BASIC 7

WEEKLY LESSON PLAN – WEEK 7

Strand:	Computational Thinking		Sub-Strand:		Robotics	
Content Standard:	B8.4.3.1. Discuss Robot Intelligence Concepts					
Indicator (s)	B8.4.3.1.1 Describe the principles underlying the operation of the components of a robot (Controller Mechanical, Sensors)			**Performance Indicator:** Learners can make Robots using sensors.		
Week Ending	11-08-2023					
Class	B.S.7	**Class Size:**			**Duration:**	
Subject	Computing					
Reference	Computing Curriculum, BS7 Computing Textbook, Teachers Resource Pack, Learners Resource Pack					
Teaching / Learning Resources	Personal Computer, Poster, Charts, Video		**Core Competencies:**		• Communication and Collaboration • Digital Literacy	

DAY/DATE	PHASE 1 : STARTER	PHASE 2: MAIN	PHASE 3: REFLECTION

TUESDAY	Discuss with Learners about the meaning of terminologies in the lesson.
	
	Keywords/Terminologies;
	
	  ♦ Robot
	  ♦ Robot controller
	  ♦ Sensors
	  ♦ Mechanical
	  ♦ Manipulator
	  ♦ Endeffector
	  ♦ Locomotion
	  ♦ Automatons
		1. Assist Learners to identify the components of a Robot.
		2. Discuss the meaning and components of a Robot controller with the Learners.
		3. Learners brainstorm to explain why the Robot controller is referred as the "brain" of the robot.
		4. Show Learners video and pictures of the various parts of the robot.
		
		Components or Parts of a Robot
		
		1. Central Processing Unit
		
		One of the main components of a robot is found in any computer-driven technology: the central processing unit (CPU). The CPU acts as the "brain" of the robot. In other words, a CPU is the robot component that provides feedback to outside stimuli.
		
		2. Sensors
		
		That takes us to the next key component of every robot: sensors. Sensors are the powerhouse of a robot's feedback
			Reflect on the components of a Robot.
			
			Exercise;
			
			Explain the parts of a Robot.

mechanism. They act as eyes and ears to help it take in information about its surroundings. Robots typically incorporate a wide range of sensor types to help them perform their work. These include:

- Light sensors
- Sound sensors
- Temperature sensors
- Contact sensors
- Proximity sensors
- Distance sensors
- Pressure sensors
- Positioning sensors

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3. Actuators

If sensors are the eyes and ears of the robot, its actuators function like muscles. Actuators are small motors attached directly to the structure of the machine that facilitate movement. Some of the most common types include:

- **Hydraulic**: Uses oil to facilitate movement
- **Pneumatic**: Uses air to facilitate movement
- **Electric**: Uses electric current and magnets to facilitate movement
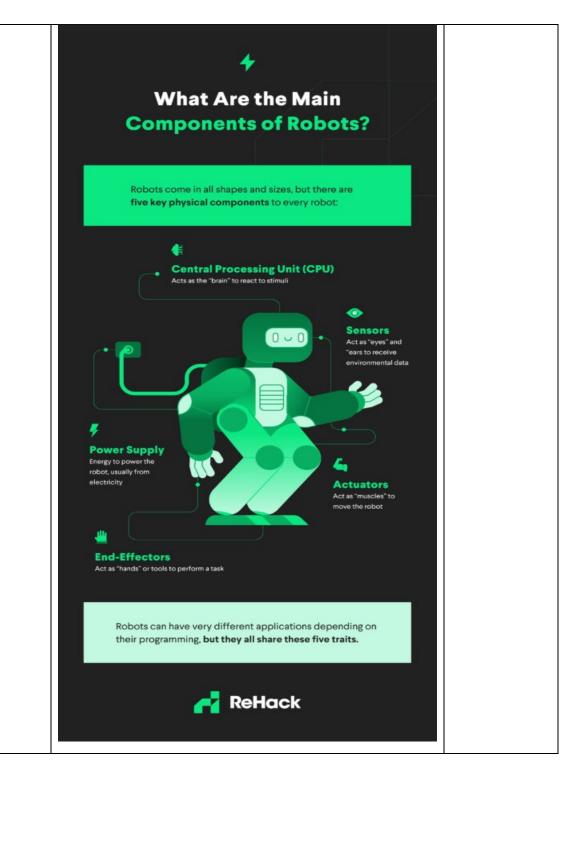
4. End-Effectors

Another quality that most robots have in common is end-effectors. The terms "effector" and "end-effector" are sometimes used interchangeably. Both terms refer to the tools aboard the robot — the parts that perform the actual work and interact with the environment or a workpiece. Here are a few examples:

- Factory robots may feature end-effectors such as welding torches, screwdrivers, rivet guns and paint sprayers.
- Mobile robots usually have manipulators and grippers for lifting objects or disposing of dangerous ordinance.
- Robots like those dispatched to other planets may carry shovels, drills, hammers, cameras, lights and other analytical implements.

5. Power Supply

Just like human beings consume food when they need energy, robots need energy to function as well. Almost all robots receive their power from electricity.

6. A Program

A robot's programming isn't a physical component, but it's still an essential part of the whole. Each of the basic components of robots we've looked at takes in stimuli or provides a form of feedback. The program within a robot provides the logic that drives these behaviors.

| **FRIDAY** | Assist Learners to identify the principles or the three laws of Robotics. | 1. Discuss with Learners about the classifications of Robots.
2. Assist Learners to describe how a range of sensors can be used to input data into a computer system, including light, temperature, magnetic field, gas, pressure, moisture, humidity, pH and motion.
3. Learners in small groups to discuss and report to the class on how sensors are used in real-life scenarios.

The Principles/ Laws of Robotics;

    • A robot may not injure a human being or through inaction, allow a human to be harmed.
    • A robot must obey orders given by human except when that conflicts with the first law
    • A robot must protect its own existence unless that conflicts with first or second law.
Classification of Robots

According to the Japanese Industrial Robot Association, robots are classified into six classes.

They are:

Class 1 – Manual Handling Robot

Manual Handling Robot has multiple degrees of freedom, actuated by an operator.
Class 2 – Fixed Sequence Robot

A bot that performs the continuous task according to the situation and condition applied on it. It uses a constant sequence which is hard to modify.

Class 3 – Variable Sequence Robot

Variable Sequence Robot also performs continuous tasks as situation applied but one main difference is it can be modified as it is used for a variety of sequences.

Class 4 – Playback Robot

This category of robot records the tasks performed by the human before and stores the tasks and motions for later playback. The robots will repeat the task and motions according to the recorded information.

Class 5 – Numerical Control Robot | Learners brainstorm to make robotic games using sensors. |
| **FRIDAY** | | | |

| | | The operator supplies the robot with a movement program rather than teaching it manually.

Class 6 – Intelligent Robot

A robot that can able to understand its work environment and the ability to successfully complete a task though there is a change in the surrounding conditions under which is it to be performed. This type of robot will easily absorb the changes in its work area and work regarding that. | |

Name of Teacher: *School:*   *District:*