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**

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| **A**Black crystalline solidMelting point = 3652°CBoiling point = 4200°CIonization energy = 1088 kJ/molHydride = AH4Oxide = AO2, AOChloride = ACl4 | **B**Colorless gasMelting point = -233°CBoiling point = -188°CIonization energy = 1682 kJ/molHydride = BHOxide = B2OChloride = BCl | **C**Black crystalline solidMelting point = 114°CBoiling point = 184°CIonization energy = 1031 kJ/molHydride = CHOxide = C2OChloride = CCl | **D**Silver-white, soft metallic solidMelting point = 186°CBoiling point = 1336°CIonization energy = 519 kJ/molHydride = DHOxide = D2OChloride = DCl |
| **E**Colorless gasMelting point = -272°CBoiling point = -268°CIonization energy = 2372 kJ/molHydride = noneOxide = noneChloride = none | **F**Silver-white, soft metallic solidMelting point = 28°CBoiling point = 670°CIonization energy = 375 kJ/molHydride = FHOxide = F2OChloride = FCl | **G**Colorless gas Melting point = -112°CBoiling point = -107°CIonization energy = 1170 kJ/molHydride = noneOxide = GO2 (unstable)Chloride = GCl4 (unstable) | **I**Gray crystalline solidMelting point = 1420°CBoiling point = 2355°CIonization energy = 787 kJ/molHydride = IH4Oxide = IO2Chloride = ICl4 |
| **J**Silver-white, soft metallic solidMelting point = 842°CBoiling point = 1240°CIonization energy = 590 kJ/molHydride = JH2Oxide = JOChloride = JCl2 | **K**Colorless gasMelting point = -249°CBoiling point = -246°CIonization energy = 2080 kJ/molHydride = noneOxide = noneChloride = none | **L**Silver-gray, soft metallic solidMelting point = 1280°CBoiling point = 2970°CIonization energy = 898 kJ/molHydride = LH2Oxide = LOChloride = LCl2 | **M**Silver, soft metallic solidMelting point = 62°CBoiling point = 760°CIonization energy = 418 kJ/molHydride = MHOxide = M2OChloride = MCl |

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| **N**Silver, pale yellow metallic solidMelting point = 774°CBoiling point = 1140°CIonization energy = 551 kJ/molHydride = NH2Oxide = NOChloride = NCl2 | **P**Colorless gasMelting point = -157°CBoiling point = -153°CIonization energy = 1346 kJ/molHydride = noneOxide = PO2 (unstable)Chloride = PCl4 (unstable) | **Q**Gray-white metallic solidMelting point = 958°CBoiling point = 2700°CIonization energy = 780 kJ/molHydride = QH2Oxide = QO2, QOChloride = QCl2, QCl4 | **R**Red-orange solidMelting point = -7.2°CBoiling point = 59°CIonization energy = 1148 kJ/molHydride = RHOxide = R2OChloride = RCl |
| **S**Colorless gasMelting point = -189°CBoiling point = -186°CIonization energy = 1519 kJ/molHydride = noneOxide = noneChloride = none | **T**Silver-white metallic solidMelting point = 651°CBoiling point = 1107°CIonization energy = 736 kJ/molHydride = TH2Oxide = TOChloride = TCl2 | **U**Silver-white, soft metallic solidMelting point = 38°CBoiling point = 700°CIonization energy = 410 kJ/molHydride = UHOxide = U2OChloride = UCl | **V**Silver, pale yellow metallic solidMelting point = 725°CBoiling point = 1140°CIonization energy = 504 kJ/molHydride = VH2Oxide = VOChloride = VCl2 |
| **W**Pale yellow gasMelting point = -103°CBoiling point = -34°CIonization energy = 1255 kJ/molHydride = WHOxide = W2OChloride = WCl | **X**Gray-white metallic solidMelting point = 232°CBoiling point = 2260°CIonization energy = 709 kJ/molHydride = XH4Oxide = XO2, XOChloride = XCl2, XCl4 | **Y**Gray metallic solidMelting point = 327°CBoiling point = 1620°CIonization energy = 715 kJ/molHydride = YH4Oxide = Y2O, YO2Chloride = YCl2, YCl4 | **Z**Silver, soft metallic solidMelting point = 97.5°CBoiling point = 880°CIonization energy = 498 kJ/molHydride = ZHOxide = Z2OChloride = ZCl |