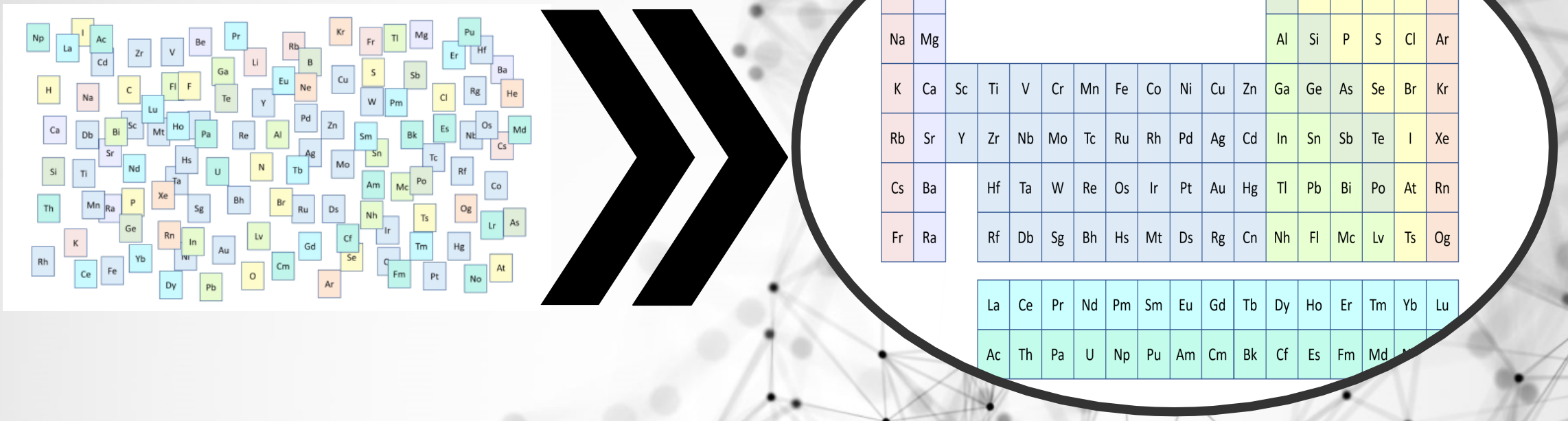


Remember: No matter where you go, there you are

Samuella B. Sigmann

August 23, 2022

Putting It All Together

Dmitri Mendeleev

ОПЫТЪ СИСТЕМЫ ЭЛЕМЕНТОВЪ,

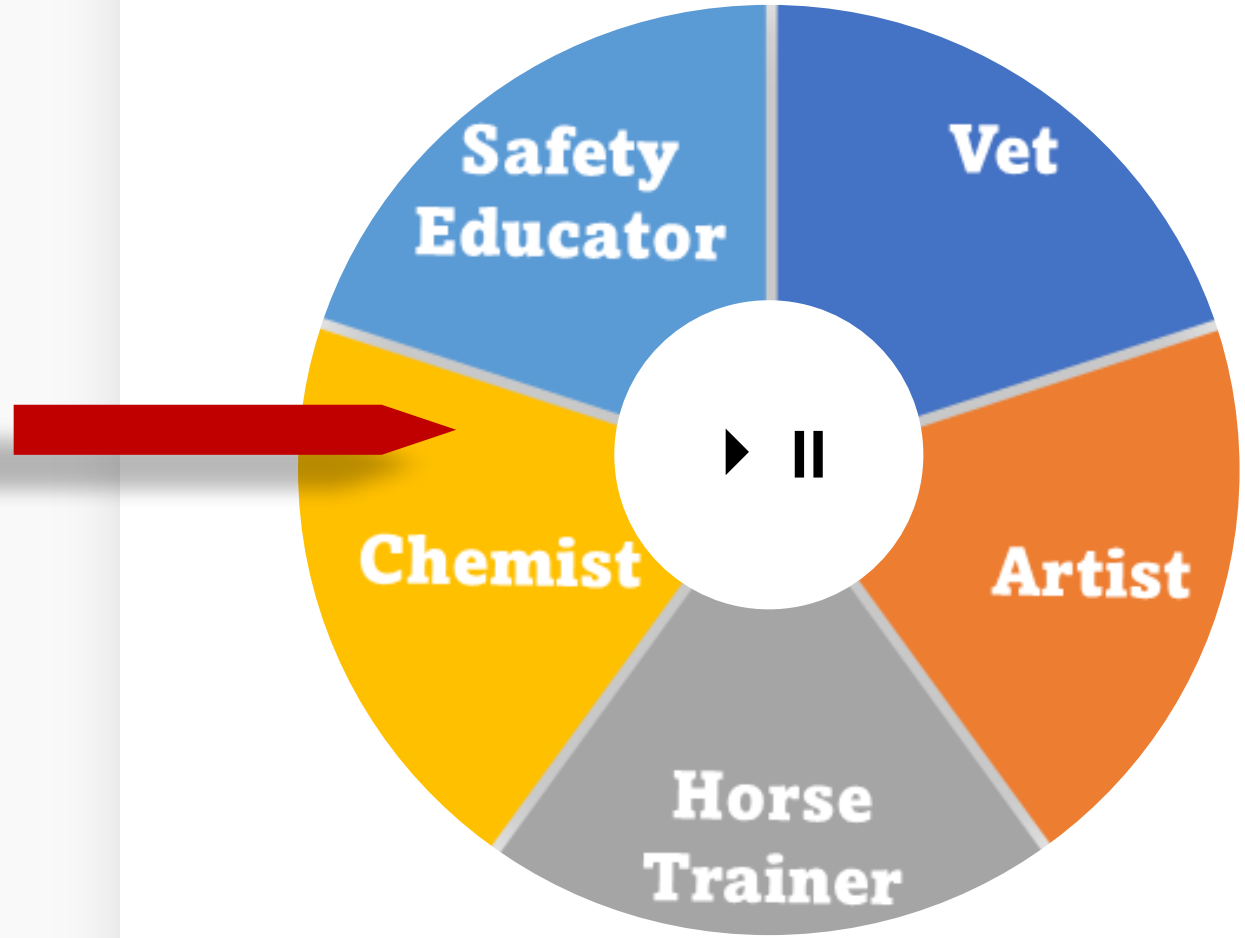
ОСНОВАННОЙ НА ИХЪ АТОМНОМЪ ВѢСѢ И ХИМИЧЕСКОМЪ СХОДСТВѢ.

			Ti=50	Zr= 90	?=180.
			V=51	Nb= 94	Ta=182.
			Cr=52	Mo= 96	W=186.
			Mn=55	Rh=104,4	Pt=197,1.
			Fe=56	Ru=104,4	Ir=198.
			Ni=Co=59	Pd=106,6	Os=199.
H=1			Cu=63,4	Ag=108	Hg=200.
	Be= 9,4	Mg=24	Zn=65,2	Cd=112	
	B=11	Al=27,3	?=68	Ur=116	Au=197?
	C=12	Si=28	?=70	Sn=118	
	N=14	P=31	As=75	Sb=122	Bi=210?
	O=16	S=32	Se=79,4	Te=128?	
	F=19	Cl=35,5	Br=80	I=127	
Li=7	Na=23	K=39	Rb=85,4	Cs=133	Tl=204.
		Ca=40	Sr=87,6	Ba=137	Pb=207.
		?=45	Ce=92		
		?Er=56	La=94		
		?Yt=60	Di=95		
		?In=75,6	Th=118?		

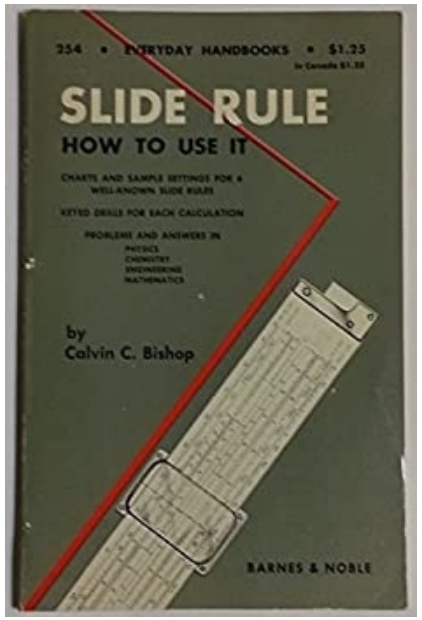
Д. Менделѣевъ

We are all a product of our life experiences. Learning to utilize learned experiences and making choices based on interest and ability took me to unexpected heights.

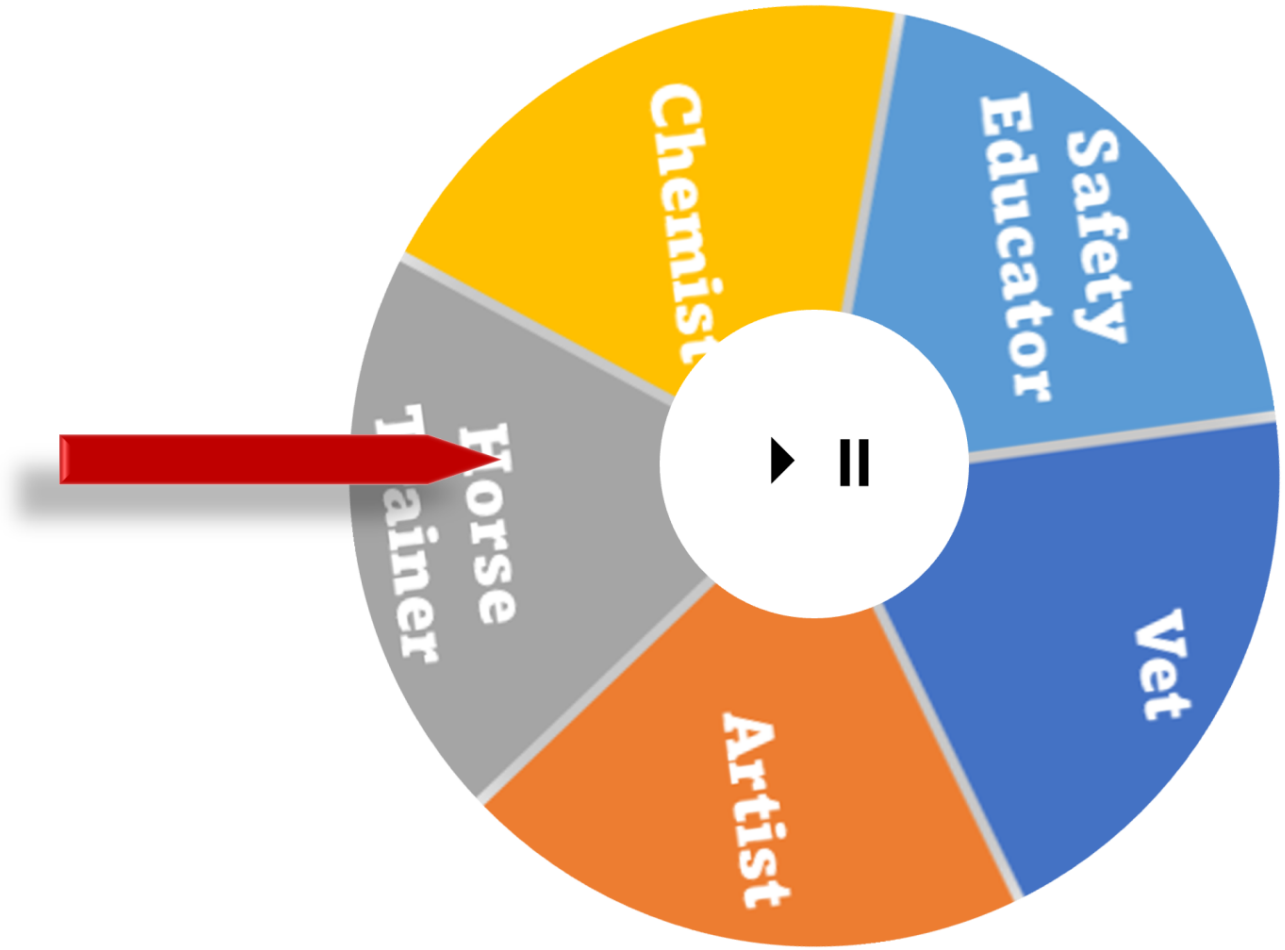
Additionally, utilizing rejections made me resilient.



High School Chemistry



1	D	1	9122	1	11 GPE 1	069	WASHKA	GGYM	B D D
1	D	2	0660	2	2SEM STDY	036	MACADAM	C008	
2	D	3	2134	6	US HIST	091	TARAS	A018	B B B C B B A B
3	D	3	5124	1	SPAN IIA	011	EDELMAN	B009	A A B B B B C B
4	D	3	1084	8	PHASE III	032	JOHNSON	A013	C B C C B C B C
5	D	3	4114	3	CHEM B	079	WHITE	B006	C C E E D B C D
6	D	3	3074	F	GEOM	053	MUNFAKH	A034	B B C C C C C C


Chemist
Safety Educator
Vet
Artist
Horse Trainer

Nitrofurazone/DMSO for Horses

Nitrofurazone is an antibacterial used to treat skin and wounds in horses.

Nitrofurazone/DMSO for Horses

- I learned 40 years ago that DMSO was a carrier agent that enhanced the absorption of other therapeutics.
- I learned to wash my hands BEFORE applying the treatment and to wear gloves.
- I also learned that I am a taster.

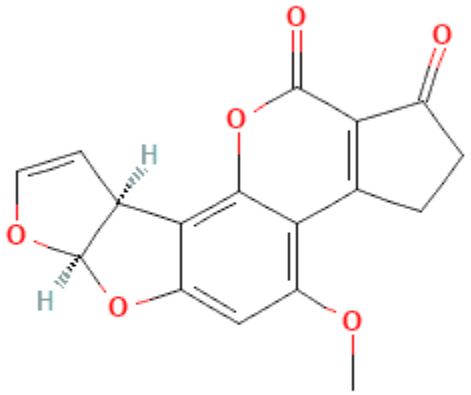
Nitrofurazone/DMSO for Horses

The oral LD_{50} of dimethyl sulfoxide in the dog is greater than 10 gm/kg.

However, careless use can result in exposure to a toxicant.

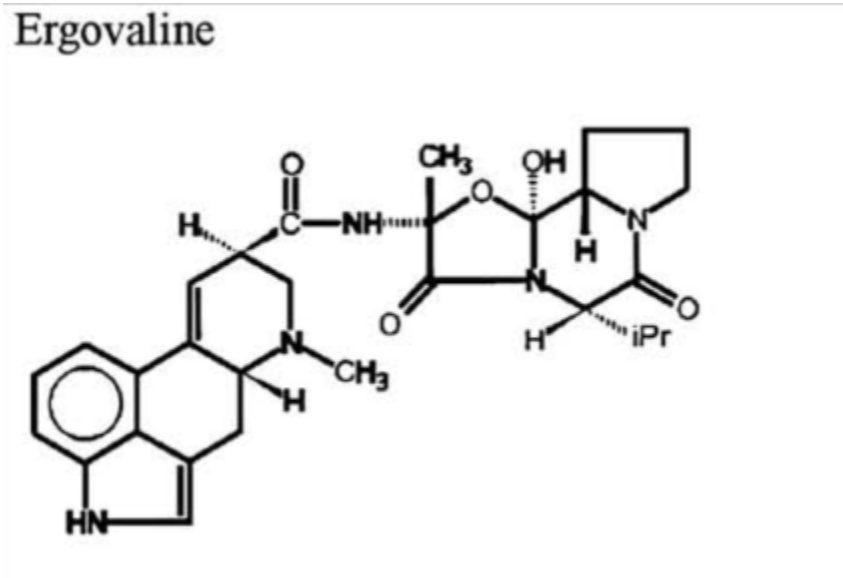
Horses are Very Susceptible to Mycotoxins

Aflatoxins (*Aspergillus)*



Aflatoxin B1 PubChem

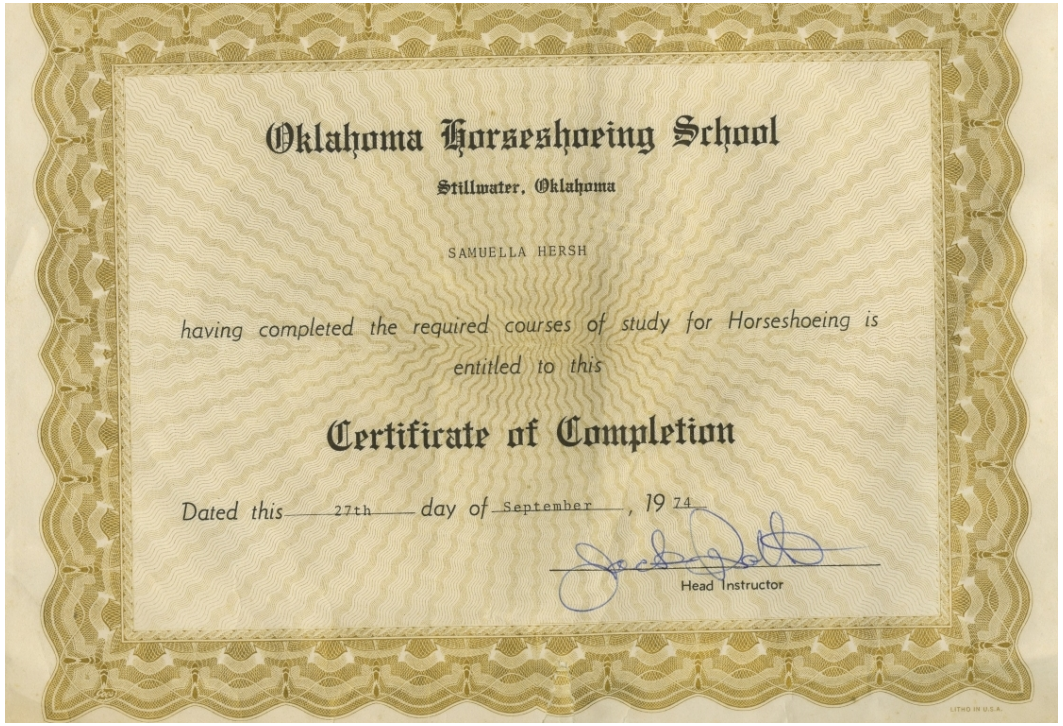
Fescue Toxicosis



R Fayrer-Hosken et al Vol 28, No 11 (2008) Journal of Equine Veteranary Science

Horseshoeing

I learned that unless it is red, hot metal looks just like cold metal.



Oklahoma Horseshoeing School

Stillwater, Oklahoma

SAMUELLA HERSH

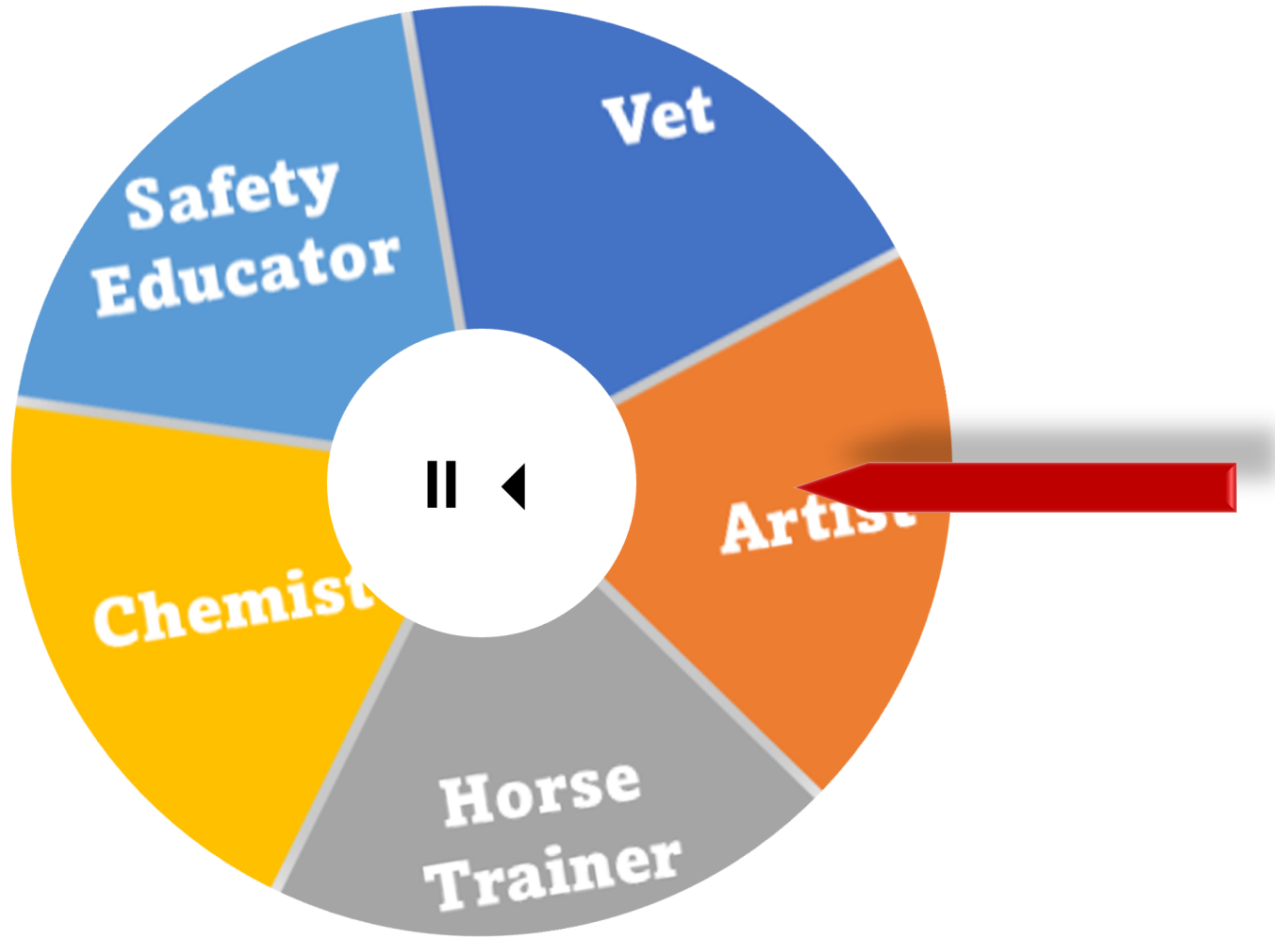
having completed the required courses of study for Horseshoeing is entitled to this

Certificate of Completion

Dated this 27th *day of* September, 19 74

Head Instructor


REJECTED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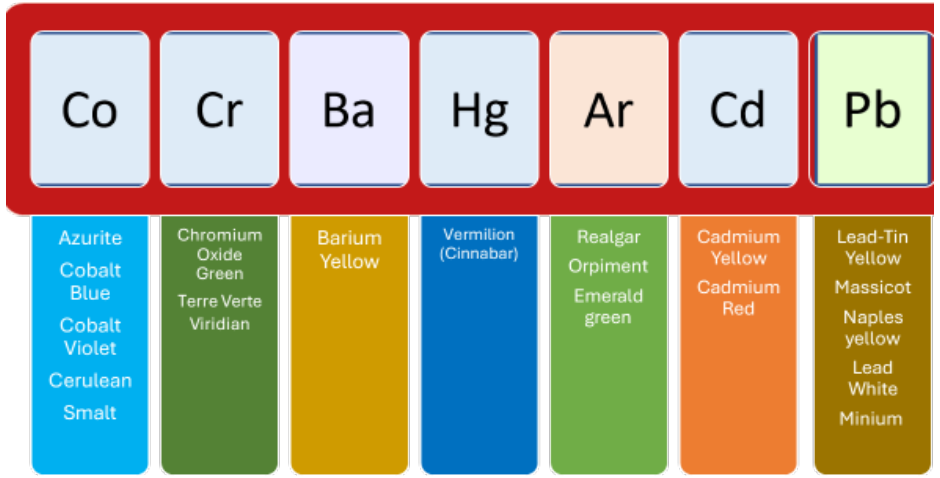
Chemist
Horse Trainer

Pigments are not just pretty colors

There are a lot of acutely and chronically toxic pigments.



https://www.jcsparks.com/painted/pigment-chem.html#Vermilion

During this time, I learned not “point” your brushes with your mouth…

INORGANIC PAINT PIGMENT COMPOUNDS

A number of inorganic compounds can be used as pigments in paints. Many of these compounds are coloured due to the absorption of light energy by electrons in d orbital subshells, meaning we see colours depending on which wavelengths of light are not absorbed by the compound.

CARBON BLACK

Carbon, C

CERULEAN BLUE

Cobalt (II) stannate, Co_2SnO_4

CHROME GREEN

Chromium (III) oxide, Cr_2O_3

COBALT VIOLET

Cobalt (II) phosphate, $Co_3(PO_4)_2$

CADMIUM ORANGE

Cadmium sulfoselenide, Cd_2SSe

TITANIUM WHITE

Titanium dioxide, TiO_2

ANTIMONY WHITE

Antimony trioxide, Sb_2O_3

ZINC WHITE

Zinc oxide, ZnO

ULTRAMARINE BLUE

Sulfur-containing sodium silicate, $Na_4Al_4Si_6S_4O_{20}$

PRUSSIAN BLUE

Ferric hexocyanoferrate, $Fe_7(CN)_{18}$

COBALT BLUE

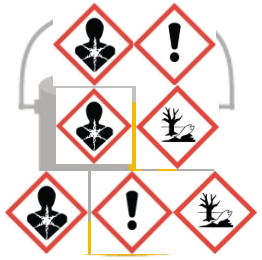
Cobalt (II) aluminate, $CoAl_2O_4$

VIRIDIAN GREEN

Hydrated chromium oxide, Cr_2O_3

CADMIUM GREEN

Cadmium sulfide & chromium (III) oxide



CADMIUM YELLOW

Cadmium sulfide, CdS

CHROME YELLOW

Lead chromate, $CdPbO_4$

ZINC YELLOW

Zinc chromate, $ZnCrO_4$

CADMIUM RED

Cadmium selenide, CdSe

RED OCHRE

Iron (III) oxide, Fe_2O_3

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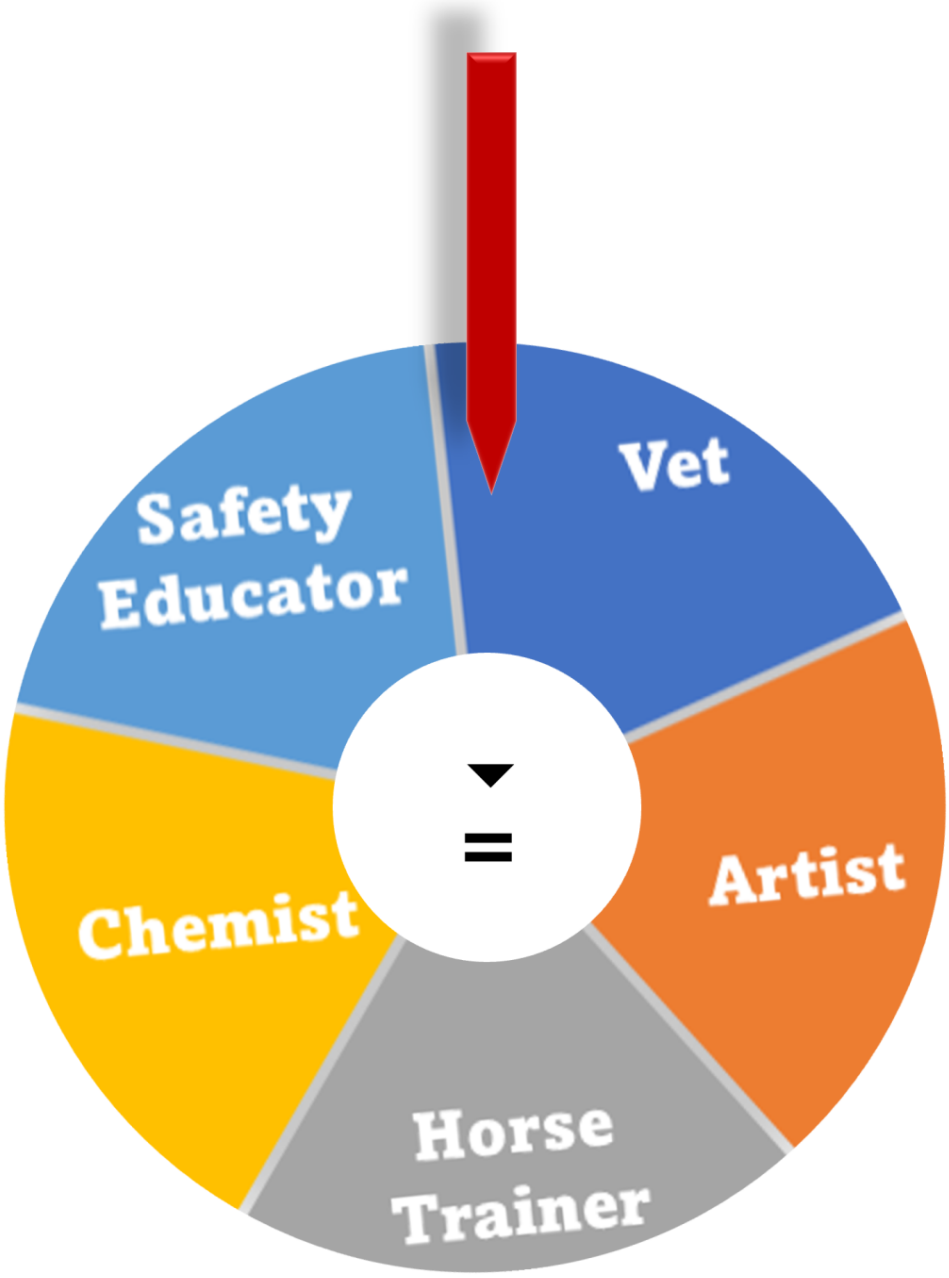
Vet
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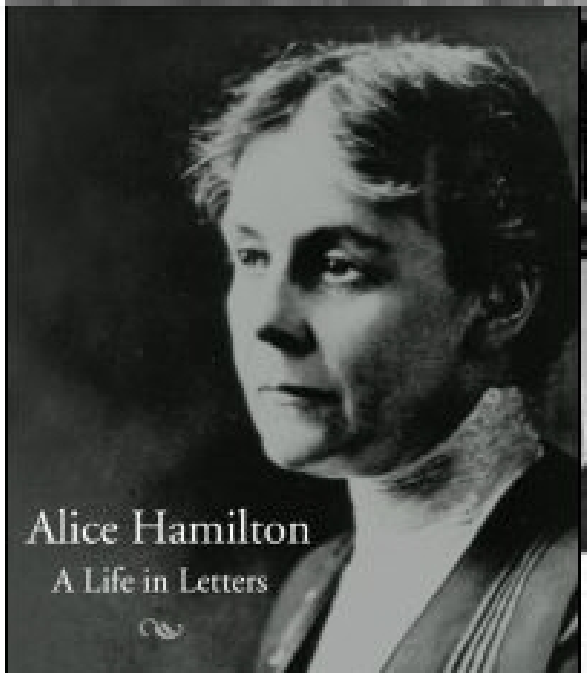
Horse Trainer
Chemist
Safety Educator

20th Century Advocates

Aldo Leopold (1887 – 1948)

Alice Hamilton (1869 – 1970)

Rachel Carson (1907 – 1964)



Osmium Tetroxide

Pictogram(s)

Corrosive Acute Toxic

Signal	Danger
GHS Hazard Statements	H300: Fatal if swallowed [Danger Acute toxicity, oral] H310: Fatal in contact with skin [Danger Acute toxicity, dermal] H314: Causes severe skin burns and eye damage [Danger Skin corrosion/irritation] H330: Fatal if inhaled [Danger Acute toxicity, inhalation]

FIXATION OF SUSP

A. Preparation of tissue

1. Obtain culture of unicellular organisms. These usually require listilled water heated to 60° C and mixed thoroughly until it dissolves
2. Cool the material until it gels and then cut the material into 1

B. Fixation

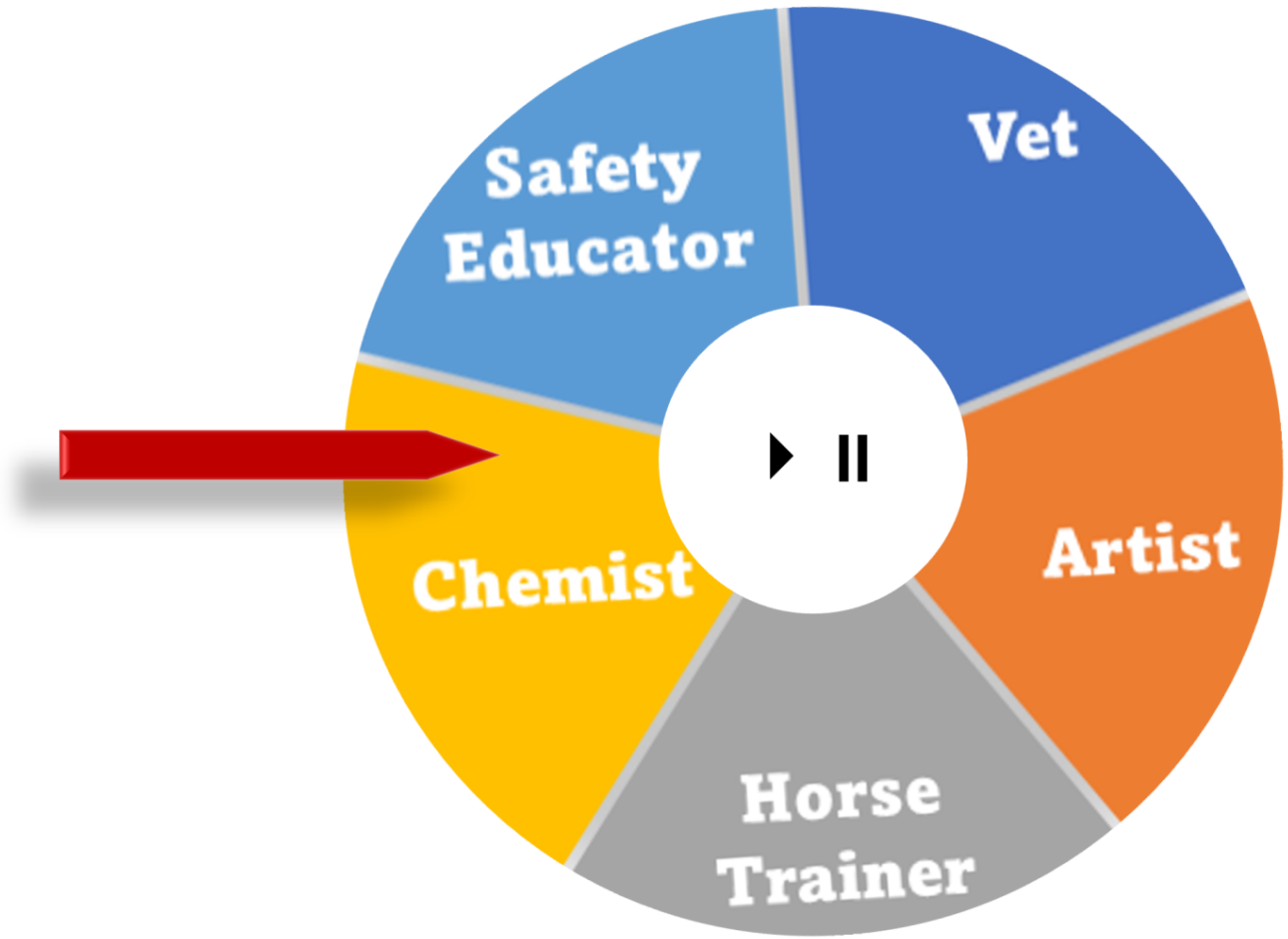
1. Transfer tissue to a vial of 3% glutaraldehyde in 0.1 M cacod t results! After one hour, transfer material to refrigerator at 4° C.
2. Tissue may be processed immediately or held up to several months in a holding solution of 0.1 M cacodylate buffer at pH of fixation at 4° C.
3. Rinse tissue with three changes of cold buffer, 10 minutes per change.
4. Postfix in cold 2% osmium tetroxide (mixed 1:1 4% osmium with the 2X buffer) for 30 minutes to 2 hours on ice or in the refrigerator. Work with uncapped osmium solutions only under the fume hood.
5. Rinse tissue with cold buffer for 10 minutes.

C. Dehydration

1. Dehydrate the tissue using the following concentrations of ethanol in a cold graded ethanol series (10 minutes per change): 30%, 50%, 70%, 80%, 90%, 100%. If you have to stop at any point in the dehydration process 70% ethanol is best.
2. Continue dehydration with two more changes of cold 100% ethanol (10 minutes per change).
3. Follow cold 100% ethanol with one 10 minute change of cold (1:1) 100% ethanol : propylene oxide. Use propylene oxide in the fume hood.
4. Complete dehydration with three changes of propylene oxide in the refrigerator, 10 minutes per change. Bring the tissue slowly to room temperature.

D. Infiltration

1. Infiltrate tissue using the following concentrations of Spurr's resin, approximately 2-4 hours per change or longer: (1:2) Spurr's resin : prop. oxide, (2:1) Spurr's resin : prop. oxide. Refractory material may take up to one day per change.
2. Use two changes of 100% Spurr's resin (2 hours or more per change).
3. Embed in fresh Spurr's resin (less than one day old). Polymerize for 6 to 8 hours at 70° C.


Safety Educator
Vet
Chemist
Artist
Horse Trainer

Chemistry

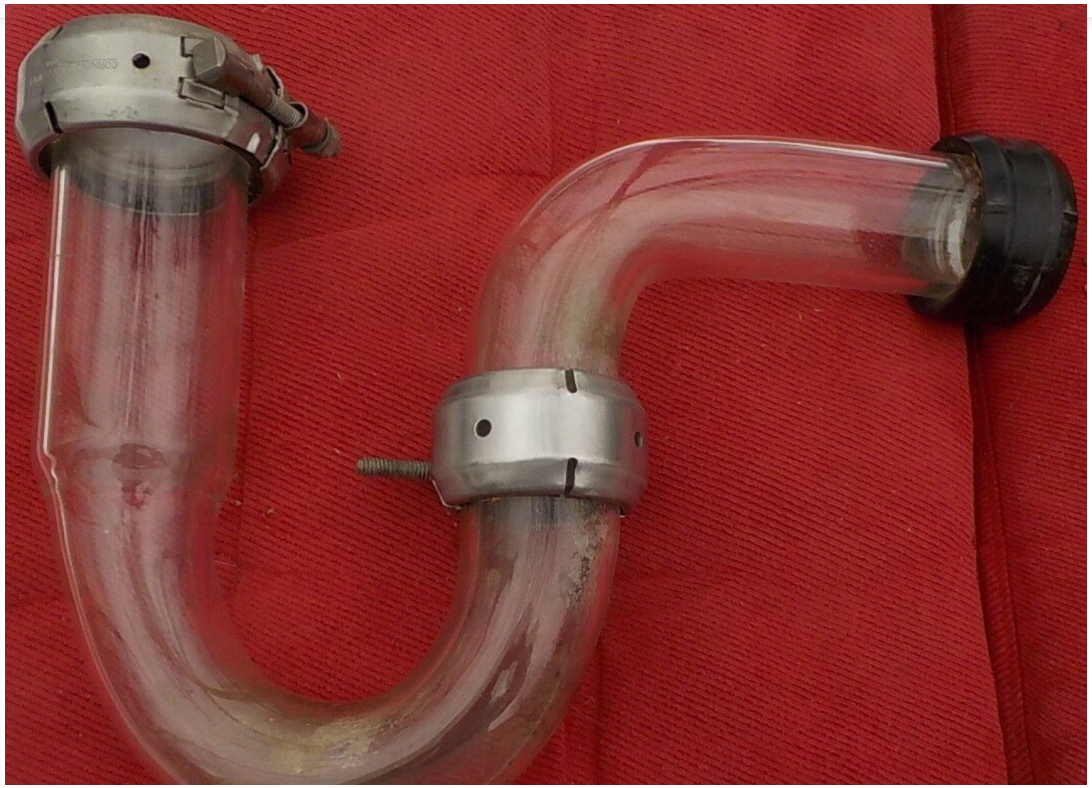
They have calculators now!! Yeah.

Reactivity of Nitric Acid

All of my graduate research required using 1+1 HNO_3.

Our AAS lab sink had glass traps and my research advisor warned that any combination of nitric acid and acetone would likely blow the glass trap.

I did not even allow acetone or other solvents in the lab.



All that is gold does not glitter,
Not all those who wander are lost;
The old that is strong does not wither,
Deep roots are not reached by the frost.

From the ashes a fire shall be woken,
A light from the shadows shall spring;
Renewed shall be blade that was broken,
The crownless again shall be king.

— J.R.R. Tolkien, The Fellowship of the Ring

So, Where Was I?

FROM HORSES

- I learned chemicals could be absorbed.
- I learned that hazards can be isolated to minimize risk and that routines (SOPS) minimize risk.
- I learned that there are many plant toxins that affect horses and humans.

FROM ART

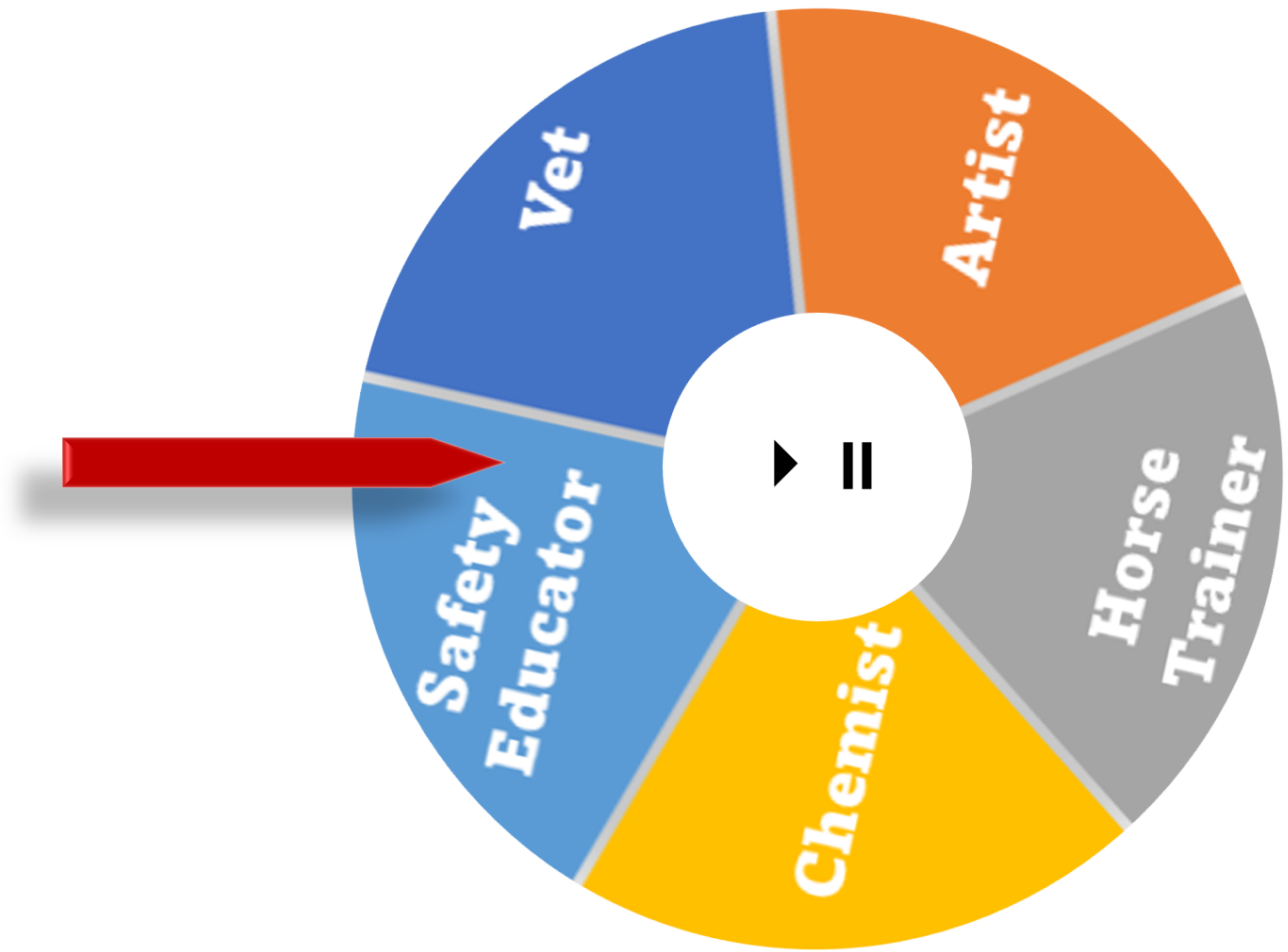
- I learned that toxicants can be ingested.
- I learned that solvents cause dermatitis and dissolve gloves.

FROM BIOLOGY

- I learned about how toxins affect systems.
- I learned how toxicants affect reproductive development.
- I learned that osmium tetroxide is nasty stuff….
- I learned about environmental pollutants, responsible use of chemicals, bioaccumulation, and biomagnification.
- I learned about inhalation hazards ventilation in labs.

FROM CHEMISTRY

- I learned not to mix nitric acid with acetone – and a lot of other stuff….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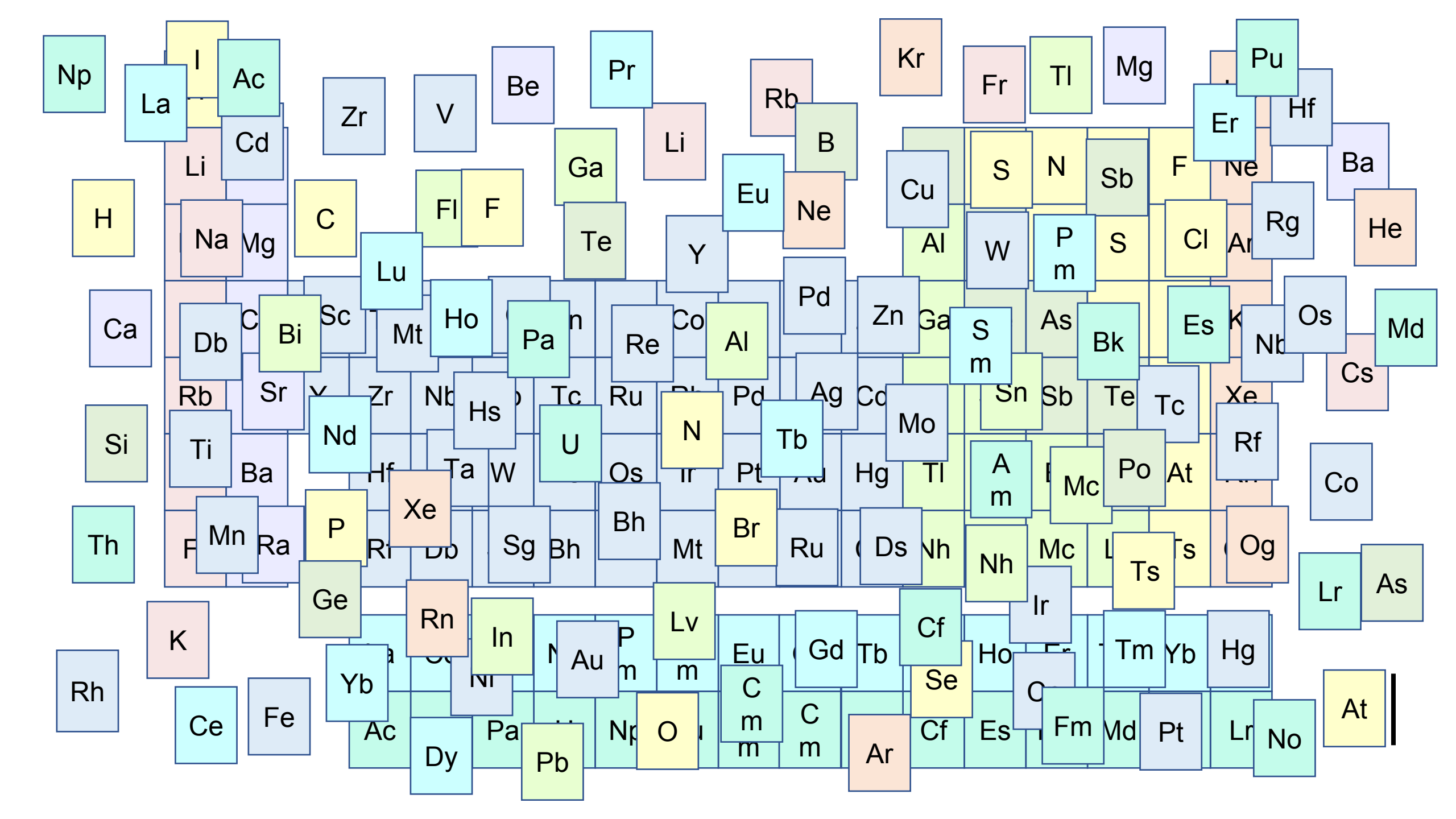
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La
Zr
V
Be
Pr
Kr
Fr
Tl
Mg
Pu
Cd
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Rb
B
Er
Hf
Ba
H
Na
Mg
C
Fl
F
Ga
Li
Eu
Ne
Cu
S
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Sb
F
Ne
Rg
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Np
O
Eu
m
C
m
C
m
Se
Ho
Ar
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Es
Fm
Md
Pt
Lr
No
At

Lifelong Leadership Skills

Work hard

Be resilient

Adapt

Know your own worth

Say “yes”

Do a lot of things until you find out what you are good at because everything you learn will make you better at that job…

Don’t be afraid to spin the wheel.

Thank you!