Chapter 7: Energy — How Things Work

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Exercise 7.1 — Observe and Wonder (kitchen observations)

Q1 Look at a kitchen. Write one thing you observe and one question that comes to your mind.

SOLUTION

This is an observation activity — answers will vary based on what you see.
Sample observation: 'The food is getting cooked.'
Sample question: 'How is it being cooked?' or 'What is making the stove hot?'

Answer: Sample — I observe: The food is getting cooked. I wonder: How is it being cooked? (Your own observations and questions will vary.)

Exercise 7.2 — Discuss — Things in nature that move, shine, make sound, get warm or cool

Q1 From your observations, write down at least three things you have noticed that move, provide light, make a sound, make things hot, make things cool.

SOLUTION

Things that move: leaves blowing in the wind, a flying bird, a flowing river.
Things that provide light: the Sun, a lit bulb, a flame.
Things that make a sound: thunder, a ringing bell, a barking dog.
Things that make things hot: the Sun, fire, a heater.
Things that make things cool: a fan, wind, cold water.

Answer: Moving: leaves, birds, river. Light: Sun, bulb, flame. Sound: thunder, bell, dog. Hot: Sun, fire. Cool: fan, wind. (Your own examples will vary.)

Exercise 7.3 — Activity 1 — Balloon (observation question)

Q1 When you release the mouth of a filled balloon, what happens?

SOLUTION

When air rushes out of the balloon, it pushes the balloon forward.
The movement of air generates energy that makes the balloon move.

Answer: The balloon moves forward because the air rushing out pushes it in the opposite direction.

Q2 What would you change in the balloon air rocket activity to make the toy move faster or slower?

SOLUTION

To make it move faster: fill the balloon with more air so more air rushes out at once, or use a lighter/thinner straw.
To make it move slower: put less air in the balloon, or use a wider straw that lets air escape more slowly.

Answer: More air in the balloon makes it move faster; less air makes it move slower.

Exercise 7.4 — Activity 2 — Rubber Band Guitar (observation question)

Q1 What happens if you use thinner or thicker rubber bands in the rubber band guitar? Do they sound different?

SOLUTION

Thinner rubber bands vibrate faster and produce a higher-pitched sound.
Thicker rubber bands vibrate more slowly and produce a lower-pitched, deeper sound.
Yes, they sound different — thin bands make a sharper sound and thick bands make a deeper sound.

Answer: Yes, they sound different. Thinner bands make a higher sound; thicker bands make a lower, deeper sound.

Exercise 7.5 — Activity 3 — Sun-powered Water Warmer (observation question)

Q1 You place one cup of water in sunlight and another in shade. After 15–20 minutes, what do you notice when you touch the water in both cups?

SOLUTION

The water in the sunlight feels warmer than the water in the shade.
This is because the Sun heats up the water in the cup kept in sunlight.
This shows that sunlight gives us heat energy.

Answer: The water in sunlight feels warmer. The Sun's heat energy warms it up; the water in shade stays cooler.

Exercise 7.6 — Discuss — Fuel for cooking

Q1 What kind of fuel do you use at home for cooking?

SOLUTION

This is a personal question — the answer depends on your home.
Common fuels used for cooking in India include LPG (cooking gas), wood, coal, kerosene, and electricity.

Answer: At home we use LPG (cooking gas) for cooking. (Your answer will vary — wood, coal, kerosene or electricity are also used in different homes.)

Q2 What are the problems of using too much wood or coal?

SOLUTION

Burning wood or coal creates a lot of smoke and pollution.
This polluted air is harmful to our health — it can cause breathing problems.
It is also bad for the environment because it releases harmful gases into the air.

Answer: Using too much wood or coal creates smoke and pollution that harms our health and pollutes the air.

Exercise 7.7 — Activity 4 — Understanding How Fuel Works (diya observation)

Q1 (a) Which diya burns longer — the one with only a wick, or the one with a wick and oil? Why?

SOLUTION

Diya 2 (with the wick and oil) burns longer.
The oil acts as a fuel that keeps feeding the flame.
Diya 1 (without oil) goes out quickly because there is no fuel to burn.

Answer: Diya 2 (with oil) burns longer because the oil acts as a fuel that feeds the flame.

Q2 (b) What is acting as a fuel in the diya activity?

SOLUTION

The oil is acting as the fuel in the diya.
It provides the energy that keeps the flame burning.

Answer: The oil is the fuel. It provides energy to keep the diya burning.

Exercise 7.8 — Write — How food is cooked at home

Q1 How is food cooked in your house?

SOLUTION

This is a personal question based on your home.

In many homes, food is cooked on a gas stove using LPG as fuel.

In some homes, people use an electric induction cooktop, a wood fire, or solar cookers.

Answer: In our house, food is cooked on a gas stove using LPG (cooking gas) as fuel. (Your answer will vary.)

Exercise 7.9 — Activity 5 — Electricity table (devices at home)

Q1 Walk around your home or classroom. Identify five things that run on electricity. Fill in the table with the device, what it does, and what it requires (light/sound/heat/movement/cooling/other).

SOLUTION

1. Fan — Blows air — Movement
2. Light bulb — Gives light — Light
3. Television — Shows pictures and sound — Light and Sound
4. Refrigerator — Keeps food cold — Cooling
5. Electric iron — Irons clothes — Heat

Answer: 1. Fan — Movement 2. Light bulb — Light 3. Television — Light and Sound 4. Refrigerator — Cooling 5. Electric iron — Heat

Exercise 7.10 — Think — Life without electricity

Q1 What would your day be like if there was no electricity at all?

SOLUTION

Without electricity, we could not use fans, lights, television, refrigerators, or mobile phones.
We would have to use candles or oil lamps for light at night.
Cooking would need firewood or gas only.
Schools and offices would not be able to use computers or projectors.
Life would be much slower and many things we take for granted would stop working.

Answer: Without electricity, there would be no lights, fans, TV, or phones. We would use candles for light and cook on gas or wood. Life would be very difficult and slow.

Exercise 7.11 — Think — Cloth drying in sun vs shade

Q1 You place a small damp cloth in the Sun and another in the shade. Which one do you think will dry first? Why?

SOLUTION

The cloth in the Sun will dry first.
Sunlight provides heat energy that warms the cloth and evaporates the water in it faster.
The cloth in shade does not receive direct sunlight, so it stays damp longer.

Answer: The cloth in the Sun dries first because sunlight provides heat energy that evaporates the water faster.

Exercise 7.12 — Activity 6 — Pinwheel (observation question)

Q1 You make a pinwheel and hold it in the wind (or run with it). What happens to your pinwheel?

SOLUTION

The pinwheel rotates (spins) when held in the wind.
The moving air (wind) pushes the blades of the pinwheel and makes it spin.
This shows that wind has energy — it can make things move.

Answer: The pinwheel spins. Moving air (wind) pushes its blades and makes it rotate, showing that wind has energy.

Exercise 7.13 — Activity 7 — Sunlight in Focus (observation question)

Q1 You hold a magnifying glass in sunlight and focus the light onto a piece of paper. What happens to the paper?

SOLUTION

The paper gets very hot at the focused spot and may start to burn or turn brown.
The magnifying glass focuses sunlight onto a tiny spot, concentrating the Sun's heat energy.
This shows that the Sun's light carries heat energy powerful enough to burn paper.

Answer: The paper gets very hot and starts to burn or scorch. The magnifying glass concentrates the Sun's heat energy onto one small spot.

Exercise 7.14 — Activity 8 — Water Wheel (observation question)

Q1 You pour water onto the paper cup water wheel. Does the water make the wheel move?

SOLUTION

Yes, the water makes the wheel move (spin).
The flowing water pushes the spoons attached to the cup, causing the cup to rotate around the pencil.
This shows that flowing water has energy — it can make things move.

Answer: Yes, the water makes the wheel spin. Flowing water pushes the spoons and turns the wheel, showing that water has energy.

Exercise 7.15 — Write — More examples of Sun, wind and water energy

Q1 Can you think of more examples where we use the Sun, the wind or the flowing water in daily life?

SOLUTION

Examples using the Sun: drying papads or clothes in sunlight, solar cookers, solar panels on rooftops, drying grains or fish.

Examples using the wind: flying a kite, sailing boats, windmills grinding grain, wind turbines making electricity.

Examples using flowing water: watermills (gharaats) grinding grain in hilly areas, hydroelectric dams generating electricity, water wheels.

Answer: Sun: drying clothes, solar cookers. Wind: kites, sailing boats, windmills. Water: gharaats (watermills), hydroelectric dams.

Exercise 7.16 — Write — Energy All Around Us (picture table activity)

Q1 Look at the picture showing various activities. List the actions you see and fill in the table: Activity and Source of Energy. One example is given: A child carrying a school bag — Food.

SOLUTION

This activity is based on a picture in the textbook. Using the chapter's concepts:
A child carrying a school bag — Food (body energy)
A fan running — Electricity
A vehicle moving on the road — Fuel (petrol/diesel)
Solar panels on a roof — Sunlight
A windmill turning — Wind

Answer: Fan → Electricity; Vehicle → Fuel (petrol/diesel); Solar panel → Sunlight; Windmill → Wind; Child carrying bag → Food. (Your table will depend on the picture in your book.)

Exercise 7.17 — Activity 9 — Energy Flow Game (guidance)

Q1 How do you play the Energy Flow Game? Give one example of an energy chain.

SOLUTION

Each student gets a card: one is an energy SOURCE (Sun, wind, food), one is the TYPE of energy (heat, light, movement), and one is the USE (drying clothes, cooking, turning a turbine).
Students walk around and find the two others who complete their energy chain.
Then each group presents their chain to the class.
Example chain: Sun → Heat → Helps dry clothes.

Answer: Students match a source, type, and use of energy into a chain. Example: Sun → Heat → Helps dry clothes. Another example: Wind → Movement → Turns a turbine to make electricity.

Exercise 7.18 — Let us reflect — End-of-chapter questions

Q1 What will happen if there is no electricity in your house for a day?

SOLUTION

Without electricity, fans, lights, television, refrigerator, mobile phone chargers, and other appliances will stop working.
We will have to use candles or oil lamps for light.
Food stored in the refrigerator may spoil.
We will depend on natural light during the day and will not be able to watch TV or use computers.

Answer: Without electricity, fans, lights, TV, fridge, and phones will not work. We will need candles for light at night, and stored food may spoil.

Q2 Why is it better to use solar or wind energy instead of coal?

SOLUTION

Burning coal creates a lot of smoke and harmful gases that pollute the air.
This polluted air is harmful to our health and damages the environment.
Solar and wind energy are clean sources — they do not produce smoke or pollution.
The Sun and wind are naturally available and will not run out, making them sustainable.

Answer: Solar and wind energy are clean — they do not produce smoke or pollution. Burning coal pollutes the air and harms our health. Solar and wind will also never run out.

Q3 Give two examples where you have seen energy being stored.

SOLUTION

1. Batteries in a torch or toy — batteries store energy and release it when needed.
2. Our body stores energy from food — even if we skip a meal, we can still walk and run using stored energy.
Other examples: a fully charged mobile phone, a charged power bank.

Answer: 1. A battery in a torch stores energy. 2. Our body stores energy from food so we can run even if we skip a meal.

Q4 What is the one thing you can do at home to save energy?

SOLUTION

There are many ways to save energy at home.
Examples: Switch off lights when leaving a room; use LED bulbs instead of regular bulbs; switch off fans when no one is in the room; unplug chargers when not in use; dry clothes in sunlight instead of a dryer.

Answer: I can switch off lights and fans when I leave a room to save electricity. Using LED bulbs also saves more energy than regular bulbs.

Q5 Find out how many kilometres a vehicle travels per litre of petrol or diesel. Ask about different vehicles. How will you compare them?

SOLUTION

This is an explore activity — ask a family member or neighbour.
A car typically travels about 12–18 km per litre of petrol.
A two-wheeler (scooter/motorcycle) typically travels about 40–60 km per litre.
A bus or truck travels fewer km per litre but carries many more people or goods.
To compare them, you can look at how far each vehicle goes on 1 litre — the higher the number, the more efficient it is.

Answer: A scooter goes about 50 km per litre; a car goes about 15 km per litre. Compare by checking how many km each travels on one litre — a higher number means better mileage. (Ask elders for actual figures.)

Q6 Look around your home or classroom. List any three objects that use energy and mention their source of energy. (Example: Fan → Electricity)

SOLUTION

1. Light bulb → Electricity
2. Gas stove → Fuel (LPG / cooking gas)
3. Mobile phone (when charging) → Electricity

Other examples: ceiling fan → electricity; bicycle → food (human energy); car → petrol (fuel).

Answer: 1. Light bulb → Electricity 2. Gas stove → LPG (fuel) 3. Mobile phone → Electricity. (Your own examples will vary.)

Q7 (a) Draw or make a simple plan of a 'clean energy home' that uses solar, wind or any such source of energy. (b) Make 'my energy diary' for one day — record the number of times you have used electricity, fuel, and so on.

SOLUTION

(a) This is a creative drawing/design activity.
In your clean energy home plan, include: solar panels on the roof (for electricity), large windows for natural light, a solar water heater, a small windmill if in a windy area, and a garden or courtyard for natural cooling.
(b) For the energy diary, note every time you use electricity (switching on a light, fan, TV, charging a phone) or fuel (gas stove, vehicle ride) during the day.
Count the total number of times at the end and think about how you can reduce it.

Answer: (a) Plan a home with solar panels on the roof, large windows for natural light, and a solar water heater. (b) Keep a diary of each time you use a light, fan, stove, or vehicle in a day and count the total uses.