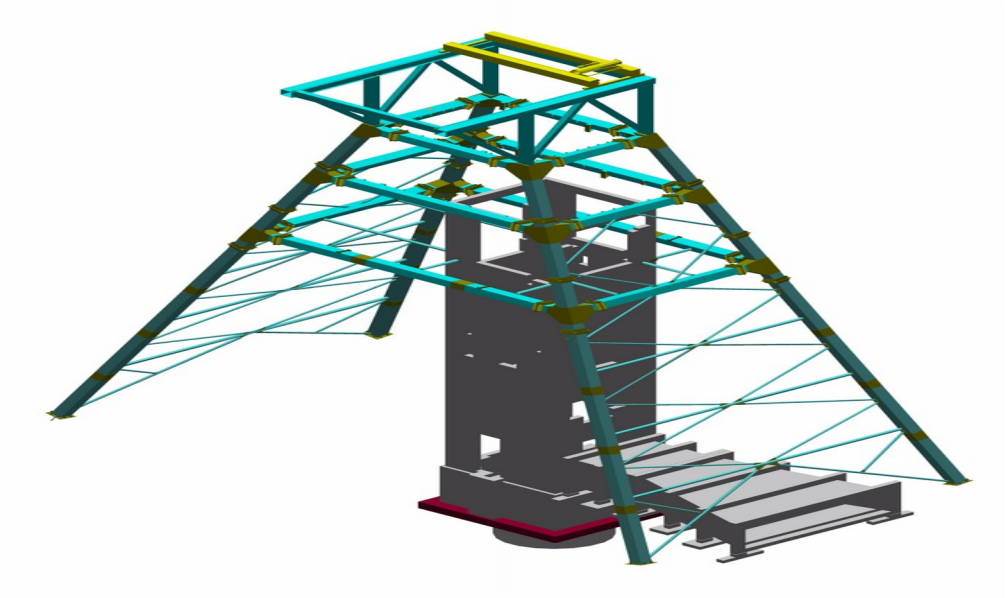
GRADE 8

PRACTICAL ASSESSMENT TASK: TERM 3 (2025) MEMORENDUM

70 MARKS



Name: _____Grade 8: __		Possible mark	Learners' mark
Investigate (15 Marks)	Investigation: Lifting mechanisms (mine headgear)	15	15
Design (20 Marks)	Design brief, specifications, and constraints	10	10
	Sketch of Initial Idea	6	6
	"Real" Budget	4	4
Make (35 Marks)	2D Working drawing	12	12
	Make (Plan steps, select materials & tools)	8	8
	Make the model in groups	15	15
TOTAL		**70**	**70**

During the PAT you will find the following icons on the pages. This is what each mean.

Symbol	Meaning	Symbol	Meaning
	Think about …		Work together as a group but write your own answer.
	Work on your own.		Work together as a group to develop an answer or product.

TEACHER GUIDANCE SECTION

This integrated PAT for **Term 3** introduces a real-world **mineshaft structural system**, incorporating mechanical components and optional electronic/robotic enhancements. It aligns fully with **CAPS Term 3 outcomes**, especially the focus on **structures, mechanical systems**, and **design processes**.

STRUCTURAL THEME INCLUDED

Smart Mining Headgear System - A structural lifting frame used in mines to raise and lower ore, equipment, and miners from underground using mechanical, electrical, or coded systems.

SYSTEM REQUIREMENTS

Each level of the system:

- Can be built progressively across three levels (**Basic**, **Intermediate**, **Advanced**).
- Requires learners to apply **structural stability techniques** (e.g., triangulation, bracing).
- Provides rich opportunities for **drawing, designing, and collaboration**.
- Promotes innovation through **mechanical design, smart safety features**, and **optional automation**.

CAPS-ALIGNED LEVEL PROGRESSION TABLE

Level	Structure	Mechanical Systems	Electrical Components	Robotics / Coding	Structural requirements
Basic	Yes	Yes (Manual crank, pulley)	No	No	Triangulation + Stability
Intermediate	Yes	Yes Motorized lift, switch, buzzer	Yes (motor, lights (red, green), buzzer, load indicator)	No	Same as Basic
Advanced	Yes	Yes (Same as Intermediate + automation)	Yes (Same as Intermediate + automation) plus emergency stop system	Yes (Micro:bit or Arduino logic with sensors, coded automation, alerts)	Same as basic and Intermediate

DESIGN SYSTEM APPLICATION PER LEVEL

Design Level	Smart Mining Headgear System
Basic	Manual lifting frame with crank and pulley system; includes triangulated

	support structure
Intermediate	Motorised lift with electrical controls (e.g., switch, buzzer for overload, lights for safety)
Advanced	Microcontroller-based system with automated logic, sensor-triggered alerts, and coded operation

GLOSSARY – KNOW THESE PARTS:



HEAD GEAR:

The tall metal structure built above the mine shaft. It supports the cables, pulley (sheeve wheel0, and lifting system. It must be strong and stable, using diagonal bracing (triangulation).



SHEAVE WHEEL:

A pulley at the top of the headgear. the cable goes over this wheel and lifts or lowers the cage. It changes the direction of the cable.



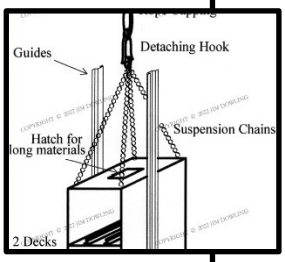
WINCH MOTOR:

A drum that winds or unwinds the steel cable. A motor is used to turn it in modern systems



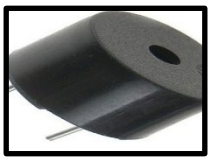
MINE CAGE:

A lift used to carry miners and equipment down into the mine.



SKIP:

A metal container that carries platinum ore or waste rock up from underground



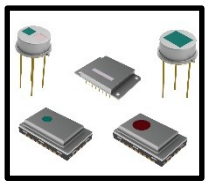
BUZZER:

A load alarm sound to warn of danger or overload



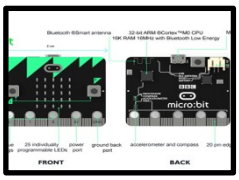
LIGHTS(RED, AMBER, GREEN):

Used to signal when the system is safe (green), warning (amber), or unsafe (red).



SENSOR (ADVANCED ONLY):

Detects if something is too heavy, too close, or out of place. Can be connected to a microcontroller.



MICRO:BIT / ARDUINO (ADVANCE ONLY): A small coding computer that can control lights, buzzer, and motors by following programmed instructions.

HOW TO USE THIS PAT

Introduce **the real-world mining scenario** and engineering challenge to learners.

Allow individuals or groups to select the **level (Basic, Intermediate, or Advanced)** based on skill, materials, and time.

Support progression through the following activities:

- **Activity 1**: Investigate: Smart Mining Headgear System
- **Activity 2**: Define the problem, users, specifications, and constraints
- **Activity 3**: Design: Freehand sketch of structural solution with labeled features
- **Activity 4:** Draw up a budget
- **Activity 5**: 2D working drawing
- **Activity 6**: Groupwork Activities (Make: Plan steps, select materials & tools)
- **Activity 7**: Make the model
- **Evaluation**: Peer review and design reflection

NOTE:

This PAT reflects an integrated, scaffolded design approach. Teachers should:



- Encourage **creativity, critical thinking, and innovation** within structural and mechanical boundaries.
- Promote use of **recycled materials** and cost-effective construction.
- Support learners at all levels — especially those progressing into **electrical systems or coding**.
- Ensure **all models** meet the following minimum expectations:
    - A **visible structure** that shows strength, triangulation, and real-world form
    - At least one **mechanical or functional component** used to demonstrate lifting/movement
    - Intermediate/Advanced models should include **switches, lights, sound, or automation features**

Learner Guidance



- You will be working on a real-world problem: building a **safe and functional headgear system** that simulates lifting 10 tons of ore.
- Work **individually or in groups**, but make sure you understand each task and complete your own workbook.
- Choose your **level**:

- **Basic** = manual system (crank/pulley),
- **Intermediate** = add lights, buzzer, and electric motor,
- **Advanced** = code your system with sensors and logic using robotics.

Scenario:

A **tender** is an offer by someone to do work at a certain price. When a company "puts out a tender", it invites people to apply to do a job for them.

Mining Contract Simulation

A large deposit of **platinum**, a highly valuable metal, has been discovered beneath land owned by a local tribe in a rural region of South Africa. **Platinum Stars**, a joint venture between international and South African investors, plans to explore this opportunity and invest in a long-term mining operation.

Initial geological samples show that the platinum lies approximately **500 meters below the surface**. To access the ore, the company intends to **sink a mine shaft** to that depth and assess the feasibility of a full-scale operation.

Your **engineering firm** has been invited to submit a **tender proposal** for designing and constructing a **Smart Mining Headgear System**: a structural and mechanical solution that will form the backbone of the shaft operation.

The headgear system must be able to:

Lift loads of up to 10 tons of platinum ore from underground,

Safely transport miners and equipment down to the mining level,

Be **structurally strong**, **safe**, and **rigid** through proper engineering techniques like triangulation and bracing,

And optionally **incorporate modern technologies**, such as:

Automated lifting systems

Overload detection

Light and sound indicators

Sensor-controlled safety features

Microcontroller-based programming

Your team is responsible for investigating, planning, budgeting, and constructing a **working model** of your proposed headgear system, tailored to either a **Basic**, **Intermediate**, or **Advanced** solution.

This project challenges you to **solve a real-world engineering problem** by blending **mechanical systems**, **structural design**, and where applicable, **automation and coding** all within the constraints of a simulated professional brief.

Activity 1: Investigate – Smart Mining Headgear System (15)

Activity Objective:

You are part of a team submitting a tender to design a mining headgear structure that can transport miners and lift loads of up to 10 tons. You will now investigate how such systems function and how new technologies can improve their safety and performance.

Instructions:

1. Read the scenario carefully.
2. Study the mining headgear diagrams provided.
3. Answer all core questions (Part A).
4. Then, answer the correct challenge questions for your level (Part B).

PART A: A Mine's headgear (CORE UNDERSTANDING) (9)

You are part of an engineering team designing a Smart Mining Headgear System. Before you begin the design, you must understand how these systems work, what their challenges are, and how modern technologies are being used to improve them.

This picture shows a mine's lifting system. The whole lifting system is called the **headgear**.
There are **four main parts** to a mine's headgear:

Part 1:

The **winch or hoist** is in a **winding house.** This part of the system is used to wind or unwind the steel cable.

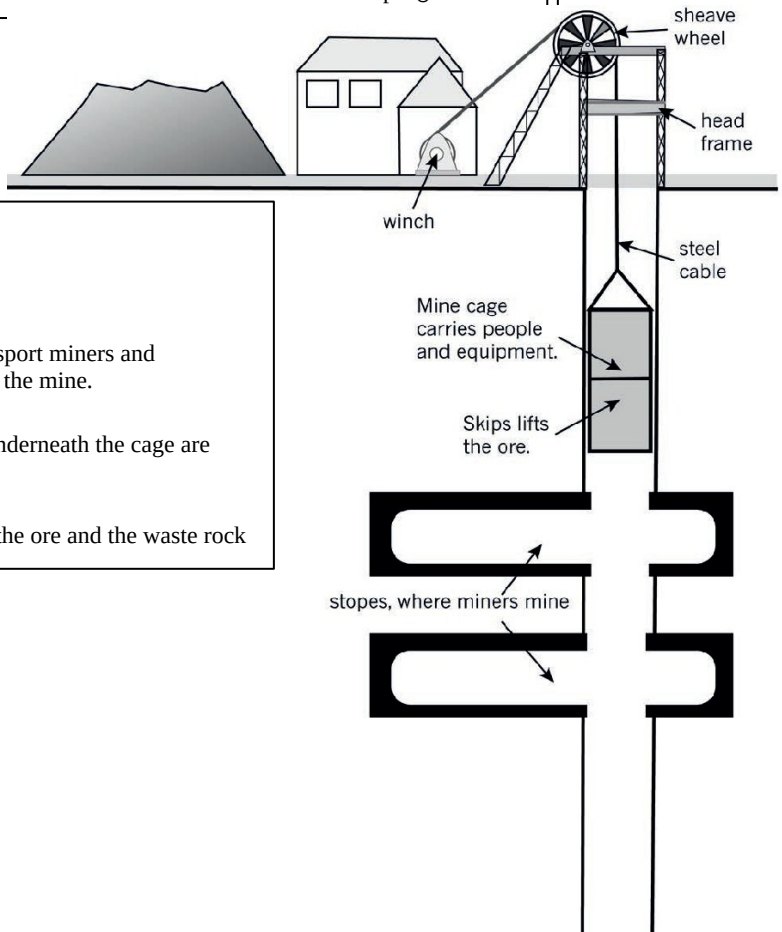
The **hoist** is attached to a motor and a control system.

The mine cage and the skips are lowered into the mine when a steel cable unwinds from the winch.
The mine cage and skips are raised when the steel cable winds up again.

Part 2:

The **sheave wheel** is a pulley wheel that sits above the mine shaft. The hoist cable passes over the sheave wheel and then down the shaft of the mine.

The sheave wheel changes the direction in which the cable is pulling. It also reduces the sliding friction of the cable.



Part 3:

The **head frame** is the structure that supports the sheave wheel. It must be strong enough to keep the sheave wheel in place when it lifts the heavy mine cage.

The left "legs" of the head frame slope towards the hoist. This is due to the tension in the cable pulling the whole frame in that direction. The sloping legs prevent the head frame from toppling or falling over.

Part 4:

The **cage and skips.**

The **cage** is used to transport miners and equipment up and down the mine.

Attached alongside or underneath the cage are skips.

Skips are used to bring the ore and the waste rock

Look at the pictures and read the notes above to answer the questions:

1. What is the main job of a mine headgear structure? (1)

   To lift heavy loads like ore and transport miners and equipment in and out of the mine shaft. ✔

2. What does the winch or motor do? (1)

   It winds or unwinds the cable to lift or lower the cage and skips in the mine shaft ✔

3. Explain the function of the sheave wheel and why is it placed at the top of the frame? (2)

   The sheave wheel is a pulley that changes the direction of the cable. ✔

   It is placed at the top so the cable can go down the shaft and reduce friction when moving. ✔

4. Why are the legs of the headgear slanted or triangulated? (2)

   To make the structure stable and prevent it from falling over. ✔

   The slanted legs help balance the tension from the cable and make the frame stronger. ✔

5. What are the mine cage and skip used for? (2)

   The cage is for carrying miners and equipment. ✔

   The skip is used to carry ore and waste rock to the surface. ✔

6. Name two ways to make the headgear strong and safe? (1)

   Use triangulation and bracing to strengthen the structure. ✔

PART B: A Mine's headgear (CRITICAL THINKING) – Based on your level you have chosen (6)

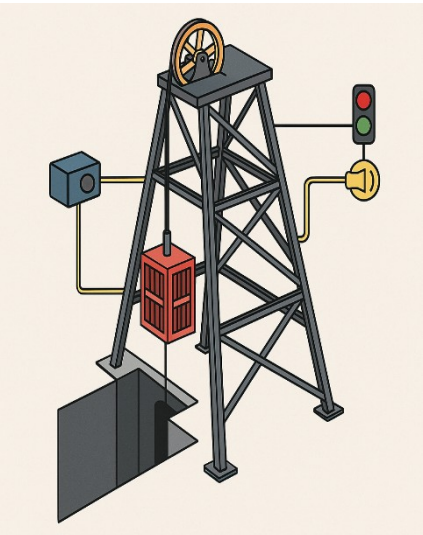
For PART B, you must choose your level: **Basic, Intermediate, or Advanced.** Answer each question from the level you have selected.

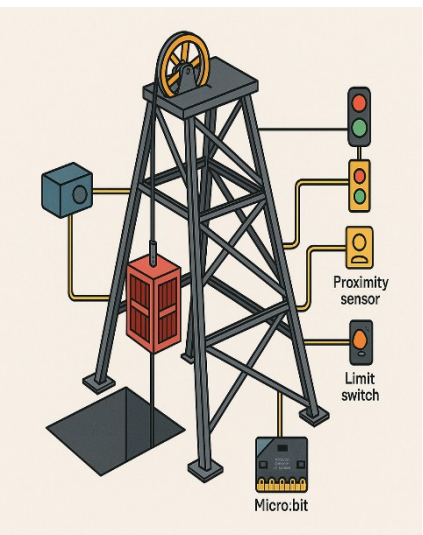
· **Each question = 2 marks. You must only answer 3 questions in total.**

· **Do not answer questions from a different level.**

Look at the pictures below of the mining headgear, based on the different levels:







BASIC LEVEL MINING HEADGEAR	INTERMEDIATE LEVEL MINING HEADGEAR	ADVANCED LEVEL MINING HEADGEAR

A. Basic Level – Crank and Pulley System:

1. Why must your lifting system be strong, even without a motor?	2. What could go wrong if the pulley or crank is placed incorrectly?	3. What classroom materials could you use to make a strong model?
So that it doesn't fall over or break while lifting heavy loads. A strong frame keeps the pulley safe and stable. ✔✔	The rope could slip off or tangle, or the crank may not work properly, making lifting unsafe or impossible. ✔✔	Ice-cream sticks, skewers, cardboard, glue, and string to make the pulley system and stable frame. ✔✔

B. Intermediate Level – Motor, Lights, and Buzzer

1. How can red, amber, and green lights help people stay safe?	2. Why might you need a buzzer in a mining system?	3. What does a load indicator do, and why is it useful?
Red means stop (danger), amber means get ready or warning, and green means safe to operate. It helps miners know what's happening. ✔✔	The buzzer warns workers of danger or if something is overloaded or not working properly. ✔✔	It shows how much weight is being lifted. If it's too heavy, it can stop the motor or give a warning to prevent an accident✔✔

C. Advanced Level – Automated with Micro:bit or Arduino

1. What can a proximity or weight sensor help detect?	2. How can a coded program stop the motor when something dangerous happens?	3. Why is it safer to use automation instead of human control alone?
It can sense when the cage is full or close to the top/bottom. It helps the system stop	The code checks sensor input and sends a command to stop the motor if the load is too heavy or if	Humans can make mistakes, but sensors and code can act faster and more accurately in

automatically to prevent crashes. ✔✔	someone is in danger✔✔	dangerous situations✔✔

NB! Remember you only mark the answers based on the level the learners have identify and chosen.

Section	Description	Possible Marks	MARKS
Part A	6 short structured questions	9	9
Part B	2 open-ended, level-specific questions	6	6
TOTAL		**15**	**15**

Activity 2: Design brief, specifications, and constraints [10]

1. Read through the scenario again and use the questions below to help you write the **design brief.**

Mining Contract Simulation

A large deposit of **platinum**, a highly valuable metal, has been discovered beneath land owned by a local tribe in a rural region of South Africa. **Platinum Stars**, a joint venture between international and South African investors, plans to explore this opportunity and invest in a long-term mining operation.

Initial geological samples show that the platinum lies approximately **500 meters below the surface**. To access the ore, the company intends to **sink a mine shaft** to that depth and assess the feasibility of a full-scale operation.

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And optionally **incorporate modern technologies**, such as:

Automated lifting systems

Overload detection

Light and sound indicators

Sensor-controlled safety features

Microcontroller-based programming

Your team is responsible for investigating, planning, budgeting, and constructing a **working model** of your proposed headgear system, tailored to either a **Basic**, **Intermediate**, or **Advanced** solution.

This project challenges you to **solve a real-world engineering problem** by blending **mechanical systems**, **structural design**, and where applicable, **automation and coding** all within the constraints of a simulated professional brief.

Write Your Design Brief:

- What is it? (what is needed?)
- Who it is for?
- What it is for?
- Where will it be used? (4)

I'm going to design a A Smart Mining Headgear System✔ for Platinum Stars mining company✔ to lift platinum ore and carry miners safely up and down a shaft✔, In a rural mining site in South Africa, 500 meters deep✔

2. Identify the specifications and list them below. (Hint: look in the scenario) (4)

   Must lift up to 10 tons of ore✔

   Must be strong, safe, and stable✔

   Should include triangulation or bracing✔

   Can include modern technology (lights, motor, sensors) ✔

3. Now write down 2 constraints. (2)

   Think about people, purpose, safety, environment, and cost.

   Must be **cost-effective**✔

Must be **safe for workers and the environment✔**

Activity 3: DESIGN: Initial Idea/sketch (free hand, no instruments) (6)

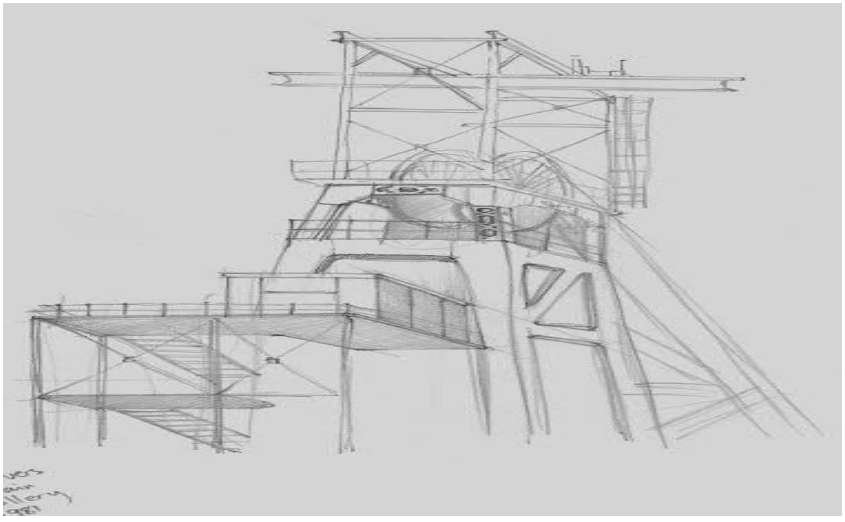
Use a freehand drawing to show your first idea for the mining headgear structure. Add labels and notes to explain what your structure will include. This is a rough concept drawing, not a formal technical drawing.

Instructions:

1. Use only a pencil and your freehand drawing skills **(no ruler or compass)**
2. Draw your full mining headgear system.
3. Clearly label the main parts of your design. (use the **"Know These Parts"** list if you need help.
4. Add extra notes showing **what your system will do,** for example, include where the **motor goes**, where **lights** or **sensors** will be placed, and how your **cage or skip** works.

Labelled Features to Include **(based on the level you have chosen if applicable**)

- Headgear frame (with triangulation or bracing)
- Sheave wheel
- Cage and skip
- Cable or pulley system
- Crank or motor (based on level)
- Lights (red/green/amber) – Intermediate/Advanced
- Buzzer / load indicator – Intermediate
- Sensors, coding module (e.g. Micro:bit or Arduino) – Advanced



Just an example of a drawing

Marking rubric: Initial Idea	Good All aspects are correctly done	Adequate Most of the criteria is met	Poor Less than half of the criteria is met	Not done

[An exact copy of the example on page 2 is not allowed. If it was copied the maximum mark should not be more than 3 out of 6]	3	2	1	0
Freehand sketch drawn neatly. Learner demonstrates good freehand drawing skills.	3			
Appropriate notes and labels were made on the required sizes as mentioned in the instructions.	3			
Total	**6/ 6**			

Activity 4: Draw up a budget **(4)**

To win a tender, you will have to show that your design is going to be the best and the best value for money.

Look at your head frame drawing and complete the table below.

- Calculate the total length of steel column you will need for the legs of the head frame. Then enter the total length into the "Quantity needed" row of the table. Calculate the cost of the total length of steel columns that you need to buy and enter the amount into the table.
- Calculate the total length of steel you will need for the cross braces and enter this total into the table. Calculate the cost of the steel needed for bracing.
- Complete the rest of the table. Enter quantities you will need and calculate the cost estimate for each item.
- Your project advisor says that you will need one project manager, two engineers, four artisans, four semi-skilled workers and 12 unskilled workers on the project, and that it will take six months to complete. Calculate the labour cost estimate for each of these workers.
- Calculate the "subtotal" for each of the three cost categories, namely "steel for the head frame", "lift components" and "labour".
- **What will your total project cost be?** Add up all of the subtotals of the different cost categories to calculate the total project cost.

(½ mark for each correct mark)

Item	*Cost per unit*	*Quantity needed*	*Cost estimate*
Costs of steel for the head frame			
Steel column	R500 per meter	20	R 10 000
Steel for cross braces	R20 per meter	250✔	R 5 000
Sub-total: Cost for steel frame			R 15 000✔
Costs of lift components			
Sheave wheels	R 150 000	1	R 150 000

Winch and motor	R 1 200 000	1	R 1 200 000✔
Cable	R 100 per meter	500✔	R 50 000
Cage and skip	R 350 000	1	R 350 000
Sub-total: Cost of lift components			R 1750 000✔

Labour costs

Project manager	R 30 000 per month	6 months	R 180 000
Engineers	R 30 000 per month	6 months	R 180 000
Artisans	R 25 000 per month	6 months	R 150 000✔
Semi-skilled workers (10)	R 20 000 per month	6 months	R 1200 000
Unskilled workers (15)	R 12 000 per month	6 months	R 1080 000
Sub-total: Labour cost			R 2790 000✔
TOTAL PROJECT COST:			R 4555 000✔

MARKING RUBRIC: BUDGET	POSSIBLE MARK	LEARNERS' MARK
Good estimates of materials quantities	1	1
Correct calculations of labour quantities (person/hours)	1	1
Calculations of cost estimate per item	1	1
Calculations of subtotal and total project cost	1	1
TOTAL	**4**	4

Activity 5: 2D WORKING DRAWING (12)

2D Working drawing:

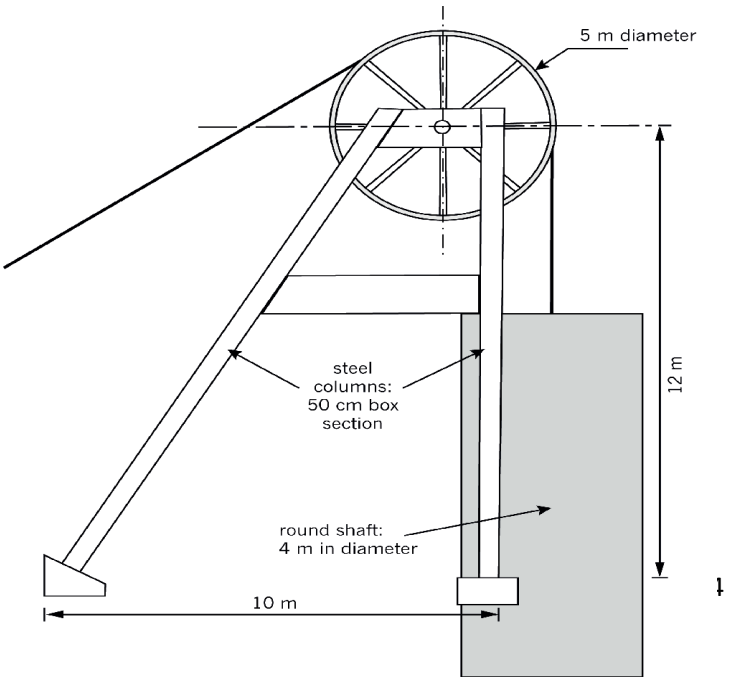
Draw your head frame

Look at the drawing on the right.

It is an example of a working drawing for a small head frame design.

This view shows:

- the size of the sheave wheel,



● the height of the sheave wheel,

● and the distance between the front and back legs.

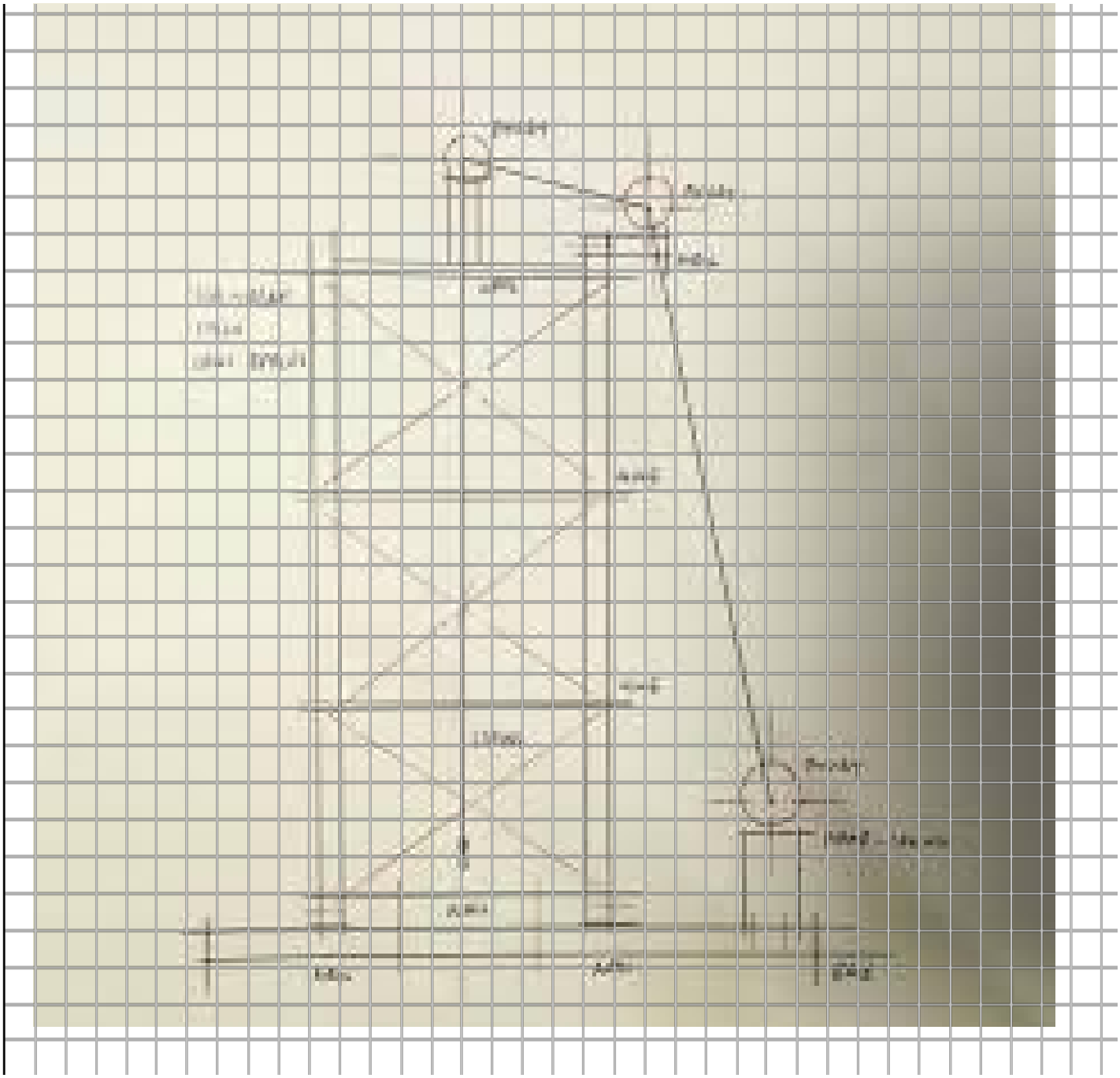
Activity Objective:

Draw a formal 2D working view of your Smart Mining Headgear System. The drawing must be accurate, neat and labeled with dimensions. **You may not copy the drawing; you must draw your own design**.

Only draw **one face** (view) of your design. Use a compass to draw the sheave wheel.

Use the square grid paper and a **pencil and ruler.**

Indicate at least **4 different dimensions** for the main parts of your head frame design



Rubric

Marking rubric: 2D Working drawing **[An exact copy of the example on page 7 is not allowed. If it was copied, the maximum mark should be more than 6 out of 12]**	**Good** All aspects are correctly done	**Adequate** Most of the aspects are correctly done	**Elementary** Half of the criteria is met	**Poor** Less than half of the criteria is met	**Not done**
	4	**3**	**2**	**1**	**0**
Triangulation was added and the design looks strong and rigid. It also meets the specifications of the brief.	4				
At least 4 dimensions indicated correctly.	4				
Neatly and accurately drawn with a pencil and ruler. Lines are consistent and meet at	4				

corners.					
Total	**12/ 12**				

Activity 6: Groupwork activities:

1. Make: Plan steps (4)

- Think about the making of the different parts of the head gear and how to assemble the parts together.
- Write down at least **8 important steps** in the correct sequence. You may also decide to draw the steps in a flow chart.

(½ mark per logical step)

Sample correct sequence:

Cut the base and vertical frame from cardboard or wood.

Attach the upright supports to the base using glue.

Add diagonal braces for triangulation.

Install the sheave wheel using bottle caps or pulleys.

Attach the string or cable through the pulley system.

Mount the crank or motor, depending on level.

Add lights/buzzer (Intermediate+) or sensors (Advanced).

Test the lifting function and make adjustments

2. Make: Select materials & tools (4)

Look again at your steps and decide what materials and tools you will need. Firstly, see what materials and tools are available at school. You can also bring materials and tools from home if your teacher agrees. Make a list of at **least 4 materials and 4 tools** you may need:

(½ mark per logical item)

Material	Tool
Cardboard or wood sticks✔	Scissors or craft knife✔
String or fishing line✔	Ruler✔
Bottle caps (for pulley) ✔	Glue gun✔
DC motor or Micro:bit (depending on level) ✔	Screwdriver✔

_2___/2	__2_/2

Activity 7: Make the Model (15)

NB! Confirm Your Build level before you start.

Tick ( ) your chosen level. Then, explain why you chose this level.

Level	Tick Here	Reason for Choosing This Level (1 - sentences)
Basic	✔	I chose Basic because I can build a pulley system using simple materials. I understand how cranks and rope systems work.
Intermediate	✔	I chose Intermediate because I want to use a motor and lights. I know how to connect wires and can work with buzzers and switches.
Advanced	✔	I chose Advanced because I want to code the system using Micro:bit or Arduino. I can write simple code and use sensors to improve safety

Activity Objectives:

Use your design, planning steps, and materials to **build your Smart Mining Headgear model**. The model must follow your drawing, show structural strength, and include all the required features for your chosen level (Basic, Intermediate, or Advanced).

List of Possible Materials

Category	Material / Component	Use in Model	Level
Structure	Cardboard, hardboard, wood sticks (e.g. skewers, kebab), ice cream sticks	Frame and base structure	All levels
	Straws, plastic rods, toothpicks	Diagonal bracing (triangulation)	All levels
Cables & Movement	String, fishing line, elastic bands	Lifting mechanism (pulley or motor connection)	All levels
	Plastic pulleys, spools, bottle caps	Sheave wheels or crank systems	All levels
Crank or Motor	Plastic crank handle, hand-made crank	Manual lifting system	Basic
	Small DC motor, battery pack	Motorised lifting system	Intermediate, Advanced
Electrical Items	Switch, buzzer, LED lights (red, amber, green)	Control system and safety indicators	Intermediate, Advanced
	Light housing (e.g. beads, tubing), bell wire	Wiring and light assembly	Intermediate, Advanced
Sensors & Coding	Micro:bit, Arduino UNO, breadboard, jumper wires	Programming logic and sensor control	Advanced
	Ultrasonic sensor, weight/load cell, touch sensor	Detecting load or position	Advanced
Assembly Tools	Scissors, craft knife (teacher-supervised), glue gun, tape	Cutting, shaping, attaching	All levels
	Ruler, pencil, compass, pliers	Measuring, drawing, bending wire	All levels
Other Useful Items	Paper clips, thumb tacks, split pins, bottle tops, matchboxes	Hinges, wheels, movement or detailing	All levels

Instructions:

- Work carefully, safely, and as a team (if applicable).
- Use your drawings and steps to guide the process.
- Your model must:
  - Be stable and upright
  - Show proper structural elements (triangulation, base, frame)
  - Include moving mechanical parts (pulley, crank, or motor)
  - Contain working lights/buzzer/sensors (if Intermediate/Advanced)
- Make sure each group member contributes to the construction process.

Level Requirement Recap:

Level	Key Features Required in Model
Basic	Pulley or crank system; triangulated structure; working cable & cage
Intermediate	Motorised lift system; switch; buzzer/light(s); triangulation; lifting motion
Advanced	Automated system; coded microcontroller; working sensors, buzzer, lights, programmable logic

Rubric:

Marking rubric: Making of the head gear	**Good** All aspects are correctly done	**Adequate** Most of the aspects are correctly done	**Elementary** Half of the criteria is met	**Poor** Less than half of the criteria is met	**Not done**
	4	**3**	**2**	**1**	**0**
Model was accurately made according to the 2D working drawing	4				
The model is stable and strengthening techniques was used	4				
The sheave wheel can turn and pull up the cage	4				
All members of the group had a function in making the model	3✔		2	1	0
Total	15/ 15				



EVALUATE

As a group evaluate two different group's models and designs. Commend on all aspects and make suggestions how to improve on the design.

Group _____ Names:_____		
Questions	Answers	Suggestions to improve
1. How well does it function	The model lifts the cage smoothly using a motor. The string is tight and does not slip.	Make sure the motor speed is not too fast; add a stopper to avoid over-lifting.
2. Does it look good?	Yes, the model is neat. It has clear labels and looks like a real mine headgear	Add some colour or signs to make it more realistic and professional.
3. Is it strong and stable?	Yes, the frame uses good triangulation and a wide base. It stands up without falling.	Use stronger glue or extra bracing for the top part.
4. Is it well constructed/assembled?	All parts are well-joined, and the sheave wheel turns correctly. The cable doesn't tangle.	tape down the wires or cables so they don't move during lifting.
5. Is it a cost-effective design?	Yes, it uses recycled materials like cardboard and bottle caps. Very affordable.	Maybe use a lighter material for the cage so the motor uses less energy.
Extra notes: This group worked well together. Their explanation was clear, and they followed their plan. Great teamwork!		