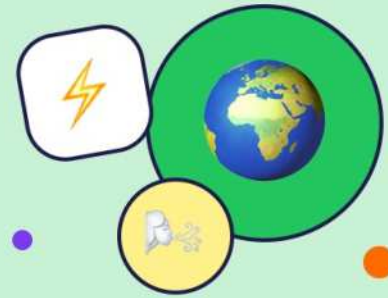


Science

Grade 12

Energy and climate change

Examine the greenhouse effect and compare energy sources.



I can explain the greenhouse effect and evaluate energy sources.

1



Put it in order

Number the boxes to put them in the right order.

☐

Greenhouse gases absorb some of this heat.

☐

Sunlight reaches Earth and warms the surface.

☐

The heat is re-emitted, warming the lower atmosphere.

☐

The surface gives off heat as infrared radiation.

2 ⚡ Sort it

Write each word in the right box.

coal

hydroelectric

wind

natural gas

geothermal

solar

oil

Renewable

Non-renewable

3 🌍 Pick the answer

Circle the right answer.

1. Which gas contributes most to human-caused warming?

A carbon dioxide

B oxygen

C nitrogen

2. A drawback of solar power is that...

A it releases CO₂ while running

B output depends on daylight

C it uses up fuel

4 ✅ True or false

Circle true or false.

1. The CO₂ concentration in the atmosphere has risen since the Industrial Revolution.

True

False

2. The greenhouse effect is caused entirely by humans.

True

False

3. Methane is a greenhouse gas.

True

False

4. Nuclear power stations release large amounts of CO₂ while running.

True

False

5. When seawater warms, it expands, which adds to sea-level rise.

True

False

5

**Efficiency**

Efficiency = useful energy out $\div$ energy in $\times$ 100. Fill in the empty boxes.

Machine	Energy in (J)	Useful energy out (J)	Efficiency (%)
A	200	150	
B	800	200	
C	1,200	480	
D	400		60

6

**Energy calculations**

Work out the missing numbers.

1. A 2 kW heater runs for 3 hours. Energy used = _____ kWh
2. Electricity costs 0.40 per kWh. 6 kWh costs _____
3. A 3 MW wind turbine runs at full power for 10 hours. It produces _____ MWh
4. A 60 W bulb is replaced by a 10 W LED bulb. Power saved = _____ W
5. A 1,500 W kettle runs for 120 s. Energy used = _____ J

7 How do they make electricity?

Draw a line to match each pair.

☐ Solar •

☐ Wind •

☐ Hydroelectric •

☐ Geothermal •

☐ Nuclear •

• **A.** uses heat from inside the Earth

• **B.** uses moving air to turn turbines

• **C.** uses the fission of uranium to heat water

• **D.** uses falling or flowing water

• **E.** turns sunlight into electricity with photovoltaic cells

8 Climate check

Circle the right answer.

1. Which of these is a carbon sink?

A forests

B coal power stations

C cars

2. Which gas traps more heat per molecule than CO₂?

A oxygen

B methane

C argon

3. What does "carbon neutral" mean?

A only renewable energy is sold

B no CO₂ is ever released

C net CO₂ emissions are balanced to zero

9 Think and write

Compare wind power and nuclear power for a country's electricity. Give two advantages and two disadvantages of each.

How did it go?



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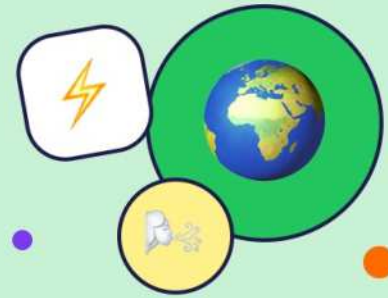
Science

Grade 12

Answer key

Energy and climate change

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Renewable

wind, solar, hydroelectric, geothermal

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Efficiency = useful energy out $\div$ energy in $\times$ 100. Fill in the empty boxes.

Machine	Energy in (J)	Useful energy out (J)	Efficiency (%)
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B	800	200	25
C	1,200	480	40
D	400	240	60

6



Energy calculations

Work out the missing numbers.

1. A 2 kW heater runs for 3 hours. Energy used = 6 kWh
2. Electricity costs 0.40 per kWh. 6 kWh costs 2.40
3. A 3 MW wind turbine runs at full power for 10 hours. It produces 30 MWh
4. A 60 W bulb is replaced by a 10 W LED bulb. Power saved = 50 W
5. A 1,500 W kettle runs for 120 s. Energy used = 180,000 J

7 How do they make electricity?

Draw a line to match each pair.

E Solar •

B Wind •

D Hydroelectric •

A Geothermal •

C Nuclear •

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