Names Class Date

**Operation: Periodic Table**

**Mission Directive**

You have been given data on 24 mystery elements. Your team’s mission is to arrange these elements in a table according to their chemical and physical properties. The goal is to display as many patterns among the properties as possible. Use the following guidelines to help you accomplish your mission:

1. Tables typically contain vertical columns and horizontal rows. This format is recommended but not required.
2. First, sort the elements into groups according to similar *chemical* properties (hydride, oxide, chloride). Make each group as specific as possible. Try a few different methods and choose the one that works best.
3. Within each of your groups, arrange the elements in some logical order according to at least one *physical* property. Try to develop a pattern that incorporates as many properties as possible. Also, try to incorporate both horizontal and vertical patterns into your layout.
4. Once you have finalized the layout of your table, glue it to a piece of poster paper. In the space below, write a brief, but *specific*, description of how your table is organized. Make sure your names are on both papers. You may decorate your table if time allows.

**Periodic Table Description**

|  |  |  |  |
| --- | --- | --- | --- |
| **A**  Black crystalline solid  Melting point = 3652°C  Boiling point = 4200°C  Ionization energy = 1088 kJ/mol  Hydride = AH4  Oxide = AO2, AO  Chloride = ACl4 | **B**  Colorless gas  Melting point = -233°C  Boiling point = -188°C  Ionization energy = 1682 kJ/mol  Hydride = BH  Oxide = B2O  Chloride = BCl | **C**  Black crystalline solid  Melting point = 114°C  Boiling point = 184°C  Ionization energy = 1031 kJ/mol  Hydride = CH  Oxide = C2O  Chloride = CCl | **D**  Silver-white, soft metallic solid  Melting point = 186°C  Boiling point = 1336°C  Ionization energy = 519 kJ/mol  Hydride = DH  Oxide = D2O  Chloride = DCl |
| **E**  Colorless gas  Melting point = -272°C  Boiling point = -268°C  Ionization energy = 2372 kJ/mol  Hydride = none  Oxide = none  Chloride = none | **F**  Silver-white, soft metallic solid  Melting point = 28°C  Boiling point = 670°C  Ionization energy = 375 kJ/mol  Hydride = FH  Oxide = F2O  Chloride = FCl | **G**  Colorless gas  Melting point = -112°C  Boiling point = -107°C  Ionization energy = 1170 kJ/mol  Hydride = none  Oxide = GO2 (unstable)  Chloride = GCl4 (unstable) | **I**  Gray crystalline solid  Melting point = 1420°C  Boiling point = 2355°C  Ionization energy = 787 kJ/mol  Hydride = IH4  Oxide = IO2  Chloride = ICl4 |
| **J**  Silver-white, soft metallic solid  Melting point = 842°C  Boiling point = 1240°C  Ionization energy = 590 kJ/mol  Hydride = JH2  Oxide = JO  Chloride = JCl2 | **K**  Colorless gas  Melting point = -249°C  Boiling point = -246°C  Ionization energy = 2080 kJ/mol  Hydride = none  Oxide = none  Chloride = none | **L**  Silver-gray, soft metallic solid  Melting point = 1280°C  Boiling point = 2970°C  Ionization energy = 898 kJ/mol  Hydride = LH2  Oxide = LO  Chloride = LCl2 | **M**  Silver, soft metallic solid  Melting point = 62°C  Boiling point = 760°C  Ionization energy = 418 kJ/mol  Hydride = MH  Oxide = M2O  Chloride = MCl |

|  |  |  |  |
| --- | --- | --- | --- |
| **N**  Silver, pale yellow metallic solid  Melting point = 774°C  Boiling point = 1140°C  Ionization energy = 551 kJ/mol  Hydride = NH2  Oxide = NO  Chloride = NCl2 | **P**  Colorless gas  Melting point = -157°C  Boiling point = -153°C  Ionization energy = 1346 kJ/mol  Hydride = none  Oxide = PO2 (unstable)  Chloride = PCl4 (unstable) | **Q**  Gray-white metallic solid  Melting point = 958°C  Boiling point = 2700°C  Ionization energy = 780 kJ/mol  Hydride = QH2  Oxide = QO2, QO  Chloride = QCl2, QCl4 | **R**  Red-orange solid  Melting point = -7.2°C  Boiling point = 59°C  Ionization energy = 1148 kJ/mol  Hydride = RH  Oxide = R2O  Chloride = RCl |
| **S**  Colorless gas  Melting point = -189°C  Boiling point = -186°C  Ionization energy = 1519 kJ/mol  Hydride = none  Oxide = none  Chloride = none | **T**  Silver-white metallic solid  Melting point = 651°C  Boiling point = 1107°C  Ionization energy = 736 kJ/mol  Hydride = TH2  Oxide = TO  Chloride = TCl2 | **U**  Silver-white, soft metallic solid  Melting point = 38°C  Boiling point = 700°C  Ionization energy = 410 kJ/mol  Hydride = UH  Oxide = U2O  Chloride = UCl | **V**  Silver, pale yellow metallic solid  Melting point = 725°C  Boiling point = 1140°C  Ionization energy = 504 kJ/mol  Hydride = VH2  Oxide = VO  Chloride = VCl2 |
| **W**  Pale yellow gas  Melting point = -103°C  Boiling point = -34°C  Ionization energy = 1255 kJ/mol  Hydride = WH  Oxide = W2O  Chloride = WCl | **X**  Gray-white metallic solid  Melting point = 232°C  Boiling point = 2260°C  Ionization energy = 709 kJ/mol  Hydride = XH4  Oxide = XO2, XO  Chloride = XCl2, XCl4 | **Y**  Gray metallic solid  Melting point = 327°C  Boiling point = 1620°C  Ionization energy = 715 kJ/mol  Hydride = YH4  Oxide = Y2O, YO2  Chloride = YCl2, YCl4 | **Z**  Silver, soft metallic solid  Melting point = 97.5°C  Boiling point = 880°C  Ionization energy = 498 kJ/mol  Hydride = ZH  Oxide = Z2O  Chloride = ZCl |