**WEEK 9 YEAR 11 APPLIED TECHNOLOGY**

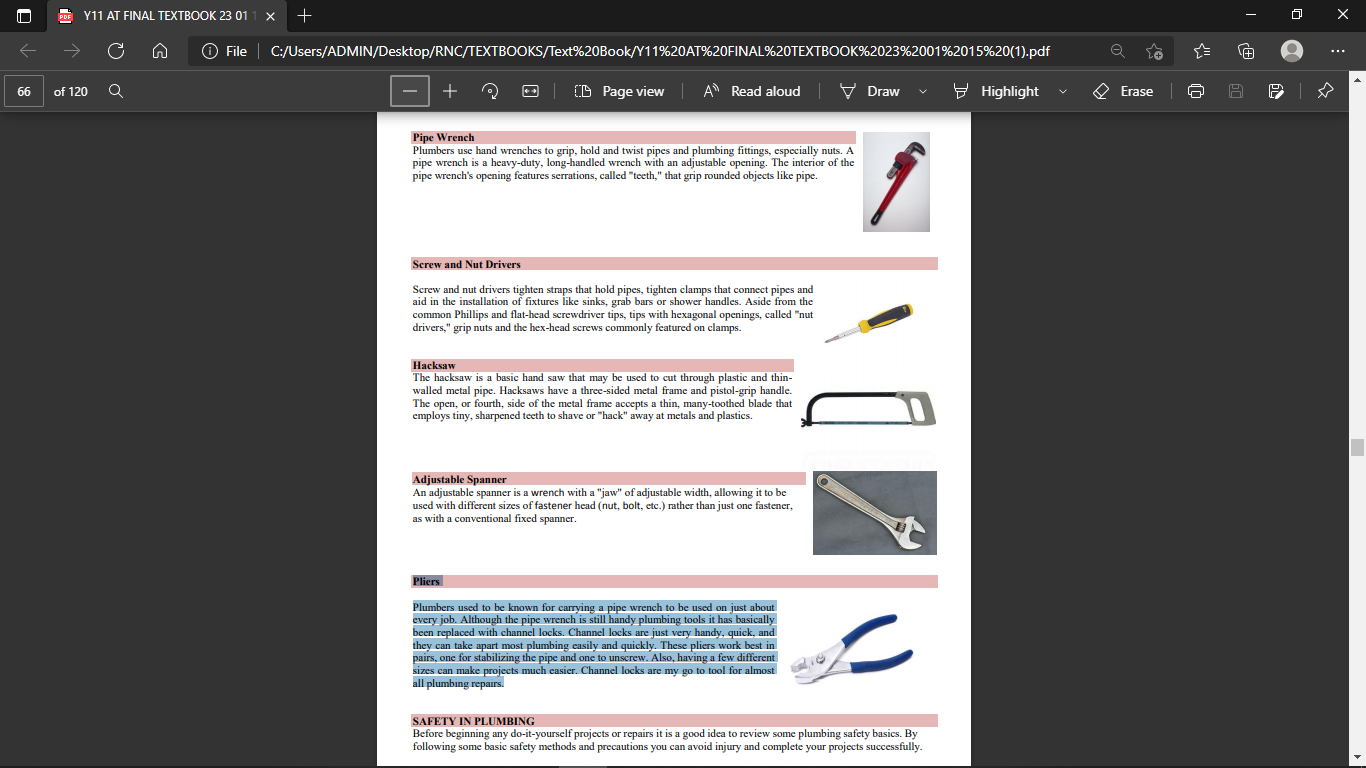
**STRAND: BASIC HOME IMPROVEMENT**

**LESSON 69:** **TOOLS IN BASIC PLUMBING**

**LEARNING OUTCOME: IDENTIFY THE TYPES OF TOOLS IN BASIC PLUMBING**

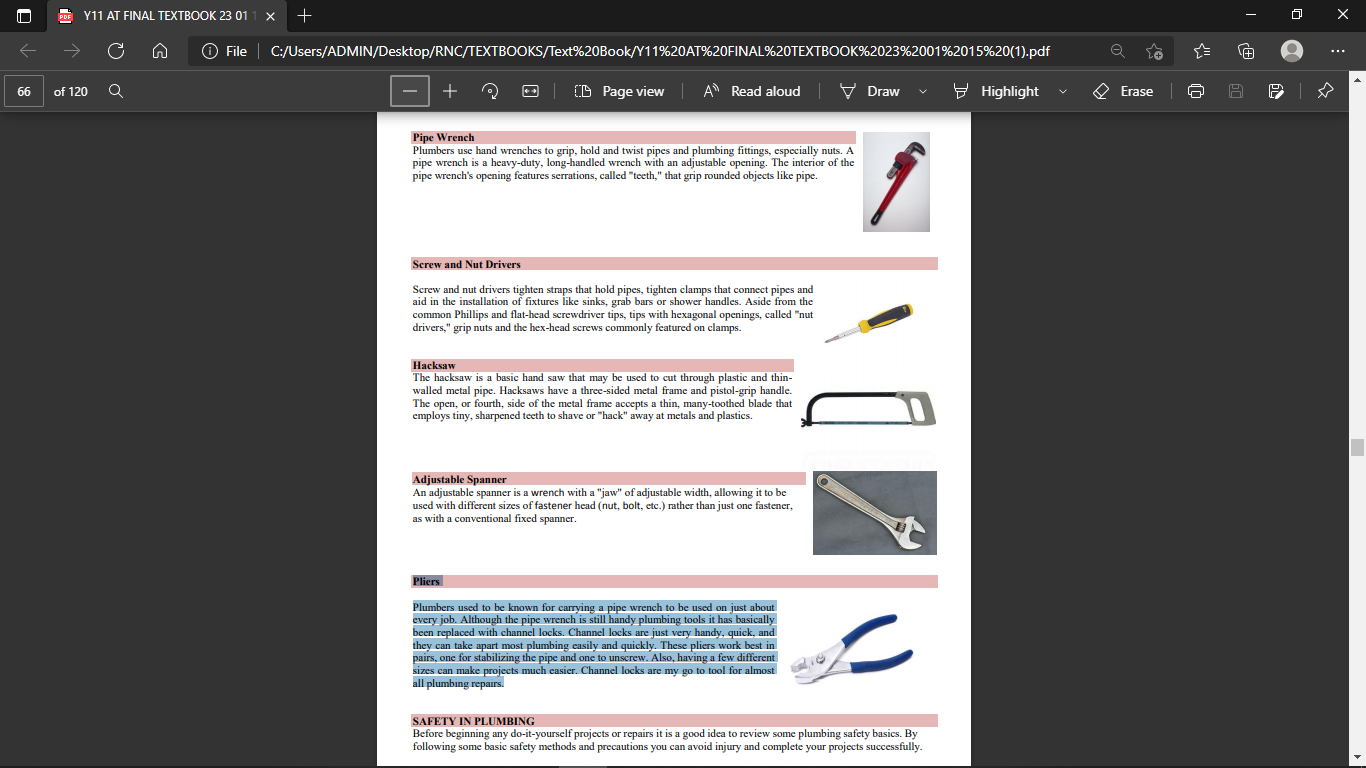
1. **PIPE WRENCH**

* Plumbers use hand wrenches to grip, hold and twist pipes and plumbing fittings, especially nuts.
* A pipe wrench is a heavy-duty, long-handled wrench with an adjustable opening.
* The interior of the pipe wrench's opening features serrations, called "teeth," that grip rounded objects like pipe.



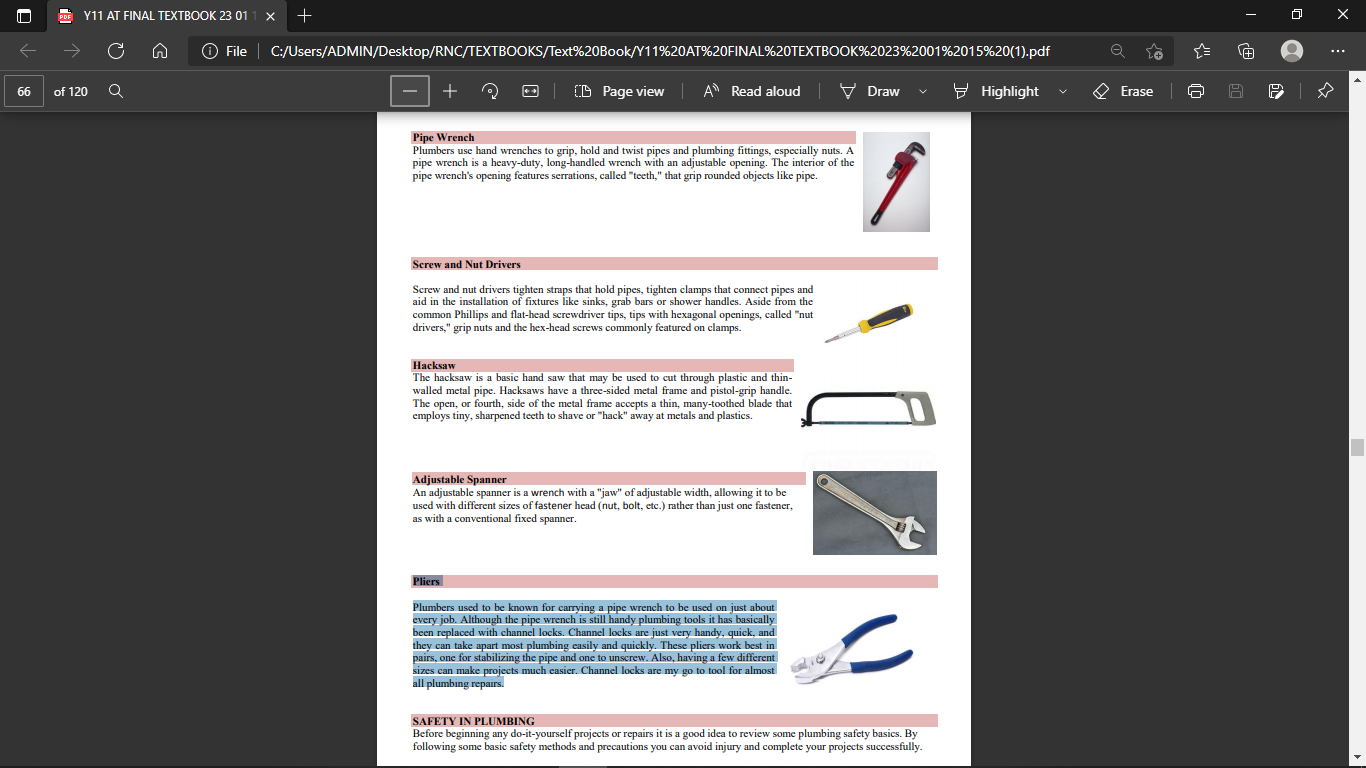
1. **SCREW & NUT DRIVERS**

* Screw and nut drivers tighten straps that hold pipes, tighten clamps that connect pipes and aid in the installation of fixtures like sinks, grab bars or shower handles.
* Aside from the common Phillips and flat-head screwdriver tips, tips with hexagonal openings, called "nut drivers," grip nuts and the hex-head screws commonly featured on clamps.



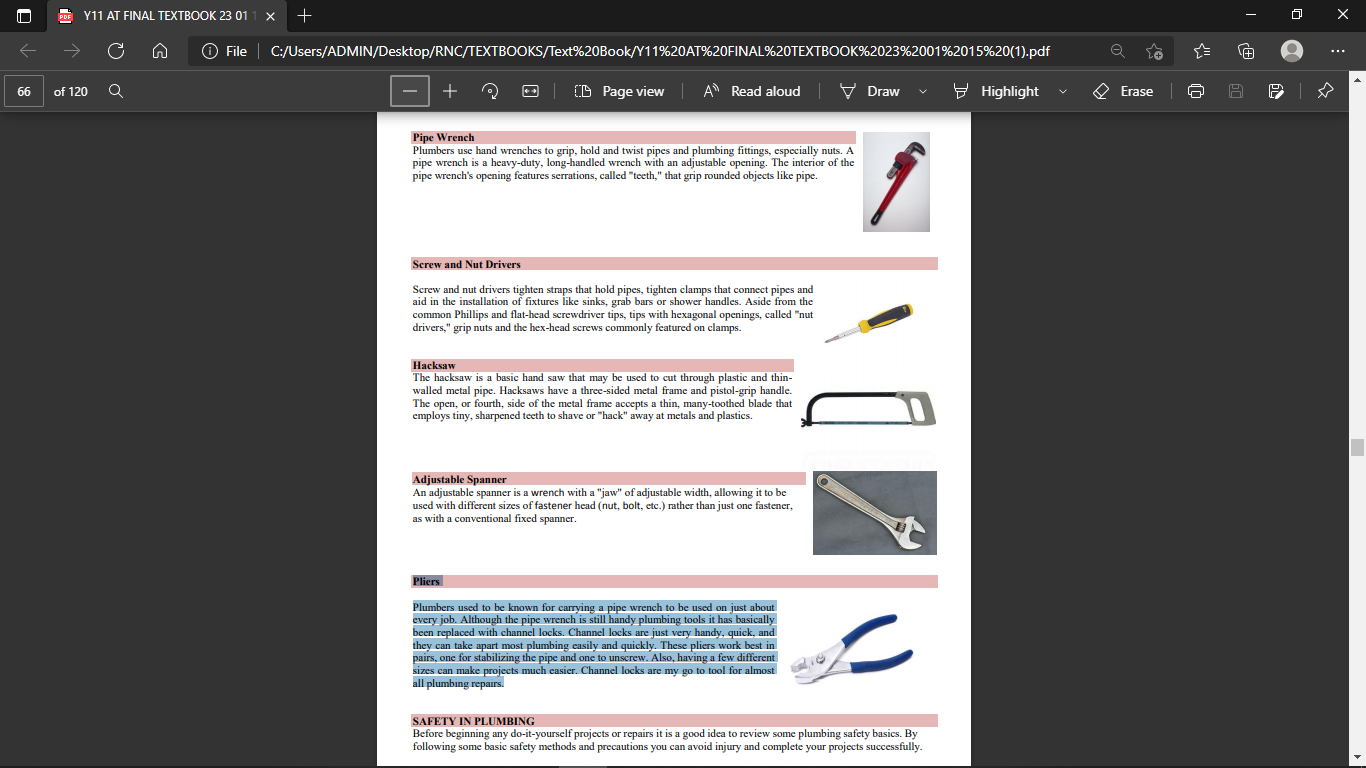
1. **HACKSAW**

* The hacksaw is a basic hand saw that may be used to cut through plastic and thinwalled metal pipe.
* Hacksaws have a three-sided metal frame and pistol-grip handle.
* The open, or fourth, side of the metal frame accepts a thin, many-toothed blade that employs tiny, sharpened teeth to shave or "hack" away at metals and plastics.



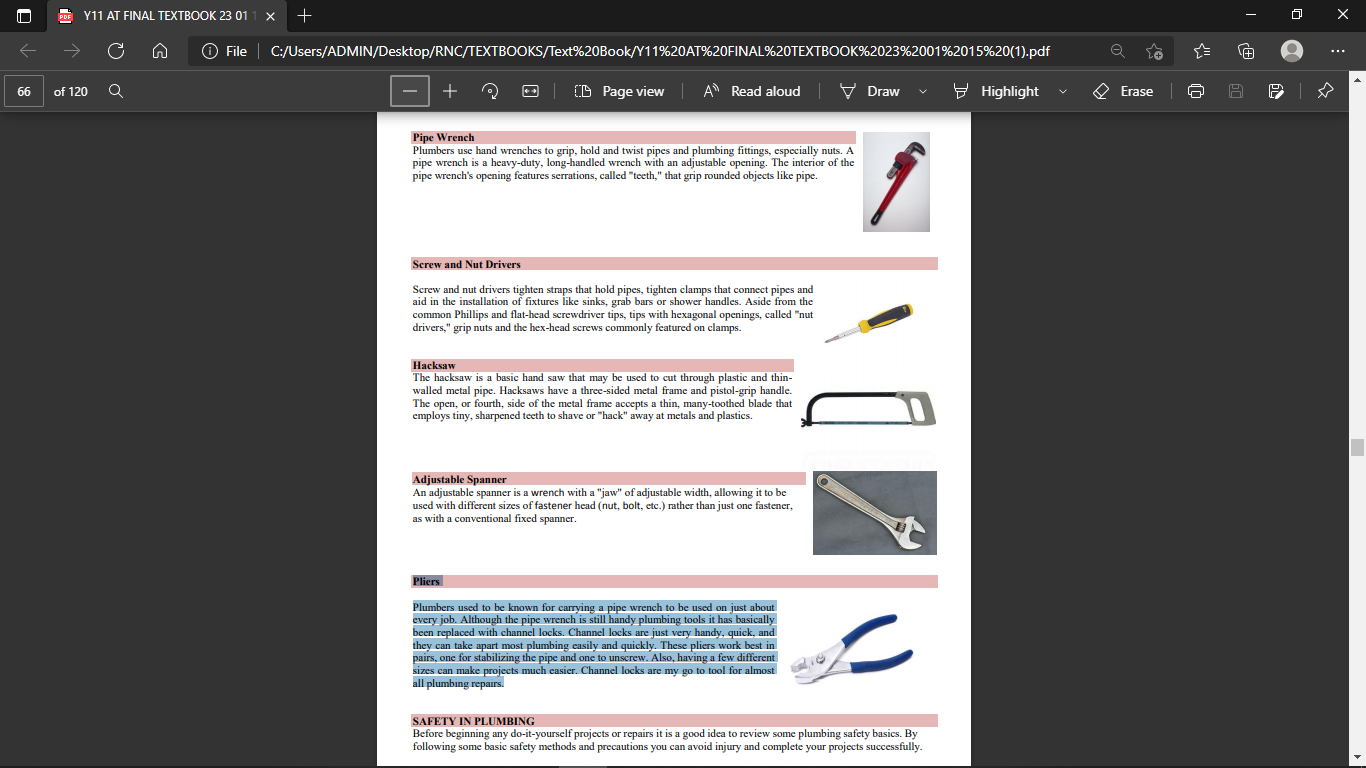
1. **ADJUSTABLE SPANNER**

* An adjustable spanner is a wrench with a "jaw" of adjustable width, allowing it to be used with different sizes of fastener head (nut, bolt, etc.) rather than just one fastener, as with a conventional fixed spanner.



1. **PLIERS**

* Although the pipe wrench is still handy plumbing tools it has basically been replaced with channel locks.
* Channel locks are just very handy, quick, and they can take apart most plumbing easily and quickly.
* These pliers work best in pairs, one for stabilizing the pipe and one to unscrew.
* Also, having a few different sizes can make projects much easier. Channel locks are my go to tool for almost all plumbing repairs.



**LESSON 70:** **SAFETY IN PLUMBING**

**LEARNING OUTCOME: IDENTIFY THE SAFETY PROCEDURES IN PLUMBING**

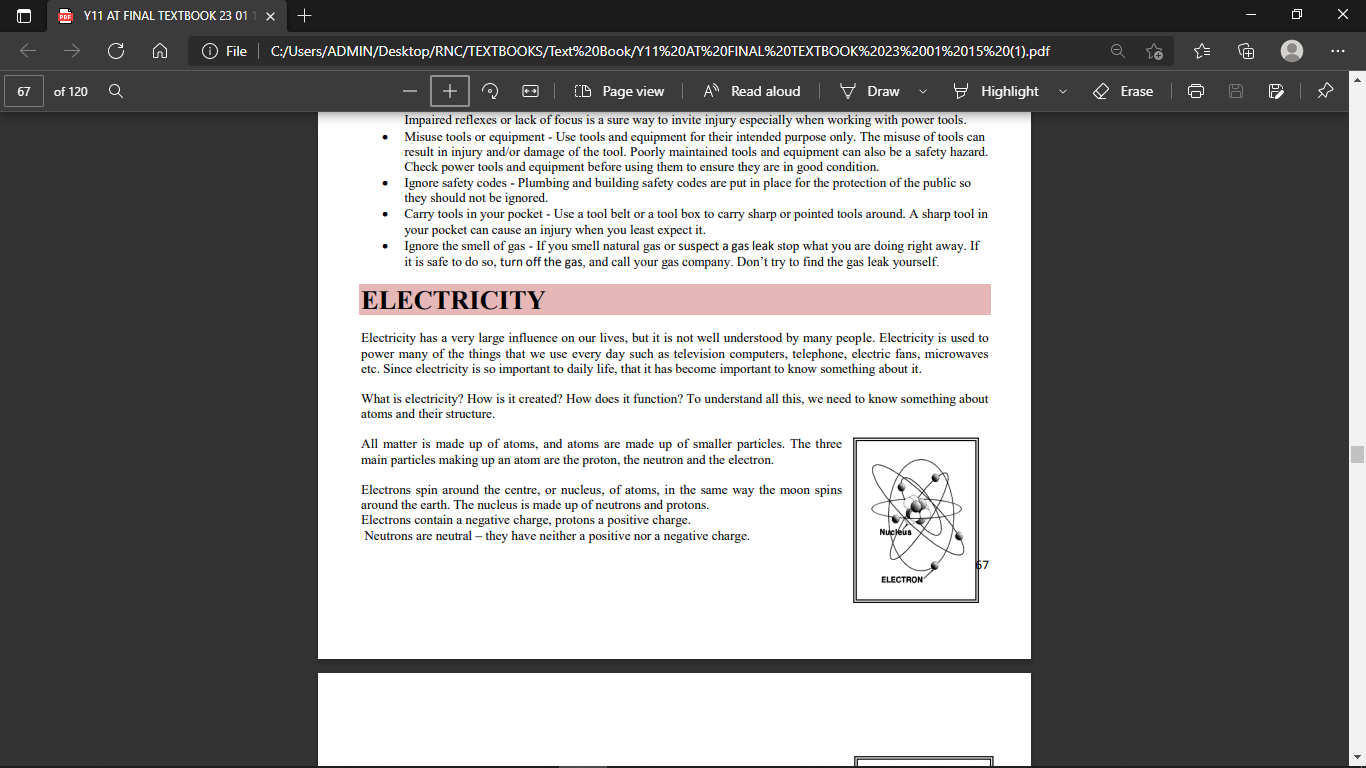
1. **BE INFORMED** - Know what work you can do yourself and what work will require a professional.

1. **PROTECT YOUR EYES** - Wear safety glasses when doing any plumbing work especially when doing anything that potentially damage your eyes.. Small objects can fall down or fly up right into your eye when least expected. Eyes are very sensitive and easily injured so it is always a good practice to protect them.
2. **PROTECT YOUR HANDS** - Wear appropriate work gloves to protect your hands. When using a drain machine of any sort it is a good idea to wear latex gloves under leather gloves to protect you from the germs typically found in drain lines.
3. **PROTECT YOUR LUNGS** - Use a face mask when necessary to protect your lungs. When projects involve sawing or sanding do take the extra precaution of using a disposable face mask to prevent inhalation of dust particles.
4. **BE CAUTIOUS** - Exercise caution when using power tools and follow the recommended manufacturer suggestions for use. Many people are injured by not keeping two hands on the power tool and staying focused on the project.
5. **HAVE A HELPER** - Having a spotter or helper will make completing your projects easier and safer.
6. **READ LABELS** - Always read labels and instructions when using chemicals or machines. Follow the recommendations for use at all times. Check the warning labels on products and equipment and know what to do in case of an emergency.
7. **WORK WHILE IMPAIRED** - Never work while you are overly tired, ill, or under the influence of alcohol or drugs. Impaired reflexes or lack of focus is a sure way to invite injury especially when working with power tools.
8. **MISUSE TOOLS OR EQUIPMENT** - Use tools and equipment for their intended purpose only. The misuse of tools can result in injury and/or damage of the tool. Poorly maintained tools and equipment can also be a safety hazard. Check power tools and equipment before using them to ensure they are in good condition.
9. **IGNORE SAFETY CODES** - Plumbing and building safety codes are put in place for the protection of the public so they should not be ignored.
10. **CARRY TOOLS IN YOUR POCKET** - Use a tool belt or a tool box to carry sharp or pointed tools around. A sharp tool in your pocket can cause an injury when you least expect it.
11. **IGNORE THE SMELL OF GAS** - If you smell natural gas or suspect a gas leak stop what you are doing right away. If it is safe to do so, turn off the gas, and call your gas company. Don‘t try to find the gas leak yourself.

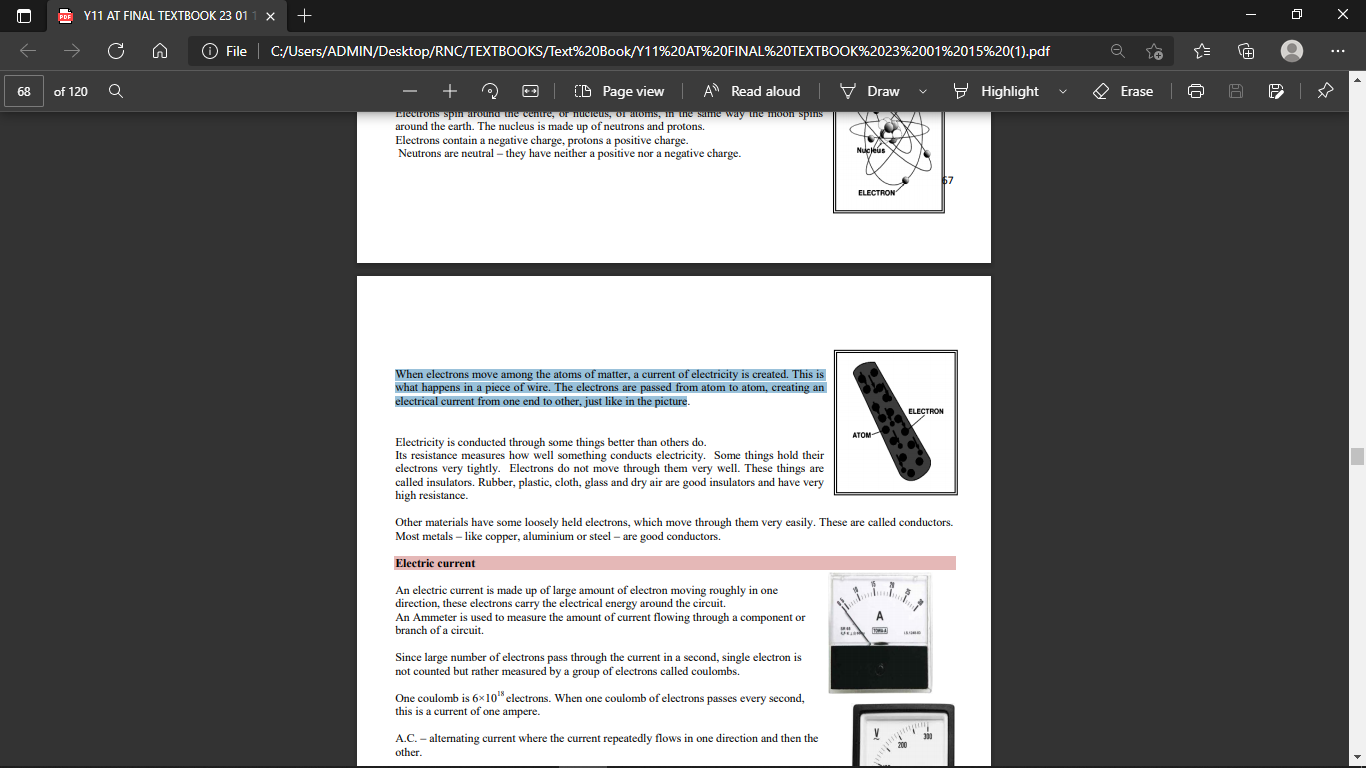
**LESSON 71:** **ELECTRICITY**

**LEARNING OUTCOME: UNDERSTAND HOW ELECTRICITY IS CREATED**

* Since electricity is so important to daily life, that it has become important to know something about it.
* All matter is made up of atoms, and atoms are made up of smaller particles. The three main particles making up an atom are the proton, the neutron and the electron.
* Electrons spin around the centre, or nucleus, of atoms, in the same way the moon spins around the earth. The nucleus is made up of neutrons and protons. Electrons contain a negative charge, protons a positive charge. Neutrons are neutral – they have neither a positive nor a negative charge.



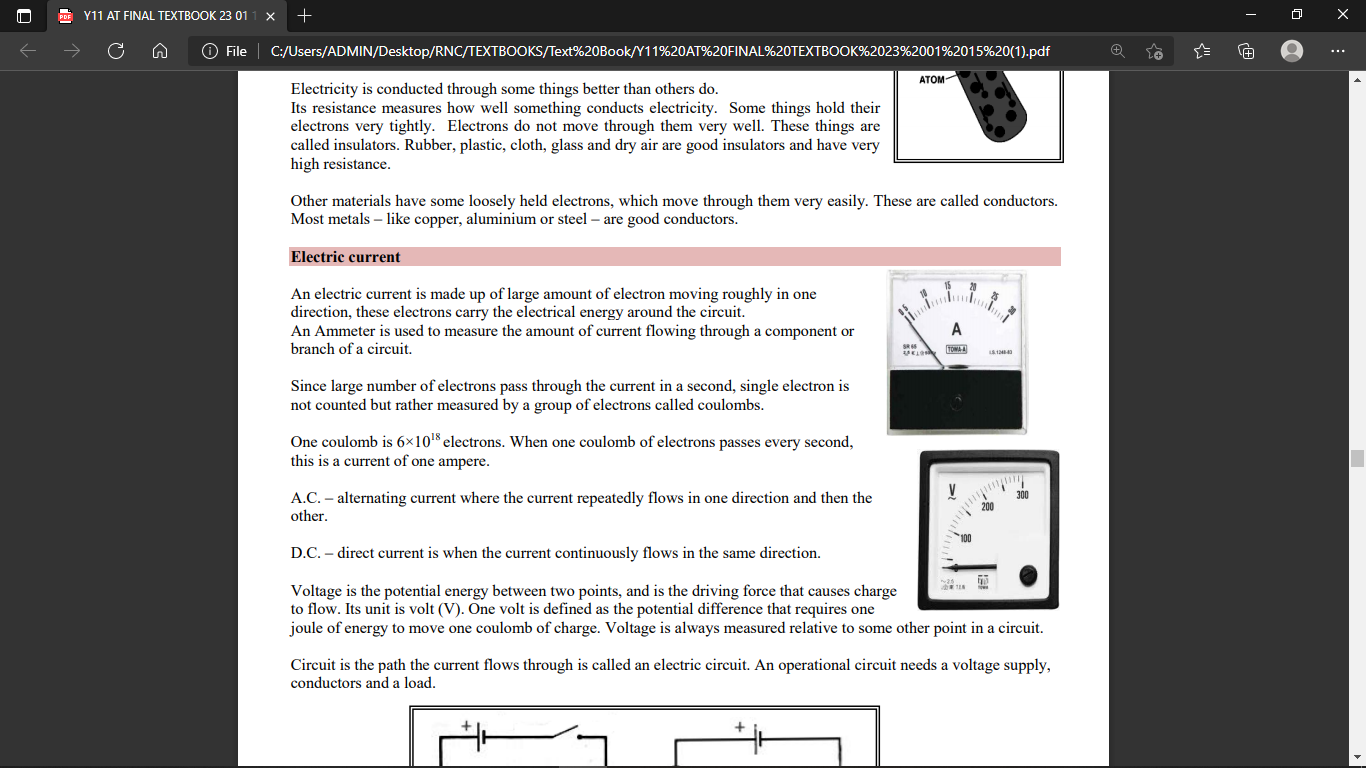
* When electrons move among the atoms of matter, a current of electricity is created. This is what happens in a piece of wire. The electrons are passed from atom to atom, creating an electrical current from one end to other



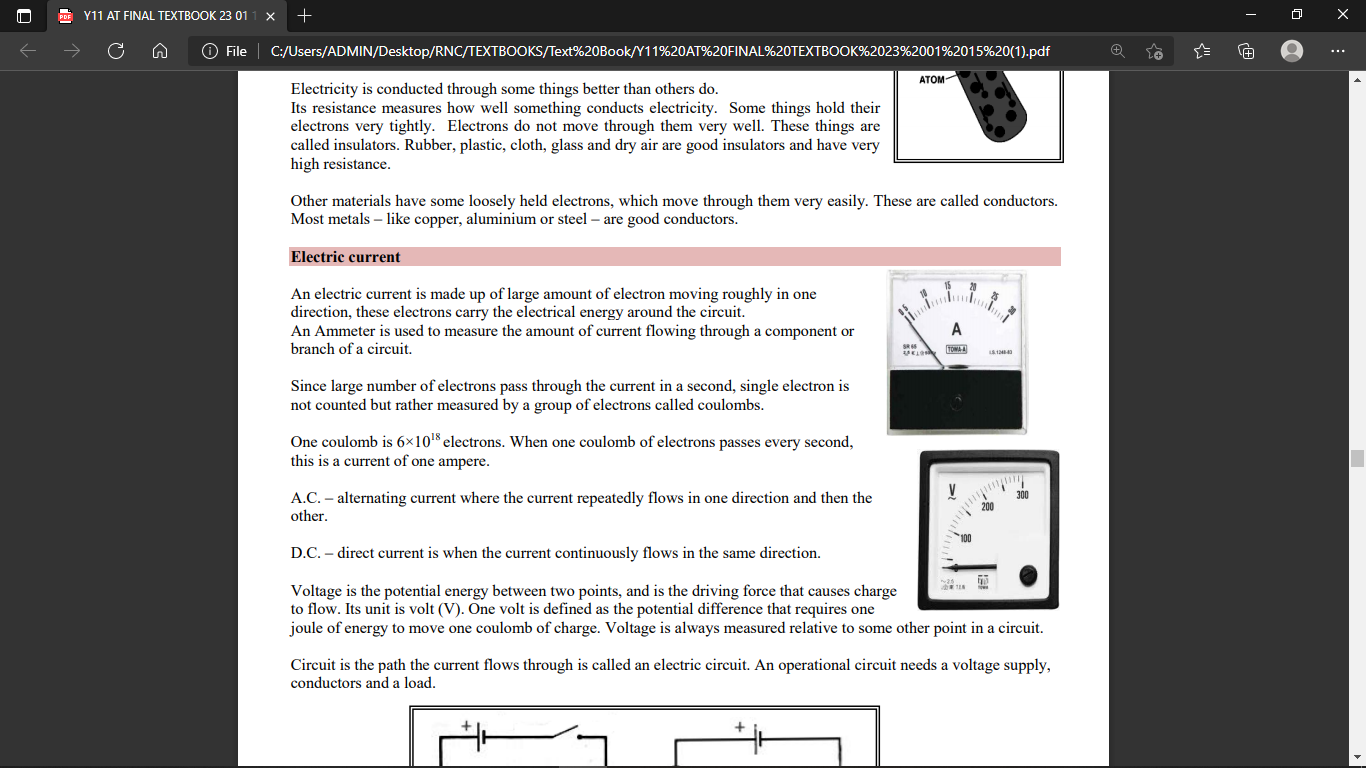
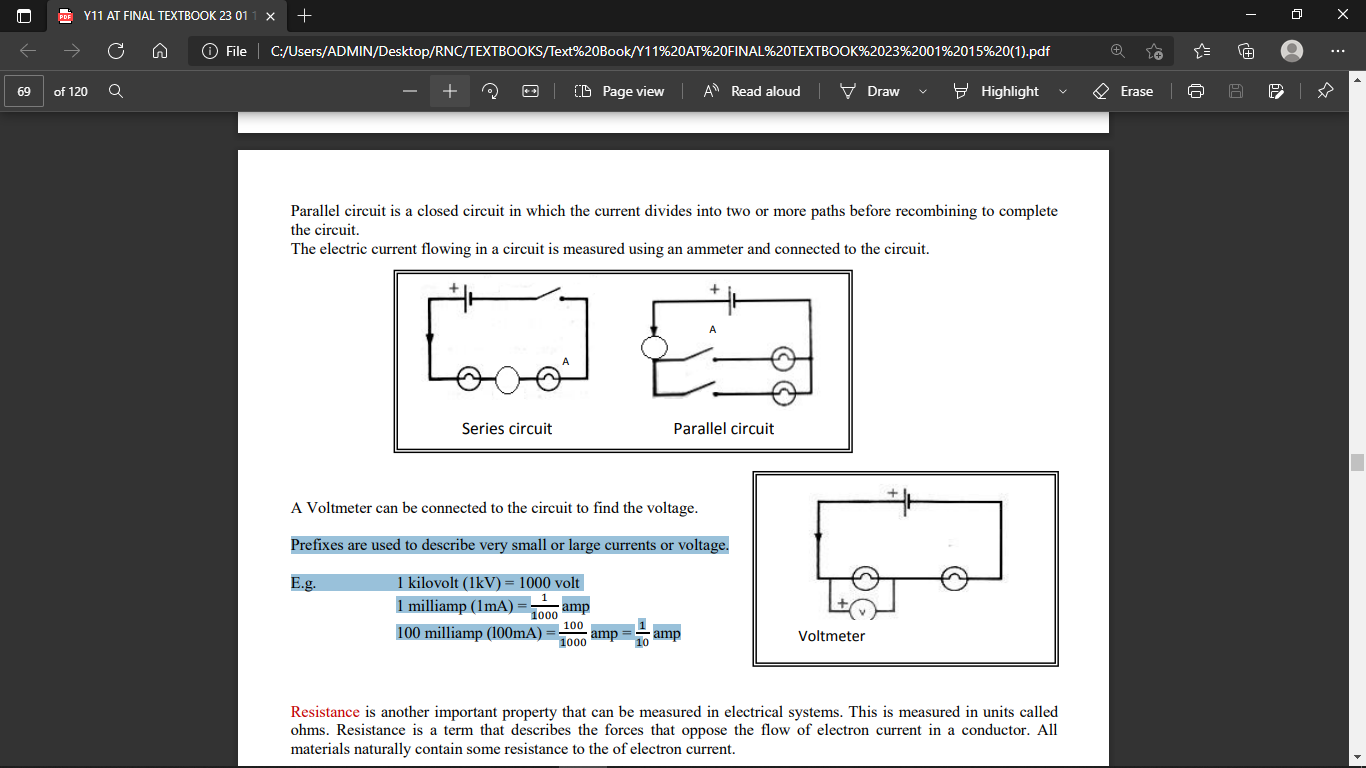
**LESSON 72:** **ELECTRIC CURRENT**

**LEARNING OUTCOME: DEFINE ELECTRICAL TERMS & TYPES OF CIRCUIT**

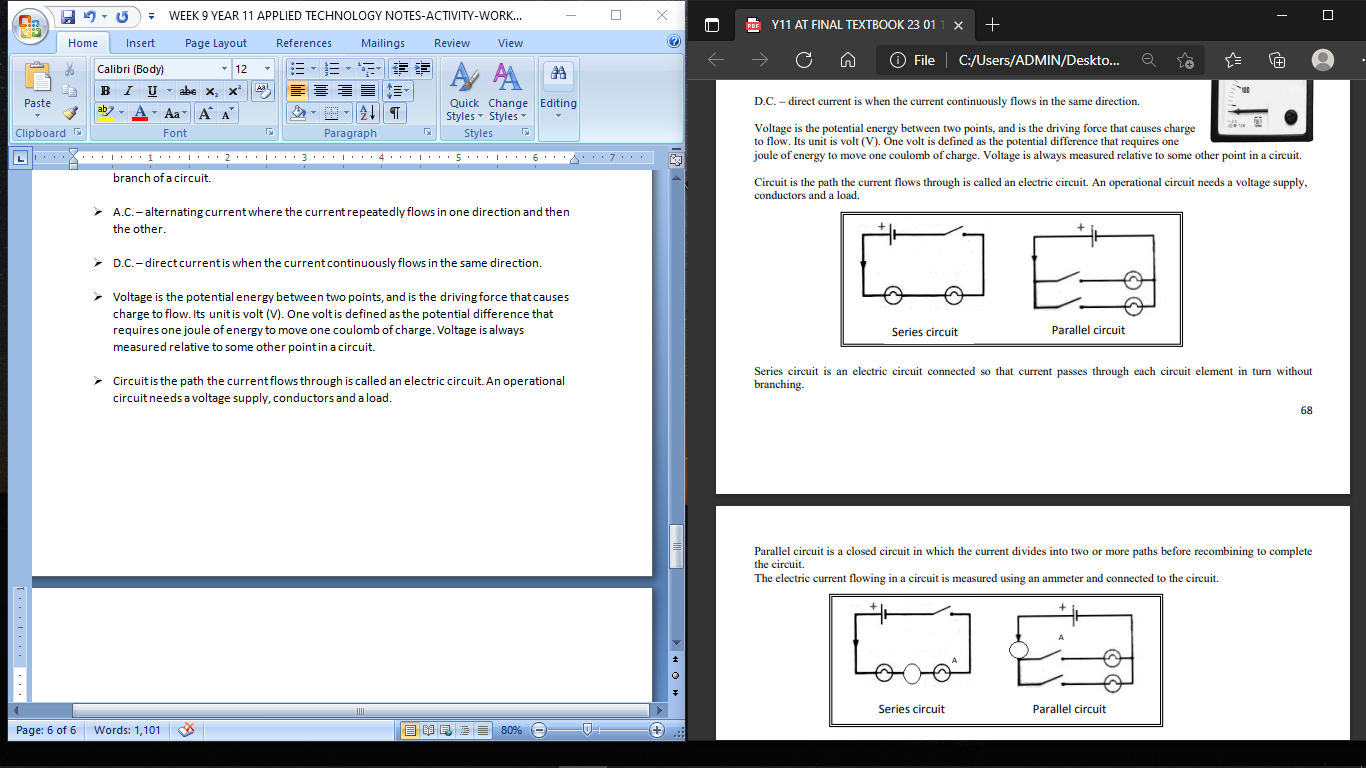
* An electric current is made up of large amount of electron moving roughly in one direction, these electrons carry the electrical energy around the circuit
* An **Ammeter** is used to measure the amount of current flowing through a component or branch of a circuit.



* A **Voltmete**r can be connected to the circuit to find the voltage.

* **A.C**. – alternating current where the current repeatedly flows in one direction and then the other.
* **D.C.** – direct current is when the current continuously flows in the same direction.
* **Voltage** is the potential energy between two points, and is the driving force that causes charge to flow. Its unit is volt **(V).** One volt is defined as the potential difference that requires one joule of energy to move one coulomb of charge. Voltage is always measured relative to some other point in a circuit.
* Circuit is the path the current flows through is called an **electric circuit**. An operational circuit needs a voltage supply, conductors and a load.



* **Series circuit** is an electric circuit connected so that current passes through each circuit element in turn without branching
* **Parallel circuit** is a closed circuit in which the current divides into two or more paths before recombining to complete the circuit.
* **Resistance** is another important property that can be measured in electrical systems. This is measured in units called ohms. Resistance is a term that describes the forces that oppose the flow of electron current in a conductor. All materials naturally contain some resistance to the of electron current.
* **Resistor** is a device that opposes the flow of current and in is common to every circuit known to man. Resistors are designed to have specific values of resistance or impedance.
* **Ohms** is the amount of electrical resistance that exists in an electrical circuit when one amp of current is flowing with one volt being applied to the circuit. The following formula is used to calculate electrical values so that we can design circuits and use electricity in a useful manner.
* Ohm's Law is shown : **I= V/R**

* R = resistance in Ω, V= voltage in volts, I= current in Amps Depending on what you are trying to solve we can rearrange it two other ways. **V = I x R**
* If the voltage stays the same, and the resistance goes up, then the current goes down. If the voltage stays the same, and the resistance goes down, then the current will go up.

Prefixes are used to describe very small or large currents or voltage.

* 1 kilovolt (1kV) = 1000 volt
* 1 milliamp (1mA) = amp
* 100 milliamp (l00mA) = 100/1000 amp = 1/10 amp

**LESSON 73:** **RESISTORS IN SERIES CIRCUIT**

**LEARNING OUTCOME: CALCULATE COMBINED RESISTANCE, CURRENT & VOLTAGE**

1. **RESISTORS IN SERIES CIRCUIT**

* The total resistance (R) of a series circuit is equal to the sum of the separate resistance (R1,R2).
* R = R1 + R2

**Example**: A Partial discharge (p.d) of 4V is applied to two resistors ( of 6 Ω and 2 Ω) connected to the series

Calculate:

* The combined resistance

Combined resistance = R1 + R2 = 6 Ω and 2 Ω = 8Ω 2.

* The current flow

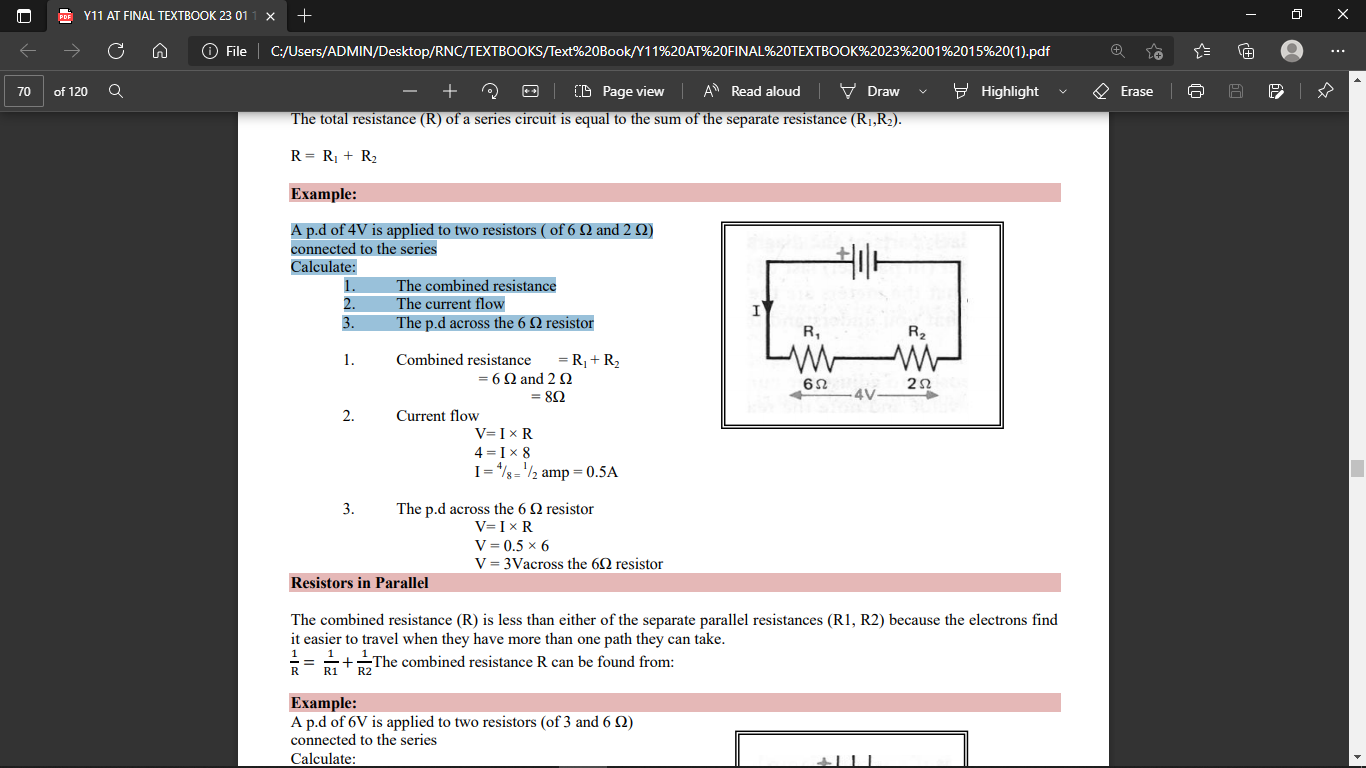
Current flow V= I × R 4 = I × 8 I = 4 /8 = 1 /2 amp = 0.5A

* The partial discharge across the 6 Ω resistor

The p.d across the 6 Ω resistor V= I × R V = 0.5 × 6 V = 3V across the 6Ω resistor

**ACTIVITY**

1. A P.D of 4V is applied to two resistors ( of 5 Ω and 3 Ω) connected to the series

****

3 Ω

5Ω

4V

Calculate:

* The combined resistance
* The current flow
* The P.D across the 6 Ω resistor

1. Define the following

* Voltmeter
* Ammeter
* Resistor

1. Identify the two types of electrical circuit

**WORKSHEET**

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| --- | --- |
| Name the following |  |
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