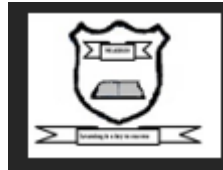




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NDAEDZO SECONDARY SCHOOL



GRADE 9 TERM 3 TECHNOLOGY - PAT TERM 3 – 2024

ELECTRONIC SYSTEMS AND CONTROL

NAME OF LEARNER: \_\_\_\_\_

CLASS: \_\_\_\_\_

SKILLS TO BE ASSESSED

INVESTIGATION SKILL: \_\_\_\_/15

Design brief, specifications, and constraints)

DESIGN SKILLS: Working drawing \_\_\_\_/20

MAKING SKILLS: Task 6: Rubric \_\_\_\_/35 TOTAL

## SCENARIO

It can be frustrating and even unsafe to come back to a house at the end of a working day without adequate outdoor lighting. Emily wants her outdoor lights to be operational when she arrives home in the evenings. Instead of using an automatic system, she prefers a manual switch that she can operate to turn the lights on and off as needed.

You need to design and make a scale model of an electronic circuit with a light, housed in a structure where the light and switch can be easily accessed. The circuit will include a manual switch that Emily can use to activate the LED lights, representing her outdoor lights.

## REQUIREMENTS FOR THE CIRCUIT AS WELL AS THE STRUCTURE THAT HOUSES THE CIRCUIT

- The size of the structure that houses the light and switch should be 40 mm x 30 mm x 20 mm.
- The structure should protect the components of the electronic circuit.
- The structure should hold the circuit and components securely without collapsing.
- The structure should not have any sharp edges that could harm people.
- The LED and the manual switch should be visible from the outside of the structure.
- Components/materials that must be used for the circuit are:
  - LED: to indicate when the circuit is switched on
  - Manual switch: to control the circuit
  - Batteries, resistors, transistor
- The electronic components should be securely attached to the baseboard.
- The batteries should be easily replaceable.
- The cost of the electronic circuit of the scale model should not exceed R40.

## Activity 1

1. INVESTIGATION SKILLS      TASK 1

1.1. Identify Emily's problem.

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[2]

1.2.1 Give two reasons why Emily wants a manual switch for her outdoor lights. [2]

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1.3 How does Emily want to solve the problem? [2]

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1.4.1 Do you think her suggestion of using a manual switch is suitable? [2]

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1.4.2 Give a reason for your answer.

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1.4.3

Draw the electric circuit diagram that should be used using the correct symbols

[5]

[TOTAL 15 MARKS]

### **ACTIVITY 2 DESIGN**

**Answer the following questions.**

**2.1.1 Write a design brief for the identified problem in the scenario. [2]**

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**2.1.2 How will the solution benefit the community at large? [2]**

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**2.1.3 Identify and list TWO specifications for the structure that will house the electronic circuit. (Any TWO) [2]**

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**2.2.2 List TWO specifications for the electronic system within the structure mentioned in 2.2.1. (Any TWO) [2]**

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**2.3.1 Identify and list THREE constraints for the electronic circuit and/or structure that house the circuit [3]**

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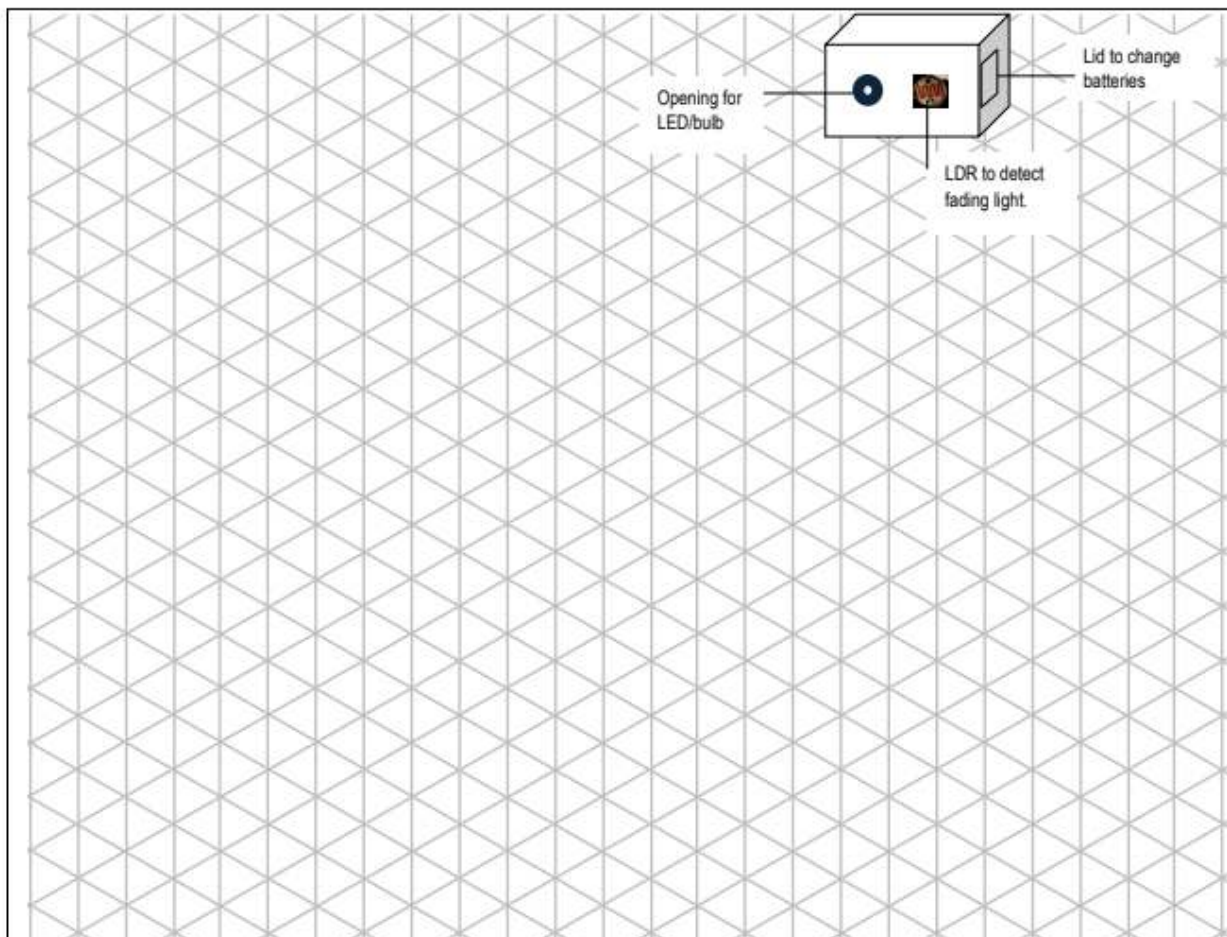
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## 2.2

**Draw a 3D sketch showing the device that will house the electronic circuit. Remember to position the [SWITCH not LDR] and LED where they will be most effective for the intended purpose.**

### 2.2.1



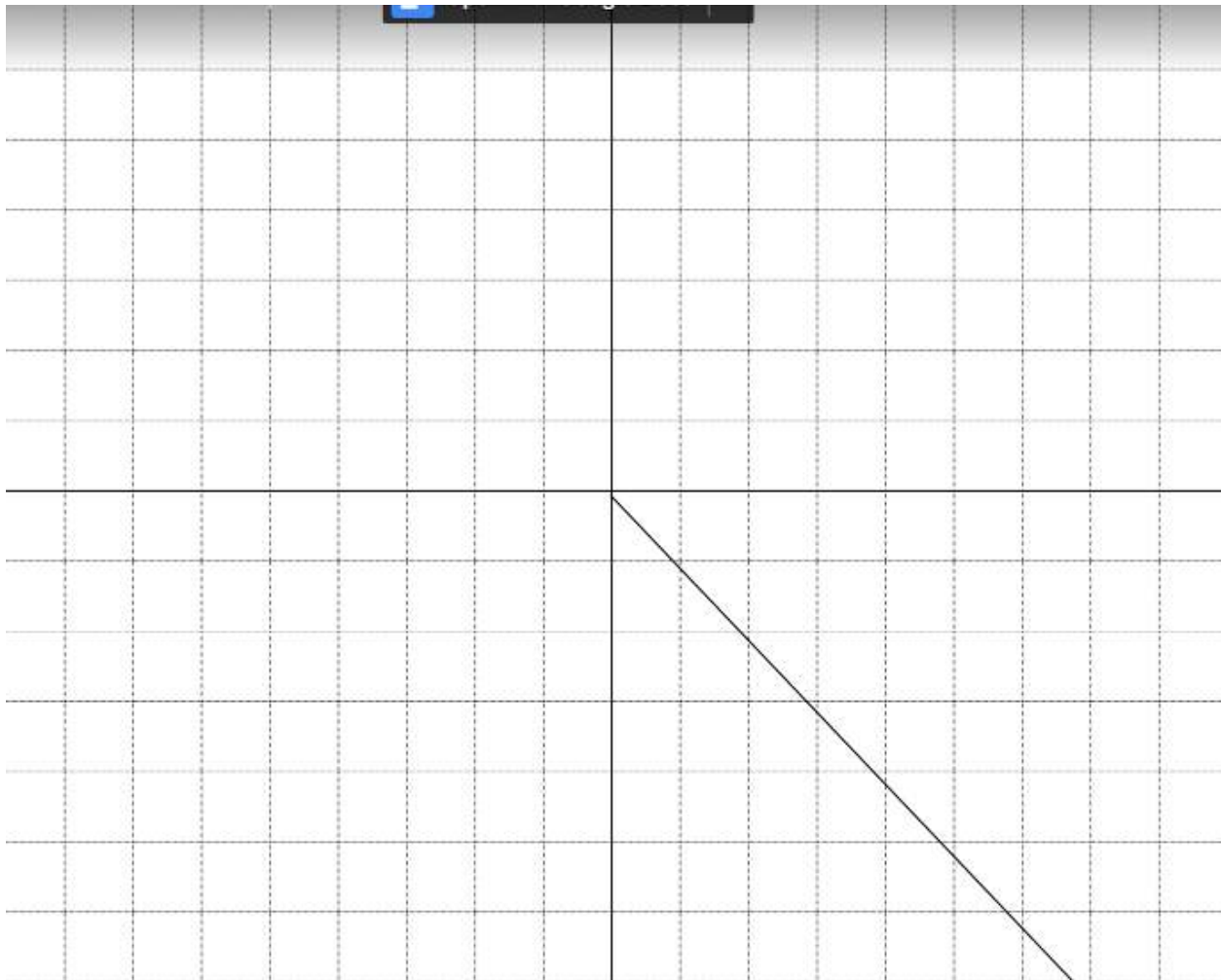
[4]

## 2.2.2

Draw the first angle orthographic drawing of the structure that houses the electronic system. Use a scale of 1 : 10. These drawings need to.....

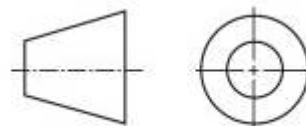
- List all the components and materials needed
- Give the dimensions for each aspect of the design
- Be drawn at full size or to a scale that has been provided in the scenario.

**N.B. Specification of the container: 40 mm x 30 mm x 20 mm.**



Scale= \_\_\_\_\_

[5]



First angle projection symbol

### **Project Evaluation Rubric (Total: 35 Points)**

| Criteria                 | Excellent (5)                         | Good (4)                       | Satisfactory (3)         | Needs Improvement (2) | Unsatisfactory (1) |
|--------------------------|---------------------------------------|--------------------------------|--------------------------|-----------------------|--------------------|
| Structure Size           | Meets dimensions (40mm x 30mm x 20mm) | Slightly off                   | Noticeably off           | Major deviations      | Not built          |
| Protection of Components | Very secure, no collapse              | Good protection                | Adequate protection      | Minimal protection    | No protection      |
| Safety (Sharp Edges)     | No sharp edges                        | Minimal sharp edges            | Some sharp edges present | Multiple sharp edges  | Very hazardous     |
| Visibility of Components | LED and switch highly visible         | Visible with minor obstruction | Some visibility issues   | Poor visibility       | Not visible        |
| Circuit Assembly         | Excellent, secure attachment          | Good attachment                | Somewhat secure          | Poor attachment       | Not attached       |
| Battery Accessibility    | Very easy to replace                  | Fairly easy                    | Somewhat difficult       | Difficult             | Not accessible     |
| Overall Functionality    | Works perfectly                       | Minor issues                   | Some functionality       | Major issues          | Non-functiona      |
|                          |                                       |                                |                          |                       |                    |