

Date:

Name

ACT 01 ICOSAHEDRON: The Element Project

Purpose(s):

1. Primary:
  - A. To make a solid icosahedron, a polyhedron with 20 faces. Each face will have one property of a single chemical element.
2. Secondary:
  - A. The project serves as the first introduction to many of the properties of chemical elements that we'll be covering throughout the year.
  - B. To become the class expert on this one element.
  - C. To help you practice following written directions. Carefully and correctly performing laboratory experiments is essential for successful results. This requires you to follow exactly both oral and written directions. If not, not only might the experiment not work properly but, more importantly, the lab can quickly become unsafe thereby potentially injuring yourself and/or others.

Background:

Throughout the year, we will be studying similarities and differences between various chemical elements. As part of this activity, you will become the class expert on one of the 92 naturally-occurring chemical elements.

Periodic Table of the Elements

Group 1											Group 18																																																																
1 H Hydrogen 1.01											2 He Helium 4.00																																																																
Group 2												Group 17																																																															
3 Li Lithium 6.94	4 Be Beryllium 9.01											9 F Fluorine 18.99	10 Ne Neon 20.18																																																														
Group 3		Group 4		Group 5		Group 6		Group 7		Group 8		Group 9		Group 10		Group 11		Group 12		Group 13		Group 14		Group 15		Group 16																																																	
11 Na Sodium 22.99	12 Mg Magnesium 24.31	13 Al Aluminum 26.98	14 Si Silicon 28.09	15 P Phosphorus 30.97	16 S Sulfur 32.07	17 Cl Chlorine 35.45	18 Ar Argon 39.95	19 K Potassium 39.10	20 Ca Calcium 40.08	21 Sc Scandium 44.96	22 Ti Titanium 47.87	23 V Vanadium 50.94	24 Cr Chromium 52.00	25 Mn Manganese 54.94	26 Fe Iron 55.85	27 Co Cobalt 58.93	28 Ni Nickel 58.69	29 Cu Copper 63.55	30 Zn Zinc 65.38	31 Ga Gallium 69.72	32 Ge Germanium 72.61	33 As Arsenic 74.92	34 Se Selenium 78.96	35 Br Bromine 79.90	36 Kr Krypton 83.80	37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molybdenum 95.94	43 Tc Technetium 98.91	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.91	46 Pd Palladium 106.42	47 Ag Silver 107.87	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.71	51 Sb Antimony 121.76	52 Te Tellurium 127.60	53 I Iodine 126.91	54 Xe Xenon 131.29	55 Cs Cesium 132.91	56 Ba Barium 137.33	57 La Lanthanum 138.91	58 Ce Cerium 140.12	59 Pr Praseodymium 140.91	60 Nd Neodymium 144.24	61 Pm Promethium 144.91	62 Sm Samarium 150.36	63 Eu Europium 151.96	64 Gd Gadolinium 157.25	65 Tb Terbium 158.93	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93	68 Er Erbium 167.26	69 Tm Thulium 168.93	70 Yb Ytterbium 173.05	71 Lu Lutetium 174.97	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.84	75 Re Rhenium 186.21	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.97	80 Hg Mercury 200.59	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium 209	85 At Astatine 209	86 Rn Radon 222.02

You will be assigned one element to research. Fill out the below report by answering each of the 20 questions. Follow the procedure for making the parts of the icosahedron. Before assembling it, write one property on each face. For example, for property 17, write "Environ. Considerations: "and fill in the property for your element. Then assemble the icosahedron as directed.

Grading:

- o Complete the below report.....5 points
- o Make an icosahedron with the listed 20 items showing one item per face.....5 points

⇒ Report and element ball are due: ←

Date: \_\_\_\_\_

Name: \_\_\_\_\_

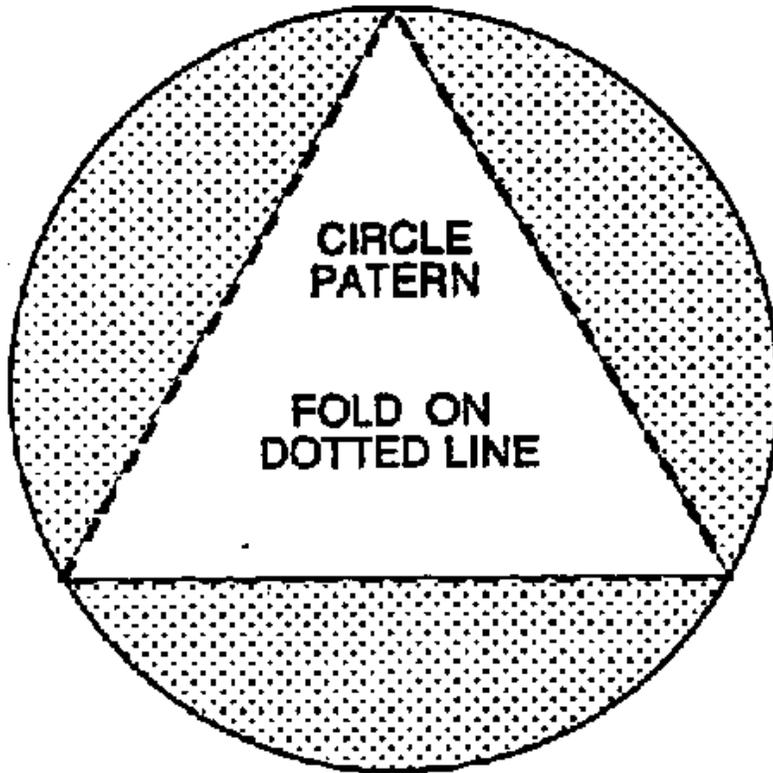
## ICOSAHEDRON ACTIVITY - REPORT

1. Your name \_\_\_\_\_
2. Element name \_\_\_\_\_
3. Element symbol \_\_\_\_\_
4. Atomic number \_\_\_\_\_
5. Number of protons, neutrons, & electrons \_\_\_\_\_
6. Atomic mass number of the most common isotope \_\_\_\_\_
7. When discovered & by whom \_\_\_\_\_
8. Group and Period number \_\_\_\_\_
9. Boiling or melting point \_\_\_\_\_
10. Density \_\_\_\_\_
11. Isotopes \_\_\_\_\_
12. State of matter at room temperature \_\_\_\_\_
13. Source(s) in nature for obtaining the element \_\_\_\_\_
14. Noble-gas electron configuration \_\_\_\_\_
15. Commercial or scientific uses \_\_\_\_\_
16. Commercial or scientific use (No this is not a mistake, find 2 uses)  
\_\_\_\_\_
17. Environmental considerations in either producing the element or disposing of it  
\_\_\_\_\_
18. Atomic radius \_\_\_\_\_
19. Category (halogen, metalloid, etc.) \_\_\_\_\_
20. Health or safety issues \_\_\_\_\_

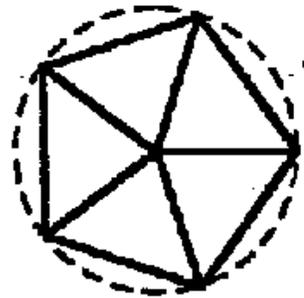
## Preparing an Icosahedron Element Ball

- Use the attached pattern and cut 20 circles from construction paper (top figure on following page).
- Use the triangle pattern to trace and fold the circles into triangles (Figure 1). The folds will end up inside the icosahedron.
- Enter each of the 20 items on a separate face. Color and decorate as you deem appropriate. Pictures and Clip Art may be suitable for some items.
- Select **5** (five) triangles and securely glue (and/or staple) them together in a pie shape pentagon. The shaded parts of the circle should go **inside** the element ball (Figure 2). Repeat this to make the lower section of the element ball.
- Take the remaining 10 triangles and secure them (glue and/or staple) together in a strip (Figure 3).
- Glue and/or staple the ends of the strip together to form a ring. This will form the equator of the element ball.
- Secure one of the pentagons to the top of the ring. Turn over and secure the other pentagon to form the complete element ball. This step requires at least three hands, so ask someone for help.
- Punch a hole in one of the sides and tie on a 30 cm piece of string or yarn. This will be used to hang the element ball.

# ELEMENT ICOSAHEDRON



**FIGURE 1**



**FIGURE 2**



**FIGURE 3**