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**OFFICE OF THE DISTRICT MANAGER:
NGAKA MODIRI MOLEMA DISTRICT**

GRADE 8

TERM 1: 2023

**STRAND: MECHANICAL SYSTEMS AND
CONTROL & STRUCTURES**

FOCUS: INVESTIGATE + DESIGN + MAKE

MODEL: MAIZE CRUSHER

PAT

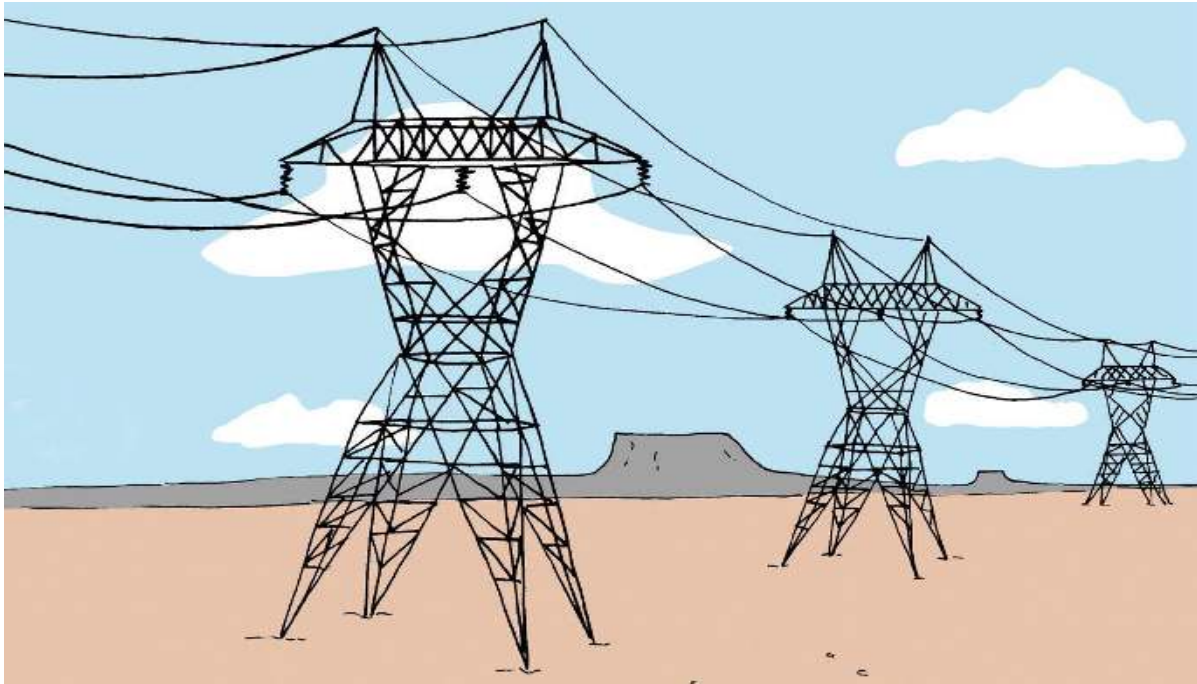
(PRACTICAL ASSESSMENT TASK)

Name and Surname:

School: _____

Grade: 8__

Mark: _____ /70

TECHNOLOGY FORMAL PRACTICAL ASSESSMENT TASK**INSTRUCTIONS:**

- Write legibly and fill each page with necessary information i.e., your Name and Date.
- Draw neatly by using pencil.
- Fill all spaces with relevant answers.
- Ask your teacher if you do not understand as s/he will supervise your progress throughout.
- Complete the PAT in the set time and submit to your teacher immediately.
- You may attach drawing or extra materials in your PAT as evidence.
- Pack your PAT according to page numbering.
- This PAT consists of 10 printed pages.

INFORMATION

This PAT will run over **two/three** weeks. For this PAT, individual work and group work to be submitted.

Mark allocation of Term 1 PAT

DESIGN PROCESS	TASK	MARK ALLOCATION	LEARNER MARK
1. Investigate	1.1 Purposes of structures	02	
	1.2 Explanation of the pylon design	02	
	1.3 Usage of concrete blocks	01	
	1.4 Stiffening methods used in pylons	02	
	1.5 Advantages and disadvantages of using electric pylons.	06	
	1.6 Design that is suitable to carry cable load	02	
Total		15	
2. Design	2.1.1 Design brief	03	
	2.1.2 Specifications and constraints	04	
	2.1.3 2 initial idea sketches	06	
	2.1.4 2D working drawing	07	
Total		20	
3. Make		35	
GRAND TOTAL		70	

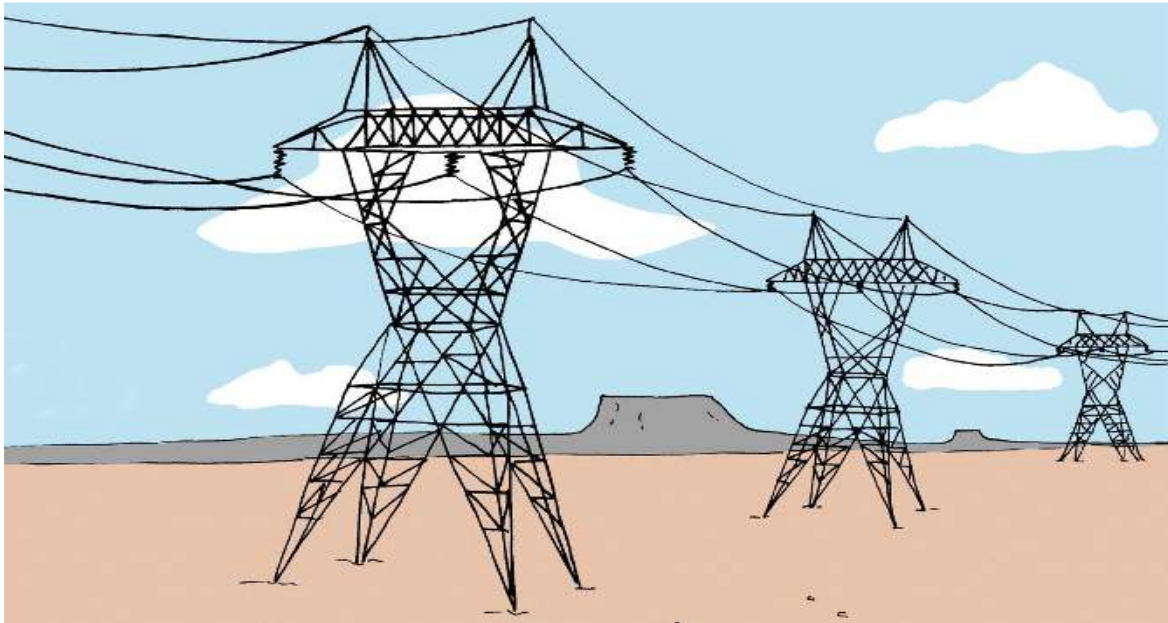
1. Investigate Electrical Pylons.**Case Study: Examine existing Electrical pylons.**

Study the electrical Pylons below in Figures 1 to 6. Can you identify different electrical pylons? These Electrical pylons have all been designed by engineers to solve the problem. The problem: how to strengthen a structure so that it is able to withstand different forces? Study the pylons and answer the questions below.

Compare different designs of electrical pylons.

Study the pictures below and answer the questions that follow:

1.1 Outline the two purposes that these structures serve. (2)



1.2 Explain why do you think the pylon below in **Figure 1** is designed the way it is, and not in the way shown in **Figure 2**? (2)

The pylons in **Figures 3 and 5** are solid structures made from concrete. All the other pylons are steel frame structures.



Figure 1

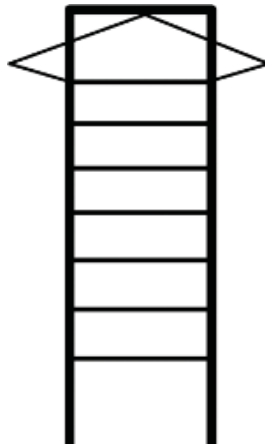


Figure 2

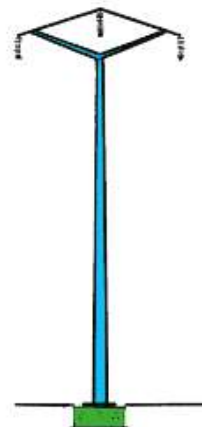


Figure 3

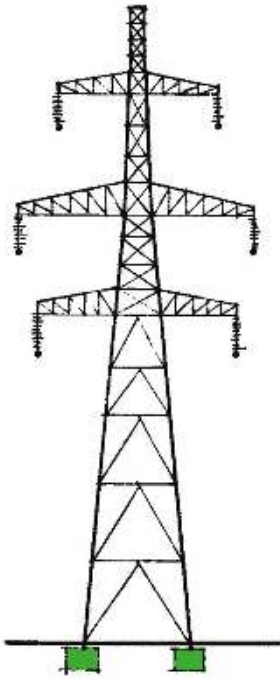


Figure 4

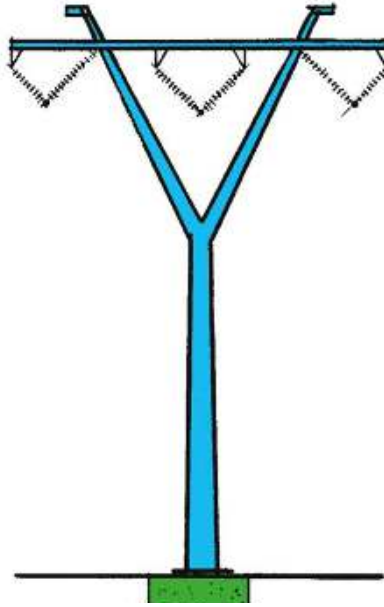


Figure 5

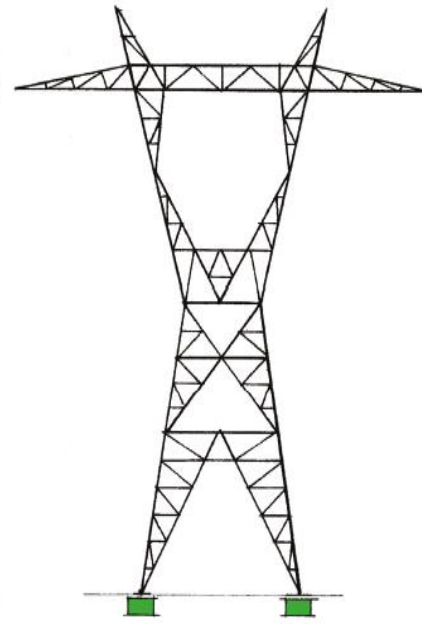


Figure 6

1.3 Describe the usage of concrete blocks in figure 3-6. (1)

1.4. List two stiffening methods that have been used in the pylons above. (2)

1.5 Write two advantages and one disadvantage of using electrical pylons in **Figures 3 and 4**. Take note of the mark allocation as you answer this question.

Figure 3 Electrical Pylon	
Advantages	Disadvantages

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(3)

Figure 4 Electrical Pylon	
Advantages	Disadvantages

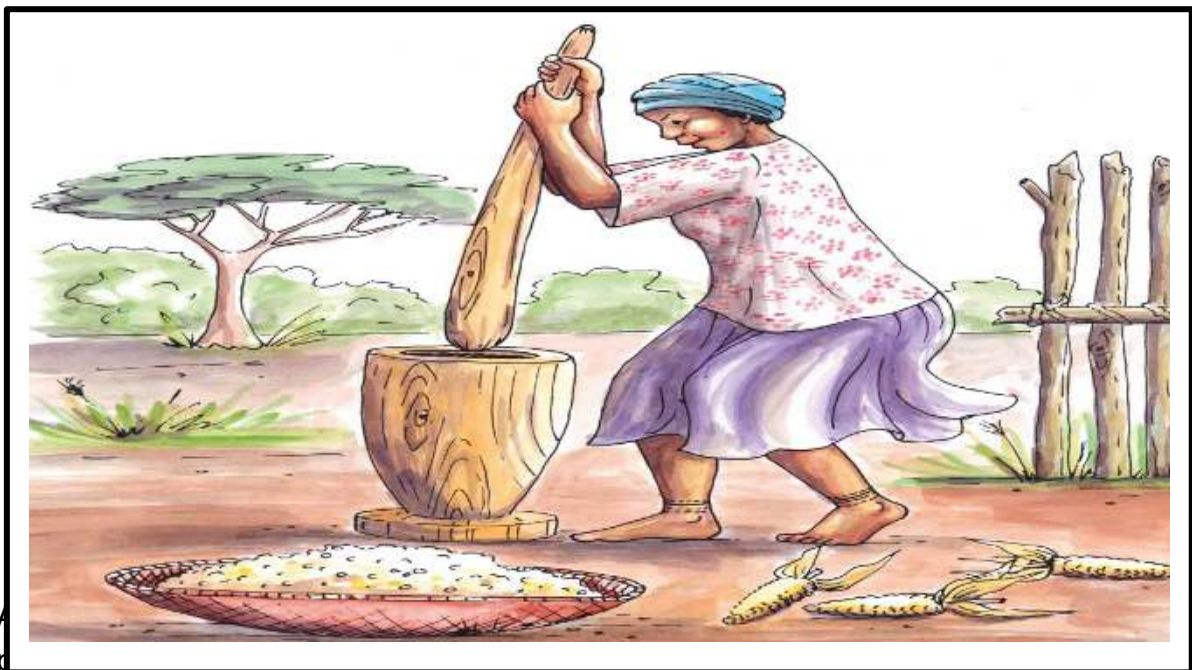
(3)

1.6. Identify the design (figure) that is least suitable to carry a cable load? Give a reason to your answer.

(2)

Total marks: [15]

2. Design Skills



model, but will rather turn the handle of a crank by hand. This rotational movement should be changed into a reciprocating movement so that the grain will be crushed, like hitting it with a hammer.

The mechanisms that your model uses should be housed inside a strong and

stable structure.

2.1 Design brief, specifications, and constraints

2.1.1 Write the design brief on how you are going to solve the identified problem in the scenario given. (3)

2.1.2. Write any **two** specifications and **two** constraints. (4)

Specifications	Constraints

2.1.3. Make a rough sketch below of your plan to strengthen the structure of a maize crusher.

Each person in your team should make their own sketch of their own idea.
Add notes and labels to the sketch to explain your design. (2x3= 6)

Marking guidelines for initial ideas

Initial Idea 1

	Possible mark	Learner's mark
The drawing accurately shows the design you sketched	1	
The drawing shows all important dimensions.	1	
The drawing is to scale, and the scale is shown.	1	
Total mark	03	



Initial Idea 2

	Possible mark	Learner's mark
The drawing accurately shows the design you sketched	1	
The drawing shows all important dimensions.	1	
The drawing is to scale, and the scale is shown.	1	
Total mark	03	



2.1.4 Working drawing

Make a working drawing in 2D of what you will add to the structure so that it cannot collapse or topple over.

Decide for yourself what the scale should be so that the drawing will fit into the space below.

Your teacher will look at the following to assess your drawing:

	Possible mark	Learner's mark
The drawing accurately shows the design you sketched	2	
The drawing shows all important dimensions.	2	
The drawing is to scale, and the scale is shown.	2	
The drawing shows all hidden lines.	1	
Total mark	07	

Total marks: [20]

3. Make

Rubric for marking the model

RUBRIC : MAKING A MAIZE CRUSHER STRUCTURE					
Assessment Criteria	Marks 1	Marks 2	Marks [3 – 4]	Marks 5	Learner's Mark
Working in a group and supporting peers	Unable to work with others in a group - little participation, even rejection of the group's activities.	A passive group member requiring direction and supervision from others.	An active participant of a working group, successful in one role.	An active member of a working group, successful in a variety of roles.	
Making a structure Maize crush mechanisms	Product is poorly conceived and made and is non-functional and/or dangerous.	Product is simply conceived and made but lacks functionality, safety and/or interest.	Product is simply conceived and made but is functional and safe to use.	Product is well-conceived and made; is functional, safe, interesting and innovative.	
Choosing appropriate tools and tools	A senseless choice has been made.	A poor and inappropriate choice has been made.	A simple, suitable and convenient choice has been made.	A well-thought-out and most appropriate choice has been made.	
Using tools for joining	Unable to use tools at all. Shows no care.	Attempts to use tools but does so incorrectly and/or inappropriately, and with little care.	Able to use tools correctly and carefully.	Able to use tools correctly, most precisely and with great care.	
Strength of product	Product is already broken or damaged due to limited previous handling.	Product is fragile and in danger of breaking with handling.	Product is strong enough to handle and demonstrate.	Product is extremely strong and appears long-lasting.	
The model meets the specifications to solve the problem.	Poor model which does not meet most of specifications	Model which meet some of the specifications	Good model which meets some of specifications	Excellent model which meets all specifications	
Functioning of the mechanism of the structure.	Poor functioning of the structure.	Attempt functioning of the structure.	Good functioning of the structure.	Excellent functioning of the structure.	
TOTAL				35	

TOTAL MARKS [70]