Clue C

Substance	Energy, in joules per kg, for a 1°C change in temperature
air	990
copper	390
concrete	3400
cotton	1400
polystyrene	1300
water	4200
iron	450

Clue A

What is the effect of heating some water?
-It gets hotter.

This rise in temperature shows that the water now has more heat energy stored inside it.

Question 3

Can you guess how much energy, in joules, might be needed to raise the temperature of ***two*** kilograms of iron by 1°C?

Question 6

Water is used to fill hot water bottles for warming beds. A hot block of concrete wrapped in a cloth can also be used. Why are these two materials the best for warming something up?

Clue D

Different substances behave differently when heated.
It takes 4200 joules of heat energy to raise the temperature of 1kg of water by one degree; but it only takes 450 joules to raise the temperature of 1kg of iron by one degree.

Question 4

Can you guess how much energy, in joules, might be needed to raise the temperature of 1kg of iron by ***two*** degrees?

Clue B

Some substances need a lot of energy to warm them up, while others don't need so much.

Question 5

What is the specific heat capacity of polystyrene (careful with the units) ?

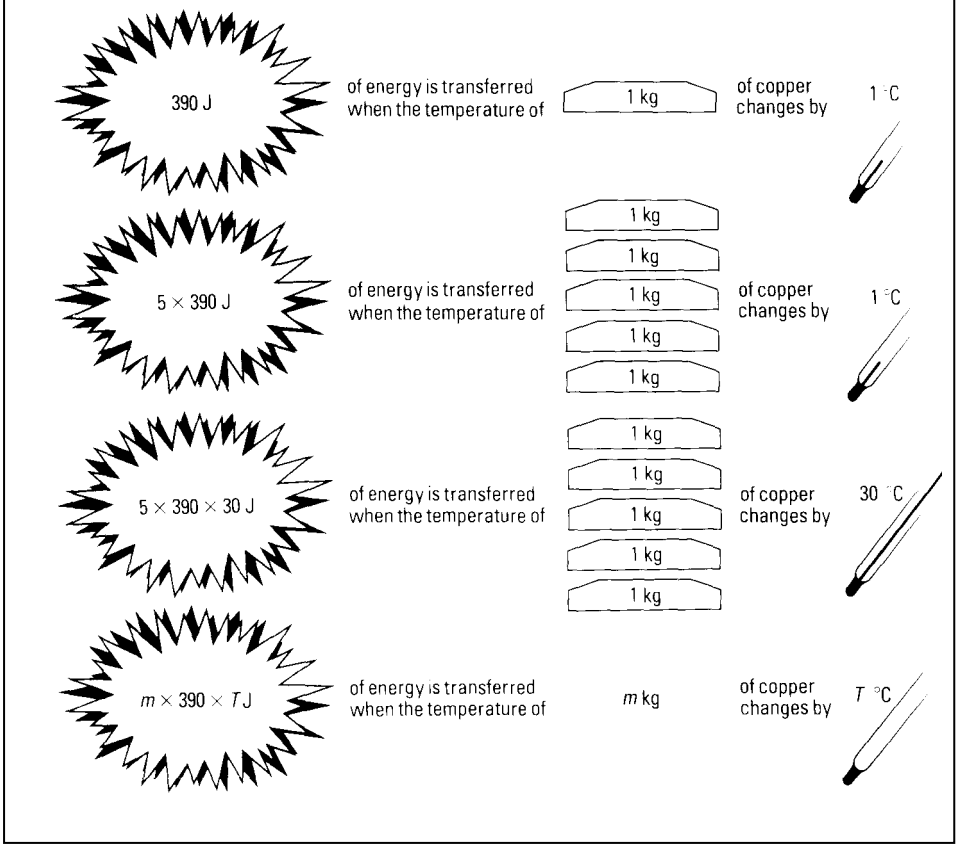
Question 1

In terms of energy transfer, how is a *rise* in temperature different from a *drop* in temperature?

Question 2

Can you name a substance that needs a lot of energy to raise its temperature?

Clue E



Clue F

Surprise surprise, all of this can be summed up by a neat little formula. It goes like this:

Energy transferred = m × c × T

where
m = mass of object
T = *change* in temperature of object
c is called *specific heat capacity* (the amount of energy needed to change the temperature of 1kg of substance by one degree)

Question 9

You can look up heat capacities of different materials in a data book. But someone had to measure these heat capacities at some time.

If you had an immersion heater which put out heat at a known rate (in watts), how could you use it to find out the specific heat capacity of water?

Include in your answer: a diagram, brief method, and an explanation of what data you would collect and how you would present and use it.

Question 7

How much energy would be needed to raise the temperature of a 5kg block of concrete by 10°C?

Question 8

Write brief notes on what specific heat capacity means, including the formula and some sentences to explain it.