Extending Concepts

Periodic Table In Exercises 23–30, use the periodic table of elements.

Period I	1																	40
	_	Nonmetals								Metalloids 2								
1	Н			Alkali metals						Halogens								
	1.008	Alkaline earth metals						talc	Noble gases				13	14	15	16	17	4.003
3	_	4		Transition elements						Lanthanides				6	7	8	9_	10
2	Li	Be	Other metals						Actinides				В	C	N	0	F	Ne
	6.941		9.012 Other metals Actinides								25		10.81	12.01	14.01	16	19 17	20.18
	Na	Ma											ΑI	Si	P	S	'CI	Ar
_	22.99	24.31	3	4	5	6	7	8	9	10	11	12	26.98	28.09	30.97	32.07	35.45	39.95
1	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	39.10	40.08	44.96	47.88	50.94	52	54.94	55.85	58.47	58.69	63.55	65.39	69.72	72.59	74.92	78.96	79.9	83.8
_	37 DI-	38	39	40	41 N.U-	42	43	44 D.	45	46 D-I	47	48	49	50	51 CI-	52 T -	53	54
-	Rb 85,47	Sr 87.62	Y 88,91	2r	Nb 92,91	Mo 95.94	Tc	Ru 101,1	Rh	Pd 106.4	Ag	Cd	In 114.8	Sn 118.7	Sb 121.8	Te	126.9	Xe
	55	56	00.91	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
	Cs	Ba		Hf	Ta	w	Re	Os	Ir	Pt	Âu	Hg	TI	Pb	Bi	Po	At	Rn
	132.9	137.3		178.5	180.9	183.9	186.2	190.2	192.2	195.1	197	200.5	204.4	207.2	209	(210)	(210)	(222)
_	87	88		104	105	106	107	108	109	110	111	112	113	114	115	116	117	118
7	Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Uub	Uut				Uus	Uuo
	(223)	(226)		(257)	(260)	(263)	(262)	(265)	(266)	(271)	(272)	(285)	(284)	(289)	(288)	(292)	0	0
6				57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
0				La 138.9	140.1	140.9	144.2	(147)	150.4	152	157.3	158.9	162.5	164.9	167.3	168.9	173	LU 175
89 90 91 92						93	94	95	96	97	98	99	100	101	102	103		
7 Ac Th Pa U Np						Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		
				(227)	232	(231)	(238)	(237)	(242)	(243)	(247)	(247)	(249)	(254)	(253)	(256)	(254)	(257)

Chemical Properties

- All discovered alkali metals react strongly with water.
- All discovered alkaline earth metals are solid at room temperature.
- All discovered noble gases are odorless.
- All actinides are radioactive.
- **23.** Write a syllogism that involves potassium (element 19). Then draw a set diagram.
- **24.** Write a syllogism that involves xenon (element 54). Then draw a set diagram.
- **25.** Write a syllogism that involves radium (element 88). Then draw a set diagram.
- **26.** Write a syllogism that involves thorium (element 90). Then draw a set diagram.
- **27.** There are hypothetical alkali metals that have not been discovered. Use inductive reasoning to draw a conclusion about all alkali metals, discovered or undiscovered.
- **28.** There are hypothetical alkaline earth metals that have not been discovered. Use inductive reasoning to draw a conclusion about all alkaline earth metals, discovered or undiscovered.
- **29.** Suppose ununennium (hypothesized element 119) is an undiscovered alkali metal. Write a syllogism that involves how ununennium reacts with water. Use your conclusion from Exercise 27 as your first premise.
- **30.** Suppose unbinilium (hypothesized element 120) is an undiscovered alkaline earth metal. Write a syllogism that involves unbinilium's state at room temperature. Use your conclusion from Exercise 28 as your first premise.



Xenon is used in high-intensity discharge headlamp bulbs.