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## WHO'S IN CHARGE?

### **LEVEL**

Level 7 – Level 8

### **ACTIVITY DESCRIPTION**

On their recent excursion to Puffing Billy Railway, students learnt about the power of steam energy. They investigate energy types, energy transformation and undertake a school energy audit. Students collect and interpret data and suggest solutions to reduce energy usage and costs.

### **THEME**

- Energy forms and transformation
- Energy audit

### **MATERIALS REQUIRED**

- “Energy Forms” worksheet
- Writing materials
- Access to electricity/gas bills from school/home
- Photocopies of the electricity/gas bills
- “Energy Audit” worksheet
- Access to computers and the internet to create a power point presentation.
- Access to school classrooms and facilities to undertake energy audit.

### **INSTRUCTIONS**

Reiterate with students the different forms of energy. Discuss the types of energy they saw in action at Puffing Billy Railway and energy requirements in the future.

Discuss kinetic energy (movement), potential energy (stored), heat, light, chemical and sound energy. Distribute the “Energy Forms” worksheets for students to complete. Encourage group discussions and sharing knowledge.

Once students have successfully completed their worksheets, encourage peer assessment or whole group assessment to make sure all students have a thorough understanding of energy forms before you move on.

#### **THE TASK**

Introduce the Energy Audit to the whole class. An audit can be used to assess and monitor the school’s energy consumption. There are huge environmental and financial benefits to reducing energy consumption. Students consider energy uses at school. They record the details of the energy used, make assessments about the schools’ energy consumption, and make recommendations about how to save energy and money. Students prepare a power point presentation for teachers and parents on their findings and recommendations.

*Note: The audit can also be undertaken at home to compare energy consumptions in two different locations or you might find a local business that would love for students to be involved in an energy audit.*

**1. BACKGROUND INFORMATION** - Start your audit by finding out the total amount of energy used at your school over one year. You can do this by examining the school's/home energy bill. Remember if the billing period is for 3months you will need to multiply it by four to represent a whole year. From the bill, calculate the amount and cost of energy that is used per day.

Research if the school already has undertaken energy audits or has an energy reduction plan in place. Using previous information may assist the project.

**2. DATA COLLECTION** - Using the "Energy Audit" worksheet provided make a list of all the appliances that use energy at school. This is a large task, students may need several lessons to complete and will require access to all classrooms, labs, sporting facilities, canteen etc to complete the task. Alternatively, designate student groups to different areas of the school.

**3. DATA ANALYSIS** -Analyse and Interpret collected data. Research power rating of each appliance.

**4. DRAW CONCLUSIONS AND RECOMMEND SOLUTIONS** - The following questions can be used to guide findings.

- What were the top 5 most common appliances found?
- What form of energy is used the most?
- Which appliance has the highest and lowest power rating?
- What energy saving solutions do you recommend?
- Which appliance has the potential to be the greatest money saver and the most environmentally friendly?

**5. PRESENTATION** - Prepare power point presentation for teachers and parents on the project, including each step, the findings and the recommended solutions.

**6. TAKE ACTION** - Implement solutions at school to reduce energy consumption.

**7. FOLLOW UP** - After 3months of implementing solutions compare the next electricity and gas bill to see if the solutions are working. Hopefully, the school will notice a reduction in environmental impacts and costs.

**8. SHARE YOUR KNOWLEDGE, CONTINUE TO MAKE A DIFFERENCE** - Pass the project onto the next year level so the school can continue contributing to reduced environmental impacts and a better planet.

## ✓ **SUGGESTIONS FOR ASSESSMENT**

Peer assessment of "Energy Forms" worksheet.  
"Energy Audit" worksheets.

Power point presentation to teachers and parents.

## ▶ **CURRICULUM LINKS**

### **SCIENCE**

Energy appears in different forms including movement (kinetic energy), heat, light, chemical energy and potential energy; devices can change energy from one form to another ([VCSSU104](#))

Identify questions, problems and claims that can be investigated scientifically and make predictions based on scientific knowledge ([VCSIS107](#))

Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed ([VCSIS108](#))

Use scientific knowledge and findings from investigations to identify relationships, evaluate claims and draw conclusions ([VCSIS111](#))

Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method ([VCSIS112](#))

Communicate ideas, findings and solutions to problems including identifying impacts and limitations of conclusions and using appropriate scientific language and representations ([VCSIS113](#))

### **MATHS**

Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies. ([VCMNA248](#))

## ENERGY FORMS WORKSHEET

Energy is what makes matter move or change. Potential Energy is stored for later use.

Kinetic Energy comes from movement.

<b>NAME</b>	<b>DRAW A PICTURE</b>	<b>IS THE ENERGY, POTENTIAL OR KINETIC</b>
H		
E		
C		
N		
L		
E		
S		
M		

## **ENERGY FORMS ANSWER SHEET**

<b>FORMS OF ENERGY</b>	<b>IS THE ENERGY POTENTIAL OR KINETIC?</b>
HEAT	Kinetic
ELASTIC	Potential
CHEMICAL	Kinetic
NUCLEAR	Potential
LIGHT	Kinetic
ELECTRIC	Kinetic
SOUND	Kinetic
MECHANICAL	Kinetic

**ENERGY AUDIT WORKSHEET**

What items are using energy?

<b>APPLIANCES (ITEMS USING ENERGY)</b>	<b>TALLY</b>	<b>TOTAL NUMBER OF APPLIANCES</b>	<b>ELECTRICITY OR GAS</b>	<b>TIME ON AND USED</b>	<b>POWER RATING</b>	<b>PERCENTAGE TIME WASTED</b>	<b>POTENTIAL ENERGY SAVING</b>