INTRODUCTION TO PERIODIC TABLE 80minutes

period 1	group 1 1.00794 2.20 1312.0 2.20 H Hydrogen	2		atomic mar	5 - F - C	245 0		The	Per	iodi		able	e of	the	Ele	emę	ents	18 4.002602 2 Helium
2	6.941	9.012182 8775 1.57 4 Beeyllium 5729	or most st 1 st ioniz cher	able mass number ration energ in kl/m mical symbo	g 55.8 g − 762.5 I − F(943 <u>∠</u> 1.83 <u>∠</u>	+6 +5 +4 +3 +2 +1	atomic number electronegativit	ty dikai	ine metals metals ition metals	nonmet haloger	ols s oses	10.811 8026 2.04 Boron 16 26 204	12.0107 1086.5 2.35 Carbon 197.267.26	14.0067 1402.3 304 Nitrogen 3 147.367 201	15.9994 1333.9 3.44 Oxygen 14 24*29*	18.998403 9 1481.0 3.95 9 F Fluorine 52 22 22 ⁶	20.1797 10 20927 10 Neon 147 20*
3	22.98976 11 1958 0.93 Sodium Pe(34)	24.3050 737.7 1.31 Magnatum (Nej 267	electron c 3	nam configuratio	e Iron [Ar] 3c 5	¹⁶ 4s ²	-1	oxidation state: most common are bal	s lanth a octin 9	anoids oids 10	radioactive masses in p	n elements elements have arenthesis 12	26.98153 13 577.5 1.41 13 Aluminium Pei 3/ 3/	28.0855 786.5 1.90 Silicon PM(3x ² 3y ²	30.97696 15 P Phosphorus 3 Phosphorus 3	32.065 9974 2.58 Suffer Pel 34 744	35.453 1251.2 3.16 Chlorine PA(34'36'	39.948 18 Argon Ne(34' 34*
4	39.0983 19 Rotassium	40.078 589.8 100 20 Collcium (A) 447	44.95591 21 533.1 1.36 21 5candium [M] 34 ⁶ 44 ⁷	47.867 5588 1.54 22 Titanium (A) 39 44	50.9415 450.9 1.63 23 Vanadium (#]349.49	51.9962 652.9 1.85 24 Chromium (H) 249 64	54.93804 2 717.3 1.55 2 Manganese (A) 349 442	25 55.845 742 5 1.83 26 Fe fron (M) 34 ⁶ 64 ⁷	58.93319 27 Cobalt (A) 28 ⁴ 44 ²	58.6934 737.1 1.88 28 Nickel M 34* 44	63.546 745.5 1.90 29 Copper (H) 20 ⁴ 41	^{65.38} Zinc M 34° 42	69.723 31 Sins 181 31 Golfium (A) 349 49 49	72.64 201 32 Germanium (A) 24* 64 44	74.92160 33 947.0 2.18 33 Arsenic (A) 347 447	Selenium (x) 20° 40° 40° 40°	79,904 1129,9 2,96 Br Bromine (H1 34/9 44) 44 ³	83.798 1352.8 3.00 Krypton (x) 34° 44° 44
5	85.4678 37 403.8 0.82 37 Rublidium Rublidium	87.62 549.5 0.95 38 Strontium Mol Str	88.90585 39	91.224 640.1 1.33 40 Zirconium (N) 44'54'	92.90638 41 Niobium	95.96 654.3 2.16 Molybdenum Molybdenum	(98) 1.90 TC Technetium (9) 4d ^e 50 ^o	13 101.07 Ruthenium Not44 5v	102.9055 45 Rh Rhodium	106.42 804.4 220 Pd Palladium	107.8682 47	112.441 48 667.8 1.69 Codmium [0] 4d*54	114.818 49 558.3 1.78 49 In Indium	118.710 50 Sn Tin Miled* Set Set	121.760 51 Sb Antimony	127.60 52 Tellurium	126.9044 53	131.293 54 Xenon Not 44** 54* 54*
6	132,9054 55 3757 0.79 55 Cassium	137.327 502.9 0.89 56 Barium Barium	174.9668 71 523.5 1.27 ** LU Luteflum	178.49 658.5 1.30 Haffium Mathium	180.9478 73	183.84 700.0 2.36 74 Tungsten	186.207 740.0 1.90 Ree Rhenium	75 190.23 76 Osmium	192.217 77	195.084 870.0 228 78 Pt Plotinum	196.9665 79 890.1 2.54 Gold	200.59 80 Hg Mercury	204.3833 81 587.4 1.42 31 Thallium	Pb Leod	208.9804 83 Bismuth	(210) a12.1 2.00 84 Polonium Polonium	Astatine	(220) 86 Rn Radon
7	(223) 380.0 0.70 87 Francium 89174	Radium	(262) 103 470.0	(261) 104 80.0 Rf Rutherfordium	(262) 105 Dubnium	(266) 106 Seg	(264) 10 Bh Bohrium)7 (277) 108 Hossium	(268) 109 Mt Meitnerium	(271) 110 Ds Dormstadium	(272) 111 Rg Roemgenium	(285) 112 Copernicium	(284) 113 Uut Ununtrium	⁽²⁸⁹⁾ 114 Uuunguadidm	(288) 115 Ununpenfium	(292) 116 Uuh Ununhexium	117 Uus ^{Ununseptium}	(294) 118 Uuo Ununoctium
$\frac{1}{1000} \frac{1}{1000} \frac{1}{1000$									4 70 97 102 0 29									



Overview: in this lesson, Students will identify different atoms by the number of protons in the nucleus and realize that the number of electrons equals the number of protons in a neutral atom. They will also be able to explain the meaning of atomic number and atomic mass.using expedition guided tour. They will identify the elements named after places and create a google project on it.

Subject/Topic:	Grade Level:				
Chemistry/Environmental Chemistry	8-10 Th Grade				
 learning objectives: Students will begin to look closely at the periodic table. They will be introduced to the basic information given for the elements in most periodic tables: the name, symbol, atomic number, and atomic mass for each element. Students will focus on the some important groups of element using guided tour from expeditions. They will try to correctly match cards with information about an element to each of the elements. students will explore some elements named after places and find the reasons for the naming Students will environmental implications of metallurgical processes and strategize a sustainable model for use of 	 lesson summary: Engage: Students will begin to look closely at the periodic table. They will be introduced to the basic information given for the elements in most periodic tables: the name, symbol, atomic number, and atomic mass for each element They will try to correctly match cards with information about an element to each of the first 20 elements. Explore: students will explore some elements named after places and find the reasons for the naming Students explore environmental implications of metallurgical processes. Revise: Revise: 				
sustainable model for use of metals	 Apply: students will use the VR expedition project - periodic table using expeditions app , Elements to help them determine what atom your card describes. The diagram and information below will help you 				

	match your cards to the correct atoms.				
materials needed:	Inquiry:				
 access to <u>google earth</u>. Expedition app <u>https://expeditions.gle/fdl/ZcZV</u> 	 strategize a sustainable model for metallurgy 				
 student copies of the ACTIVITY sheets <u>https://www.middleschoolchemistry.com</u> /pdf/chapter4/4.2_student.pdf student internet access. 					
sustainable development goals:	Culminating task/assessment:				
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	• Students will identify some elements named after places .Determine history of the element , the sources, uses and environmental impacts of metallurgical processes involved .strategize a sustainable plan for metallurgy of the elements .				
CONSUMPTION AND PRODUCTION					

Lesson Plan							
Engage (20 minutes)	Students will be introduced to an interactive model of periodic table using a guided tour from expedition app <u>https://expeditions.gle/fdl/ZcZV</u>						
	Explain that each box contains information about a different atom. The periodic table shows all the atoms that everything in the						

	known universe is made from. It's kind of like the alphabet in which only 26 letters, in different combinations, make up many thousands of words. The 100 or so atoms of the periodic table, in different combinations, make up millions of different substances.
Explain (20 min)	Explain atomic mass. The atomic mass of an element is based on
	the mass of the protons, neutrons, and
	electrons of the atoms of that element. The
	mass of the proton and neutron are about
	the same, but the mass of the electron is
	much smaller (about 1/2000 the mass of the
	proton or neutron). The majority of the
	atomic mass is contributed by the protons
	and neutrons.
	For any element in the periodic table, the
	number of electrons in an atom of that
	element always equals the number of
	protons in the nucleus. But this is not true
	for neutrons. Atoms of the same element
	can have different numbers of neutrons
	than protons. Atoms of the same element
	with different numbers of neutrons are
	called isotopes of that element. The atomic
	mass in the periodic table is an average of
	the atomic mass of the isotopes of an
	element

Explore (30 min)	Each group will receive a set of cards with information that describes a particular atom. Each student will explore the periodic table of the elements, solve the activity sheet. They try to place the element in the common periodic table . They use internet to identify the elements named after places, find the metallurgical processes involved in extraction and its environmental implication,
revise (10 min)	in their small groups, ask students to discuss the following questions: Are number of protons equal to number of neutrons for all elements? Can two elements have same number of neutrons ? Why do you think periodic table was created? What are impacts of metallurgy on environment ? What are the best Strategies to reduce the negative impacts of metallurgical processes on environment

	Exceeding	Meeting	Approaching	Beginning
Knowledge Content	student demonstrates mastery of key student demonstrates mastery of key concepts -to the basic information given for the elements in most periodic tables: the name, symbol, atomic number, and atomic mass for each element.	student demonstrates student good understanding ofto the basic information given for the elements in most periodic tables: the name, symbol, atomic number, and atomic mass for each element.	student demonstrates partial understanding of key concepts conceptsto the basic information given for the elements in most periodic tables: the name, symbol, atomic number, and atomic mass for each element.	student lacks understanding of key concepts -to the basic information given for the elements in most periodic tables: the name, symbol, atomic number, and atomic mass for each element.
Claim And Evidence	student provides a clearly stated claim naming many metals named after places identifying the most important environmental impacts of metallurgy giving several pieces of specific evidence. student is able to explain how each piece of evidence supports their claim and strengthens their argument	student provides a clearly stated claim naming many naming many metals named after places identifying the most important environmental impacts of metallurgy giving 1-2 pieces of specific evidence. student is able to explain how each piece of evidence supports their	student provides a clearly stated claim naming many naming many metals named after places identifying the most important environmental impacts of metallurgy.ide ntifying the most important reasons for success giving 1-2 pieces of specific evidence. student is not	student provides a clearly stated claim naming naming many metals named after places identifying the most important environmental impacts of metallurgy. .evidence is either absent or does not support the student's claim.

		claim and strengthens their argument	able to explain how each piece of evidence supports their claim and strengthens their argument	
presentation	presentation clearly and creatively communicates the goals, strategy other ' strategies fall short. action steps encouraging others to get involved are included.	presentation clearly and creatively communicates the goals, why this is the best strategy and the ways that other ' strategies fall short	presentation clearly and creatively communicates the goals, strategy but does not give reasons why this is best strategy	information about the goals, strategy does not include reasons why this is the best strategy and the ways that other ' strategies fall short. action steps do not encourage others to get involved are included.

ADDITIONAL RESOURCES

Interactive periodic table

https://www.fishersci.com/us/en/periodic-table.html#ni28

CHEMICAL DIGITAL LIBRARY

http://www.chemeddl.org/resources/ptl/index.html

METALLURGY AND ENVIRONMENT ISSUE

https://link.springer.com/article/10.1007/s11837-015-1395-7

CREDITS

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