

## **Heating Curve For Water Worksheet**

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## Part 1: Foundational Knowledge

What is the melting point of water?
Hint: Think about the temperature at which ice turns to liquid.
<ul><li> -10°C</li><li> 0°C</li><li> 50°C</li><li> 100°C</li></ul>
What is the melting point of water?
Hint: Consider the temperature at which ice turns to liquid.  ○ -10°C  ○ 0°C  ○ 50°C  ○ 100°C
Which of the following are phase transitions that occur at 0°C for water? (Select all that apply)
Hint: Consider the processes that involve changing states at this temperature.
<ul><li></li></ul>
Which of the following are phase transitions that occur at 0°C for water? (Select all that apply)
Hint: Think about the changes that happen at the freezing/melting point.  Melting



<ul><li>□ Boiling</li><li>□ Freezing</li><li>□ Condensation</li></ul>
Explain what happens to the temperature of water during the melting process.
Hint: Consider the energy changes and molecular behavior.
Explain what happens to the temperature of water during the melting process.
Hint: Consider the energy input and molecular behavior.
List the three phases of water and provide the temperature range for each phase.
Hint: Think about the states of matter and their typical temperature ranges.
1. Solid phase
2. Liquid phase
3. Gas phase

What is the latent heat of vaporization associated with?
Hint: Consider the processes that involve changing from liquid to gas.
○ Melting
○ Freezing
<ul><li>Boiling</li><li>Condensation</li></ul>
- Condensation
What is the latent heat of vaporization associated with?
Hint: Consider the processes of changing from liquid to gas.
○ Melting
○ Freezing
<ul><li>Boiling</li><li>Condensation</li></ul>
Condensation
Part 2: Understanding Concepts
Which statements are true about the heating curve of water? (Select all that apply)
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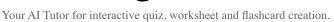
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Describe how the specific heat capacity of water affects its temperature change when heated.

Hint: Consider the amount of energy required to change the temperature.



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Describe how the specific heat capacity of water affects its temperature change when heated.	
Hint: Think about the relationship between heat energy and temperature.	
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Dout 2. Applying Knowledge	
Part 3: Applying Knowledge	
If you have a block of ice at -5°C, what must happen for it to become steam?	
Hint: Think about the steps involved in changing from solid to gas.	
◯ It must be heated to 0°C and then to 100°C.	
○ It must be heated to 0°C, melt, and then heated to 100°C.	
○ It must be heated directly to 100°C.	
○ It must be cooled to -10°C first.	
If you have a block of ice at -5°C, what must happen for it to become steam?	
Hint: Consider the steps involved in heating ice to steam.	
○ It must be heated to 0°C and then to 100°C.	
It must be heated to 0°C, melt, and then heated to 100°C.	
<ul> <li>○ It must be heated directly to 100°C.</li> <li>○ It must be cooled to -10°C first</li> </ul>	





In a laboratory experiment, a student heats water from 20°C to 120°C. Which phase transitions occur? (Select all that apply)
Hint: Consider the temperature ranges for phase changes.
☐ Boiling
☐ Freezing
Condensation
In a laboratory experiment, a student heats water from 20°C to 120°C. Which phase transitions occur? (Select all that apply)
Hint: Think about the temperature ranges for each phase.
☐ Boiling
☐ Freezing
Condensation
Given a scenario where you need to melt 100 grams of ice at 0°C, calculate the energy required using the latent heat of fusion.
Hint: Use the formula $Q = mL$ , where $Q$ is the heat energy, $m$ is the mass, and $L$ is the latent heat of fusion.

Given a scenario where you need to melt 100 grams of ice at 0°C, calculate the energy required using the latent heat of fusion.

Hint: Consider the formula for calculating energy based on mass and latent heat.

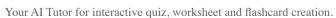


Part 4: Analyzing Relationships
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Which part of the heating curve represents the greatest energy change without a temperature increase?
Hint: Consider the phases where energy is absorbed or released.
○ Melting
○ Boiling
Heating solid
○ Heating liquid
Which part of the heating curve represents the greatest energy change without a temperature increase?
Hint: Think about the phase changes that involve energy absorption.
○ Melting
O Boiling
O Heating solid
Heating liquid
Analyze the heating curve of water. Which of the following are true about the energy changes during phase transitions? (Select all that apply)
Hint: Think about the energy dynamics during melting and boiling.
☐ Energy is absorbed during melting.
☐ Energy is released during boiling.
☐ Energy is absorbed during vaporization.
☐ Energy is released during freezing.

Analyze the heating curve of water. Which of the following are true about the energy changes during phase transitions? (Select all that apply)



Hint: Consider the energy dynamics during melting and freezing.
☐ Energy is absorbed during melting.
☐ Energy is released during boiling.
☐ Energy is absorbed during vaporization.
☐ Energy is released during freezing.
Explain the relationship between the heating curve of water and the concept of latent heat.
Hint: Consider how latent heat is involved in phase changes.
Explain the relationship between the heating curve of water and the concept of latent heat.
Hint: Think about how latent heat is represented in the heating curve.
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Part 5: Synthesis and Reflection
Which scenario would require more energy: melting 100 grams of ice or boiling 100 grams of water? Assume both start at their respective phase change temperatures.
Hint: Consider the energy required for each phase change.
○ Melting 100 grams of ice
O Boiling 100 grams of water
O Both require the same energy
○ Cannot be determined





Assume both start at their respective phase change temperatures. Hint: Consider the energy required for each phase change. O Melting 100 grams of ice O Boiling 100 grams of water O Both require the same energy Ocan't be determined Evaluate the following statements and select those that accurately describe the heating curve for water. (Select all that apply) Hint: Consider the characteristics of the heating curve. ☐ The curve is linear throughout. ☐ The curve has two plateaus. The temperature increases uniformly. The curve reflects both temperature and energy changes. Evaluate the following statements and select those that accurately describe the heating curve for water. (Select all that apply) Hint: Consider the characteristics of the heating curve. The curve is linear throughout. The curve has two plateaus. The temperature increases uniformly. The curve reflects both temperature and energy changes. Design an experiment to measure the specific heat capacity of water using the heating curve. Describe the materials, procedure, and expected results. Hint: Think about the setup needed to accurately measure temperature changes.

Which scenario would require more energy: melting 100 grams of ice or boiling 100 grams of water?



Design an experiment to measure the specific heat capacity of water using the heating curve. Describe the materials, procedure, and expected results.	
lint: Think about the steps involved in measuring specific heat capacity.	
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