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Voyage to Venus (and Phase Change Practice!)

Before we get into today's task, let's review a bit! Phase changes are **physical** changes, meaning when they occur, the chemical composition of the substance does **NOT** change. **YES**, the substance may LOOK different after a phase change. However, the substance is still what it was! When ice (water) melts... it is still water, it just has a different appearance and different amount of energy within the particles.

Your Mission:

During a mission to the planet Venus, a young chemist named Misty, hailing from Cerulean City, obtained a sample of an unfamiliar solid substance on the planet's violent surface. Through analysis, she has determined that it is not a compound (group of two or more elements bonded) but is a single element that does not seem to fit into the parameters of Earth's periodic table of elements. To determine if it was similar to elements on Earth in terms of states of matter and phase changes, the following data was collected by heating the substance using a direct heat source:

Time (minutes)	Temperature (°C)	Time (minutes)	Temperature (°C)
0	5	11	40
1	10	12	45
2	15	13	50
3	20	14	50
4	25	15	50
5	25	16	50
6	25	17	50
7	25	18	55
8	25	19	60
9	30	20	65
10	35	21	70

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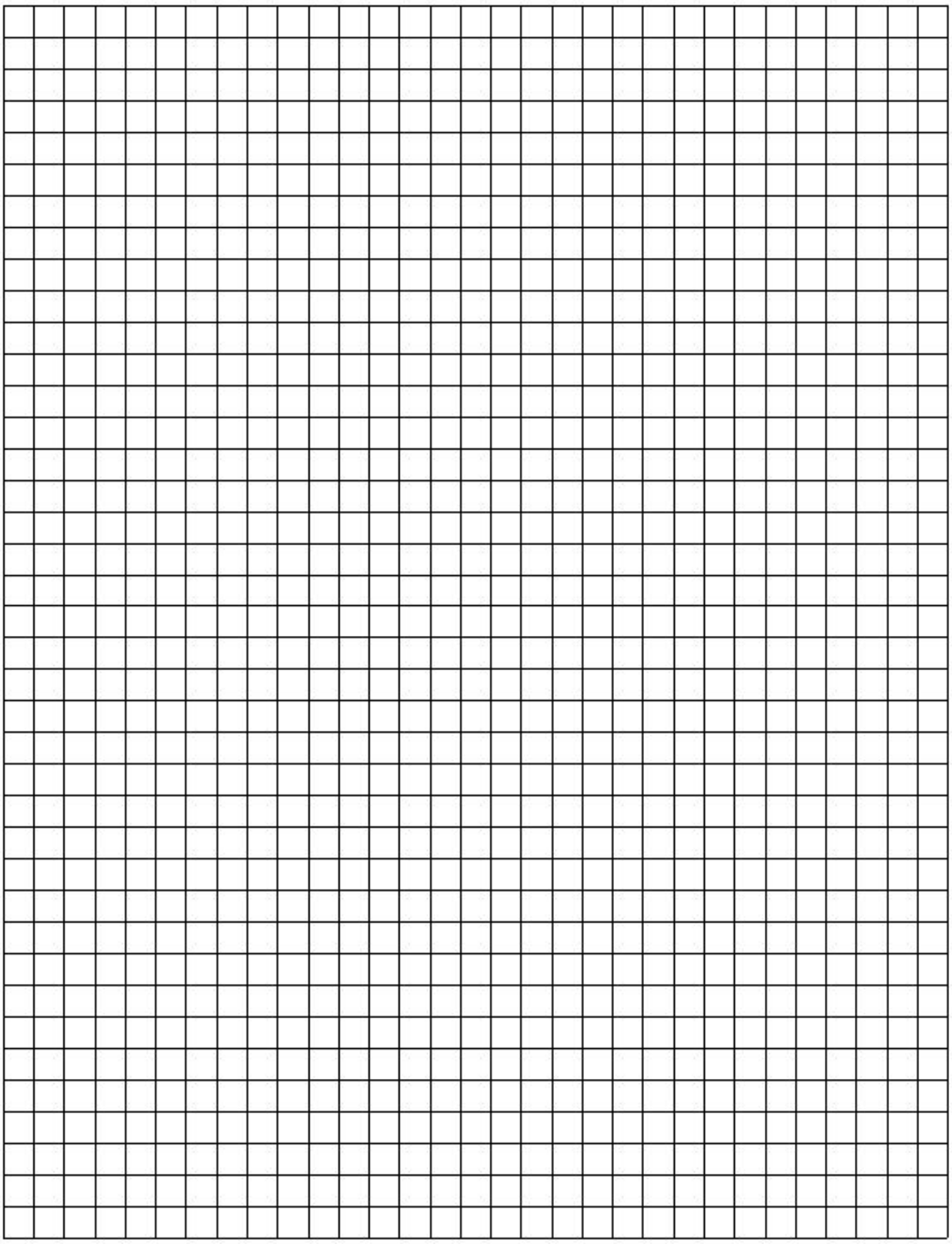

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Analysis:

1. Graph the data on the graph paper provided. Label the following on the graph

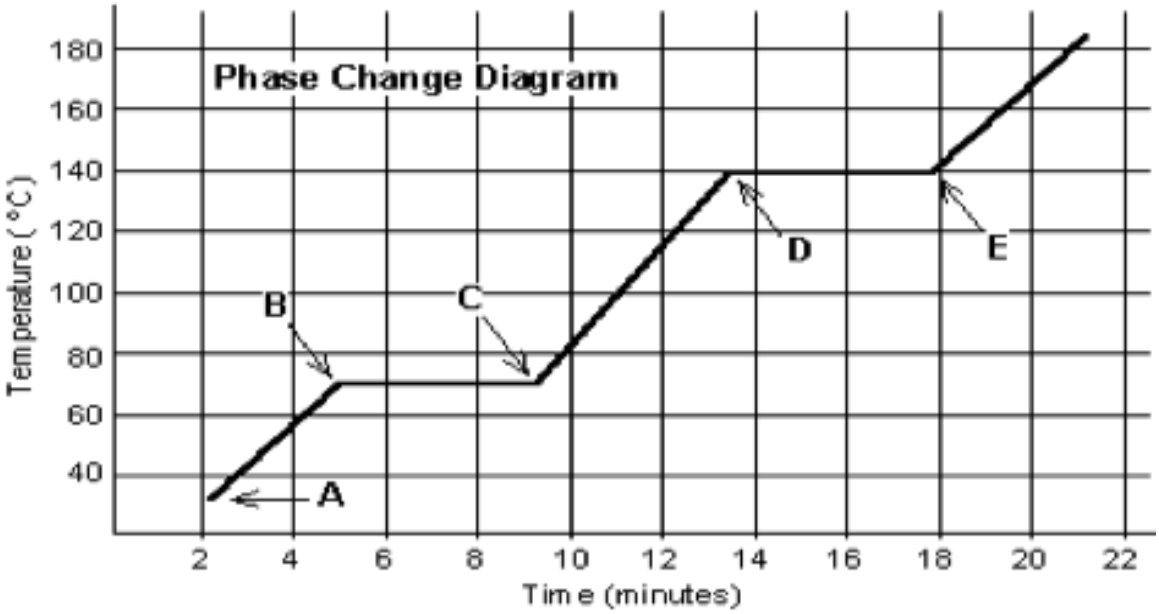
Solid	Freezing	Condensing
Liquid	Melting	Subliming
Gas	Evaporating	Depositing

2. When a substance is **melting**, is the temperature of the substance increasing, decreasing, or staying the same? BE CAREFUL! Look at your graph! _____

Name your new element from Venus :-) _____

Practice:

Use the graph below and the word bank to complete the following paragraphs. Words can be used once, more than once, or not at all!



Solid	Energy	Freeze	Shape	
Liquid	Temperature	Melt	Color	Low
Gas	Rapidly	Evaporating	Condensing	

At **point A**, the beginning of observations, the substance exists in a **solid** state. Material in this phase has definite volume and definite shape. With each passing minute, _____ is added to the substance. This causes the molecules of the substance to move more rapidly which we detect by a rise in _____ in the substance. At **point B**, the temperature of the substance is _____°C. If we are increasing the temperature, then at point B, the substance begins to _____. At **point C**,

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the substance is now in the _____ state of matter. Material in this phase generally takes on the _____ of the container it is found in. The energy put into the substance between minutes 5 and 9 was used to begin breaking the intermolecular forces (forces holding particles close together) and convert the substance from a _____ to a _____.

Between 9 and 13 minutes, the added energy increases the _____ of the substance. During the time from **point D to point E**, the substance is _____. By **point E**, the substance is completely in the _____ phase of matter. Materials in this phase have relatively _____ densities and their particles move around _____. The energy put to the substance between minutes 13 and 18 converted the substance from a _____ to a _____ state of matter. Beyond **point E**, the substance is still in the _____ phase, but the molecules are moving more _____ as indicated by the increasing temperature.

Substance	Melting point	Boiling point
Gilsdorfium	20 °C	100 °C
Nymanium	40 °C	140 °C
Ridgeium	70 °C	140 °C

*Which of these three substances was likely used in the phase change diagram from the previous page?

_____

Label on the graph HOW YOU KNOW!

Complete the following concept map to practice phase change vocabulary!