

Student worksheet

3.4 Energy can be transformed

Pages 48–49 and 171

Energy transformations

- 1    Name a device that will convert:
- a    chemical to electrical energy: \_\_\_\_\_

b    chemical into heat energy: \_\_\_\_\_

c    electricity to light: \_\_\_\_\_

d    chemical energy into sound: \_\_\_\_\_

e    electricity to heat: \_\_\_\_\_

f    potential to kinetic energy: \_\_\_\_\_

g    chemical energy to light: \_\_\_\_\_

h    kinetic energy to sound: \_\_\_\_\_
- 2    Draw a flow diagram that shows all of the energy changes when:
- a    a light turns on

b    a toaster cooks your toast

c    a church bell is struck by a bell-ringer

d a firework explodes

e an iPhone is charged using energy from a coal power station

3 Why does a mug of hot chocolate eventually cool down? Where does the heat energy go?

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4 What will happen to a glass of ice-cold water if left at room temperature?

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5 Why does the ice-cold water form condensation on the side of the glass?

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6 Does hot chocolate or cool lemonade have more thermal energy? Explain your answer

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7 Which of the drinks in question 6 will have more thermal energy if they are left on the same bench overnight? Explain your answer.

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## Extend your understanding

In exothermic chemical reactions, reactants have more energy than products. Therefore, when the products form, the extra energy is released to the surroundings as heat.

In endothermic reactions, products have more energy than reactants. Therefore, heat must be absorbed from the surroundings for the reaction to occur.

8 If an exothermic reaction occurred in a beaker, what would the beaker feel like if you picked it up?

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9 If an endothermic reaction occurred in a beaker, what would the beaker feel like if you picked it up?

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10 Show the energy conversion of these two processes by drawing energy chain flow charts:

a Exothermic

b Endothermic

11 Is the burning of coal an exothermic or an endothermic reaction? Explain your answer.

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