



Grade 5 Term 3

Natural Science and Technology

Summary

Energy and Change

Stored Energy in Fuels: Fuels

Fuels as Sources of Useful Energy

- We use energy from fuels every day to do many different things.
- Fuels help us stay warm, cook our food, travel from one place to another, and light up our homes.
- Without fuels, many of the things we do each day would be much harder.

Everyday Fuels

- Some common fuels we use every day include coal, wood, petrol, paraffin, gas, and candle wax.
- These fuels store energy that originally comes from the sun.
- For example, plants use sunlight to grow, and when we burn wood, we are using the energy that the plant stored from the sun.
- This stored energy is what we use to make our lives easier.



Useful Output Energy

- When we burn fuels, they release energy in the form of heat and light.
- This is called useful output energy.
- For instance, when we burn wood in a fireplace, we get heat to warm our homes and light to see by.
- When we use petrol in a car, it helps the car move.
- Fuels are very important because they provide us with the energy we need to do many different kinds of work.

Burning Fuels

How Fuels Burn and Stay Lit

- Fuels require heat to start burning.
- They need something like matches or fire lighters to provide this heat.
- Once the heat touches the fuel, such as coal, it begins to burn.
- Air plays an important role too. It helps the coal keep burning by providing oxygen.
- Oxygen is a gas that's part of the air we breathe.
- So, when we light a fuel like coal, it needs both heat and oxygen to keep burning and produce fire.



Safety With Fire

Fires Can Be a Threat to Our Communities

- Fires can be very dangerous and can cause a lot of damage to our homes and communities.
- For a fire to start, it needs three things: a start-up source like a match, fuel like wood or coal, and air (oxygen) to keep it burning.
- If a fire gets out of control, it can be very harmful, so it is important to know how to prevent and handle fires safely.



Prevention of Fires in Our Communities

There are many ways fires can start, but we can help prevent them by being careful and following some simple rules:

- **Don't play with fire:** Matches and lighters are not toys.
- **Turn off the stove:** Always turn off the stove when you're not using it.
- **Watch candles, stoves, and lamps:** Never leave them burning without someone watching them.
- **Keep heaters away from flammable items:** Things like curtains can catch fire easily.
- **No smoking inside:** Make sure adults do not smoke inside the house.
- **Be careful with candles:** Have an adult light candles, and don't place them near open windows where curtains can blow and knock them over.

- **Keep candles away from children and pets:** They can easily knock them over.
- **Fire safety checks:** Ask a local fire and safety officer to check your home for fire safety.

What to Do in Case of a Fire

If a fire does start, it's important to know how to put it out and keep yourself safe. Here are some tips:

- **Know how fire works:** Fire needs oxygen to burn, so cutting off the oxygen can help put it out.
- **Be prepared:** When making or using fire, keep a bucket of sand or a blanket nearby.
- **Smother the fire:** If the fire gets out of hand, use sand or a blanket to smother it.
- **Use a fire extinguisher:** Make sure you know how it works.
- **Electrical fires:** Never use water on an electrical fire; it could shock you.
- **Kitchen fires:** Use the lid of a pot to smother a fire on the stove.
- **Stop, Drop, and Roll:** If your clothes catch fire, stop where you are, drop to the ground, and roll to smother the flames.
- **Treat burns:** Always pour cold water on a burn and get to a doctor, clinic, or hospital as soon as possible.
- **Crawl to safety:** If a fire is inside your house, don't run out; instead, crawl to the nearest exit. Hot air and smoke rise, so the air near the floor is safer to breathe.



Important Emergency Numbers

It's also very important to know these emergency numbers in case of a fire or other emergencies:

- Fire: 107
- Police: 10111
- Ambulance: 10177
- Emergency from a cellphone: 112

Energy and Electricity: Cells and Batteries

Storing Energy in Cells and Batteries

- Humans have learned how to take the energy from the Sun and store it in cells and batteries.
- This stored energy can be used later when we need it, such as in a flashlight or a portable radio.

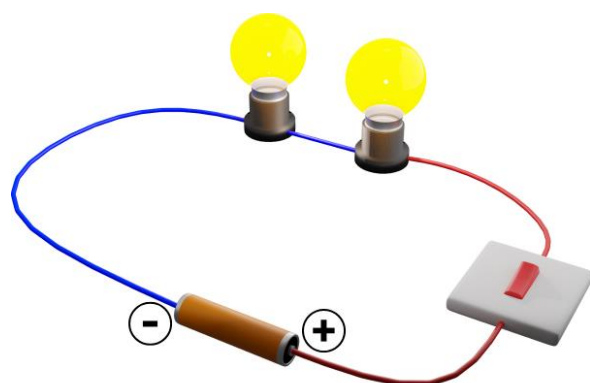
What Are Cells and Batteries?

- Cells and batteries are devices that store energy in the form of electricity.
- A battery is made up of many cells working together. Each cell is a small part of a battery that stores energy.
- We use cells and batteries in many everyday items like cars, radios, flashlights, drills, cell phones, alarm clocks, and laptops.
- A battery is like a container full of special chemicals that can produce electrical energy.
- The first cell was invented by an Italian scientist named Alessandro Volta in 1792, and he created the first battery in 1800 by stacking multiple cells together.



Parts of a Battery

- A cell has two ends called terminals.
- One terminal is positive (+) and the other is negative (-).
- The chemicals inside the cell create electrical energy that travels from the negative terminal to the positive terminal.
- This electricity moves very quickly.
- When a cell is connected to a device, like a light bulb, the energy flows from the negative terminal, through the light bulb, and back to the positive terminal, making the light bulb shine.
- If the cell is not connected to anything, it does not lose its energy.



Electricity and Circuits

- A circuit is a system that transfers electrical energy to where it is needed.

What Is a System?

A system is made up of two or more parts that work together to do something useful. For example:

- A pestle and mortar work together to grind black pepper into a powder that we can use in cooking.
- A can opener has different parts that grip, turn, and cut open a can, helping us access the food inside.



What Is an Electrical System?

An electrical system is called a circuit. For example:

- A battery
 - Electrical wires
 - A light bulb
 - A light bulb holder
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- When you connect these parts together, you create an electrical circuit.
 - This circuit allows the light bulb to shine when all the parts are properly connected.
 - The electrical energy moves quickly from the negative terminal of the cell to the positive terminal, then through the wires to the light bulb.
 - The bulb lights up as the electricity passes through it.
 - The energy then flows back through the wires to the negative terminal, completing the cycle.
 - The light bulb will stop shining if the energy is used up or if the circuit is broken.
 - When a circuit is connected and working, we say it is closed.
 - When there is a break in the circuit, we say it is open.

Energy and Electricity: Mains Electricity

Electricity from Power Stations

- Electricity in our homes comes from power stations.
- The electricity flows through cables from the power stations to circuits in our houses, providing the energy we need for lights, appliances, and other electrical devices.

The Flow of Mains Electricity

- The electricity we use in our homes travels a long way from the power stations.
- After it is made, the electricity flows through large structures called pylons and goes through substations and electric boxes to reach our homes.
- Most of our power stations use coal to produce this electricity.
- At the power station, transformers increase the power of the electricity, allowing it to travel long distances.
- Once the electricity reaches our homes and powers our appliances, it flows back to the power station in reverse, starting the cycle again.



A Power Station Needs a Source of Energy

- All power stations need a fuel source to produce electricity.
- In South Africa, most power stations use coal because there is a lot of it available.
- These coal-fired power stations are mainly located in Mpumalanga.
- The process works like this: coal is burned to release heat, and this heat is used to generate electricity, which is then sent to our homes.



Besides coal, South Africa also uses other sources of energy to make electricity:

- **Water** (Hydroelectric Power): Uses the energy from flowing water to produce electricity.
- **Wind** (Wind Turbines): Uses the wind to turn large blades connected to generators.
- **Nuclear** (Nuclear Power Plants): Uses nuclear reactions to produce energy.
- **Gas** (Gas Turbines): Uses natural gas to produce electricity.



Energy and Electricity: Safety with Electricity

Safety Rules for Electricity

- Electricity is very useful, but it can be dangerous if not used properly.
- The electricity from a wall socket is powerful enough to harm or even kill you.
- Our bodies conduct electricity well because they are made up of about 70% water.
- If electricity flows through your body, you can get an electric shock.

Safety Tips

Check Your Appliances Regularly

It's important to check your electrical appliances regularly to avoid accidents. Look for these problems and fix them immediately:

- The controls do not work correctly.
- Any part of the appliance is broken or there are missing parts.
- Parts are loose.



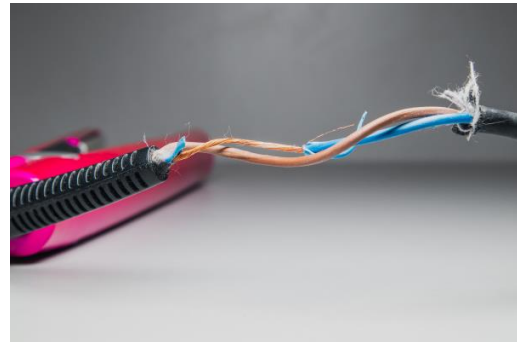
Plugged in Safely

- Use SABS-approved plugs.
- Do not overload a wall socket; use an adaptor if needed.
- Do not pull the plug out by the cord; always pull it by the plug.
- Turn off all wall sockets before plugging in or unplugging an appliance.
- Never stick your fingers, bare wires, or anything else into a wall socket.

- Cover unused sockets with safety plugs to prevent accidents.

Safety with Cords

- Do not use cords that are worn or frayed; ensure they are completely insulated.
- Keep cords away from heat sources like stoves or fires.
- Do not place cords under mats or rugs where they can be damaged.
- Avoid placing cords where people walk to prevent tripping or damage.



Other Safety Tips

- Water conducts electricity well, so always keep electrical devices away from water.
- Do not use appliances with wet hands.
- Do not play near pylons, substations, and electricity boxes.
- Avoid touching transmission wires.

What to Do in an Emergency

- Your school should conduct fire drills once a term so everyone knows what to do if there is a fire.
- It's also important to have a plan for your home.
- Talk with your family about what to do in case of a fire at home.
- Knowing the plan can help keep everyone safe.



Energy and Movement: Elastic and Springs

Using Elastic and Springs

- We can make things move by using stretched or twisted elastic and compressed springs.
- Elastic bands do work when they are stretched, and springs do work when they are compressed.

Springs Do Work for Us

- A spring gets smaller when you compress it, and when you release it, the spring goes back to its normal size.
- This ability is very useful in many everyday items.

- For example, cars and motorcycles use springs to absorb shocks when driving over bumps.
- Other items that use springs include watches, ball-point pens, staplers, clothing pegs, garage doors, and trampolines.
- Toys like a jack-in-the-box also use springs to create fun surprises.

Elastic That Does Work for Us

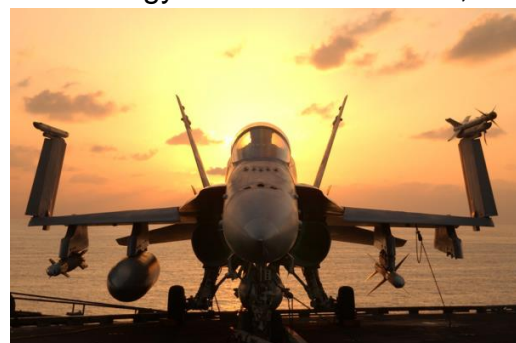
- Elastic bands get longer when you stretch them, and when you let go, they return to their normal size.
- This can be very useful in many ways.
- For example, a catapult uses strong elastic bands to shoot objects over long distances.
- Other uses of elastic bands include slingshots and bungee cords.



Elastic and Springs Store Energy

When we stretch, twist, or compress elastic bands or springs, we store energy in them. This stored energy can then be used to do work. Here are some examples:

- **Cars and Motorcycles Shock Absorbers:** When a car or motorcycle goes over a bump, the springs compress and absorb the shock, making the ride smoother.
- **Jack-in-the-Box:** When you push the Jack down and close the box, energy is stored in the coiled springs, ready to make Jack jump out when the box opens.
- **Ancient Catapult:** When you pull back the catapult, energy is stored in the catapult. Releasing it shoots the rock into the sky.
- **Slingshot:** Pulling back the slingshot stores energy in the elastic bands, and releasing it shoots the object forward.
- **Aircraft Carrier Plane Catapult:** The catapult machine stores energy and then releases it to launch the plane into the air.
- **Elastic-Powered Airplanes:** Twisting the elastic band stores energy, and when released, it spins the propeller and powers the airplane.



Movement Energy

- Elastic bands and springs store energy, and when we release them, we get movement energy.
- This energy makes things move.

Storing and Releasing Energy

- The more energy we put into stretching or compressing elastic bands or springs, the more movement energy we will get when we release them.
- By understanding how to store and use this energy, we can make many useful and fun things work.

Systems For Moving Things: Wheels and Axles

Vehicles Use Wheels and Axles

- **Wheels:** A wheel is a round object that turns around a central point. Think of the wheels on your bicycle—they are round and spin around the middle.
- **Axles:** An axle is a rod that connects two wheels. The wheels are attached to the ends of the axle, allowing them to turn together.



Examples of Wheels and Axles in Vehicles

- **Cars and Trucks:** These vehicles have four wheels connected by axles. The engine powers the wheels, making the car or truck move.
- **Bicycles:** A bicycle has two wheels connected by an axle in the middle, allowing it to roll smoothly when you pedal.
- **Skateboards:** A skateboard has four small wheels attached to two axles, making it easy to glide on smooth surfaces.