

# Worksheet 1.9

## Catalysts in cars

A research laboratory is investigating the effectiveness of various catalysts for the reduction of pollution in petrol-powered car exhausts.

They have devised their own units for measuring air pollution called apus (atmospheric pollution units). The table below shows their results comparing several different catalysts which would be suitable for fitting into catalytic converters.

Catalyst	Unburnt petrol / apu	Carbon monoxide / apu	Oxides of nitrogen / apu
none	100	700	500
A	30	150	150
B	50	250	300
C	10	75	90

**1** In his lab notebook, the research scientist uses the abbreviations 'CO', 'NO<sub>x</sub>' and 'unburnt HC'. What do these abbreviations stand for?

a CO .....

b NO<sub>x</sub>.....

c unburnt HC .....

**2 a** Which catalyst is most effective at reducing total pollution?

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b Which is the largest pollutant in the exhaust before a catalyst is used?

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c Which is the largest pollutant in the exhaust from the most effective catalyst?

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d What types of metal are usually used as catalysts in catalytic converters?

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**3** The metal catalyst is coated on to a honeycombed ceramic support. It works best when the engine has warmed up.

**a** Explain why a honeycombed support is better than a solid one.

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**b** Explain why the catalyst works better when the engine is warm.

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**4** Heavy metals may stick to the catalyst and prevent it from working. The catalyst is said to be 'poisoned'.

**a** Explain how catalysts work and how poisoning with heavy metals prevents this.

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**b** Why should the owners of cars with catalytic converters always use unleaded petrol?

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