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Land Rover BAR is the British Challenger for the 35th America’s Cup – the oldest international sporting competition in the world. There are only six crew on the race boat, but dozens of experts are back at the team base working hard to help Land Rover BAR design the most technically advanced and innovative racing catamaran to win the America’s Cup. The Land Rover BAR team also aims to be as sustainable as possible. They monitor how they create carbon emissions that add to global warming, and find ways to reduce these emissions.

	<p><b>Dr Susie Tomson – Sustainability Manager</b></p>
<p>Since Susie has been Sustainability Manager, she has helped to ensure that 100% of electricity at the Land Rover BAR base is from renewable sources.</p>	

**1** Dr Susie Tomson, the team’s Sustainability Manager, helps every team member understand the basics about how carbon emissions add to global warming. Draw lines to match each term with the correct description:

Atmosphere	A gas that keeps the atmosphere warm.
Carbon cycle	The gradual increase in the Earth’s average temperature.
Greenhouse gas	A natural fuel formed in the past from the remains of plants or animals.
Greenhouse effect	Changes to environments and weather patterns around the world.
Fossil fuel	How carbon constantly moves from one place to another in the environment.
Climate change	The trapping of the Sun’s warmth in the atmosphere.
Global warming	The gases that surround the Earth.

**2** What fossil fuels are sometimes used to generate electricity?  
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**3** Why does burning fossil fuels add to the greenhouse effect? Use the **carbon cycle** to help you explain how burning fossil fuels moves carbon from one place to another.

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Did you know the Land Rover BAR base is powered by solar panels? The solar panels installed at Land Rover BAR have a capacity of 114 kW. Depending on the sunshine levels, that could be enough to power over 700 televisions!

**4** When sunlight shines on a solar panel, it creates an electric current across the layers of silicon in the panel, causing electricity to flow. Why does using solar panels help Land Rover BAR reduce its carbon emissions?

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**5** Land Rover BAR also buys in extra electricity when it needs to use more than it can produce. This electricity comes from renewable sources like wind and hydro power. When might Land Rover BAR need to buy electricity from these sources?

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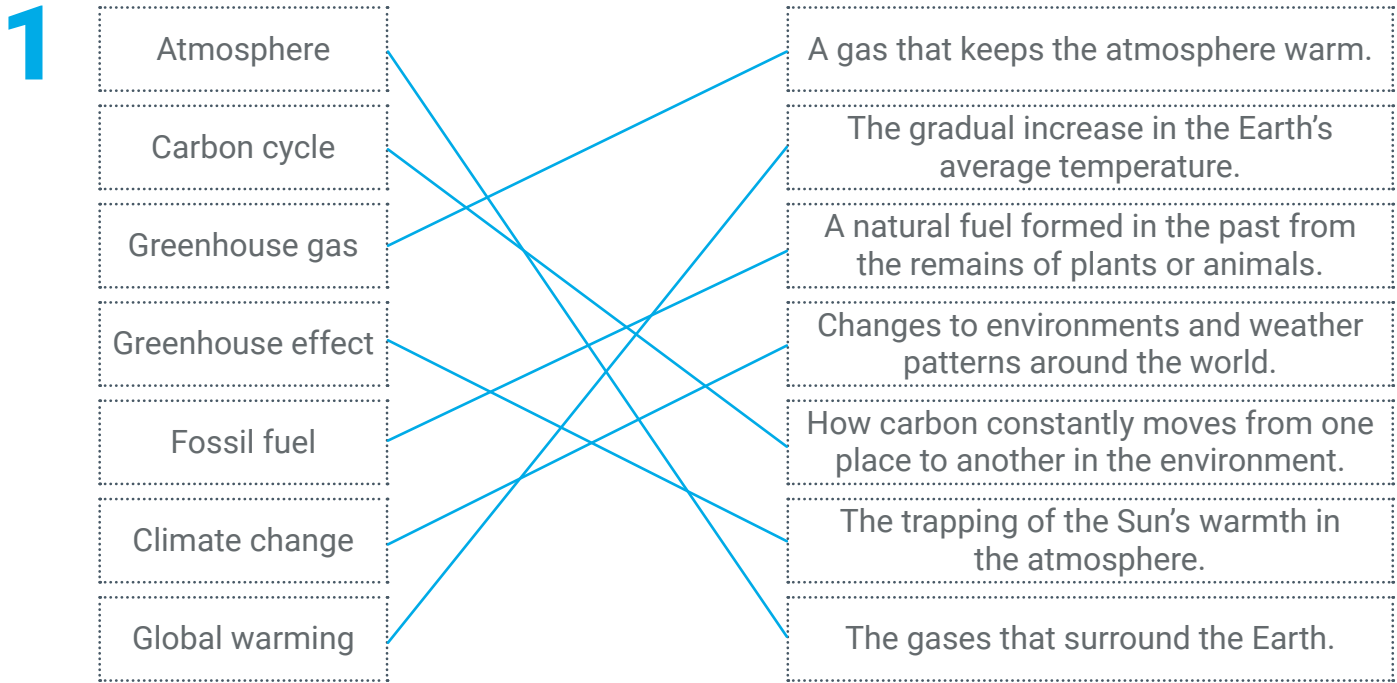
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**6** Dr Susie Tomson is always looking to find ways to reduce carbon emissions. How might Land Rover BAR's activities cause carbon emissions? Think about the energy or materials each activity might use. Complete the table to show your ideas:

Activity	How this uses energy	How this uses materials	How Land Rover BAR could reduce emissions
Travelling to work	e.g. Combustion of fossil fuels.	e.g. Plastics in car bodies.	e.g. Encourage staff to use public transport, car share, or travel by bicycle or on foot.
Working in the office			
Building the race boat			
Overseas travel and transportation of equipment			
Disposing of waste			

# ANSWERS



**2** Oil, coal or gas.

**3** Combustion releases carbon that was locked away underground in fossil fuels for millions of years, adding to the carbon stored in the atmosphere, which is a greenhouse gas.

**4** It does not release carbon into the atmosphere as no combustion is involved.

**5** When it is wintertime or cloudy, and the solar panels do not receive enough sunlight to generate the electricity needed, or when demand is more than the panels can supply regardless of weather.

# 6

Examples include:

Activity	How this uses energy	How this uses materials	How Land Rover BAR could reduce emissions
Travel to work	Combustion of fossil fuels which drives the engines of the trains or cars.	Plastics in car bodies.	Encourage staff to use public transport, car share, or travel by bicycle or on foot.
Working in the office	Electricity to power lights, equipment and heating in the office.	Plastics in office furniture, IT equipment, flooring etc.	Use low energy equipment, switch off lights etc. when not in use, use renewable electricity.
Building the race boat	Electricity to power tools and machines.	Carbon fibre and plastics for hull, foils etc.	Use renewable electricity, turn off lights and equipment when not in use, use recycled plastics and materials if possible.
Overseas travel and transportation of equipment	Combustion of fossil fuels to drive engines in planes and ships.	Plastics in airplane body and interior, steel in ships.	Plan travel wisely, only travel when necessary, keep freight as light as possible.
Disposing of waste	Transport of waste to recycling centre. Energy used to make materials that are discarded and not made into a product.	Plastic for bin bags.	Recycle as much as possible, find new uses for old equipment and re-purpose materials. Be as efficient as possible and create less waste.