Minerals Lab

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Tentative breakdown on points

Lab = 30% of class grade

Month	Day	Lecture topic	Class	Exam	Points	Lab due	Points	Points
January	24	Introduction to lab work, Minerals Lab	L2					10
January	31	Volume lab, and Excel	L3		-	L2	5	
February	7	Igneous rocks	L4	Minerals and Maps	10	L3	5	5
February	14	Maps	L5			L4	5	5
February	19			NO CLASS				
February	21	Sedimentary rocks	L6	Igneous rocks	10	L5	5	5
February	28	Topo maps	L7			L6	5	5
March	7	Metamorphic rocks	L8	Sedimentary rocks	10	L7	5	5
March	14	Structural Geology	L9	Metamorphic rocks	10	L8	5	5
March	19			NO CLASS				
March	21			NO CLASS				
March	28	Relative and numeric ages, stratigraphy	L10			L9	5	5
April	4	Compases and cross sections	L11	Topography	10	L10	5	5
April	11	Geologic mapping/Field trip	L12			L11	5	10
April	18	Rivers lab	L13	Lab test	10	L12 (field)	10	5
April	25	Coast lab	L14			L13	5	5
May	2	Porosity, Permeability, and ground water flow	L15	Lab test	10	L14	5	5
May	9	Globa data lab	L16			L15	5	5
May	16	Horus Mission	LF		70	L16	5	

% of class grade

Notes (8%)

Reports (8%)

Exams (14%)

Lab note points are given out each class once you have reached a finishing point.
Come find me, show me your notebook, and I record some points for you.

What does it take to be a science?

What does it take to be a science?

Idea generation from **data**

Recording work and sharing results

You need records for:
Team work
Short term work
Remembering details

Quick cheat sheet:

1) Is there a table of contents?
2) Is there a date and time?
3) Is the authors name on it?
4) Is there contact information?
5) Is every task and observation from today recorded in the notes?
6) Can a trained scientist follow my thoughts and actions?
7) Is there some sort of introduction/summary to guide a general reader?

Bad news and good news

Bad news:
Your going to need notes because over the last 20,000 years the human brain has gotten about 10% smaller

Good news:
In a lab you should never be without your lab note book

Lab exams (Dates listed online)
Test and review skills we have learned in lab

Lab reports:
Think about your data, Think about and practice useful skills,

Grading every lab down to every detail takes a lot of time: Every 4-5 labs you will tell me which lab that you turned in you want me to grade. I will also grade other labs that you have turned in. Your grade for lab reports which I did not specifically grade will be an average of the material I did grade if it was turned in and looks complete.

L2:
L3:
L4:
L5:
L6:

L2: I decided to grade this one
L3:
L4: Grade this one!
L5:
L6:

L2: 4/5
L3:
L4: 5/5
L5:
L6:

L2: 4/5
L3: 0 points (not turned in)
L4: 5/5
L5: 4.5 points
L6: 4.5 points

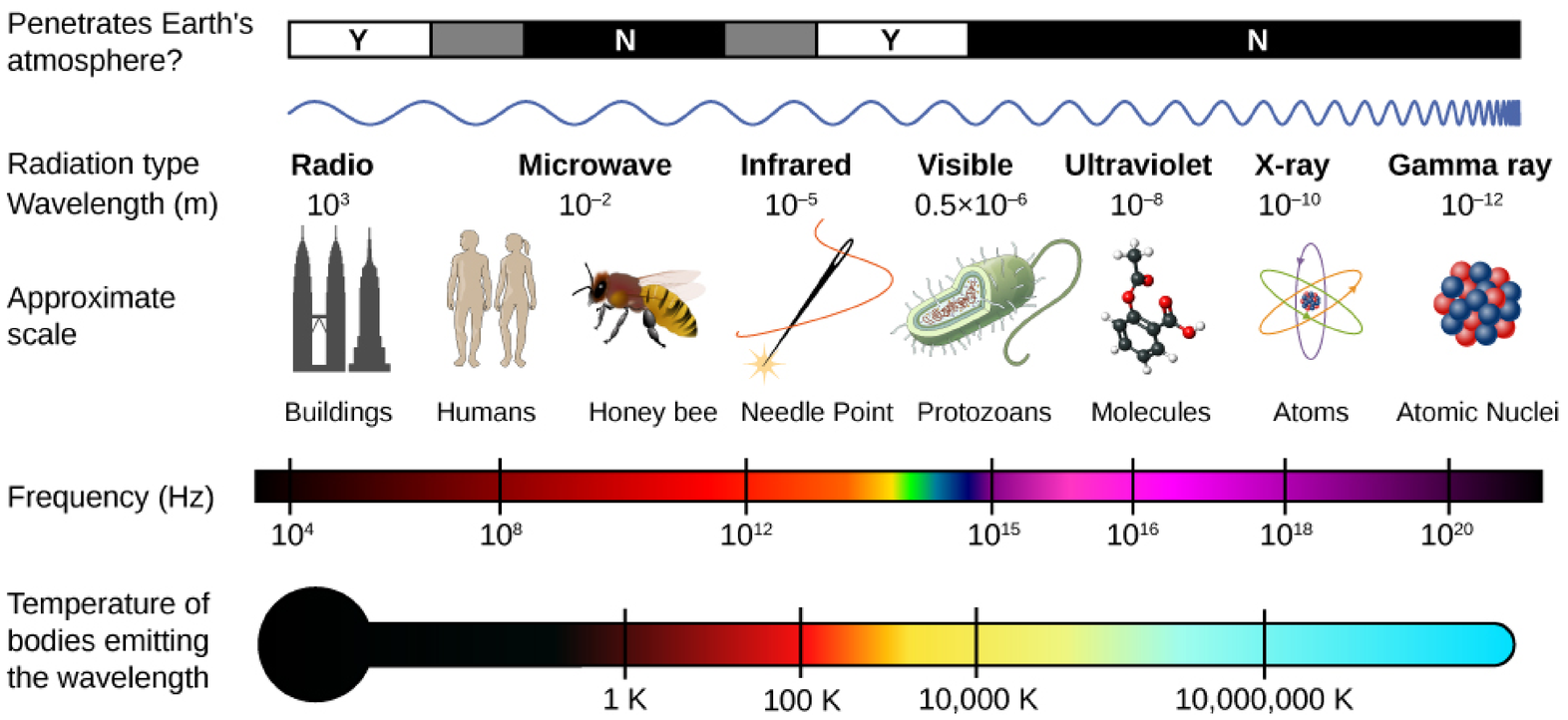
Minerals

Currently 3,800 known and named minerals

(most minerals are quite rare)

But how do we tell them apart?

How they react to the electromagnetc spectrum



How they react to the electromagnetc spectrum

Eyes!

Colors (of the mineral) and Streak
Transition metals

Morphology (shape of minerals)

Luster (Effects of light outside of color)

Luster

Dull (Earthy): This luster lacks a shine to it, and could also be described as a "matte" finish.
Greasy: This luster has a glossy look on the surface, but a creamy slightly see through interior.
Waxy: This luster looks just like candle wax (when it is cold).
Resinous: This is the luster of amber (if you have ever seen that).
Metallic: This is an appearance like aluminum foil, or any other piece of metal for that matter.
Submetallic: This luster is similar to metallic luster, but is slightly less reflective than metallic (duller).
Adamantine: This is the "fire" of a diamond (or cubic Zirconia).
Vitreous (Glossy): A glossy surface and you can peer into the mineral past its glossy surface.
Pearly: This luster has a gloss shine to it, but with an added reflection and shimmer.
Silky: This luster has a spider web or silk thread appearance.

Cleavage and fracture

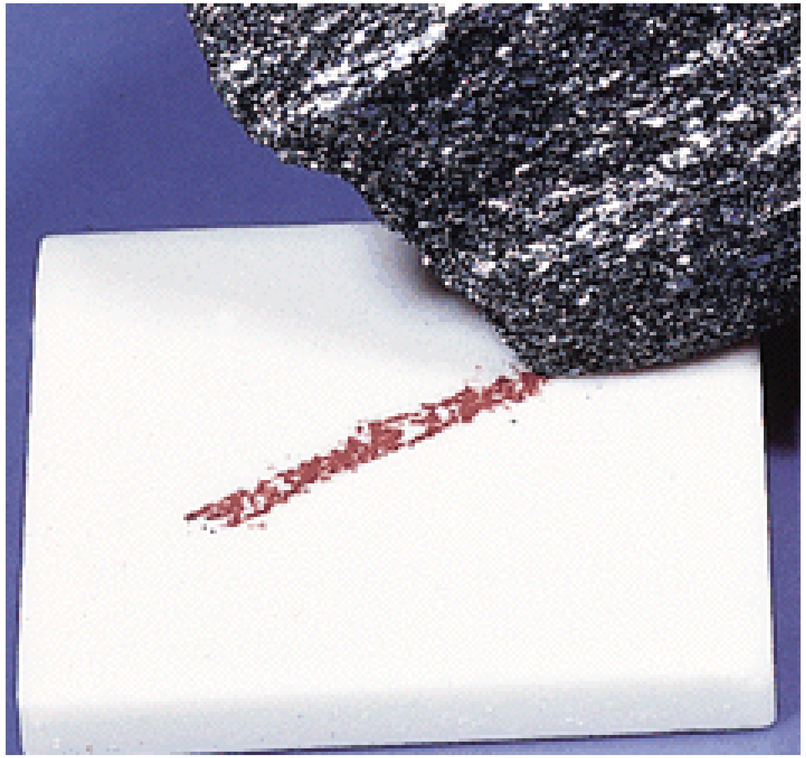
Mohs hardness

talc	1
gypsum	2
calcite	3
flourite	4
apatite	5
feldspar	6
quartz	7
topaz	8
corundum	9
diamond	10

talc	1
gypsum	2
Finger nail	2.5
calcite	3
Penny	3.5
flourite	4
Iron nail	4.5
apatite	5
Glass	5.5
feldspar	6
Steel	6.5
Streak plate	7
quartz	7
topaz	8
corundum	9
diamond	10

Reactivity to acid

Streak



Density

Electron probe microanalysis

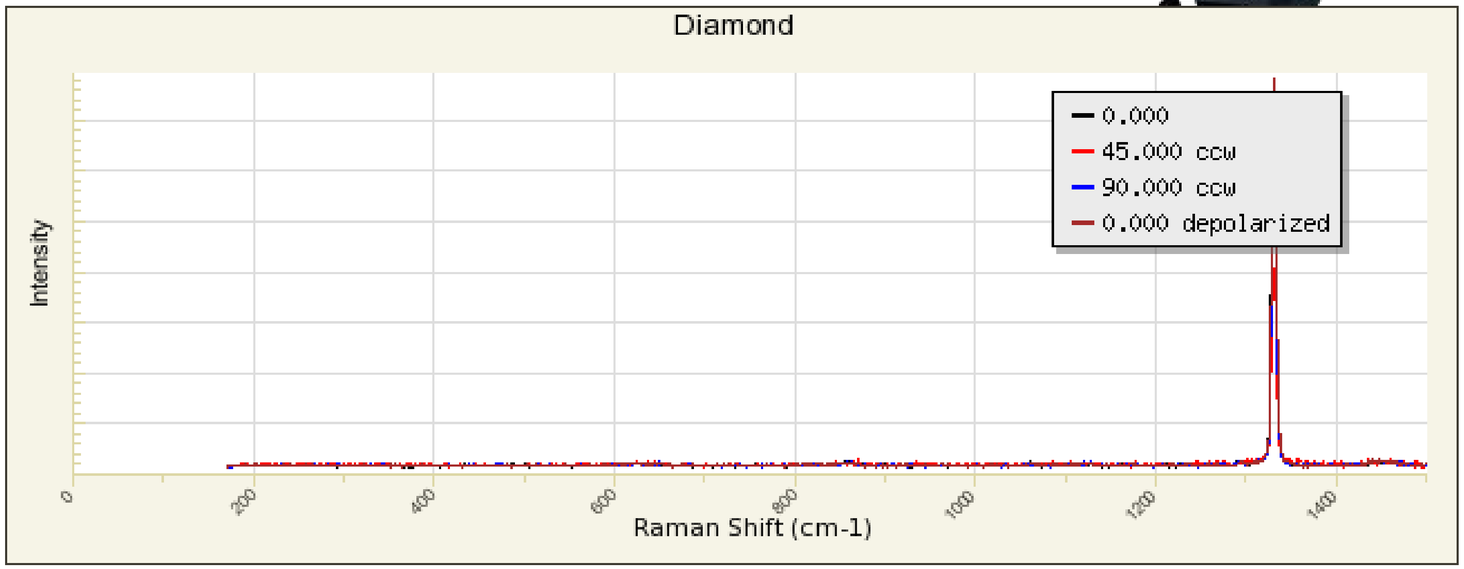
Very accurate compositions
Requires an expert to run

Pick 5 elements to check
Pick 2 minerals
Bring them up to me for EPMA

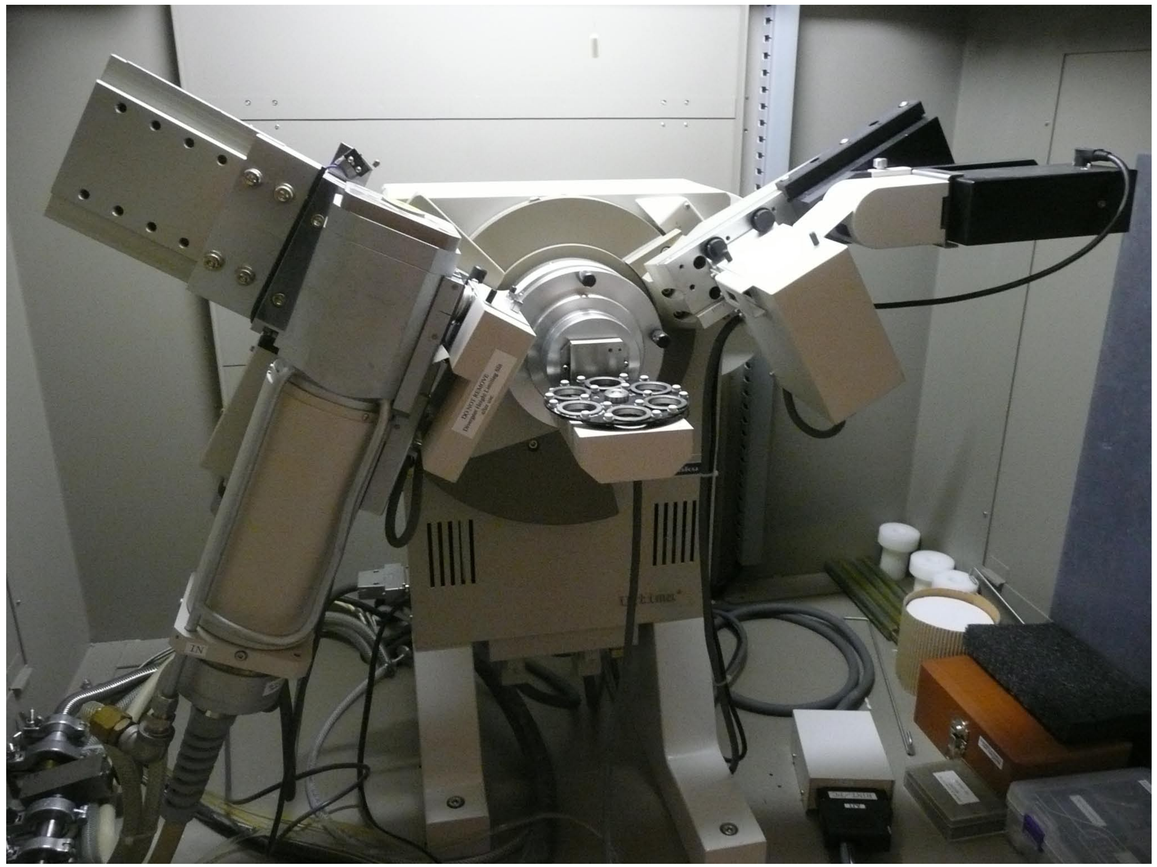
Data will go into the spread sheet

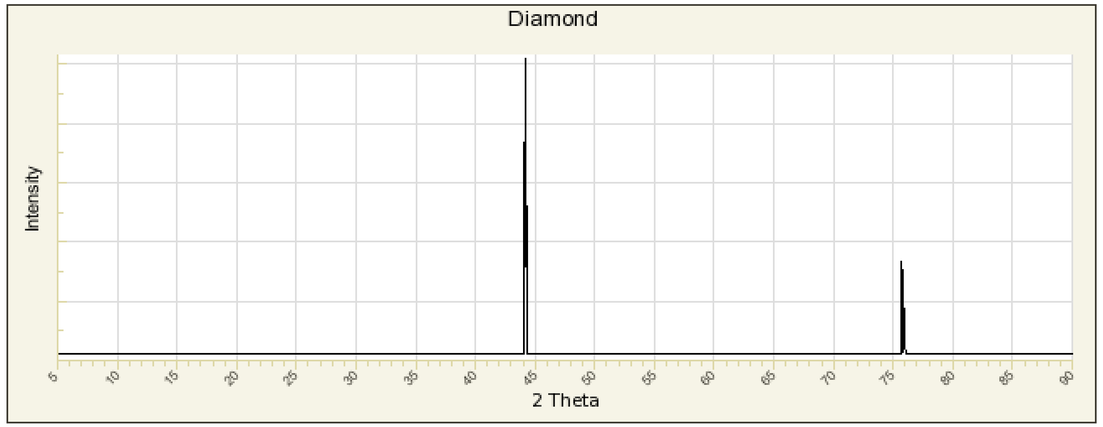
Raman and IR


FT/IR-6300


Diamond
0.000
45.000 ccw
90.000 ccw
0.000 depolarized
Intensity
0
200
400
600
800
1000
1200
1400
Raman Shift (cm-1)

X-ray diffractometer





Handheld Raman

Converting composition