

Early arrangement of the Periodic Table

Science with G-O

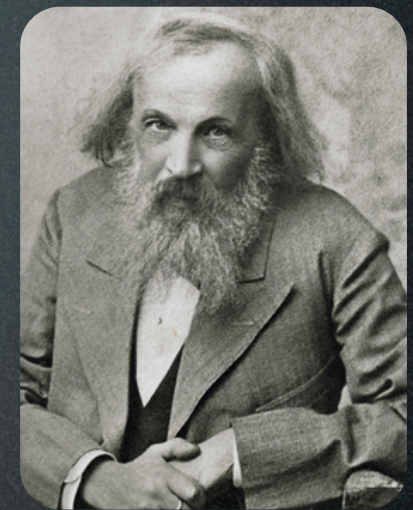
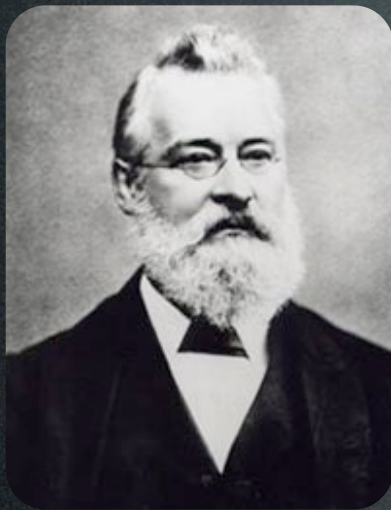
H																He	
Li	Be										B	C	N	O	F	Ne	
Na	Mg										Al	Si	P	S	Cl	Ar	
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Ht	Rft	Uub								

Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Vb	Lu
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		
U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		

H																	He
Li	Be											B	C	N	O	F	Ne
Na	Mg											Al	Si	P	S	Cl	Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Uun	Uuu	Uub						

Created by JR Ginex-Orinion
for EDT 631

Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Vb	Lu
Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr
Tp	bp	u	np	pu	am	cm	bk	cf	es	fm	md	no	lr
cp	mp	up	np	pu	am	cm	bk	cf	es	fm	md	no	lr



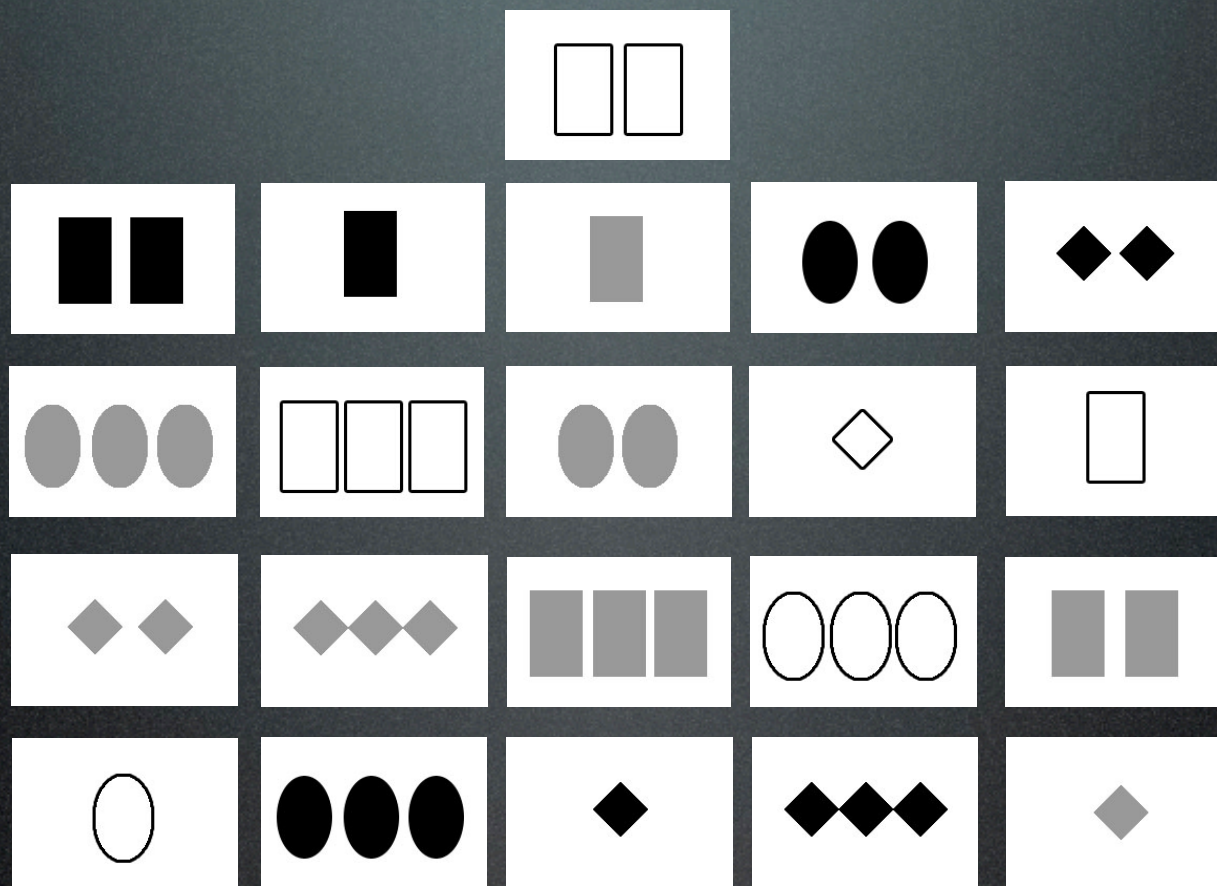
Reihen	Gruppe I. — R ⁰	Gruppe II. — R ⁰	Gruppe III. — R ⁰ ³	Gruppe IV. RH ⁴ R ⁰ ⁴	Gruppe V. RH ⁵ R ⁰ ⁵	Gruppe VI. RH ⁶ R ⁰ ⁶	Gruppe VII. RH R ⁰ ⁷	Gruppe VIII. — R ⁰ ⁸
1	H=1							
2	Li=7	Be=9,4	B=11	C=12	N=14	O=16	F=19	
3	Na=23	Mg=24	Al=27,8	Si=28	P=31	S=32	Cl=35,5	
4	K=39	Ca=40	—=44	Ti=48	V=51	Cr=52	Mn=55	Fe=56, Co=59, Ni=59, Cu=63.
5	(Cu=63)	Zn=65	—=68	—=72	As=75	So=78	Br=80	
6	Rb=85	Sr=87	?Yt=88	Zr=90	Nb=94	Mo=96	—=100	Ru=104, Rh=104, Pd=106, Ag=108.
7	(Ag=108)	Cd=112	In=113	Sn=118	Sb=122	Tc=125	J=127	
8	Cs=133	Ba=137	?Di=138	?Co=140	—	—	—	— — — —
9	(—)	—	—	—	—	—	—	
10	—	—	?Er=178	?La=180	Ta=182	W=184	—	Os=195, Ir=197, Pt=198, Au=199.
11	(Au=199)	Hg=200	Tl=204	Pb=207	Bi=208	—	—	
12	—	—	—	Th=231	—	U=240	—	— — — —



Music: duck jingle to fade

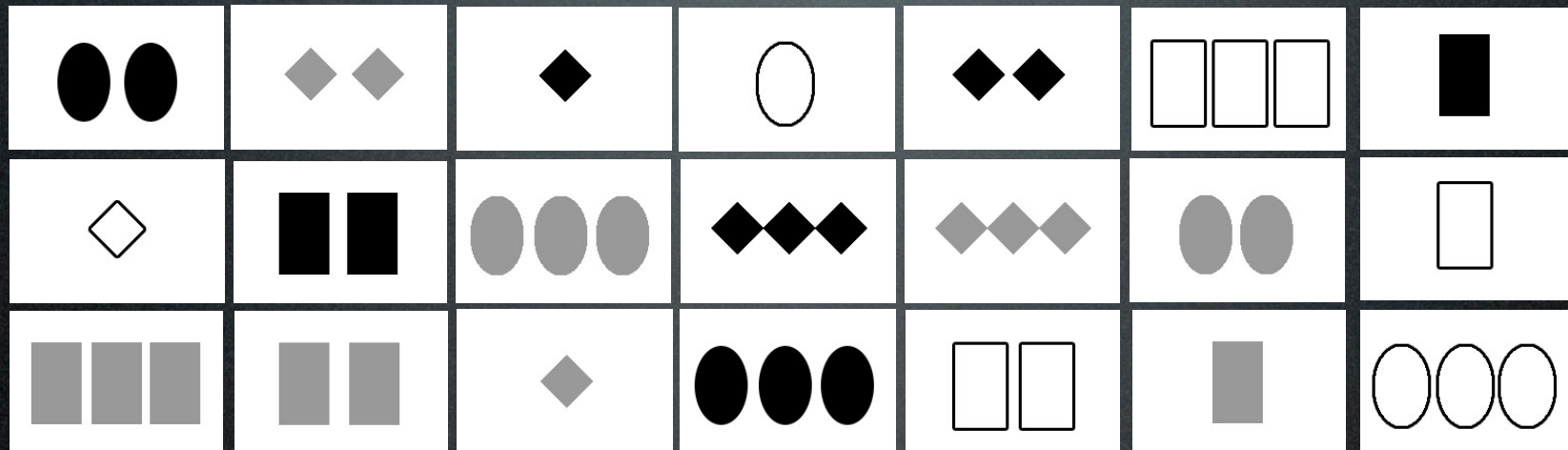
PIP starts, Click on “In this lesson...”

Hello and welcome to Science with G-O. In this lesson we are going to answer the essential question: How did early scientists organize the elements if not all of them had been discovered during their time?



Animation: reveal cards

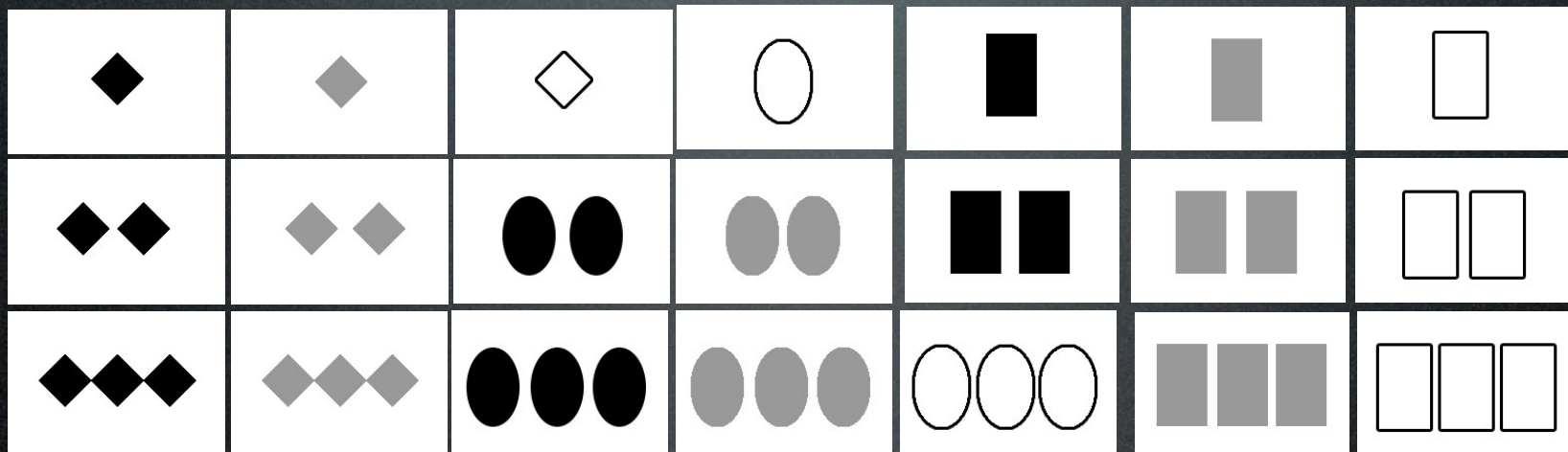
“Let's start by taking a look at a set of cards with different shapes, quantities, and shades. You can print out the cards yourself from this blog entry and try the activity yourself. Your task is to arrange the cards in a grid; with columns and rows.”



Animation: rearrange cards

You could have arranged the cards this way, with no specific logical pattern. But that doesn't seem helpful to us. It looks confusing, and it doesn't tell us anything. Let's try rearranging the cards by putting similar shapes together, similar quantities together, and similar shades together.(click)

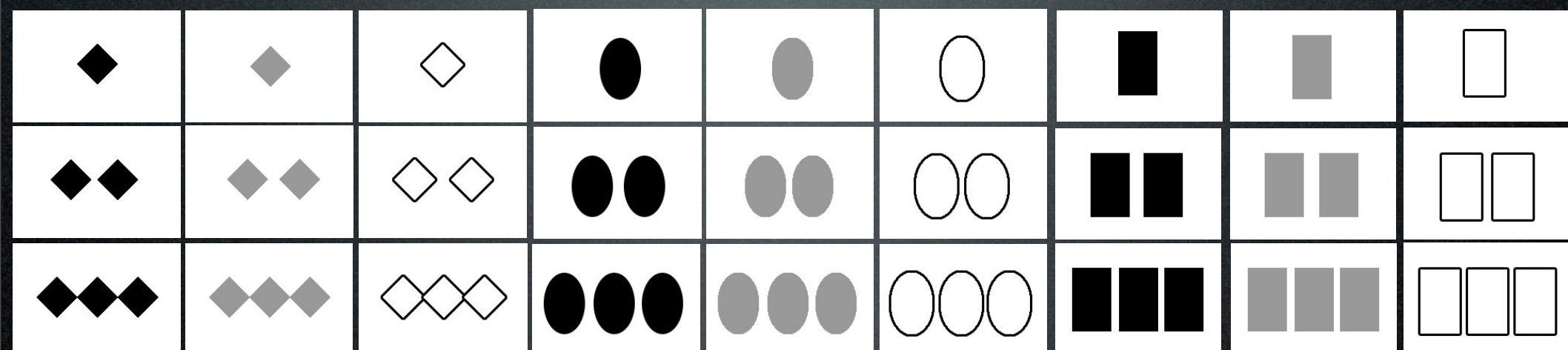
This looks better, and seems more organized, but there seems to be some inconsistencies. It feels like there may be some cards missing. Could you tell what's missing using this arrangement?



Animation: Move blocks of cards to leave space

What if we left some empty spaces for those “missing” cards in the grid? (click and pause)

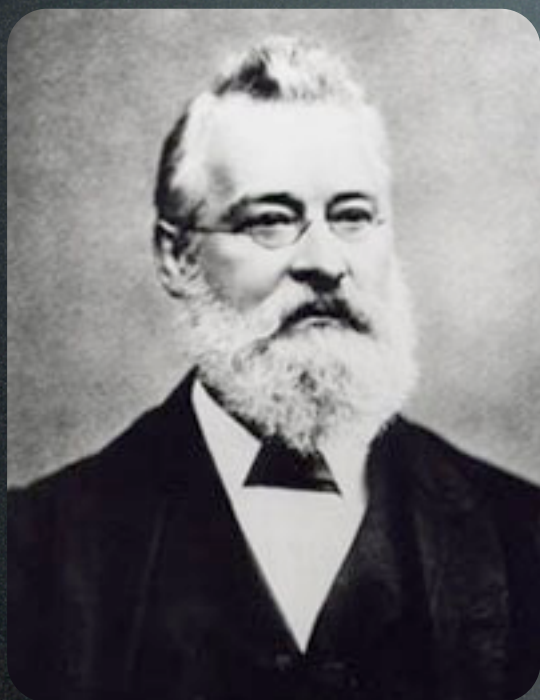
Are they easily identifiable now? (click to next slide)



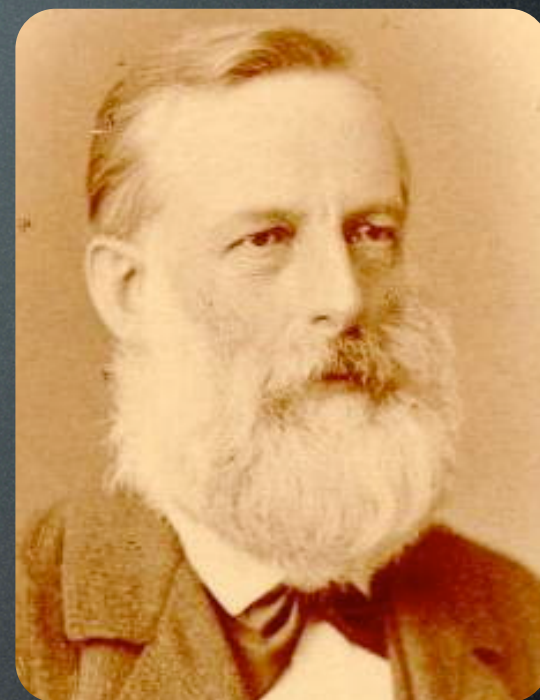
Animation: reveal missing cards

Let's see if your guesses are the same as mine... (click). Of course, if the cards were arranged in this way, it would be easy to identify the missing elements of the grid. You notice that single shapes are at the top, double shapes are in the middle, and triple shapes are on the bottom. You will also notice that there seems to be a repeating trend as you go across the grid. It repeats from black, to gray, to white. The number of shapes increases from one to three down a column, and the trend repeats on the next column.

This activity mirrors the problem that Dmitry Mendeleev had in the 1860's, and his effort to organize the known elements into a logical tabular format.



John Newlands



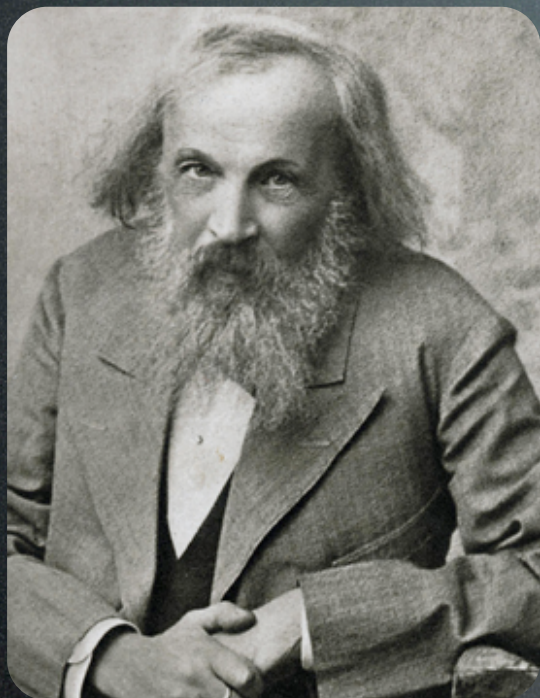
Julius Lothar Meyer

●●	◆◆	◆	○	◆◆	□□□	■
◇	■	●●●	◆◆◆	◆◆◆	●●	□
■	■	◆	●●●	□□	■	○○○

◆	◆	◇	○	■	■	□
◆◆	◆◆	●●	●●	■	■	□□
◆◆◆	◆◆◆	●●●	●●●	○○○	■	□□□

Animation: pop in sample card sets

In the early 1860's, scientists like Newlands and Meyer both published periodic tables that organized the elements (click) but looked a lot like the first two attempts of our activity.



Dmitry Mendeleev

1834-1907

Credited for the first
version of a periodic
table of elements

Using the table, he correctly
predicted the properties of
elements yet to be
discovered



Reihen	Gruppe I. — R'O	Gruppe II. — RO	Gruppe III. — R'O ³	Gruppe IV. RH ⁴ RO ³	Gruppe V. RH ⁵ R'O ⁵	Gruppe VI. RH ⁶ RO ⁵	Gruppe VII. RH R'O ⁷	Gruppe VIII. — RO ⁴
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7	(Ag=108)	Cd=112	In=113	Sa=118	Sb=122	Te=125	J=127	
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9	(—)	—	—	—	—	—	—	
10	—	—	?Er=178	?La=180	Ta=182	W=184	—	Os=195, Ir=197, Pt=198, Au=199.
11	(Au=199)	Hg=200	Tl=204	Pb=207	Bi=208	—	—	
12	—	—	—	Th=231	—	U=240	—	— — — —

PIP

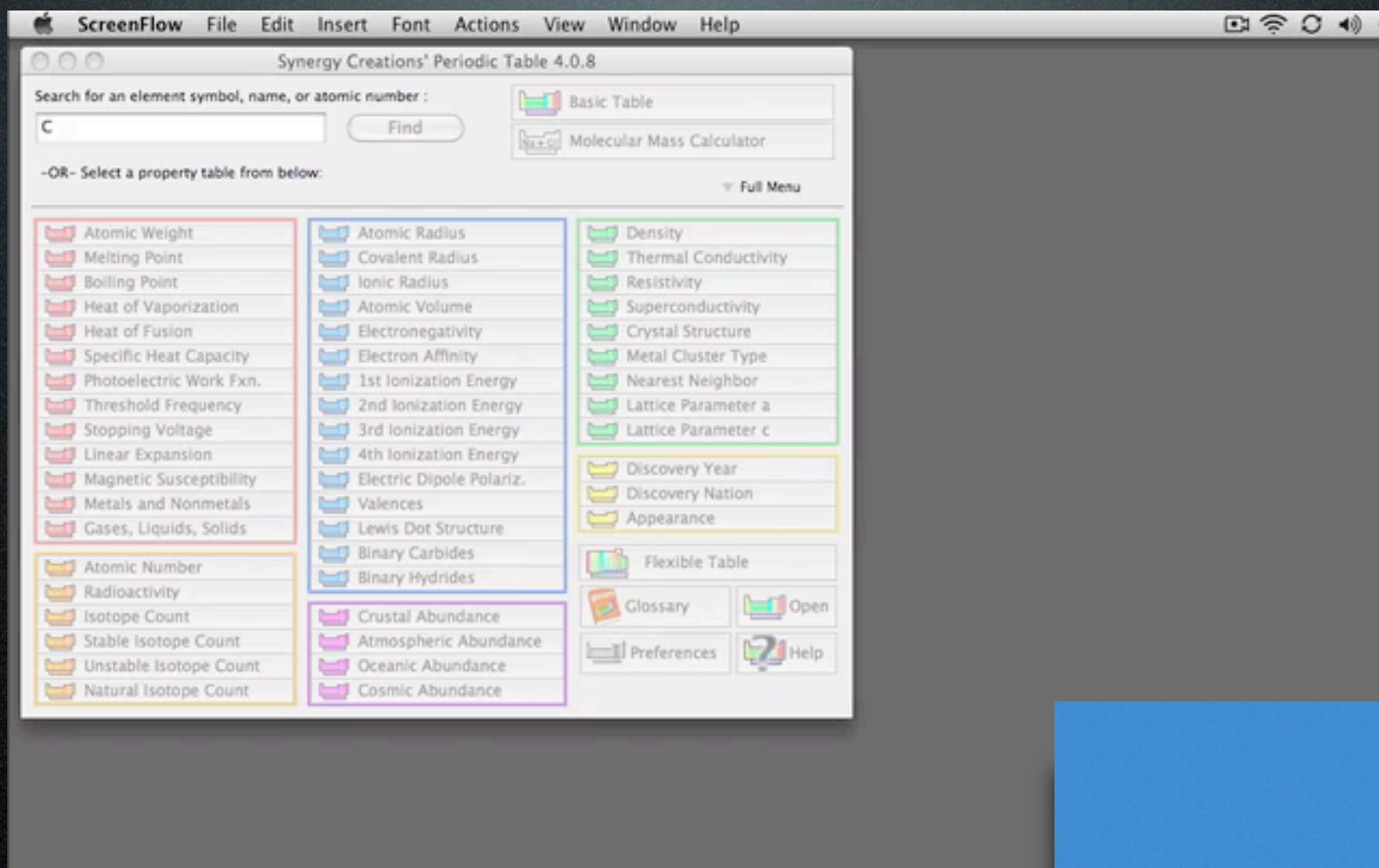
Video: zoom in to spotlight 44, 68, 72

Here is a picture of his work. He was able to predict the chemical and physical properties of these undiscovered elements (video spotlight on 44, 68, and 72) which turned out to be quite accurate. These elements were later named Scandium, Gallium, and Germanium.



PIP

Today's modern periodic table doesn't have any empty spaces to fill, except for the largest atoms. Scientists are still attempting to form larger elements by combining smaller atoms together. But it is the periodic table's organization of the elements that highlights its usefulness. Elements with similar characteristics are found within a column or group.



Music: Outro Jingle (ducked)

PIP

Video: maximize periodic trends

The periodic table also shows repeating patterns and trends as you go from top to bottom and from left to right, much like the card set we put together. In the next unit, we will identify what these trends are as we go deeper into the study of the elements. See you in class.

Credits

John Newland photo from <http://www.explicatorium.com/images/Personalidades/Johnnewlands.jpg>

Julius Meyer photo from <http://www.chemistrydaily.com/chemistry/upload/1/1a/Lmeyer.jpg>

Dmitry Mendeleev photo from
<http://mwhhonourswiki2009-per4.wikispaces.com/file/view/Mendeleev2.gif/94689668/Mendeleev2.gif>

Modern periodic table obtained from http://wiki.chemeddl.org/images/a/aa/Periodic_table.gif

Mendeleev's periodic table obtained from http://wiki.chemprime.chemeddl.org/images/thumb/9/94/Mendeleev_periodic_table.jpg/500px-Mendeleev_periodic_table.jpg

Software

Keynote

iMovie

Adobe Photoshop

Screenflow

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