

Name

Pd

Date

H₂X Lab

Review:

Molecules are separate distinct particles. Ionic crystals are one large crystal lattice all connected due to electromagnetic forces (Opposites Attract).

Define: Formula mass (2pts)

Task 1: Particle Modeling (6 pts)

In the boxes below draw a particle diagram for the species listed:

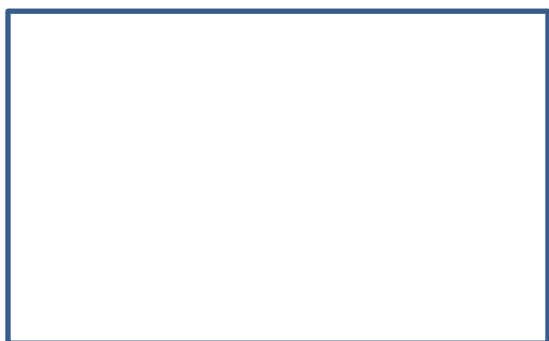
Use these shapes to represent: Atoms -



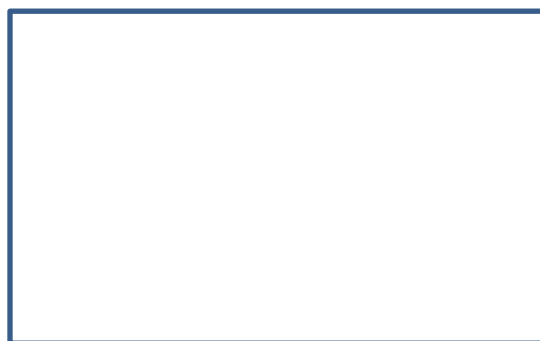
Ions-  or



9 Molecules of H_{2(g)}



1 crystal of NaCl_(s) consisting of at least 9 ions



Explain why you drew what you did in each box. _____

Task 2: Data Table 1 (12 pts)

Fill in the information for the following compounds:

| Formula | Name | Electron Dot Diagram | Formula mass (μ) | Boiling Point (K) |
|-------------------|------|----------------------|------------------------|-------------------|
| H ₂ Te | | | | |
| H ₂ S | | | | |
| H ₂ Se | | | | |

Name

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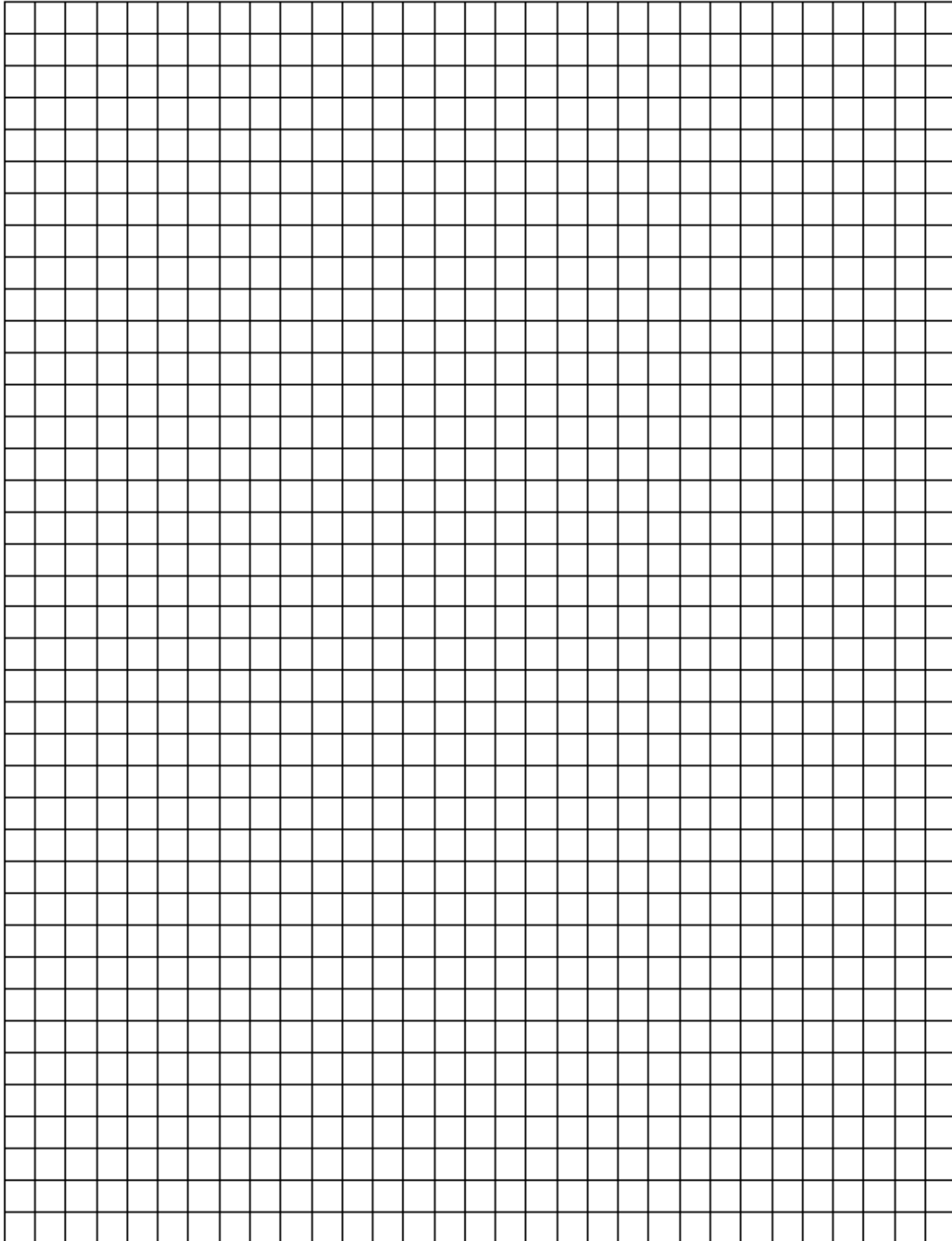
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Task 3: Graphical Representation (10 pts)

On graph paper construct a graph to show the relationship between each compounds boiling point and its formula mass by following the directions below.

- a) Label the y-axis "Boiling Point" and label the x-axis "Formula Mass". For each chose the appropriate scale and units. Start at 0 Kelvin
- b) Plot the data from Data Table 1 and connect the points with straight lines.



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Task 4: New Discovery

- a) Element A has been discovered but it has not been named yet. It contains 6 valence electrons and has an atomic mass of 209 μ .

Using the information above fill in the first row of **Data Table 2**

Data Table 2 (20 pts)

| Formula when combined with hydrogen | Name (Assume it is a covalent compound) | Electron Dot Diagram | Formula mass (μ) | Boiling Point (K) |
|-------------------------------------|--|----------------------|------------------------|-------------------|
| | | | | |
| | | | | |

- b) Element X has been discovered but it has not been named yet. It contains 6 valence electrons and has an atomic mass of 16 μ .

Using the information above fill in the second row of **Data Table 2**

DO NOT continue onto the next page until you have complete the graph in Task 3 and made your predictions in Data Table 2.

H₂X Lab**H₂X Lab Continuation (2 pts each)**

1. After plotting the data from **Table 1**, State the relationship shown between formula mass and boiling point.
2. Using the formula mass you filled in for data **Table 2**, use your graph to predict the boiling point of H₂A and H₂X. (predict by extending the lines of your graph.) Write the **Boiling Points** for both below. (Remember to put units.)

H₂A: _____H₂X: _____

3. Experiment: Determine the boiling point of H₂X from the sample given to you in class.

Results: Experimental: _____ °C

Converted to: _____ K

4. Was the predicted boiling point of H₂X from your **graph** the same as the experimental value determined **from the lab**? Compare the two values.

5. What is the actual identity of H₂X? What evidence led you to your conclusion?

6. What is the accepted value for the boiling point of H₂X? Cite source and use correct units.

7. What is the actual identity of H₂A? What evidence led you to your conclusion?

8. What is the accepted value for the boiling point of H₂A? Cite source and use correct units.

9. Fill in the remaining information on **Table 2**.

10. Determine the percent error for the following values (compared with accepted values) **Show all work:**

Predicted Boiling Point of H₂XPredicted Boiling Point of H₂AExperimental Boiling Point of H₂X

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H₂X Lab

11. What accounts for the unusually high boiling point of H₂O? (Why is the boiling point higher than predicted?)

12. Of the other four compounds (H₂S, H₂Se, H₂Te, H₂Po, which has the highest boiling point?

13. Put the 5 compounds in order of increasing **boiling points**.

14. Put the 5 compounds in order of increasing **Intermolecular Forces**.

Write a conclusion for this aim: **(20 pts)**

Aim: To put five compounds in order of increasing intermolecular forces. (To score points on new learning, you must explain the reason they are in the order you selected. Refer to the previous questions and your notes packet for help!!)