

HEAT FORMULA

Name _____

Part A: Introducing the Heat Formula

$$Q = mC\Delta T \quad \text{or} \quad Q = mC(T_f - T_i)$$

Symbol	Quantity	SI Unit
Q	Heat energy transferred	Joules (J)
m	mass	kilograms (kg)
C	Specific Heat of substance	$\frac{J}{kg \text{ } ^\circ C}$
ΔT	Change in temperature	Kelvin (K) or Degrees Celsius ($^\circ C$)
T_f	Final Temperature	K or $^\circ C$
T_i	Initial Temperature	K or $^\circ C$

Material	Specific Heat ($\frac{J}{kg \text{ } ^\circ C}$)
water	4,184
oil	1900
wood	1800
aluminum	900
concrete	880
glass	800
steel	470
silver	235
gold	129

A.1. I have 2 kg of *water*. I heat it from 20 $^\circ C$ to 30 $^\circ C$.

How much heat energy does the water absorb?

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

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A.2. How much heat energy does it take to heat a 0.5 kg aluminum can from 20°C to 200°C ?

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

A.3.How much energy does it take to heat 0.5 kg water from its melting point (0°C) to its boiling point (100°C)?

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

A.4. How much energy does it take to heat 2000 kg of steel from 20°C to 800°C ?

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

A.5. How much energy does it take to heat 3 kg of glass up by 4 degrees?

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

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A.6. How much energy does it take to heat a 0.05 kg silver ring up by 40 degrees?

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

A.7. How much energy do I need to remove to *cool* 3 kg of water from 50°C down to 37°C?

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

8. A 0.5-kilogram piece of aluminum increases its temperature 7°C when heat energy is added. How much heat energy produced this change in temperature?

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

9. A volume of water has a mass of 0.5 kilogram. If the temperature of this amount of water was raised by 7°C, how much heat energy is produced?

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

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10. How much heat energy is required to raise the temperature of 1 kilogram of steel by 10°C?

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

11. How much heat energy is needed to raise the temperature of 100-liters of water from 10°C to 25°C? Note: One liter of water has a mass of one kilogram.

Looking For	Formula	
Already Know		
Answer as equation <i>with unit</i> :		

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Answers

Answers

1. 83680 J

2. 81000 J

3. 209200 J

4. 7.3×10^8 J

5. 9600 J

6. 470 J

7. - 163176 J

15. 12 kg

16. 4,800 J [not right!]

17. about 22°C

18. about 1°C

19. approximately 33°C