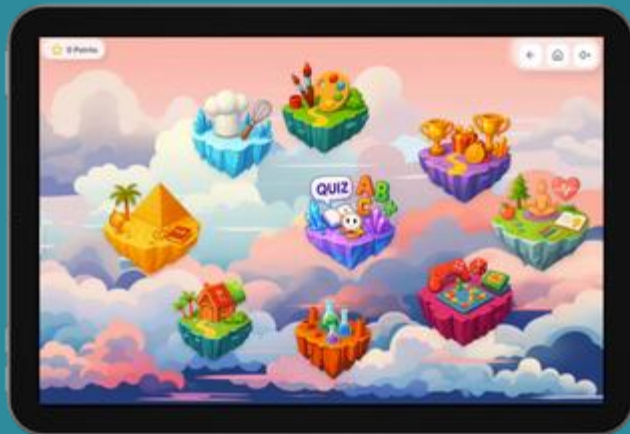


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Smart Systems - Years 5-6

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SMART SYSTEMS: POWER, COMPONENTS AND PURPOSE



System - parts working together for a purpose.



Energy transformation - energy changing from one form to another.



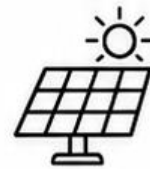
Sustainable design - useful, durable, efficient and considerate of people and environment.



What does the system need to do, and how will energy move through it?



ENERGY IN EVERYDAY SYSTEMS DEVICE AUDIT



Name: _____

Date: _____

Device or system:

1. What need or purpose does it meet?

2. What energy goes in?

3. What output is produced?

☐

Light

☐

Sound

☐

Movement

☐

Heat

☐

Other: _____

4. Identify and label at least three components.

5. Draw arrows to show the energy pathway.

6. Could renewable energy power it? Explain.

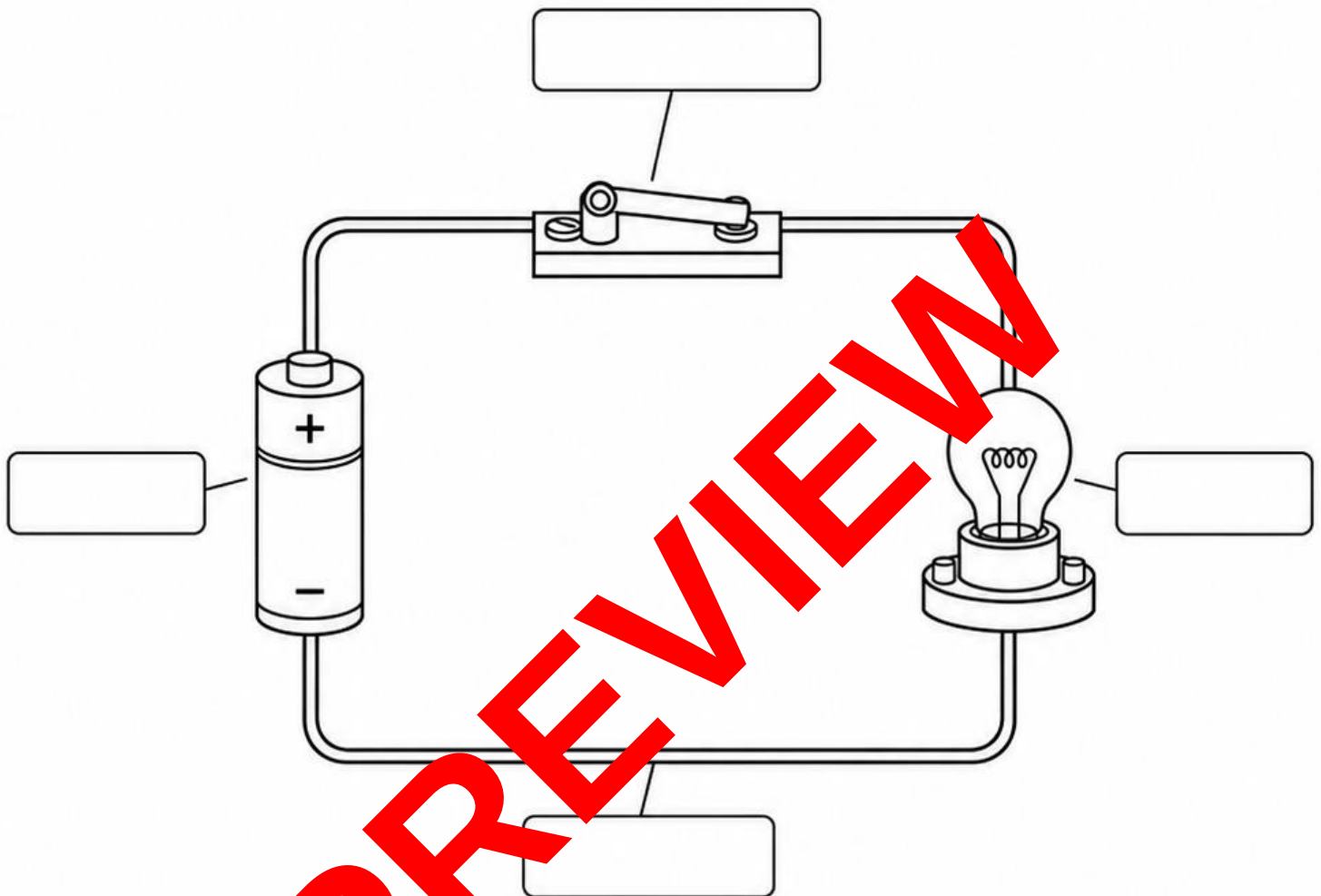
7. Suggest one improvement for safety, efficiency or usefulness.

ENERGY IN EVERYDAY SYSTEMS

LABEL A SYSTEM

Name: _____

Date: _____



- A.** Label the four components.
- B.** Draw arrows to show the direction of the energy pathway.
- C.** Electrical energy is transformed into _____ energy.
- D.** Explain what happens when the switch is open.

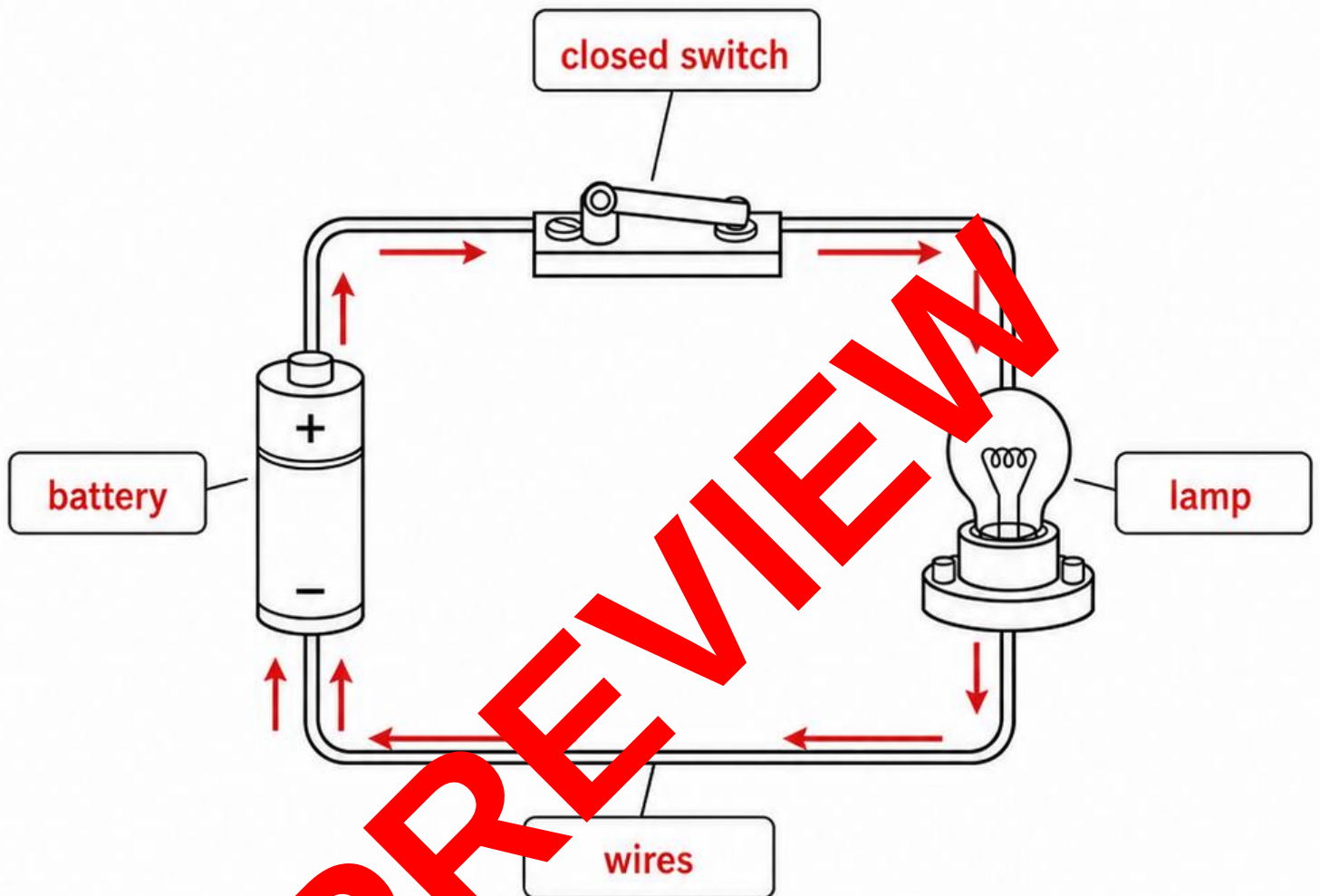
- E.** Add one safe improvement or monitoring feature.

ENERGY IN EVERYDAY SYSTEMS

LABEL A SYSTEM

ANSWERS _____

Date: _____



- A.** Label the four components.
- B.** Draw arrows to show the direction of the energy pathway.
- C.** Electrical energy is transformed into light energy.
- D.** Explain what happens when the switch is open.

The circuit is broken, so current does not flow and the lamp is off.

- E.** Add one safe improvement or monitoring feature.

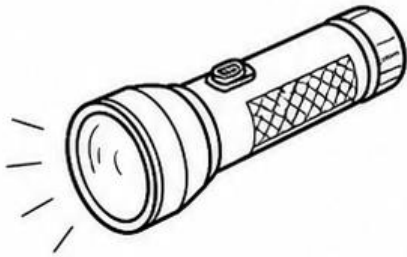
Suggested answer: add an indicator light, fuse or protective casing.

ENERGY IN EVERYDAY SYSTEMS

COMPARE TWO SYSTEMS

Name: _____

Date: _____



	SYSTEM A: BATTERY TORCH	SYSTEM B: SOLAR GARDEN LIGHT
Purpose		
Energy input		
Pathway and components		
Output		
When it works		
Sustainability strength		
Limitation		

Which system is more suitable for a remote garden path? Justify with two criteria.

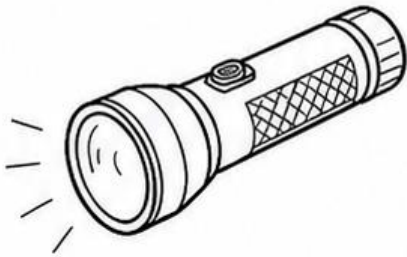
Redesign one system to improve reliability or efficiency.

ENERGY IN EVERYDAY SYSTEMS

COMPARE TWO SYSTEMS

ANSWERS _____

Date: _____



	SYSTEM A: BATTERY TORCH	SYSTEM B: SOLAR GARDEN LIGHT
Purpose	Portable lighting	Light a garden path
Energy input	Chemical energy in battery	Sunlight
Pathway and components	Battery, wires, switch, lamp	Solar panel, battery, sensor, LED
Output	Light and some heat	Light
When it works	When switched on and battery charged	After charging, when dark
Sustainability strength	Portable and reusable	Renewable input; automatic
Limitation	Batteries need replacing or recharging	Depends on sunlight and storage

Which system is more suitable for a remote garden path? Justify with two criteria.

Solar garden light: it recharges without mains power and can switch on automatically.

Redesign one system to improve reliability or efficiency.

Example: use an efficient LED, larger panel and replaceable rechargeable battery.

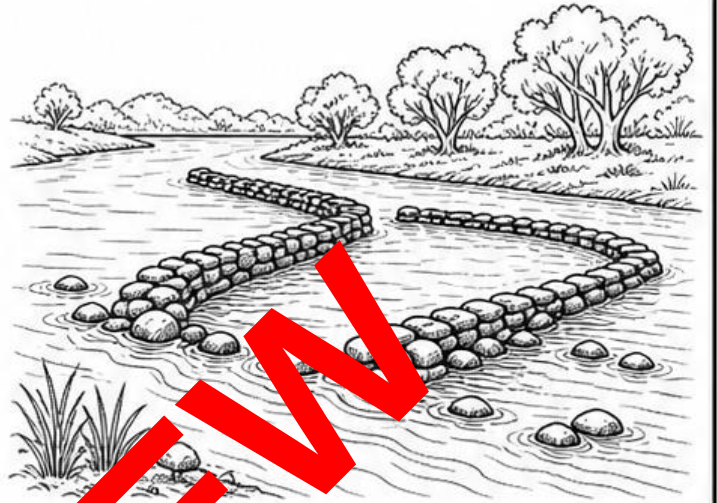
SUSTAINABLE SYSTEMS

READING AND EVIDENCE

Name: _____

Date: _____

The Brewarrina fish traps, also known as Baiaame's Ngunnhu, are a network of stone structures in the Barwon River. Aboriginal people designed channels and holding areas that work with river flow and changing water levels. The system supports selective harvesting, allows smaller fish to pass, uses local durable materials and reflects detailed knowledge cared for across generations.



1. Identify the system's purpose.

2. List two parts or features.

3. Explain how river flow is used.

4. Give two reasons the design can be considered sustainable.

5. What evidence shows knowledge of place?

6. Write one respectful design principle modern engineers could learn.

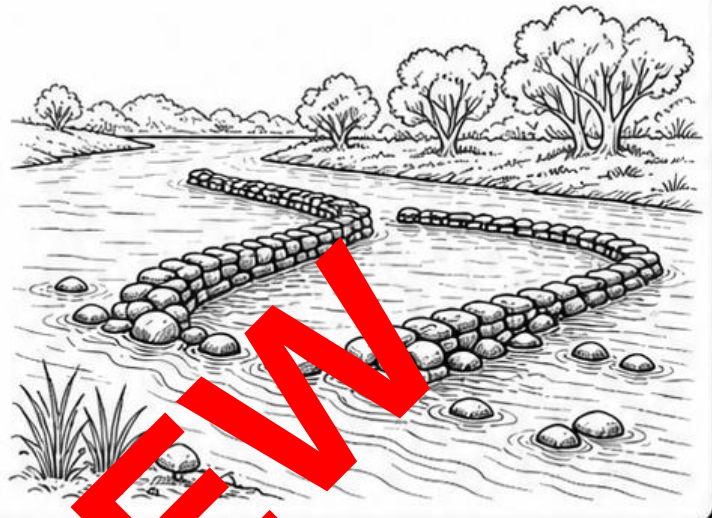
SUSTAINABLE SYSTEMS

READING AND EVIDENCE

ANSWERS

Date: _____

The Brewarrina fish traps, also known as Baiame's Ngunnhu, are a network of stone structures in the Barwon River. Aboriginal people designed channels and holding areas that work with river flow and changing water levels. The system supports selective harvesting, allows smaller fish to pass, uses local durable materials and reflects detailed knowledge cared for across generations.



1. Identify the system's purpose.

To harvest fish.

2. List two parts or features.

Stone channels and holding areas.

3. Explain how river flow works.

River flow guides fish through the stone structures.

4. Give two reasons the design can be considered sustainable.

Selective catch; local durable materials; works with nature.

5. What evidence shows knowledge of place?

It responds to river flow and changing water levels.

6. Write one respectful design principle modern engineers could learn.

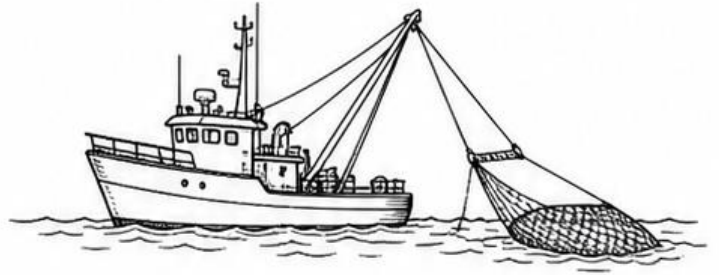
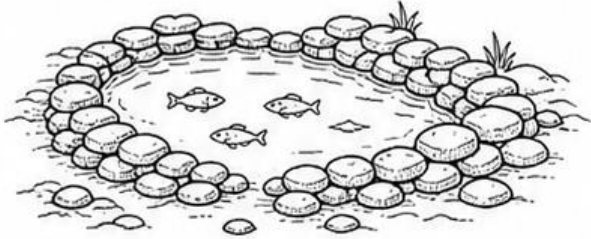
Design with local conditions and protect future use.

SUSTAINABLE SYSTEMS

COMPARE AND EVALUATE

Name: _____

Date: _____



	TRADITIONAL STONE FISH-TRAP SYSTEM	LARGE COMMERCIAL TRAWLING SYSTEM
Energy source		
Materials		
Selectivity		
Habitat impact		
Waste or bycatch risk		
Scale and speed		
Long-term considerations		

Rank each system from 1-5 for environmental impact and justify.

Identify one fair comparison limitation.

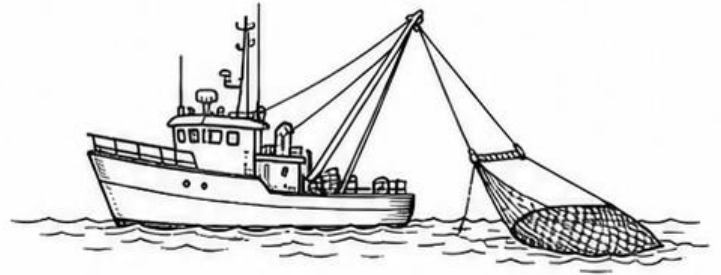
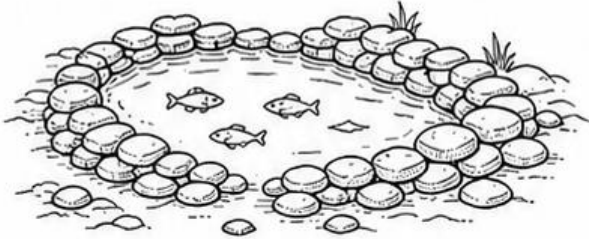
Propose a modern fishing-system improvement inspired by sustainable design principles.

SUSTAINABLE SYSTEMS

COMPARE AND EVALUATE

ANSWERS _____

Date: _____



	TRADITIONAL STONE FISH-TRAP SYSTEM	LARGE COMMERCIAL TRAWLING SYSTEM
Energy source	River flow	Fuel
Materials	Local stone	Metal and plastic nets
Selectivity	More selective	Often less selective
Habitat impact	Low when cared for	Can disturb habitat
Waste or bycatch risk	Lower	Higher
Scale and speed	Small, community scale	Industrial and fast
Long-term considerations	Fish-based, long-term use	Needs limits and monitoring

Rank each system from 1-5 for environmental impact and justify.

Example: fish trap 1-2; trawling 4-5. Evidence includes fuel, bycatch and habitat disturbance.

Identify one fair comparison limitation.

Outcomes depend on location, operation, scale and regulation.

Propose a modern fishing-system improvement inspired by sustainable design principles.

Use selective gear, bycatch escape openings, seasonal limits or lower-emission power.



SMART SYSTEM CHALLENGE CARDS



1

Light a dark bag safely



Need

User

Must do

2

Warn when a gate is left open



Need

User

Must do

3

Cool a small greenhouse



Need

User

Must do

4

Help someone find a way out at night



Need

User

Must do

5

Signal when a water container is nearly empty



Need

User

Must do

6

Remind users to switch off an appliance



Need

User

Must do

7

Create a quiet classroom alert



Need

User

Must do

8

Make a model move using renewable energy



Need

User

Must do



DESIGN CRITERIA MIXER



POWER SOURCE



Battery

POWER SOURCE



Solar

POWER SOURCE



Hand crank



OUTPUT



Light

OUTPUT



Sound

OUTPUT



Movement



DESIGN PRIORITY



Safe

DESIGN PRIORITY



Durable

DESIGN PRIORITY



Low waste



CONSTRAINT



Fits in a lunchbox

CONSTRAINT



Uses recycled casing

CONSTRAINT



Works outdoors



Draw one card from each group. Create a system concept that meets all four conditions. Explain one trade-off.



ENERGY PATHWAY SORTING GAME

HOW TO PLAY

- 1 Draw one Input card, one Control & Pathway card and one Output card.
- 2 Arrange the cards to build a sensible energy pathway.
- 3 Explain the energy transformation to your partner.
- 4 Score 1 point for a sensible pathway and 1 point for a clear explanation.

INPUT



CONTROL & PATHWAY



OUTPUT

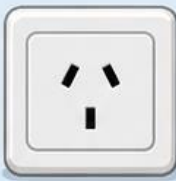


CHALLENGE

Improve sustainability, safety or usefulness.



ENERGY PATHWAY CARDS

Battery 	Solar panel 	Hand crank 	Mains power 	Stored elastic energy 	Flowing water 
Wires 	Switch 	Light sensor 	Motion sensor 	Gear set 	Water channel 
Lamp 	Buzzer 	Fan 	Motor 	Heater 	Moving sign 
Use renewable energy 	Reduce waste 	Improve safety 	Help a user 	Work outdoors 	Add automatic control 

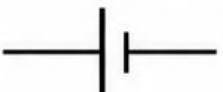
CIRCUIT DIAGRAM PRACTICE

SYMBOLS AND CONNECTIONS

Name: _____

Date: _____

PART A: Match each symbol.

1.  •
2.  •
3.  •
4.  •
5.  •
6.  •

Battery or cell

Lamp

Open switch

Closed switch

Motor

Wire

PART B: Draw a technical circuit diagram for one battery, one closed switch and one lamp in a complete loop.

PART C: Explain why component symbols help engineers communicate.

PART D: Show the energy pathway with arrows and name the output transformation.



Name the output transformation: _____

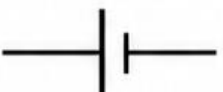
CIRCUIT DIAGRAM PRACTICE

SYMBOLS AND CONNECTIONS

ANSWERS

Date: _____

PART A: Match each symbol.

- | | | |
|----|---|-------------------|
| 1. |  | • Battery or cell |
| 2. |  | • Lamp |
| 3. |  | • Open switch |
| 4. |  | • Closed switch |
| 5. |  | • Motor |
| 6. |  | • Wire |

Battery or cell

Lamp

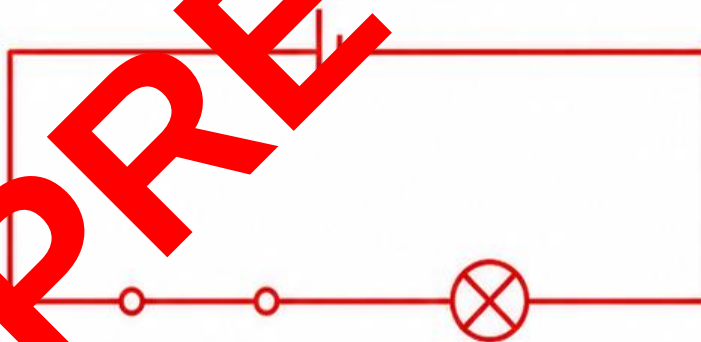
Open switch

Closed switch

Motor

Wire

PART B: Draw a technical circuit diagram for one battery, one closed switch and one lamp in a complete loop.



PART C: Explain why component symbols help engineers communicate.

Standard symbols communicate components and connections clearly and consistently.

PART D: Show the energy pathway with arrows and name the output transformation.



Name the output transformation: Electrical energy to light and heat.

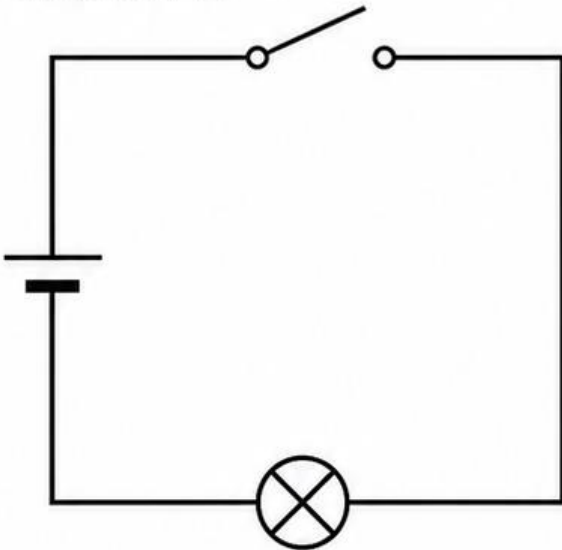
CIRCUIT DIAGRAM PRACTICE

DIAGNOSE AND REDRAW

Name: _____

Date: _____

CIRCUIT A

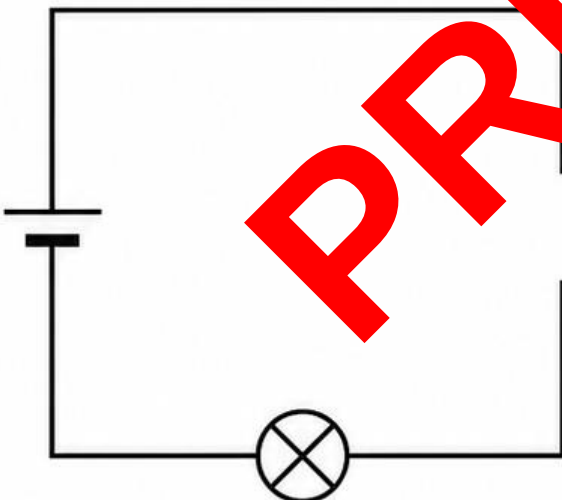


Identify the fault.

Predict the output.

Redraw a working version.

CIRCUIT B



Identify the fault.

Predict the output.

Redraw a working version.

EXTENSION

Add a second lamp and explain one design choice.

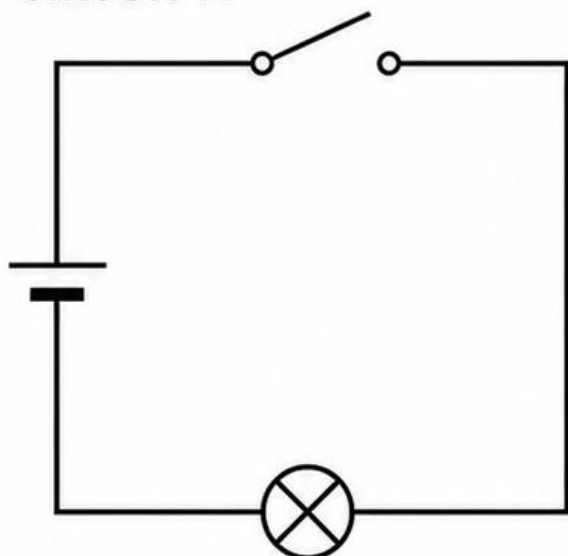
CIRCUIT DIAGRAM PRACTICE

DIAGNOSE AND REDRAW

ANSWERS _____

Date: _____

CIRCUIT A



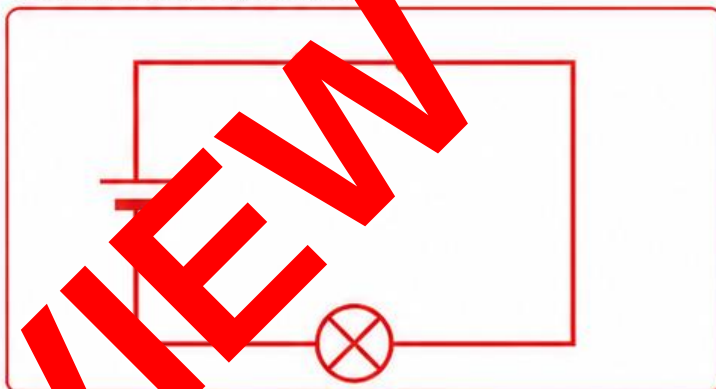
Identify the fault.

Open switch breaks the circuit.

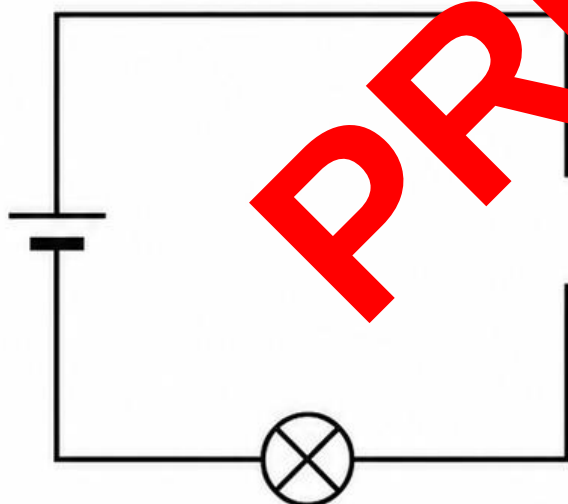
Predict the output.

Lamp is off.

Redraw a working version.



CIRCUIT B



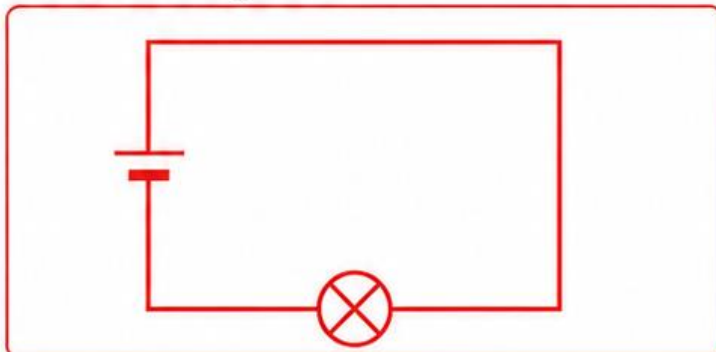
Identify the fault.

A gap breaks the wire pathway.

Predict the output.

Lamp is off.

Redraw a working version.

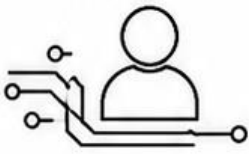


EXTENSION

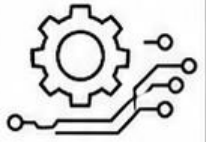
Add a second lamp and explain one design choice.



Example: two clearly connected lamps; choose an arrangement that suits the power source and desired brightness.



SMART SYSTEM PROJECT PLANNER



Designer(s): _____

Date: _____

PROBLEM AND CRITERIA

User or audience:

What real problem or need will you address?

Who experiences it?

What must the system do?

Write three success criteria beginning 'The system will...'

1. _____
2. _____
3. _____

What constraints must you consider?

Safety

Time

Materials

Cost

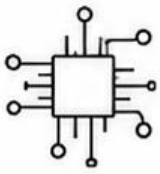
Environment

Accessibility

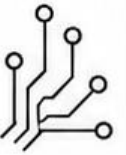
Other:

☐☐☐☐☐☐☐

Draw a quick user-context sketch.



SMART SYSTEM PROJECT PLANNER

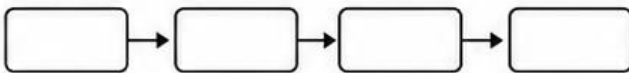


CONCEPTS AND MATERIALS

IDEA A

Sketch

Energy pathway



IDEA B

Sketch

Energy pathway



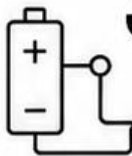
DECISION MATRIX

	IDEA A	IDEA B	SCORE 1-5
Usefulness			
Safety			
Sustainability			
Buildability			

Choose one idea and justify.

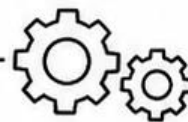
MATERIALS AND COMPONENTS

Item	Purpose	Useful property	Reused or recyclable?
Power source			
Wires			
Switch or sensor			
Output component			
Casing or structure			
Other			



SMART SYSTEM PROJECT PLANNER

DIAGRAM, TEST AND IMPROVE



Use symbols, labels and arrows.

Large empty box for drawing a diagram.

SUCCESS CRITERION	TEST METHOD	RESULT OR EVIDENCE	CHANGE NEEDED



SAFETY CHECK

☐

Power source approved

☐

Connections secure

☐

Tools used safely

☐

Casing protects components

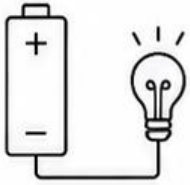
☐

Work area clear

Feedback I received:

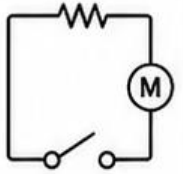
Improvement I will make:

Why this change should help:



SMART SYSTEM DESIGN REVIEW

KNOWLEDGE



Name: _____ Date: _____

Total: 16 marks

1. Define a system. (2 marks)

2. Circle the renewable input: battery / solar / mains electricity / petrol. (1 mark)

3. Name the component that controls current in a simple circuit. (1 mark)

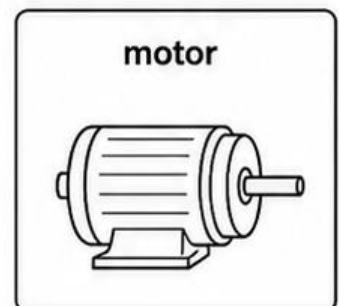
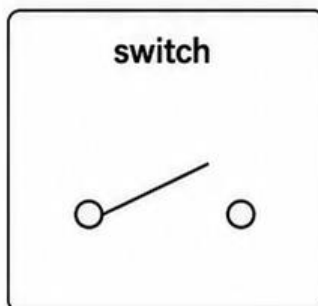
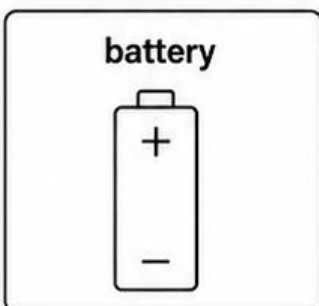
4. Complete: electrical energy -> _____ for a lamp. (2 marks)

5. Explain why a closed pathway is needed. (2 marks)

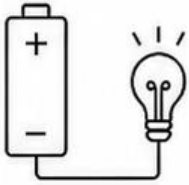
6. Give one property that makes copper suitable for wires. (2 marks)

7. State one feature of sustainable design. (2 marks)

8. Draw arrows through battery -> switch -> motor and name the output. (4 marks)

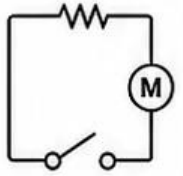


Output: _____



SMART SYSTEM DESIGN REVIEW

KNOWLEDGE



ANSWERS _____ Date: _____

Total: 16 marks

1. Define a system. (2 marks)

Parts working together for a purpose.

2. Circle the renewable input: battery / solar / mains electricity / petrol. (1 mark)

3. Name the component that controls current in a simple circuit. (1 mark)

Switch.

4. Complete: electrical energy -> light energy (he also accepted!) for a lamp. (2 marks)

5. Explain why a closed pathway is needed. (2 marks)

An unbroken circuit allows current to flow.

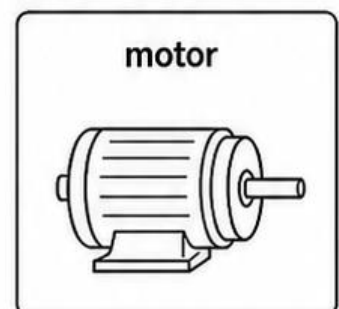
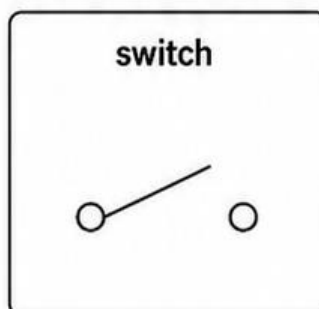
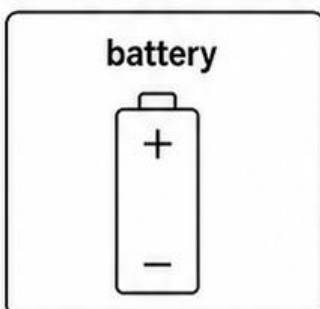
6. Give one property that makes copper suitable for wires. (2 marks)

Copper conducts electricity.

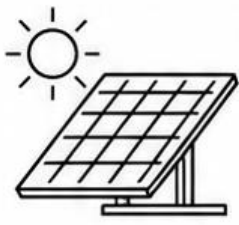
7. State one feature of sustainable design. (2 marks)

Example: durable, efficient, low waste or renewable input.

8. Draw arrows through battery -> switch -> motor and name the output. (4 marks)



Output: Movement.



SMART SYSTEM DESIGN REVIEW

SYSTEM ANALYSIS



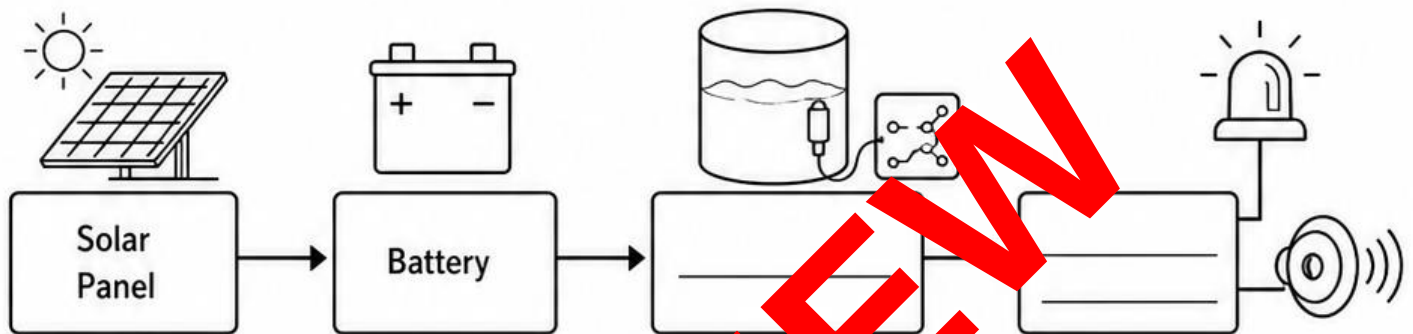
Name: _____

Date: _____

Total: 14 marks

SCENARIO

A school wants a solar-powered garden alert. A solar panel charges a battery.
A level sensor detects when the rainwater tank is low.
A control circuit turns on an amber lamp and buzzer.



1. Identify the input, sensor, storage and two outputs. (5 marks)

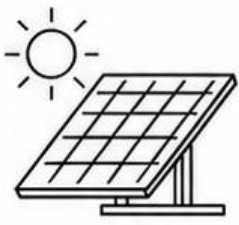
2. Write the energy transformation. (2 marks)

3. Explain two reasons the design may be sustainable. (2 marks)

4. Identify one reliability risk. (1 mark)

5. Recommend one test. (2 marks)

6. Propose one improvement for accessibility or efficiency. (2 marks)



SMART SYSTEM DESIGN REVIEW

SYSTEM ANALYSIS



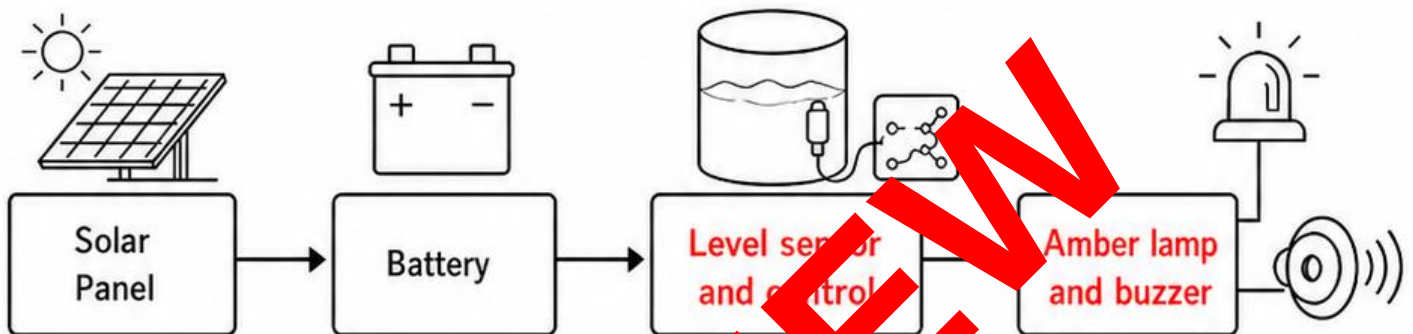
ANSWERS _____

Date: _____

Total: 14 marks

SCENARIO

A school wants a solar-powered garden alert. A solar panel charges a battery.
A level sensor detects when the rainwater tank is low.
A control circuit turns on an amber lamp and buzzer.



1. Identify the input, sensor, storage and two outputs. (5 marks)

Input: sunlight/solar panel; sensor: level sensor; storage: battery; outputs: amber light and sound.

2. Write the energy transformation. (2 marks)

Light energy → electrical energy → stored chemical energy
→ electrical energy → light and sound.

3. Explain two reasons the design may be sustainable. (2 marks)

Renewable solar input; automatic operation supports efficient water management.

4. Identify one reliability risk. (1 mark)

Low sunlight, battery failure or sensor fault.

5. Recommend one test. (2 marks)

Simulate a low water level and check that both alerts operate.

6. Propose one improvement for accessibility or efficiency. (2 marks)

Use an efficient LED plus both visual and audible alerts; add a test button.

SMART SYSTEM DESIGN REVIEW

EVIDENCE AND REFLECTION



Name: _____ Date: _____

Total: 20 marks

1. Attach or draw your final design. Annotate the input, pathway or control, and output. (5 marks)

2. Record two success criteria and evidence. (4 marks)

Success criterion	Evidence

3. Explain one material choice using a design property. (2 marks)

4. Describe one safety action. (2 marks)

5. Report one test result. (2 marks)

6. Identify a problem and explain how it was solved. (3 marks)

7. Recommend one realistic improvement and justify it. (2 marks)

SMART SYSTEMS DESIGN RUBRIC

Student: _____

Class: _____

Date: _____

CRITERIA	BEGINNING	DEVELOPING	ACHIEVING	CONFIDENT	EXCEEDING
Purposeful need and criteria	Need unclear; criteria absent.	States a simple need; criteria partly relevant.	Defines a clear need and workable criteria.	Explains user need and measurable criteria.	Insightful need analysis and precise criteria.
Energy pathway and transformation	Cannot yet identify the pathway.	Identifies some parts or energy change.	Explains a sensible input-to-output pathway.	Clearly explains pathway and transformations.	Explains complex pathways accurately and insightfully.
Components and materials	Choices missing or unexplained.	Names basic components with limited reasons.	Chooses suitable components and materials.	Justifies choices using useful properties.	Optimises choices for function and sustainability.
System or circuit communication	Design is incomplete or hard to follow.	Shows a basic design with some labels.	Communicates a clear labelled design.	Uses accurate symbols, labels and arrows.	Communicates a precise, professional design.
Safe making and testing evidence	Needs support to work safely or test.	Follows some safety steps and records a basic test.	Works safely and records useful test evidence.	Plans fair tests and uses evidence carefully.	Tests systematically and responds to evidence.
Evaluation and improvement	Reflection or improvement is missing.	Identifies a simple result or change.	Evaluates results and suggests an improvement.	Uses evidence to justify a realistic improvement.	Evaluates trade-offs and proposes a strong refinement.

Smart Systems: Power and Purpose



Lesson 1: Energy in Everyday Life



Years 5-6 Design and Technologies



PREVIEW

Lesson Objective



Identify everyday devices that use electrical energy.

Explain how electrical energy is transformed into movement, light or sound.

Understand that energy systems can be designed using different components.

Explore the role of solar power as a renewable energy source.



What Powers Your Life?



Brainstorm everything you can think of that needs power to work...



PREVIEW



What is Energy Transformation?

Energy transformation is when energy changes from one form to another.

Electrical energy can turn into:

Light

Sound

Movement

Heat



Real-Life Examples



What does this device turn electrical energy into?



PREVIEW

Real-Life Examples



What does this device turn electrical energy into?

Light



PREVIEW

Real-Life Examples



What does this device turn electrical energy into?



PREVIEW

Real-Life Examples



What does this device turn electrical energy into?

Movement



PREVIEW

Real-Life Examples



What does this device turn electrical energy into?



PREVIEW

Real-Life Examples



What does this device turn electrical energy into?

Sound



PREVIEW

Real-Life Examples



What does this device turn electrical energy into?



PREVIEW

Real-Life Examples



What does this device turn electrical energy into?

Heat



PREVIEW

Component Spotlight



Inside energy systems we find:

Batteries – power source

Wires – pathway for energy

Switch – control flow

Bulb, Buzzer, Motor – output components



PREVIEW



How Does Solar Power Work?

Solar panels use sunlight to make electricity.

Here is how they work:

Sunlight hits the solar panel.

The panel turns light energy into electrical energy.

The energy is stored in a battery or used immediately by the device.

The electricity powers devices like lights, fans, and buzzers.



Investigation Time



Option A – Hands-On

Pick a device from the table

(e.g. fan, torch, buzzer)

Observe and record:

What energy goes in?

What comes out?

What components can you

Option B – Diagram On

Use printed

Label input/output energy

Match components and arrow

Use the Energy in Everyday Systems worksheet to record your answers:



Investigation Time



When completing your worksheet:

Identify 2 energy systems

Label input and output energy

Name at least 2 components

Could this system use solar power?



PREVIEW

Review



Today you learned:

What energy transformation means.

How electrical energy becomes movement, light, sound.

What basic components make up a system.

That solar power is a clean, renewable energy source.



PREVIEW

Reflection



What energy transformations did you see today?

What surprised you?

Where do you use energy every day at home or school?



PREVIEW

Next Time



Next lesson we will:

Explore how First Nations Australians designed systems to work with nature – not against it.

Investigate fish traps and how they manage energy, flow and sustainability.

Compare traditional and modern designs – what can we learn from them?



Lesson 2: Sustainable Systems in Culture



Years 5-6 Design and Technologies



PREVIEW

Lesson Objective



Explain how First Nations Australians designed systems for sustainable living.
Compare traditional and modern systems in terms of material, function, and sustainability.
Describe what makes a system sustainable or not.



PREVIEW



What is a system?

A system is a group of parts that work together to do a job.

Let's think beyond machines — a system can be natural, cultural, or engineered.

A torch = battery + wires + bulb

A fish trap = river flow + structure + space for fish



First Nations Innovation



First Nations Australians developed intelligent systems using natural materials and long-term sustainable design.

Take a look at the traditional fish trap on the next slide.





Brewarrina Fish Traps

Observe how stone channels, river flow and carefully placed weirs work together as a system.
Look for evidence of purpose, material choice, seasonal knowledge and selective harvesting.



First Nations Innovation



The Brewarrina fish traps, known as Baiame's Ngunnhu, are a complex system of channels and holding ponds in the Barwon River.

The design guides fish moving through the river and reflects detailed knowledge of flow, seasons, place and sustainable harvesting.

Learn about this living cultural system respectfully and recognise the knowledge of its Traditional Custodians.





Features of a Fish Trap

Selective harvesting (small fish escape)

Uses flowing water

Built with natural, reusable materials

Why would this design be sustainable?

What materials are used?



PREVIEW



Fish Trap Sustainability

Sustainable systems like the Brewarrina Fish Traps use:

Local materials like rocks

Minimise environmental impact when caught for

Last a long time

Work with nature, not against it

Would this system still work today? Why or why not?





Comparing Systems

Traditional Fish Trap

Commercial Fishing Boat

No fuel required

Needs petrol/diesel

Selective catch

May catch non-target species

Reusable natural materials

Metal and plastic nets

No fuel emissions

Higher emissions on risk

Which of these is more sustainable and why?





Worksheet

Complete the Investigating Systems Worksheet

Choose one of the following:

Traditional fish trap

Traditional water container

Modern object (boat, spring, etc.)

Compare how the system works, what materials

are used, and what is sustainable.



Reflection



What did you discover?

Which materials surprised you?

What can we learn from the past?



PREVIEW

Next Time



Next lesson we will:

Plan your own system.

Use diagrams to map how it works.

Choose materials based on function and sustainability.



PREVIEW

Lesson 3: Plan Your System



Years 5-6 Design and Technologies



PREVIEW



Lesson Objective

Identify a real-world problem and propose a useful solution involving electrical energy.

Sketch and label a simple system using symbols, arrows, and components.

Begin developing a design plan using structured templates.

Understand and represent energy pathways in a system.





Materials

Student project planning sheets

A4 plain paper

Rulers, pencils, erasers

Printed symbol guide (battery, bulb, motor, wire, switch)

Sample labelled diagrams (simple)

(Optional) Devices using digital design tools (e.g. Canva, Google Drawings)





Plan Your System

What is a problem you can solve with a smart, powered solution?
Perhaps there are some daily annoyances or challenges you have noticed:
Too dark when entering a shed?
Hard to find things in a drawer?
People forget to close the door?
Write down your ideas in pairs or talking groups





From Need to Idea

Let's look at this example:

Problem: People trip at night walking down the path.

Solution: A solar-powered garden light that switches on in low light.

We can use a Thinking Frame to work out the:

Need → Idea → System





What Will Yours Do?

Brainstorm

What does your system need to do?

Will it light up? Make sound? Move something?

Example ideas:

Light-up backpack clip for walking at night.

Door alarm to signal if left open.

Fan system to monitor temperature.



PREVIEW

Learn to Sketch a System



You can draw your system using System Diagramming.

A system diagram has the following:

symbols (battery, bulb, motor, switch)

arrows to show direction of energy flow

each component labelled clearly



Learn to Sketch a System



These two diagrams show the same circuit.

Technical

Realistic



PREVIEW

Electrical Symbols



These are the most commonly used electrical symbols.

Energy starts at the power source

Flows through the wires

Is transformed into light/sound/movement

Controlled by the switch



PREVIEW

Begin Your Planning Sheet



Use your planning sheet to complete the following:

Describe the problem

Outline your idea

List what the system will need

Sketch the system diagram



PREVIEW

Feedback



Share your ideas and give warm and cool feedback:

Warm: "I like how you included..."

Cool: "You could improve your design by adding..."



PREVIEW



Reflection and Next Time

You completed your first draft of your system diagram.

What will be the hardest part to build or draw?

How could you test or improve your idea?

Think about what tools/materials will be needed.

In the next lesson you will build or create your system.



Lesson 4: Build the System



Years 5-6 Design and Technologies



PREVIEW



Lesson Objective

Build or diagram a working system that shows energy transfer (e.g. to light, sound or movement).

Use appropriate materials, tools or visual techniques safely and effectively.

Label key components and explain how the system works.

Demonstrate understanding of material properties through your choices or designs.





Build or Diagram the System

It is time to bring your ideas to life — with real tools or with a program.

You will use your plan from last lesson.

If we have the right tools, you can build your system physically.

If not, you will draw it clearly, like an engineer would.



PREVIEW

Option 1: Physical Build

Use batteries, wires, switches and bulbs or motors
Build your system carefully, following your plan



Option 2: Diagram Build



Use your planning sheet

Draw each part of the system

Show how energy moves through it



PREVIEW

Safety Reminders



Always ask before connecting power

Never mix old and new batteries

Use scissors and wires safely

Clean up when finished

Even if you are only drawing, treat your program seriously.

Engineers must clearly show which part and how it connects!



PREVIEW



Energy Transformations

What energy enters your system?

Which components control or transfer the energy?

What useful output does the system create?

Example: battery → wires → lamp → electrical energy → light and heat.

Example: sunlight → solar panel → light energy → electrical energy → movement.



Begin Your Build



Physical builders: collect materials and work safely.

Diagram creators: start a final labelled diagram on new paper



PREVIEW



Tips and Extension Ideas

Do not forget to show how power flows:

Use arrows or colour codes

Label wires, power sources, switches and outputs

Can your system do two things at once?

What happens if a part fails?

Could you improve how it is powered (solar? hand crank?)



Reflection



What was the hardest part to build or draw?

Did your system work as planned?

What would you improve next time?



PREVIEW

Lesson 5: Test, Evaluate, Improve



Years 5-6 Design and Technologies



PREVIEW



Lesson Objective

Evaluate how well your system performs its intended function (light, sound, movement).

Use design criteria (e.g. safety, accuracy, effectiveness) to assess success.

Reflect on your process and identify where you could be improved.

Suggest or make realistic modifications to enhance your design.



Testing



Does your system work the way you planned?
Does the energy travel and transform the way it should?
Is your work neat, safe and easy to understand?
Can you see the energy transformation in your system?
For example: Battery → Wire → Light bulb → and





What To Look For

Use this checklist to guide your testing:

My system works as planned.

I can point to each component and explain its

The energy path is clear and makes sense.

The system is safe and

Tip: If it does not work yet, that's okay. Now is the time to fix or improve it.



Reflecting on Your Work



What was the best part of your system?

What was tricky or needed fixing?

What skills did you learn?

What would you do differently next time?

Turn and talk: Share one challenge you faced and how you solved it.



Improving Your Design



Even if your system works, how can you make it better?

Could you use a more efficient material?

Could you make it smaller, simpler or stronger?

Could your diagram be clearer?

Improving is part of being a great designer!



PREVIEW



Assessment Task

It is time to complete your assessment worksheet.

Test your system and tick off the checklist.

Answer the reflection questions carefully.

Hand in your worksheet and project or diagram when complete.

You will be marked on:

How well your system works

How clear your explanation is

Your reflection and improvement ideas





Well Done

You have completed the Smart Systems unit!

You learned how to:

Design and plan a working system.

Use energy and materials wisely.

Build or represent something meaningful.

Reflect like a real engineer!

Well done! You are a smart thinker!



PREVIEW



PREVIEW

Well Done!



Smart Systems: Power and Purpose



Introduction



Answer 10 questions about smart systems.

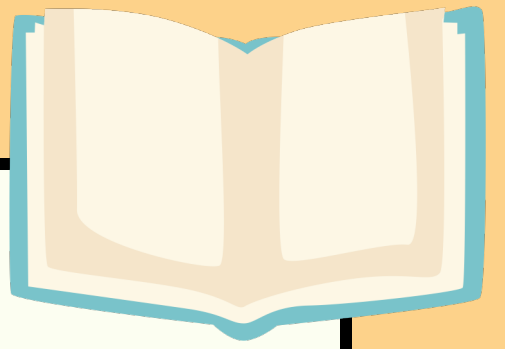
Read each question carefully.

Explain short answers using accurate system vocabulary.

Are you ready?



PREVIEW

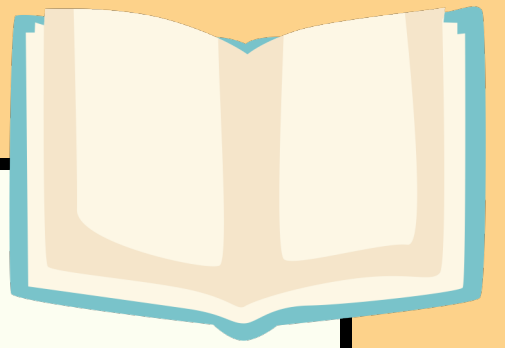


Question 1

Which component transforms electrical energy into light?

- A) Solar panel
- B) Light bulb
- C) Battery
- D) Switch





Answer 1

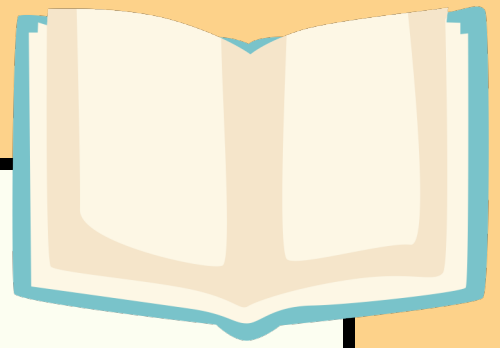
Which component transforms electrical energy into light?

- A) Solar panel
- B) Light bulb
- C) Battery
- D) Switch

Answer: B) Light bulb



Question 2

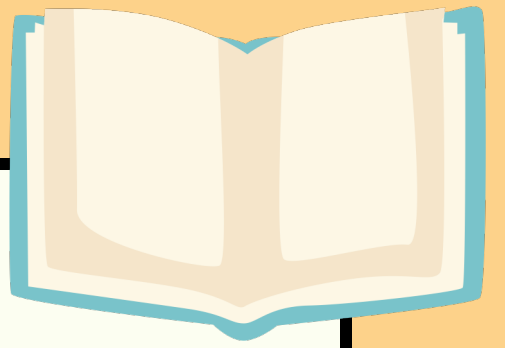


Electrical energy can only be transformed into light.

- A) True
- B) False



PREVIEW



Answer 2

Electrical energy can only be transformed into light.

A) True

B) False

Answer: B) False — it can also be transformed into sound, movement, and heat.



Question 3

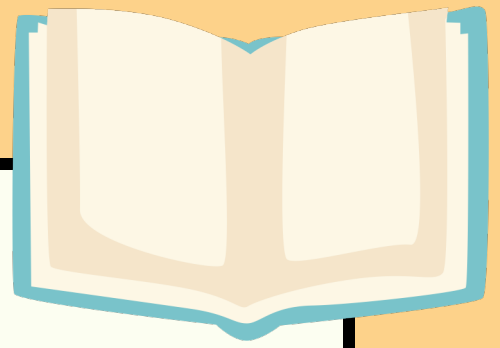


Name two everyday devices that transform electrical energy into mechanical energy.



PREVIEW

Answer 3

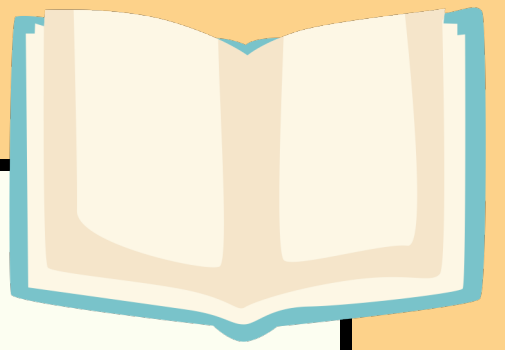


Name two everyday devices that transform electrical energy to mechanical energy.

Answer: Examples: a fan and an electric toothbrush.



Question 4



Which is a renewable power source?

- A) Coal
- B) Petrol
- C) Solar
- D) Diesel



PREVIEW

Answer 4



Which is a renewable power source?

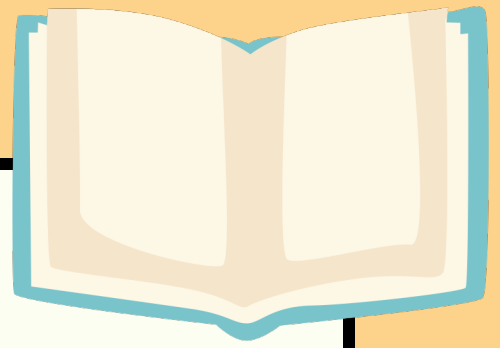
- A) Coal
- B) Petrol
- C) Solar
- D) Diesel

Answer: C) Solar



PREVIEW

Question 5



A closed circuit is needed for electricity to flow.

- A) True
- B) False



PREVIEW

Answer 5



A closed circuit is needed for electricity to flow.

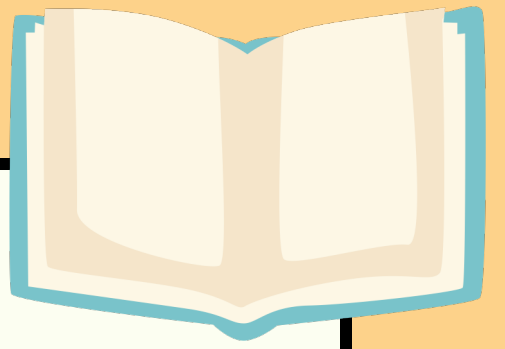
A) True

B) False

Answer: A) True



PREVIEW



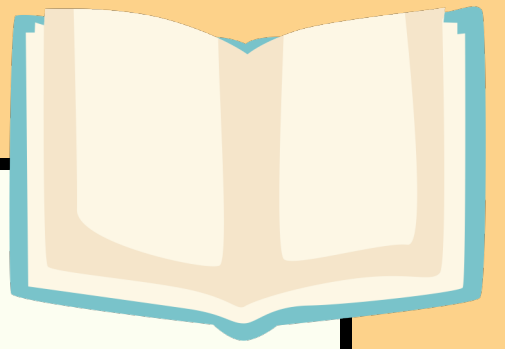
Question 6

Which item is a component in an electrical circuit?

- A) Spoon
- B) Wire
- C) Scissors
- D) Paintbrush



PREVIEW



Answer 6

Which item is a component in an electrical circuit?

- A) Spoon
- B) Wire
- C) Scissors
- D) Paintbrush

Answer: B) Wire



PREVIEW

Question 7

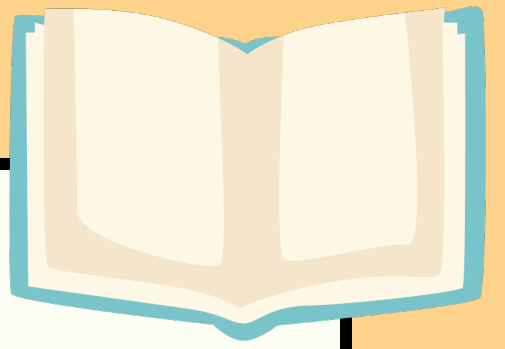


What is the main function of a switch in a circuit?

- A) Power the light
- B) Control the flow of electricity
- C) Increase voltage
- D) Change the battery



PREVIEW



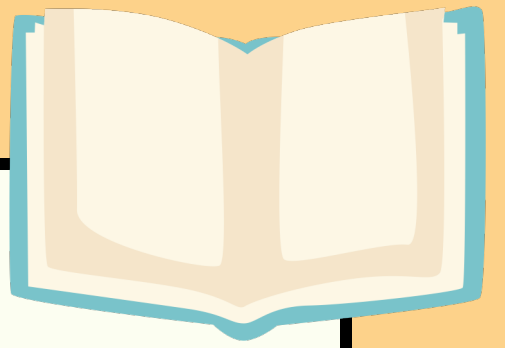
Answer 7

What is the main function of a switch in a circuit?

- A) Power the light
- B) Control the flow of electricity
- C) Increase voltage
- D) Change the battery

Answer: B) Control the flow of electricity





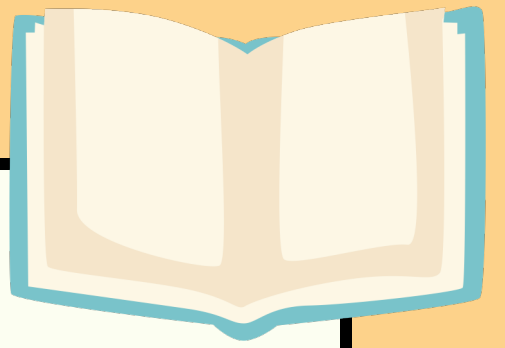
Question 8

First Nations fish traps are an example of sustainable system design

- A) True
- B) False



PREVIEW



Answer 8

First Nations fish traps are an example of sustainable system design

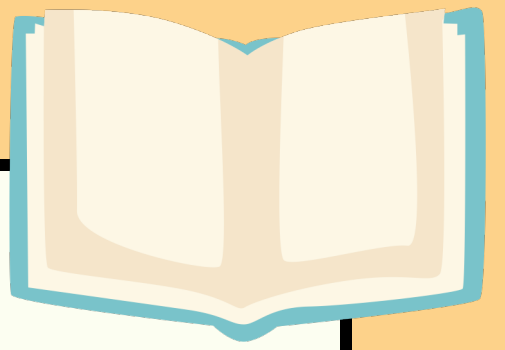
A) True

B) False

Answer: A) True



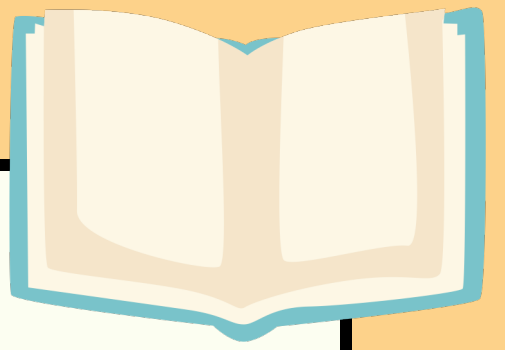
Question 9



Name one suitable circuit material and explain why it is suitable.



PREVIEW



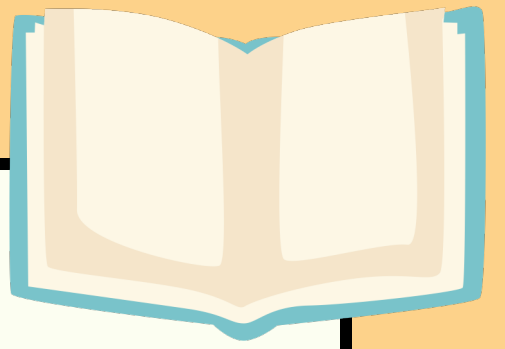
Answer 9

Name one suitable circuit material and explain why it is suitable.

Answer: Example: copper wire, because copper conducts electricity well.



PREVIEW

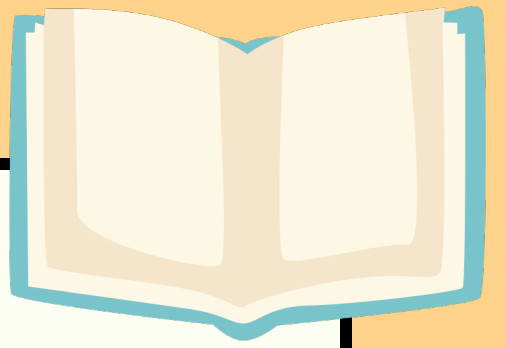


Question 10

What drawing shows the parts of an electrical system and how they are connected?

- A) Comic strip
- B) Blueprint
- C) Circuit diagram
- D) Flowchart





Answer 10

What drawing shows the parts of an electrical system and how they are connected?

- A) Comic strip
- B) Blueprint
- C) Circuit diagram
- D) Flowchart

Answer: C) Circuit diagram





PREVIEW

Well Done!

