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Name _____ Unit 3: Phases of Matter/Heat

LESSON 3.1: WHAT IS HEAT?

NOTES (include formulas & address each sub-topic)

Heat

Heat vs. Temperature

Temperature

Types/Forms of Energy

Law of Conservation of Energy

Converting between Heat units

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NOTES FROM VIDEOS SHOWN

Space to complete/write notes for "I Do" and "You Do" Questions (show work)

I DO

1. 5.0 cal = _____ J
2. 25 J = _____ cal
3. 600 cal = _____ KJ
4. 3.50 KJ = _____ cal
5. 218 kcal = _____ KJ

YOU DO

1. 918 KJ= _____ cal
2. 25.9 J = _____ Kcal
3. 45.0 Kcal = _____ KJ
4. 1,450 J = _____ cal

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LESSON 3.2: ENERGY CHANGES DURING REACTIONS

NOTES (include formulas & address each sub-topic)

Exothermic Reactions

Examples:

Endothermic Reactions

Examples:

Table I:

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NOTES FROM VIDEOS SHOWN

Table I Examples & EXPLANATIONS:

When C_2H_4 is formed, is heat released or absorbed?

$$2C(s) + 2H_2(g) \longrightarrow C_2H_4(g) \qquad +52.4$$

When C_2H_4 is broken down, is heat released or absorbed?

$$2C(s) + 2H_2(g) \longrightarrow C_2H_4(g) \qquad +52.4$$

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LESSON 3.3: CALCULATING HEAT

NOTES (include formulas & address each sub-topic)

Calculating Heat of Reactions and Q

Specific Heat (and Specific Heat of Water)

Calculating Heat (formula/variables explained)

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NOTES FROM VIDEOS SHOWN

Space to complete/write notes for "I Do" and "You Do" Questions (show work)

I DO (write out steps)

How much heat is needed to raise the temperature of 500. g of water by 15°C?

YOU DO #1

How many joules of heat are absorbed when 50.0 g of water are heated from 30.2°C to 58.6° C?

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YOU DO #2

The initial temperature of 150 g of water was 22C. What will the final temperature be of the water if 3240 J was needed to raise the temperature of the water?

SELF-GUIDED PRACTICE

SEE GOOGLE SLIDE #s 54 & 55 FOR

Question	
1. The temperature of a piece of Metal X with a mass of 95.4g increases from 25.0°C to 48.0°C as the metal absorbs 849 J of heat. What is the specific heat of Metal X?	***Answer:***
2. When 435 J of heat is added to 3.4 g of olive oil at 21°C, the temperature increases to 85°C. What is the specific heat of the olive oil?	***Answer:***
3. A piece of stainless steel with a mass of 1.55 g absorbs 141 J of heat when its temperature increases by 178°C. What is the specific heat of the stainless steel?	***Answer:***
4. How much heat is required to raise the temperature of 250.0 g of mercury by 52°C?	***Answer:***
6. How many kilojoules of heat are absorbed when 1.00 L of water is heated from 18°C to 85°C? *(Hint: You first need to determine the mass of the water, then calculate q in the requested unit.)*	***Answer:***
7. A piece of aluminum with a mass of 100.0 g has a temperature of 20.0°C. It absorbs 1100 J of heat energy. What is the final temperature of the metal?	***Answer:***
8. An unknown metal has a mass of 18.0 g. If the temperature of the metal sample rises from 15.0°C to 40.0°C as the sample absorbs 89.0 J of heat, what is the specific heat of the sample? Now look at your periodic table and choose a metal that is most likely the identity of the sample.	***Answer:***

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LESSON 3.4: PHASE CHANGES AND HEAT

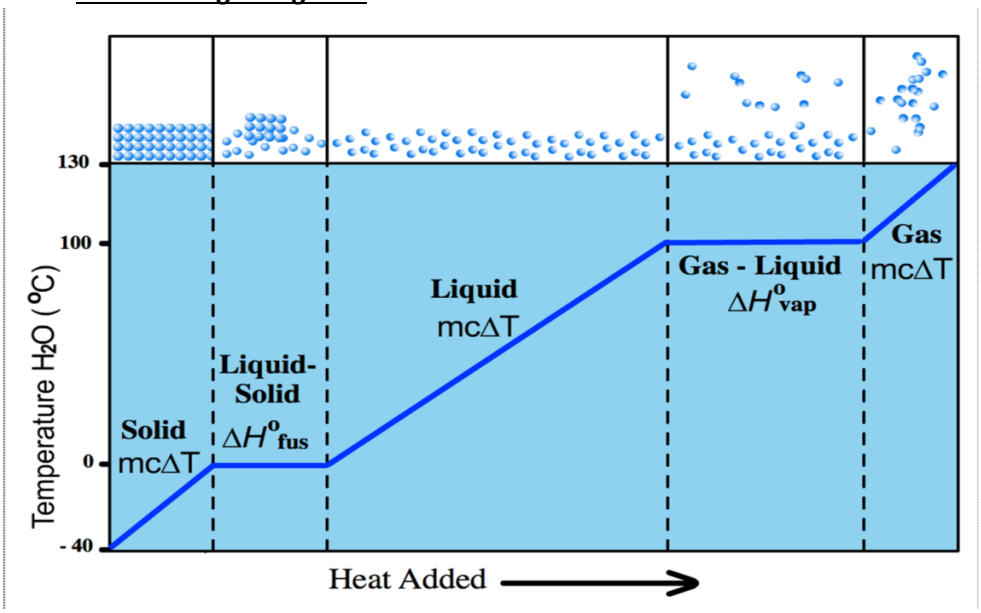
NOTES (include formulas & address each sub-topic)

Solids, Liquids, and Gases

IMFs

Phase Changes/Exothermic & Endothermic

Phase Change Diagrams



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LESSON 3.5: CALCULATING HEAT OF PHASE CHANGES

NOTES (include formulas & address each sub-topic)

Heat vs. Temperature & Heat Equation Review

When to use Heat Equation

Heat of Fusion

Heat of Vaporization

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Space to complete/write notes for "I Do" and "You Do" Questions (show work)

I DO (H_f)

(1) How many joules does it take to melt a 16 gram sample of water at 0°C?

YOU DO (H_f)

FORMULA:

1. How much energy is required to melt 10.g of ice at its melting point?

2. How much energy is released when 20. g of water is frozen at 0°C?

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Space to complete/write notes for "I Do" and "You Do" Questions (show work)

I DO (H_v)

(2) How many joules does it take to boil a 250 gram sample of water at 100°C?

YOU DO (H_v)

FORMULA:

1. How much energy is required to vaporize 10.g of water at its boiling point?

2. How much energy is released when 20. g of steam is condensed at 100°C?

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WHAT TO LOOK FOR WHEN SOLVING HEAT EQUATIONS CHART:

Effects of IMFs on Hf & Hv

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LESSON 3.6: HEATING & COOLING CURVES

NOTES (include formulas & address each sub-topic)

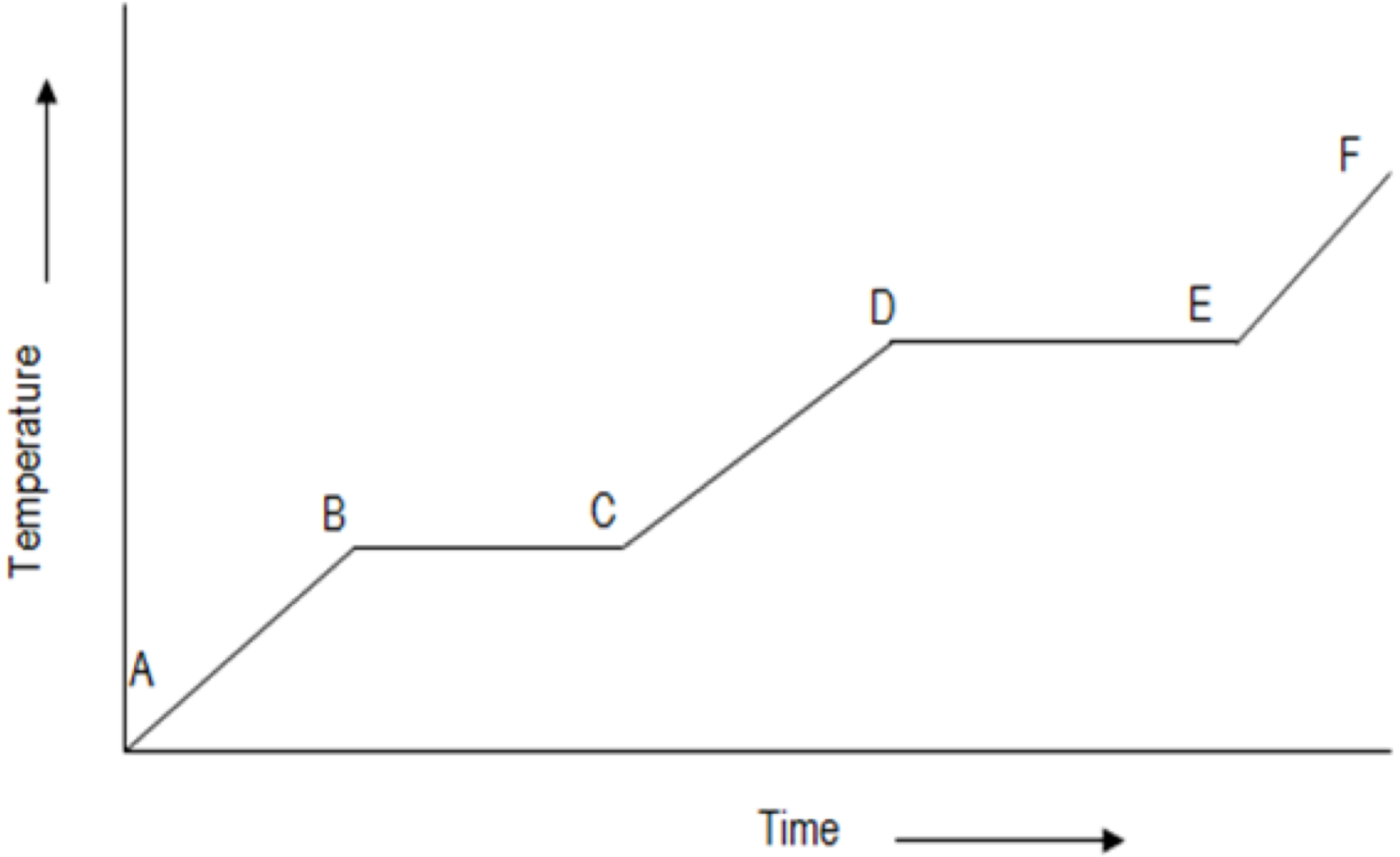
LABEL BOTH HEATING AND COOLING CURVE DIAGRAMS ON NEXT TWO PAGES

Heating Curve Notes:

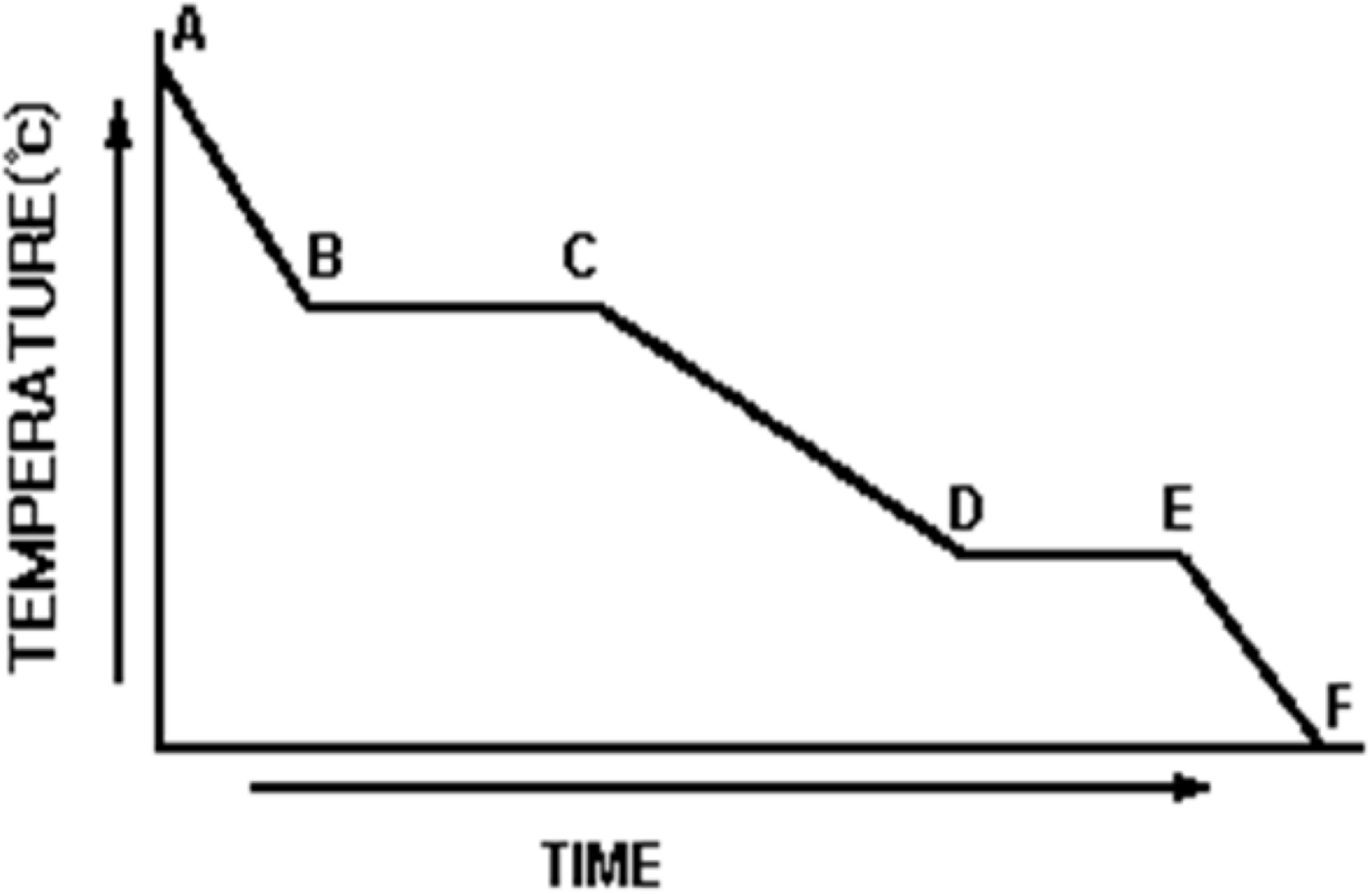
Cooling Curve Notes:

Remember the 3 Ps:

HEATING CURVE



COOLING CURVE



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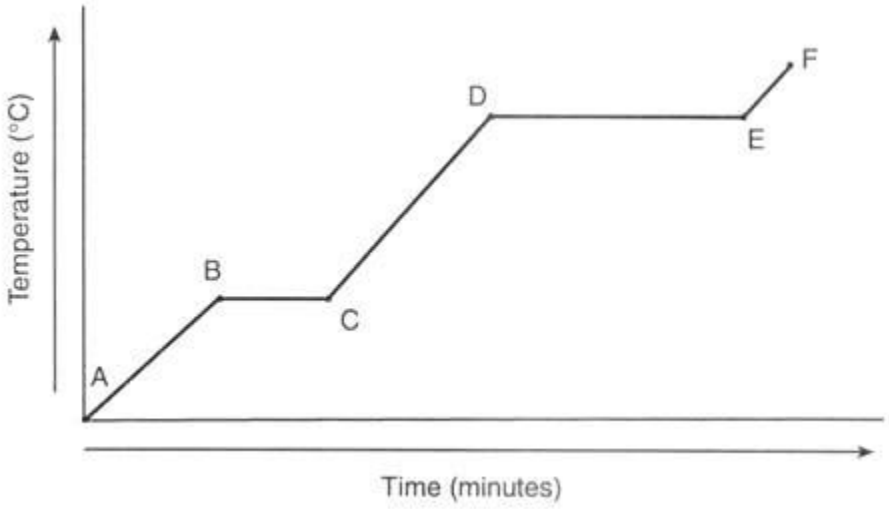
YOU DO: REGENTS PRACTICE



1. Identify the process that takes place during line segment DE of the heating curve.

2. Identify a line segment in which the average kinetic energy is increasing.

3. Using "o" to represent particles of substance X, draw at least five particles as they would appear in the substance at point F.

4. Describe, in terms of particle behavior or energy, what is happening to substance X during line segment BC.

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LESSON 3.7: VAPOR PRESSURE & TABLE H

NOTES (include formulas & address each sub-topic)

Evaporation

Vapor Pressure

Volatility

Normal Boiling Point

IMFs & Vapor Pressure

Vapor Pressure Lowering

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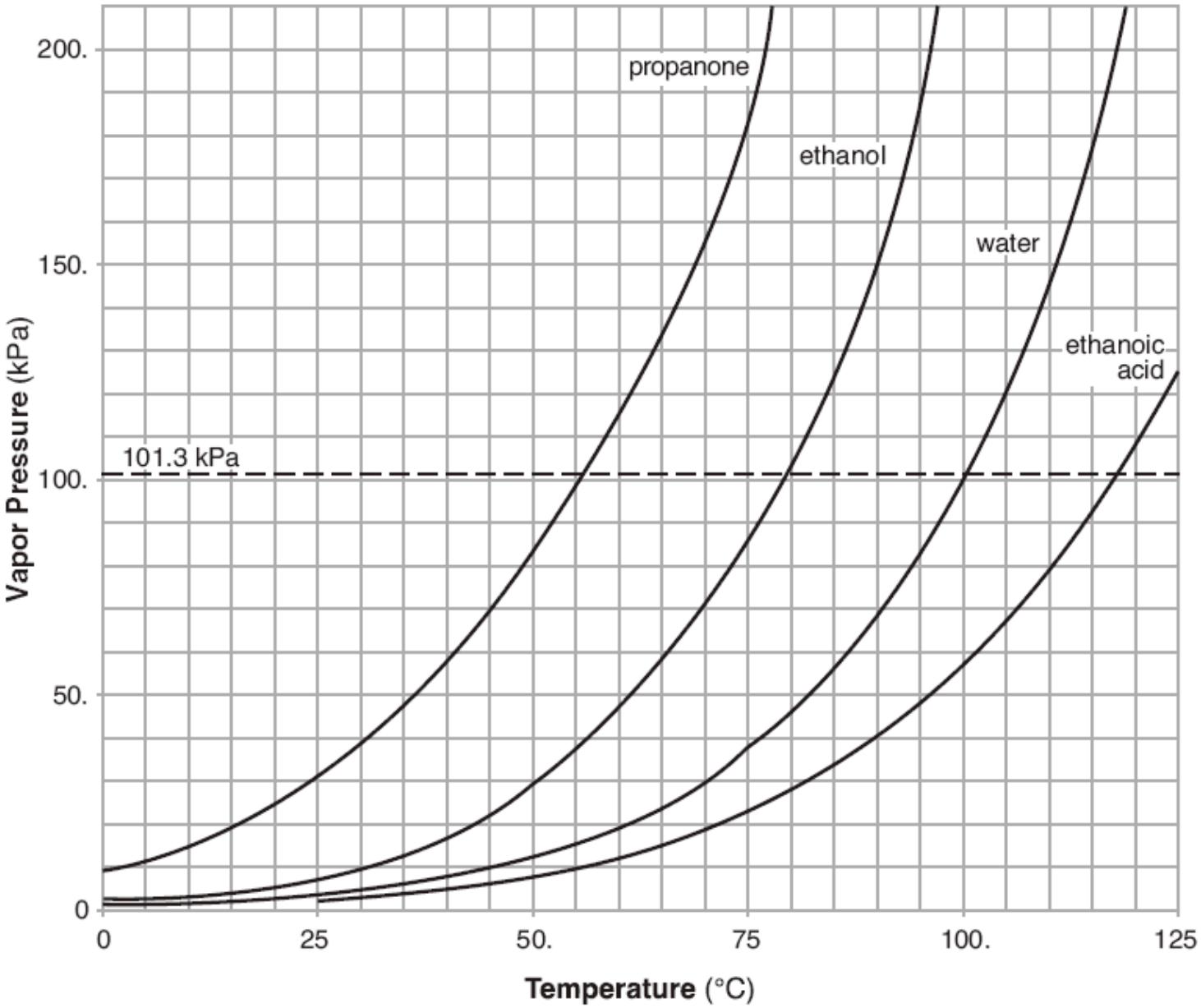
COPY OF REFERENCE TABLE H (to take notes on)



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Space to complete/write notes for "I Do" and "You Do" Questions (show work)

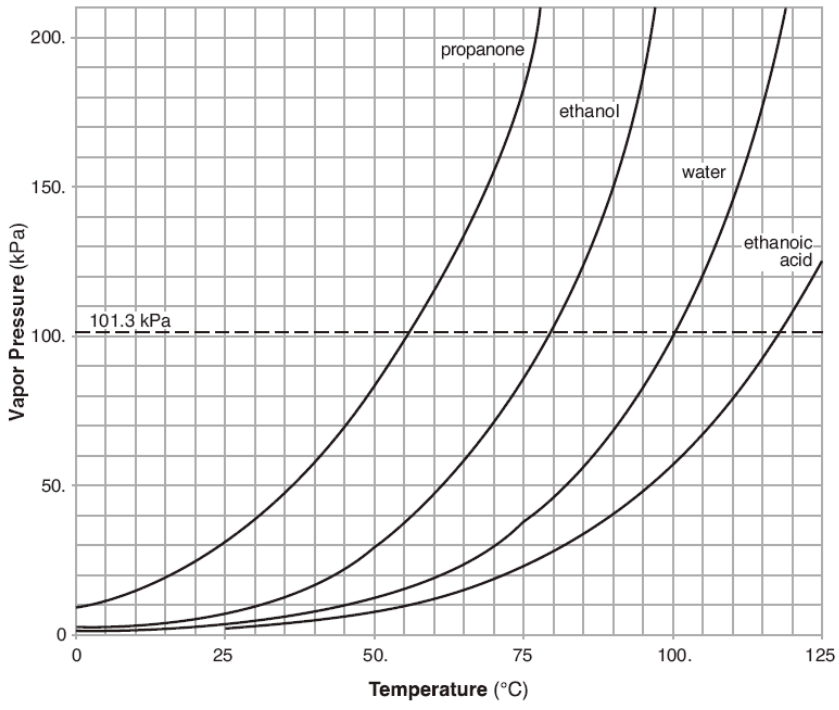
I DO

1. What is the boiling point of water when the atmospheric pressure exerted on the water is 81 kPa?

2. What is the normal boiling point of ethanoic acid?

3. Which substance has the lowest Vapor pressure at 75°C?

4. As the temperature of a liquid increases, its vapor pressure?



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YOU DO

1. According to Table H, what is the vapor pressure of propanone at 50.°C?

2. According to Table H, what is the boiling point of ethanoic acid at 80 kPa?

3. A sample of a pure liquid is boiling in an open vessel at a temperature of 150°C. The atmospheric pressure is 65 kPa. What is the Vapor Pressure of the liquid?