/L statement, and students must identify the Net Profit, Revenue, and biggest Expense.
- Final Q&A session.

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THIRD TERM - JSS 3 COMPUTER HARDWARE AND GSM REPAIRS LESSON NOTES

WEEK 1: FINAL BUSINESS PROJECT



Content: (I) Developing and presenting a GSM repair business plan.

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

1. Finalize all components of their GSM repair business plan (from Term 2).
2. Create a professional, clear, and persuasive presentation (e.g., PowerPoint or Poster) for their business plan.
3. Orally "pitch" (present) their business idea to an audience (the class).
4. Defend their business plan by answering questions about their finances, marketing, and strategy.
5. Demonstrate confidence and professionalism in their presentation.

Lesson Content:

This week is the culmination of the entire entrepreneurship module. Students will move from "planning" to "presenting."

1. What is a Business Plan "Pitch"?

- **Definition:** A "pitch" is a short, persuasive presentation (usually 5-10 minutes) that explains your business idea to potential investors (or in this case, your teacher and classmates) to get their support.
- **Objective:** Your goal is to convince your audience that your business idea (your mini GSM shop) is:
    1. **Viable:** It can actually work.
    2. **Profitable:** It can make money.
    3. **Scalable:** It has the potential to grow.

2. Finalizing the Business Plan Components (Recap) Before the presentation, each group must ensure their one-page business plan (from Term 2, Week 9) is complete and polished. It *must* include:

- **1. The Brand:** Business Name, Slogan, and Logo.
- **2. The Mission:** What problem are you solving? (e.g., "To provide fast, *honest* repairs...").
- **3. Services & Niche:** What *exactly* do you do? (e.g., "Level 2 Android repairs and accessory sales").
- **4. Target Market:** *Who* are your customers?
- **5. Marketing Plan:** *How* will you get customers? (Google, Instagram, Word-of-Mouth).
- **6. Financials:**
    - **Start-up Cost:** How much money do you need? (e.g., ₦150,000 for tools, rent, parts).
    - **Price List:** A clear price for at least 5 services.
    - **Profit Projection:** A simple P/L calculation for one popular service (e.g., Price: ₦7,000 - Cost: ₦3,500 = Profit: ₦3,500).

3. Creating the Presentation (The "Pitch Deck") Students should use MS PowerPoint, Google Slides, or a large, neat poster.

- **Slide 1: Title Slide:** Your Business Name, Logo, Slogan, and Group Members.
- **Slide 2: The Problem:** What problem are you solving? (e.g., "It's hard to find *honest* phone repairers," "Students keep breaking their screens").
- **Slide 3: Our Solution (Your Business):** Introduce your business as the solution. "Introducing 'The Phone Doctors'!"
- **Slide 4: Services & Niche:** What do you do? Show your price list.
- **Slide 5: Marketing & Customers:** Who is your target market? How will you reach them? (Show a mock-up of your Instagram page or Google Business Profile).
- **Slide 6: The Financials:** How much do you need to start? How much profit will you make per repair?
- **Slide 7: Why Us? (Your Ethics):** This is crucial. "Why choose us? Because we offer a 30-day warranty, we are 100% honest, and we protect your data."
- **Slide 8: The "Ask":** (In a real pitch) "We are asking for a ₦150,000 loan..." (For class) "We are ready to serve you. Thank you."

4. How to Give a Professional Presentation

- **Speak Clearly:** Don't mumble. Face your audience.
- **Body Language:** Stand up straight, make eye contact, and don't just read from the paper.
- **Teamwork:** Every member of the group should say something.
- **Q&A (Defense):** Be prepared for questions like:
    - "Your price for a screen is ₦7,000, but the shop next door charges ₦6,500. Why are you more expensive?" (Answer: "Because we use *original* parts and offer a 30-day warranty, which they don't.")
    - "What is your biggest risk?" (Answer: "Our biggest risk is a bad supplier, which is why we have three different trusted suppliers.")

Evaluation: (This is a practical evaluation of the group presentations, based on):

1. **The Plan:** Was the business plan complete and logical?

2. **The Presentation:** Were the slides/poster clear, neat, and professional?
3. **Communication:** Did the group speak clearly and confidently?
4. **Defense (Q&A):** Were they able to answer questions intelligently?
5. **Overall Professionalism:** Did they present a strong, trustworthy brand?

Assignment (Final Project Submission):

1. Submit your final "One-Page Business Plan" document (typed or neatly handwritten).
2. Submit your presentation slides (or hand in your poster).
3. Individually, write one paragraph answering: "What was the biggest challenge your group faced, and how did you solve it?"
4. Individually, write one paragraph answering: "What is the most important lesson you learned from this business project?"
5. What grade (A-F) would you give your own group's presentation, and why?

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WEEK 2: EXHIBITION AND PRODUCT DISPLAY



Content: (I) Demonstration of repair skills and innovations (II) Professional setup.

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

1. Understand the purpose of a "trade exhibition."
2. Set up a professional, clean, and safe workstation for public display.
3. Demonstrate a basic (Level 2) repair skill (e.g., screen replacement) clearly.
4. Demonstrate a complex (Level 3) repair skill (e.g., soldering) *safely*.
5. Communicate their skills and business value to "visitors" (classmates).

Lesson Content:

1. What is an Exhibition?

- **Definition:** An exhibition (or "trade show") is an event where businesses showcase their products and services to the public, to attract customers and investors.
- **Your Goal:** This is a *practical* version of your business plan pitch. You are *showing* (not just telling) that you have real skills.

2. Setting Up Your Exhibition Table First impressions are everything. A messy, unsafe table means a bad business.

- **1. Branding (Visuals):**
  - Your **Business Name & Logo** (from Week 1) must be clearly displayed on a small banner or sign.
  - Your **Price List** and **Business Cards** should be neat and available.
  - **Color:** Use your brand colors (e.g., a clean tablecloth).
- **2. Organization (Cleanliness):**
  - **Tools:** Tools must be *clean* and *organized* neatly, not in a jumble. (e.g., screwdrivers in a rack).
  - **Work Area:** You need a dedicated "clean mat" (an anti-static mat) for your repair.
- **3. Safety (Professionalism):**
  - All soldering irons *must* be in their safety stands.
  - You *must* have your safety goggles and (if soldering) your fume extractor running.
  - No exposed, messy wires.
  - Have a small fire extinguisher or fire blanket visible (for OHS).

3. Demonstration of Skills (What to Show) You need to show a range of skills.

- **A. The "Before and After" (Product Display):**
  - Have a collection of *broken* parts (cracked screens, dead batteries, swollen batteries) in a "display box."
  - Next to them, have the *new* replacement parts.
  - Have 2-3 "dummy" phones (non-working) on display.
- **B. The "Basic" Skill Demo (Level 2):**

    - **(Live Demo):** A student should demonstrate a *safe* and *common* repair.
    - **Best Example:** A simple battery or screen replacement on a phone that is easy to open.
    - The student should *talk* while working: "First, I am powering off the device. Now, I am using a plastic spudger to safely disconnect the battery..."
- **C. The "Advanced" Skill Demo (Level 3):**
    - **(Live Demo):** A student (the group's "expert") should demonstrate *soldering*.
    - **Safety is #1:** Must wear goggles and use a fume extractor.
    - **Best Example:**
        - **"Micro-soldering":** Replacing a charging port on a spare, dead motherboard.
        - **"IC Reballing" (Innovation):** Showcasing a reballed IC (from Term 1) under a microscope, explaining what it is.
- **D. The "Software" Skill Demo (Level 1):**
    - Have one laptop running a flashing tool (like SP Flash Tool) or an unlocking program.
    - Explain what the software does and how it fixes "boot loop" or "virus" problems.

4. Communicating with "Visitors"

- When a "visitor" (a student from another group or a teacher) comes to your table:
    - **Stand up** and greet them professionally.
    - Give a 30-second "pitch" (e.g., "Welcome to The Phone Doctors. We specialize in fast, honest repairs...").
    - *Engage* them: "Would you like to see how we replace a charging port?"
    - Give them your business card.

Evaluation: (This is a practical evaluation of the exhibition setup and demonstration).

1. **Setup:** Is the table professional, branded, and clean?
2. **Safety:** Are all safety rules (soldering, tools) being followed?
3. **Skill (Level 2):** Can the group clearly and safely perform a basic component swap?

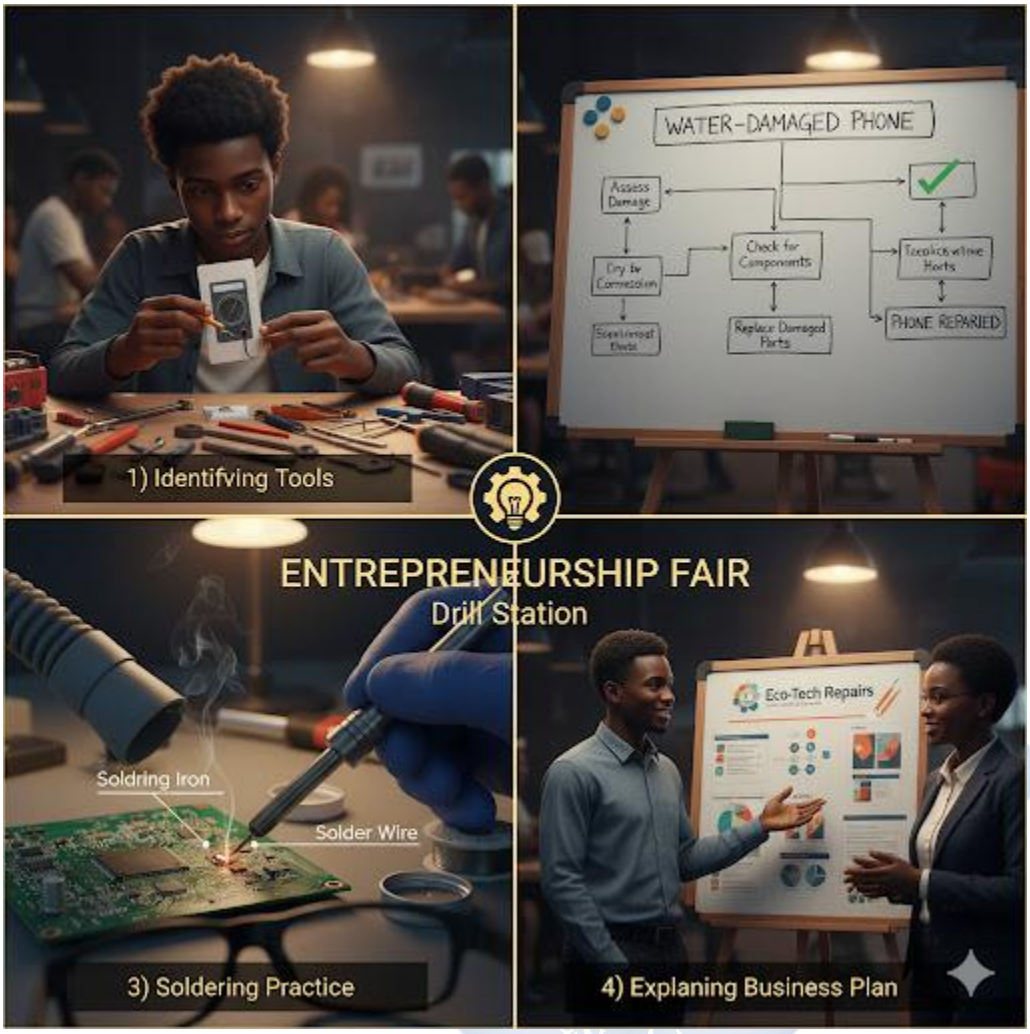
4. **Skill (Level 3):** Can the group demonstrate a soldering/desoldering skill?
5. **Communication:** Can the group *explain* what they are doing to a visitor?

Assignment:

1. What is the purpose of a "trade exhibition"?
2. List three (3) things that must be on your exhibition table to make it look *professional*.
3. What is the *most important* safety rule when demonstrating soldering?
4. What is the difference between demonstrating a "Level 2" skill and a "Level 3" skill?
5. Write a 30-second "pitch" to greet a visitor at your table and explain your business.

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WEEK 3: ENTREPRENEURSHIP FAIR PREPARATION



Content: (I) Preparing for BECE practicals and presentation.

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

1. Identify the likely practical skills to be tested in the BECE.
2. Identify the likely "business" knowledge to be tested.
3. Practice a "fault-finding" diagnosis drill.
4. Practice a "soldering" skill drill.
5. Demonstrate readiness for a formal practical assessment.

Lesson Content:

This is a focused "mock exam" week to prepare for the practical component of the Basic Education Certificate Examination (BECE).

1. What to Expect in the BECE Practical Exam The exam is designed to test *all* your skills from JSS1 to JSS3. It will likely have two parts:

- **Part A: Practical Skills (The "Technician" Test)**
    - **1. Identification:** You will be given tools, components, or ICs and asked to *identify* them and *state their function*.
    - **2. Diagnosis:** You will be given a "faulty" phone and a "symptom" (e.g., "This phone does not charge"). You will have to *write down* the *logical steps* to find the fault (your troubleshooting tree).
    - **3. Practical Repair:** You will be asked to *perform* a specific task, such as:
        - Safely disassemble and reassemble a phone.
        - Test a battery with a multimeter.
        - *Solder* or *desolder* a component (like a charging port or a wire).
- **Part B: Business Skills (The "Entrepreneur" Test)**
    - **1. Business Plan:** You may be asked to present your business plan (from Week 1).
    - **2. Finance:** You may be given a short list of income and expenses and asked to *calculate the profit or loss*.
    - **3. Ethics:** You may be given a scenario (e.g., "A customer's phone has a good part you want to steal..."). You must explain the *ethical* (right) thing to do.

2. Practical Drill 1: The "Diagnosis" Challenge

- **Activity:** The teacher gives "symptoms," and students must write down the troubleshooting steps (from easy to hard).
- **Symptom 1: "Phone fell in water."**
    1. *Wrong Answer:* "Put it in rice." (This is a myth and does not work).
    2. *Right Answer:* "1. Do NOT turn it on. 2. Disassemble *immediately*. 3. Disconnect battery. 4. Clean the *entire* motherboard with Isopropyl Alcohol (IPA) to remove water and corrosion. 5. Dry thoroughly. 6. Reassemble and test."

- **Symptom 2: "Phone does not charge."**
    1. *Step 1 (Easy):* Try a different (known-good) charger and cable.
    2. *Step 2:* Visually inspect the charging port for dirt; clean it.
    3. *Step 3 (Level 2):* Test/replace the battery.
    4. *Step 4 (Level 3):* Use a multimeter to test the port. Replace the charging port.
    5. *Step 5 (Level 4):* Check for a short circuit. Check the Power IC.
- **Symptom 3: "Phone is stuck on the Tecno logo."**
    1. *Step 1:* Try a "soft reset" (hold power + volume down).
    2. *Step 2:* Boot into recovery mode and "Wipe Cache."
    3. *Step 3 (Level 1):* "Flash" the phone with the correct firmware (using SP Flash Tool).
    4. *Step 4 (Level 4):* If flashing fails, it is a *hardware* fault (e.g., a bad eMMC/Memory IC).

3. Practical Drill 2: The "Soldering" Challenge

- **Activity:** (Under strict supervision)
    - **Task:** Each student is given a *dead* practice board and a soldering iron.
    - **Goal 1 (Desoldering):** Use a *solder wick* to cleanly remove all solder from 5 "pads."
    - **Goal 2 (Soldering):** Solder a small wire from one point to another (a "jumper wire").
    - **Teacher Checks for:** Safety (goggles), correct tinning of the iron, and *cleanliness* of the final joint (no "cold joints," no "bridges").

Evaluation:

1. What are the two (2) main parts of the BECE practical exam?
2. A customer brings a water-damaged phone. What is the *first* and *most important* thing to do?
3. A phone won't charge. List the 4 logical steps to diagnose it.

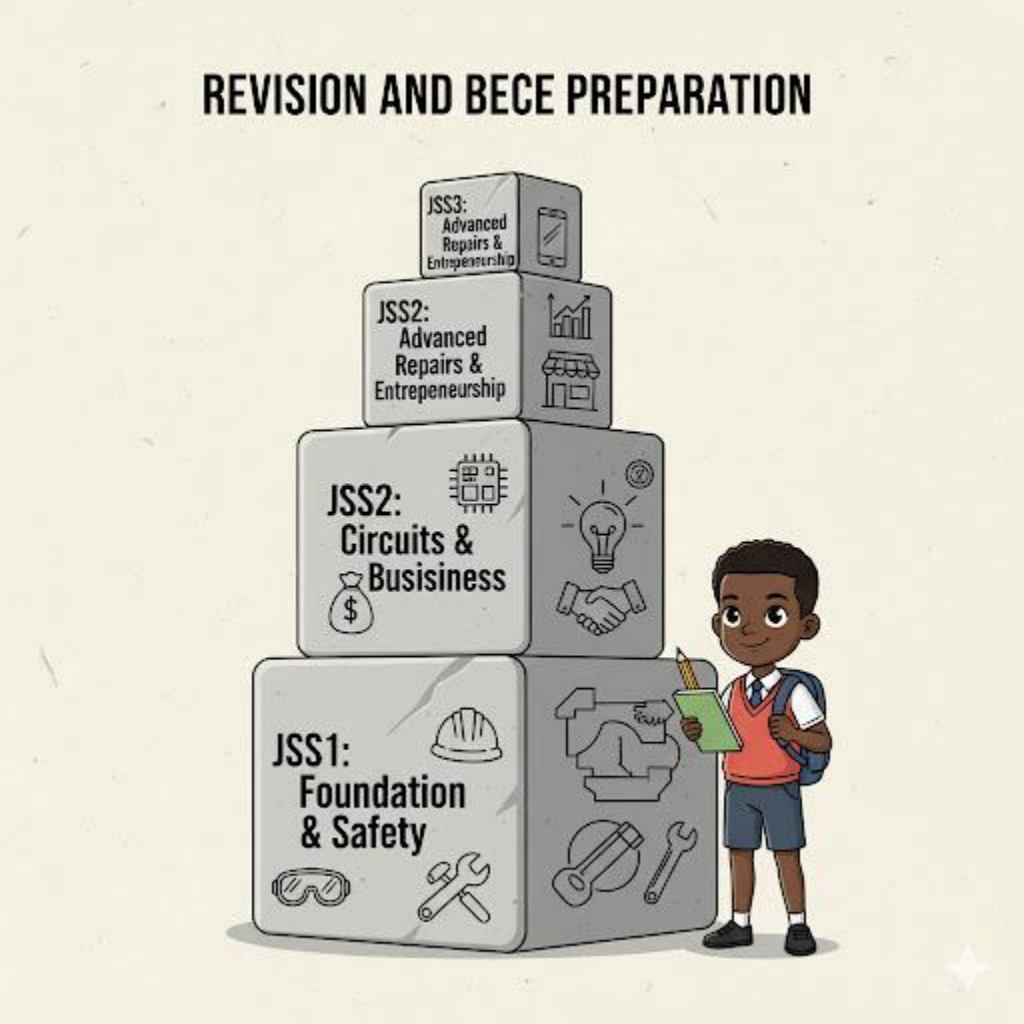
4. What is a "cold solder joint"? (A dull, lumpy, and weak solder joint that doesn't conduct electricity well).
5. What is the *ethical* answer to the question: "What do you do if you find a customer's original part is better than the one you have in stock?"

Assignment (BECE Prep):

1. Create a "flash card" for 5 important tools (e.g., Multimeter, Hot Air Station, Solder Wick, Spudger, Fume Extractor). On one side, draw the tool. On the other, write its *function*.
2. Create a "flash card" for 5 important components (e.g., Power IC, eMMC, CPU, Capacitor, Diode). On one side, write the name. On the other, write its *function* and *symptoms of failure*.
3. Write a one-paragraph summary of *your* business plan (from Week 1) that you can say in 60 seconds.
4. Calculate the Net Profit: (Revenue = ₦100,000), (Parts Cost = ₦30,000), (Rent = ₦15,000), (Salary = ₦20,000).
5. What is the *most important* safety rule in GSM repair, and why?

PAWILLS CONSULTING

WEEK 5: REVISION AND BECE PREPARATION



Content: (I) Review of JSS1–3 topics and practicals.

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

1. Recall all major theoretical concepts from JSS1 to JSS3.
2. Recall all major practical skills (diagnosis, modular, soldering, software).
3. Recall all major business concepts (entrepreneurship, finance, marketing, ethics).
4. Confidently attempt a full-length mock BECE exam (theory and practical).
5. Identify their personal areas of strength and weakness.

Lesson Content:

This is the final, comprehensive review of the entire 3-year curriculum.

1. JSS1 Curriculum Review (The Foundation)

- **Safety:** The #1 topic. PPE (goggles, gloves), OHS, fire safety (extinguishers), anti-static (ESD) wrist straps.
- **Tools:** Identification and function of *basic* tools: Screwdriver kit, spudgers, tweezers, multimeter, safety mat.
- **Basic Hardware:**
    - *External Parts:* Screen, buttons, port, mic, speaker, SIM tray.
    - *Internal Parts:* Motherboard (PCB), battery, camera, vibrator.
- **Basic Software:**
    - OS (Android, iOS) vs. Apps.
    - Basic troubleshooting (restarting, closing apps, factory reset).

2. JSS2 Curriculum Review (The Business & Circuits)

- **Circuits (Theory):**
    - Power Section (Battery, Port, Power IC).
    - Network Section (Antenna, RF IC).
    - Audio Section (Mic, Speakers).
- **Basic Repairs (Level 2):**
    - Diagnosing modular faults (e.g., a bad battery, a broken screen).
    - Step-by-step disassembly and reassembly.
- **Basic Software (Level 1):**
    - Flashing (definition), unlocking (passwords), virus removal.
- **Entrepreneurship (Intro):**
    - Starting a business, customer service (honesty, reliability), bookkeeping (basic cashbook), rights and duties.

3. JSS3 Curriculum Review (The Advanced Skills)

- **Advanced Hardware (Level 3/4):**

    - **Soldering:** Tools (Iron, Hot Air, Flux, Solder), Safety (Fumes, Goggles, Burns), Process (Tinning, Desoldering with wick, Soldering ports/pins).
    - **Board-Level:** ICs (CPU, eMMC, PMIC), Short circuits (Rosin test), "Reflowing" vs. "Reballing."
- **Advanced Software (Level 1+):**
    - **Flashing:** Odin (Samsung), SP Flash Tool (MTK), iTunes (iPhone).
    - **Unlocking:** FRP (Google lock) vs. iCloud lock.
    - **Bricking:** Soft vs. Hard, and how to *avoid* it.
    - **Ethics:** IMEI repair (legal vs. illegal).
- **Advanced Business (The "Entrepreneur"):**
    - **Expansion:** Upselling, cross-selling, new services.
    - **Finance:** Revenue, Cost, Profit (Net vs. Gross), P/L Statement, Reinvestment.
    - **Start-up:** Formal (CAC) vs. Informal (unregistered).
    - **Marketing:** Branding (Logo, Slogan), Online (Google My Business, Instagram), Offline (Word-of-Mouth).
    - **Ethics:** Consumer Rights (FCCPC), Integrity, Accountability.

Activity: Final BECE Mock Exam

- **Theory (40 Mins):** A "mock" exam paper with multiple-choice and short-answer questions covering all 3 years.
- **Practical (40 Mins):**
    - **Station 1:** Identify 5 tools and 5 components.
    - **Station 2:** Use a multimeter to test a battery and check for continuity.
    - **Station 3:** Given a *symptom*, write the 5-step troubleshooting plan.
    - **Station 4:** (If possible) Solder a wire from point A to point B on a practice board.

Evaluation:

- (The Mock BECE exam itself is the evaluation).
- The teacher will review the answers with the class, focusing on the most commonly-missed questions.

Assignment (Final Study Guide):

1. Write down the three (3_ topics from JSS1-JSS3 that you are *most* confident in.
2. Write down the three (3) topics you are *least* confident in.
3. Explain, in your own words, the complete process for diagnosing and repairing a "dead phone" (from Step 1 to the final, advanced steps).
4. Explain, in your own words, the complete process for starting a *formal* repair business (from CAC to marketing).
5. What is the *most important* lesson (either technical or business) you have learned in this subject?

