

Title: Element Clues

1. Print out a copy of the note cards, *knowns* and *unknowns*. (they are on separate pages, after the **Results** and **Discussion** sections, so they are easy to print and cut out)
2. Cut out the *known* elements cards and arrange the *knowns* in the order they would be on the periodic table.
3. Cut out the *unknown* element cards, inspect their properties, and determine where the *unknowns* would best fit in with the trends of the other elements in each group.
Note: none of the unknowns is a repeat of a known.
4. Determine the identity of the *unknowns* and record in Data Table 3.
5. Use the Chemical Elements Handbook, Appendix A of the textbook, <http://www.webelements.com>, or other online periodic tables to find information.

Data Table 2: Descriptions of Selected Elements				
Symbol	Element name	Description	Date Discovered	Graphic (optional)
Li				
Ag				
Cu				
C				
O ₂				
He				
Ne				
Ca				
Be				
Sn				
Ne				
Br ₂				
K				
Ba				
Xe				

Data Table 3: Identification and Descriptions of *Unknowns*

#	Symbol	Element name	Description	Date Discovered	Graphic (optional)
1					
2					
3					
4					
5					
6					
7					
8					
9					

Discussion:

1. Summarize what you did.
2. Explain how you predicted the identity of the *unknown* elements.

Conclusion: none required for this activity

Extension:

List the website name and URL and provide a 2—3 sentence description for 2 additional interactive periodic table sites

The Knowns

In
Physical state.....solid
Density.....7.31 g/cm ³
Hardness.....very soft
Conductivity.....medium
Melting point.....157°C
Solubility (H ₂ O).....none
Color.....silvery white

I ₂
Physical state.....solid
Density.....4.93 g/cm ³
Hardness.....soft
Conductivity.....very poor
Melting point.....113.5°C
Solubility (H ₂ O).....negligible
Color.....bluish-black

Pb
Physical state.....(observe)
Density.....11.35 g/cm ³
Hardness.....somewhat soft
Conductivity.....poor
Melting point.....327.5°C
Solubility (H ₂ O).....none
Color.....(observe)

Ar
Physical state.....(observe)
Density.....0.00178 g/cm ³
Hardness.....none
Conductivity.....very poor
Melting point.....-189.2°C
Solubility (H ₂ O).....none
Color.....(observe)

Ga
Physical state.....solid
Density.....5.904 g/cm ³
Hardness.....soft
Conductivity.....medium
Melting point.....30°C
Solubility (H ₂ O).....none
Color.....silvery

Cs
Physical state.....solid
Density.....1.87 g/cm ³
Hardness.....soft
Conductivity.....good
Melting point.....29°C
Solubility (H ₂ O).....reacts violently
Color.....silvery white

Li
Physical state.....solid
Density.....0.534 g/cm ³
Hardness.....soft, claylike
Conductivity.....good
Melting point.....180°C
Solubility (H ₂ O).....reacts with water
Color.....silver

Ag
Physical state.....solid
Density.....10.50 g/cm ³
Hardness.....somewhat soft
Conductivity.....excellent
Melting point.....961°C
Solubility (H ₂ O).....none
Color.....silver

Cu
Physical state.....(observe)
Density.....8.96 g/cm ³
Hardness.....somewhat soft
Conductivity.....excellent
Melting point.....1083°C
Solubility (H ₂ O).....none
Color.....(observe)

C
Physical state.....(observe)
Density.....2.10 g/cm ³
Hardness.....soft yet brittle
Conductivity.....good
Melting point.....3550°C
Solubility (H ₂ O).....negligible
Color.....(observe)

Cl ₂
Physical state.....gas
Density.....0.00321 g/cm ³
Hardness.....none
Conductivity.....very poor
Melting point.....-101°C
Solubility (H ₂ O).....slight
Color.....greenish yellow

He
Physical state.....gas
Density.....0.00018 g/cm ³
Hardness.....none
Conductivity.....very poor
Melting point.....-272°C
Solubility (H ₂ O).....none
Color.....colorless

Na
Physical state.....solid
Density.....0.971 g/cm ³
Hardness.....soft, claylike
Conductivity.....good
Melting point.....98°C
Solubility (H ₂ O).....reacts rapidly
Color.....silver

Ca
Physical state.....solid
Density.....1.57 g/cm ³
Hardness.....medium
Conductivity.....good
Melting point.....845°C
Solubility (H ₂ O).....reacts
Color.....silvery white

Be
Physical state.....solid
Density.....1.85 g/cm ³
Hardness.....brittle
Conductivity.....excellent
Melting point.....1287°C
Solubility (H ₂ O).....none
Color.....gray

Sn
Physical state.....(observe)
Density.....7.31 g/cm ³
Hardness.....somewhat soft
Conductivity.....good
Melting point.....232°C
Solubility (H ₂ O).....none
Color.....(observe)

Ne
Physical state.....gas
Density.....0.00090 g/cm ³
Hardness.....none
Conductivity.....very poor
Melting point.....-249°C
Solubility (H ₂ O).....none
Color.....colorless

Br ₂
Physical state.....liquid
Density.....3.12 g/cm ³
Hardness.....none
Conductivity.....very poor
Melting point.....-7.2°C
Solubility (H ₂ O).....negligible
Color.....reddish brown

K
Physical state.....solid
Density.....0.86 g/cm ³
Hardness.....soft, claylike
Conductivity.....good
Melting point.....63°C
Solubility (H ₂ O).....reacts rapidly
Color.....silver

Ba
Physical state.....solid
Density.....3.6 g/cm ³
Hardness.....soft
Conductivity.....good
Melting point.....710°C
Solubility (H ₂ O).....reacts strongly
Color.....silvery white

Xe
Physical state.....gas
Density.....0.00585 g/cm ³
Hardness.....none
Conductivity.....very poor
Melting point.....-111.9°C
Solubility (H ₂ O).....none
Color.....colorless

The Unknowns

Unknown #1
Physical state.....solid
Density.....2.33 g/cm ³
Hardness.....brittle
Conductivity.....intermediate
Melting point.....1410°C
Solubility (H ₂ O).....none
Color.....gray

Unknown #2
Physical state.....gas
Density.....0.00170 g/cm ³
Hardness.....none
Conductivity.....very poor
Melting point.....-219.6°C
Solubility (H ₂ O).....slight
Color.....pale yellow

Unknown #3
Physical state.....solid
Density.....1.53 g/cm ³
Hardness.....soft
Conductivity.....good
Melting point.....39°C
Solubility (H ₂ O).....reacts violently
Color.....silvery white

Unknown #4
Physical state.....gas
Density.....0.00374 g/cm ³
Hardness.....none
Conductivity.....very poor
Melting point.....-156.6°C
Solubility (H ₂ O).....none
Color.....colorless

Unknown #5
Physical state.....solid
Density.....19.3 g/cm ³
Hardness.....soft
Conductivity.....excellent
Melting point.....1064°C
Solubility (H ₂ O).....none
Color.....gold

Unknown #6
Physical state.....solid
Density.....2.54 g/cm ³
Hardness.....somewhat soft
Conductivity.....good
Melting point.....769°C
Solubility (H ₂ O).....reacts rapidly
Color.....silvery white

Unknown #7
Physical state.....solid
Density.....5.32 g/cm ³
Hardness.....fairly brittle
Conductivity.....fair to poor
Melting point.....937°C
Solubility (H ₂ O).....none
Color.....gray

Unknown #8
Physical state.....solid
Density.....1.74 g/cm ³
Hardness.....medium
Conductivity.....good
Melting point.....651°C
Solubility (H ₂ O).....reacts slowly
Color.....silvery white

Unknown #9
Physical state.....solid
Density.....11.85 g/cc
Hardness.....very soft
Conductivity.....medium
Melting point.....303°C
Solubility (H ₂ O).....none
Color.....silvery white