
3:41 Penny Lever Lab

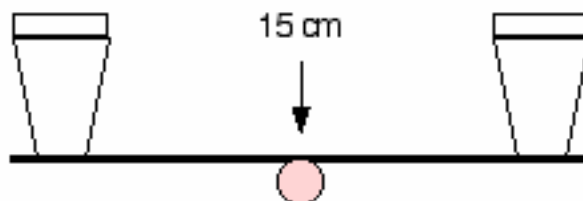
Using the supplies listed below, build a small lever like the one pictured. Use the ruler as a lever, the pencil as a fulcrum, and tape the cups to the ends to hold the pennies. Test the lever with pennies following the instructions given.

Supplies Needed:

- 2 small paper cups
- one ruler (30 cm long)
- one pencil
- some tape
- about 60 pennies

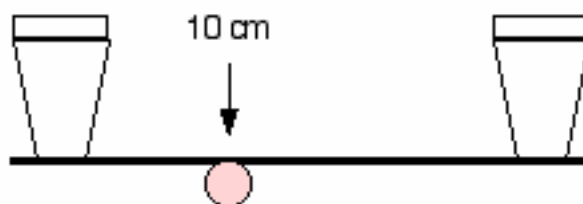
Lever One:

Build Lever One according to the diagram shown. Place the pencil fulcrum at the 15 cm mark on the ruler. Tape the pencil to the ruler if needed to keep it from sliding. Place 30 pennies in the left side cup. See how many pennies need to be added to the right side to get the lever to tip, and lift the left side cup. Record your results on the data table provided.



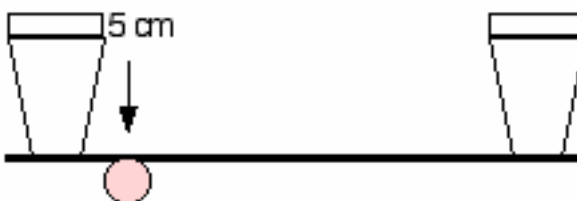
Lever Two:

Build Lever Two in the same way. Place the pencil fulcrum at the 10 cm mark on the ruler. Place 30 pennies in the left side cup. See how many pennies need to be added to the right side to get the lever to tip, and lift the left side cup. Record your results on the data table provided.



Lever Three:

Build Lever Three in the same way. Place the pencil fulcrum at the 5 cm mark on the ruler. Place 30 pennies in the left side cup. See how many pennies need to be added to the right side to get the lever to tip, and lift the left side cup. Record your results on the data table provided.



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Record the data from the three levers into the table below:

The output distance is the length of the left arm of the lever. The input distance is the length of the right arm of the lever. The output force is the number of pennies lifted, while the input force is the number of pennies needed to tip the lever.

	Output Distance	Input Distance	Output Force	Input Force
Lever One				
Lever Two				
Lever Three				

Look over the data in the table carefully. What is the relationship between the location of the fulcrum and the input force needed to lift 30 pennies?

What do you think would happen if you were to redo this lab using a meter stick instead of a ruler?

3:42 Energy Unit Review

List some examples of potential energy stored by gravity:

List some examples of potential energy stored by chemicals:

List some examples of kinetic energy:

List the seven forms of energy:

What does the law of conservation of energy state?

List the 6 types of simple machines:

3:43 Energy Alternatives Project

We rely on electricity for nearly everything we do. Electrical power is necessary for cooking and storing food, lighting our homes, and running our clocks, TVs and radios. In fact your performance on this assignment relies on a steady power supply!

Where does this electricity come from? What other forms of energy are used to get our electricity? In most cities, energy sources like coal, gas or nuclear energy are used to create heat that drive steam engines to create electricity. Which of these sources are used around the United States? Are we making the wisest choices about where we get our energy? This assignment will address these questions.

In groups of about three students, choose a source for electrical energy which you would like to find out more about from the list below.

- nuclear
- coal
- oil
- natural gas
- solar
- geothermal
- wind energy
- tidal energy
- biomass

Use the library and Internet resources to find the answers to the following questions:

- How is this fuel or energy source converted into electrical energy?
- Where is this energy source being used now?
- Should other areas of the world be making use of this source of energy? Why or why not?
- What are the advantages and disadvantages of this source?

Be sure also to consider and mention:

- cost
- availability
- environmental impact

Once you have found thorough answers to these questions, present what you have learned to the class. The presentation should answer all of the questions and address all of the listed considerations. Visual aids should be used to help illustrate your point. Your presentation will be evaluated on the quality of the information, and the merits of your arguments.

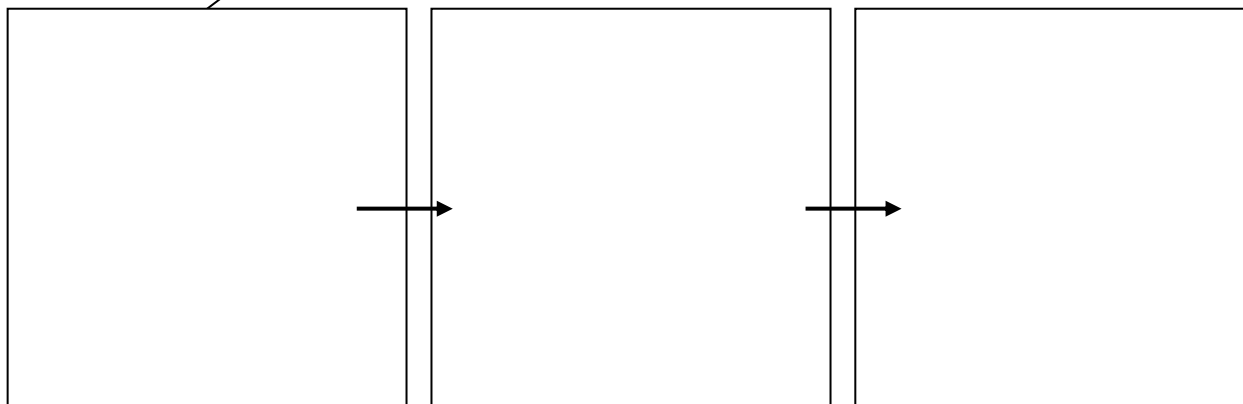
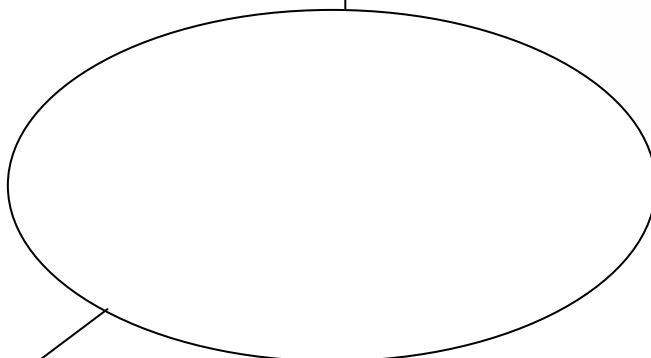
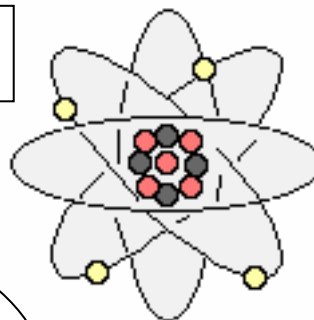
3:43 Energy Alternatives Project

Here are some Internet resources that may be of use to you:

- The Utility Connection, <http://www.utilityconnection.com/page2b.html>
- American Solar Energy Society, <http://www.ases.org/>
- American Wind Energy Association, <http://www.awea.org/>
- Energy Efficiency and Renewable Energy Network, <http://www.eren.doe.gov/>
- Department of Energy, <http://www.eia.doe.gov/cneaf/>
- Charlotte Science, <http://www.swiftly.com/apase/charlotte/formse.html>

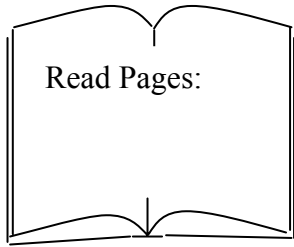
4:44 Chemical Composition Unit Map

Chemical Composition

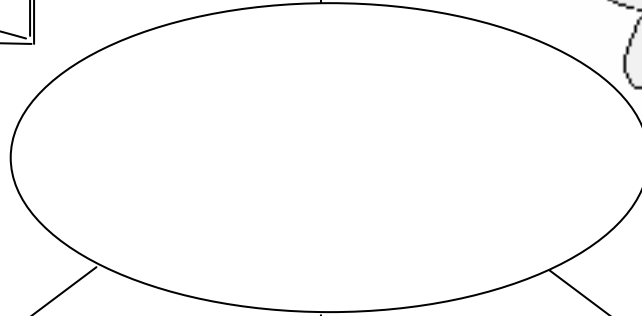
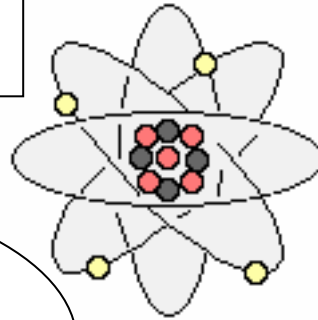


Key Unit Questions

4:45 Particles Lesson Diagram



Particles



Key Lesson Questions

Blank area for writing key lesson questions.

4:46 Particles Assignment

Describe a proton's:

Mass _____

Charge _____

Location in an atom _____

Describe a neutron's:

Mass _____

Charge _____

Location in an atom _____

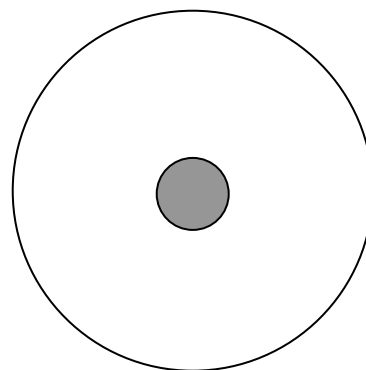
Describe an electron's:

Mass _____

Charge _____

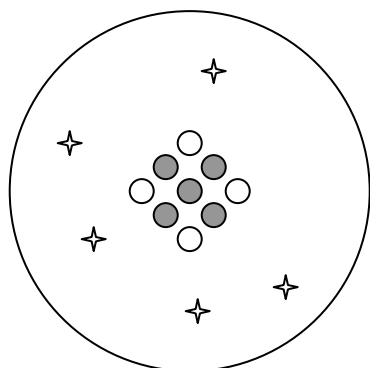
Location in an atom _____

Draw an arrow between the names of the particles to their location in the atomic diagram.

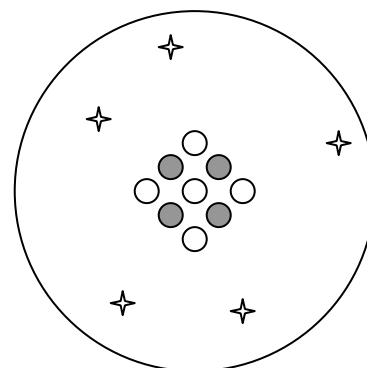


Proton Neutron Electron

Look at the diagram below and answer the following questions:



● = proton
○ = neutron
✦ = electron



What is the total mass of the figure on the left? _____ amu

What is the total mass of the figure on the right? _____ amu

What is the net charge of the figure on the left? _____

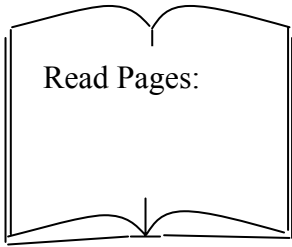
What is the net charge of the figure on the right? _____

4:47 Particles Within Atoms

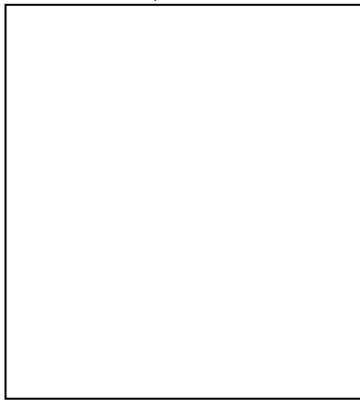
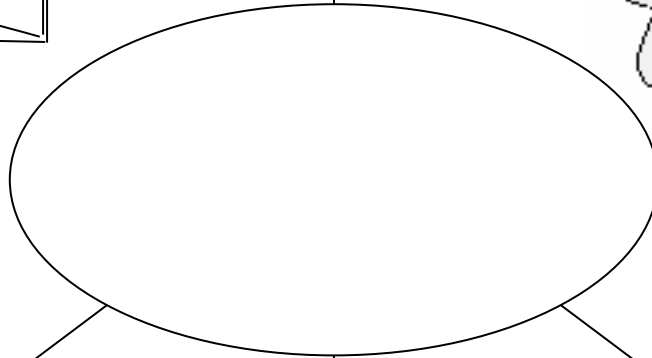
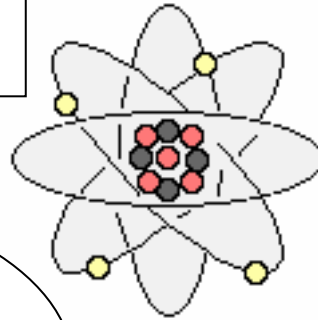
The chart below that tells you information about the properties of some atoms. Atoms get their properties from the particles within the atoms. Fill in the missing information.

Element	Symbol	Atomic Number	Mass Number	Number of Protons	Number of Neutrons	Number of Electrons	Net Charge on Atom
Hydrogen	H	1	1				+1
Helium	He	2			2	2	
Fluorine	F	9	19			9	
Nitrogen	N	7			7		0
Zinc	Zn			30	35	29	
Carbon	C	6	14			6	
Aluminum	Al		27	13	14	13	
Oxygen	O		16	8			0
Cobalt	Co	27			32	25	
Calcium	Ca	20	40				+1
Boron	B	5	11				0
Krypton	Kr	36			48	36	0
Bromine	Br			35	45	36	
Magnesium	Mg	12			12	10	

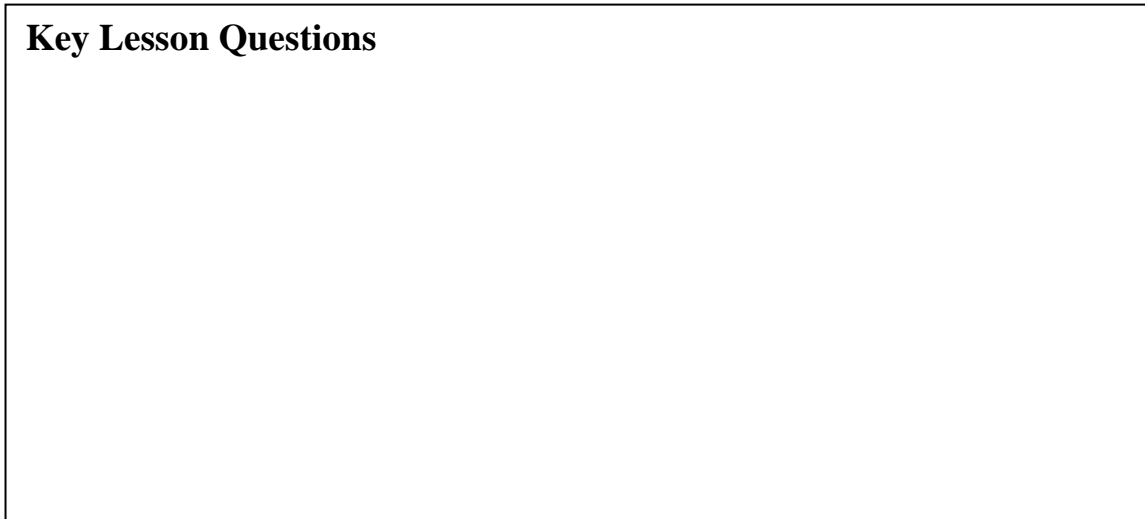
4:48 Atoms Lesson Diagram



Atoms



Key Lesson Questions



4:49 The Periodic Table of Elements

1 H Hydrogen 1									
3 Li Lithium 7	4 Be Beryllium 9								
11 Na Sodium 23	12 Mg Magnesium 24								
19 K Potassium 39	20 Ca Calcium 40	21 Sc Scandium 45	22 Ti Titanium 48	23 V Vanadium 51	24 Cr Chromium 52	25 Mn Manganese 55	26 Fe Iron 56	27 Co Cobalt 59	
37 Rb Rubidium 85	38 Sr Strontium 88	39 Y Yttrium 89	40 Zr Zirconium 91	41 Nb Niobium 93	42 Mo Molybdenum 96	43 Tc Technetium 98	44 Ru Ruthenium 101	45 Rh Rhodium 103	
55 Cs Cesium 133	56 Ba Barium 137			72 Hf Hafnium 178	73 Ta Tantalum 181	74 W Tungsten 184	75 Re Rhenium 186	76 Os Osmium 190	77 Ir Iridium 192
87 Fr Francium 223	88 Ra Radium 226			104 Rf Rutherfordium 261	105 Db Dubnium 262	106 Sg Seaborgium 263	107 Bh Bohrium 264	108 Hs Hassium 265	109 Mt Meitnerium 268
				57 La Lanthanum 139	58 Ce Cerium 140	59 Pr Praseodymium 141	60 Nd Neodymium 144	61 Pm Promethium 145	62 Sm Samarium 150
				89 Ac Actinium 227	90 Th Thorium 232	91 Pa Protactinium 231	92 U Uranium 238	93 Np Neptunium 237	94 Pu Plutonium 244

Periodic Table of Elements (Continued)

								2 He Helium 4
			5 B Boron 11	6 C Carbon 12	7 N Nitrogen 14	8 O Oxygen 16	9 F Fluorine 19	10 Ne Neon 20
			13 Al Aluminum 27	14 Si Silicon 28	15 P Phosphorus 31	16 S Sulfur 32	17 Cl Chlorine 35	18 Ar Argon 40
28 Ni Nickel 59	29 Cu Copper 64	30 Zn Zinc 65	31 Ga Gallium 70	32 Ge Germanium 73	33 As Arsenic 75	34 Se Selenium 79	35 Br Bromine 80	36 Kr Krypton 84
46 Pd Palladium	47 Ag Silver 108	48 Cd Cadmium 112	49 In Indium 115	50 Sn Tin 119	51 Sb Antimony 122	52 Te Tellurium 128	53 I Iodine 127	54 Xe Xenon 131
78 Pt Platinum	79 Au Gold 197	80 Hg Mercury 201	81 Tl Thallium 204	82 Pb Lead 207	83 Bi Bismuth 209	84 Po Polonium 209	85 At Astatine 210	86 Rn Radon 222
110 Uun Ununnilium	111 Uuu Unununium 272	112 Uub Ununbium 277		114 Uuq Ununquadium		116 Uuh Ununhexium		118 Uuo Ununoctium

63 Eu Europium 152	64 Gd Gadolinium 157	65 Tb Terbium 159	66 Dy Dysprosium 163	67 Ho Holmium 165	68 Er Erbium 167	69 Tm Thulium 169	70 Yb Ytterbium 173	71 Lu Lutetium 175
95 Am Americium	96 Cm Curium 247	97 Bk Berkelium 247	98 Cf Californium 251	99 Es Einsteinium 252	100 Fm Fermium 257	101 Md Mendelevium 258	102 No Nobelium 259	103 Lr Lawrencium 262