

Matter

4. Elements

CONCEPT 3

TEST YOURSELF

CERAMICS, POLYMERS AND COMPOSITES

KNOW

- Q1 Polymers can be broken down to the molecules they are made from. Is this a physical or a chemical change?
- Q2 What are the similarities between synthetic polymers and natural polymers?
- Q3 List 3 items made from ceramics in your home.
- Q4 Ceramic materials have been uncovered from earliest human history. What does this tell you about the nature of ceramics?

APPLY

- Q5 Why is it useful to store small molecules (such as glucose) in the form of polymers (such as starch)?
- Q6 Plants store sugar in the form of starch; animals store it in the form of glycogen. What prediction(s) can you make about glycogen?
- Q7 Describe some examples of uses of synthetic polymers in place of metals.
- Q8 Draw a table to compare the properties of ceramics with metals.
- Q9 Glass and carbon fibres are strong and lightweight. What makes glass and carbon fibres a popular choice as reinforcers?

EXTEND

Q10 Do you think that polymers are chemically the same as the monomers that make them? Explain your answer.

Q11 Suggest why ceramics may be chosen over metals to make turbo-jet engine blades.

Type of material	Material	Density (g/cm ³)	Strength (MPa) *	Strength/weight ratio
composite	fibreglass	1.9	3400	1307
composite	carbon fibre	1.6	4300	2457
metal	aluminium	2.8	600	214
metal	stainless steel	7.86	2000	254
composite	concrete	2.3	12	4.35

*The pressure needed to squash the material until it breaks.

Q12 What conclusions can you draw from the data in the table above?