Name _____ Period. _____ Score

Chem RG Chapter Packet 1 – Science of Chemistry; Mr. Nogales Peer Review/corrected score

Assign	Section #	Name		
1.		Assignment Sheet printed (10 pts)		
2.		LabApparatus.jpg printed (keep in your 3-ring binder/lab notebook) Also, keep Costa's Levels of Thinking in your binder. (10 pts)		
3.		Notes 1.1 (10 pts)		
4.		Notes 1.2 (10 pts)		
5.		Notes 1.3 (10 pts)		
6.	1.1a	WS 1.0 Math Skills Update (10 pts)		
7.	1.3	Element Names Chem Worksheet 1.3 (2 pages) (10 pts)		
8.		Ch 01 Test Review (35pts)		
9.		Section and End of Chapter Summaries using Costa's Levels of Thinking (25 pts)		

Notes: (Total Points = 130)

1. Your lab report is turned in by itself and receives a separate grade. 50 pts.
2. You will peer edit and have your editor record a score based on your work.
3. For each section, you need to use 2-3 Costa's Levels of Thinking(CLOT)questions and answer the questions.
4. Extra credit for doing at least 4 types of evidence/(below) for each set of notes/Annotate.(10 pts)
5. Please note that if you are required to show work, and you do not show your work, you will not receive credit.

EVIDENCE (after you take notes.) You should have at least 4 types of evidence for each set of notes.

1.	Number new concepts	1,2,3…/A,B,C…	2.	Delete/Cross out unimportant information	~~Unimportant~~
3.	Circle vocab/key terms	Key Terms	4.	Identify points of confusion	?
5.	Underline/Highlight main Ideas	Main Ideas	6.	Identify information to be used on a test, essay…	*
7.	Fill in gaps of information. Reword or paraphrase.	^	8.	Create visuals/symbols of important information	Visuals/symbols

YOU MUST DO YOUR WRITE-UP IN YOUR LAB BOOK!!
(NO CREDIT JUST BY FILLING IN BLANKS ON THIS PAPER)

Separation of Mixtures

Objectives

Identify **chemical and physical proper- ties of substances.**

Relate **knowledge of properties to the task of separating mixed items.**

Identify **as many methods for separat- ing the items as pos- sible.**

Separate **the compo- nents of a mixture.**

Analyze **success of methods for purify- ing mixtures.**

Design and imple- ment **your own procedure.**

Situation

CNUSD is holding a Science Olympics, and our class has volunteered to prepare challenge packages containing a mixture of sand, salt, iron filings, and poppy seeds. The Science Olympics participants must separate each component of the mixture. Your teacher has asked you to try the challenge so you can develop guidelines for evaluating the contestants' procedures.

Background

A mixture combines 2 or more types of matter and is separated by physical means. Some methods will work for some components, but not for others.

Problem

To prepare guidelines for evaluating the task, you must do the following.

- 1. Identify as many physical and chemical properties of the sub- stances in the mixture as you can.
- 2. Figure out how to use these properties to identify as many dif- ferent methods of separation as you can.
  - Evaluate the methods to determine which is the best.
  - Perform this method, and record the time it takes.

Safety: Wear safety goggles, pin long hair, sleeves up.

Materials

- 8-well micro-chemistry strip
- Aluminum foil
- Cellophane
- Cotton balls
- Distilled water
- Filter paper
- Forceps
- Glass funnel
- Magnets
- Microfunnel
- Paper clips
- Paper towels
- Petri dish
- Pipets
- Plastic forks
- Plastic spoons
- Plastic straws
- Rubber stoppers
- Sample of mixture
- Tape
- Test-tube holder
- Test-tube rack
- Test tubes
- Tissue paper
- Wood splints

Preparation

1. Before you begin, develop a plan for separating the components of the mixture. Start by trying to determine which properties of a component in the mixture are not shared by most of the others. When you you know what to do, **write down the entire plan in your lab notebook before you proceed.** Estimate how long each step will take so that you can plan your time in lab more effectively. Plan lengthy steps first!

Technique

2. Get a mixture sample, petri dish, microfunnel & a microwell plate. Use the microfunnel to place a small part of your sample in the 1st well so you can compare your separated components to the original mixture. Put a small piece of tape over the opening so the contents will not spill out.

3. Record the time when you start in your lab notebook.

4. Using any or all of the items listed in the materials list, use the Procedure you created to separate & recover all 4 components of the rest of the mixture.

Make as many observations as possible at each step, and record exactly what you do in your in your lab notebook.

6. After separating the first component, put a small amount of it in the 3rd well of the microwell plate, leaving the 2nd well empty between the mixture in the 1st well & the purified component in the 3rd well. Put a small piece of tape over the opening of the well.

7. As you separate each component, place small amounts in the 4th through 6th wells of the microwell plate. Place a small piece of tape over the after it is filled, so the contents do not spill out.

8. When all of the components have been separated, ask the teacher or lab assistant to inspect the samples and approve your work. Then record how long it took.

9. Examine the microwells of 2 other lab groups. Record observations about the purity of each lab group's samples. Record observations about the amount of time each lab group took.

Cleanup and Disposal

10. Put each recovered component in the LABELED disposal containers. Clean your equipment & lab station.

Conclusions (Write "Conclusions" in your write-up

1. **a.** What made you decide to do your procedural steps in the order that you did them?
b. Would any order have worked?

2. If you were able to do the lab over again, what two things would you do differently?
a.

b.

3. For each of your components, describe a specific physical property that enabled you to separate it from the rest of the mixture. E.g. if one of your components you needed to separate was glass beads you could write: "Glass doesn't dissolve in water."

Extensions

1. Applying Ideas

How would you separate each of the following two-part mixtures?
a. lead filings and iron filings
b. sand and gravel
c. sand and finely ground plastic foam

Hint: Think about how you separated similar items in this lab.

HC 1.1 What is Chemistry

Add additional notes and show extra calculations on the back of these pages

- The study of the matter, its composition, properties, and the _____ it undergoes.
- Chemical - any substance that has a _____ composition.

Chemical Reactions

- When one or more substances are changed into _____ substances.
- Reactants - stuff you _____ with
- Products - What you _____
- HAVE _____ PROPERTIES
- Not easily _____

Kinetic Molecular Theory

- KMT
  - Particles of matter are _____.
  - The kinetic energy (speed) of these particles _____ as temperature _____.

Four States of Matter

- Solids
  - _____ KE - particles vibrate but can't move around
  - _____ shape
  - _____ volume

Four States of Matter

- Liquids
  - _____ KE - particles can move around but are still close together
  - _____ shape
  - _____ volume

Four States of Matter

- Gases
  - _____ KE - particles can separate and move throughout container
  - _____ shape
  - _____ volume

Four States of Matter

- Plasma
  - _____ KE - particles collide with enough energy to break into charged particles (+/-)
  - gas-like, variable shape & volume
  - stars, fluorescent light bulbs, CRTs

Physical vs. Chemical

- Physical Change
  - changes the form of a substance _____
  - properties remain the _____
- Chemical Change
  - changes the _____ of a substance
  - products have _____ properties

Physical Changes

- A change that changes appearances, without changing the _____.
- Boiled water is still water. $H_2O_{(l)} \rightarrow H_2O_{(g)}$

Physical or Chemical Change?

- Tearing a sheet of paper. _____
- Melting a piece of wax. _____
- Burning a log _____

Physical vs. Chemical

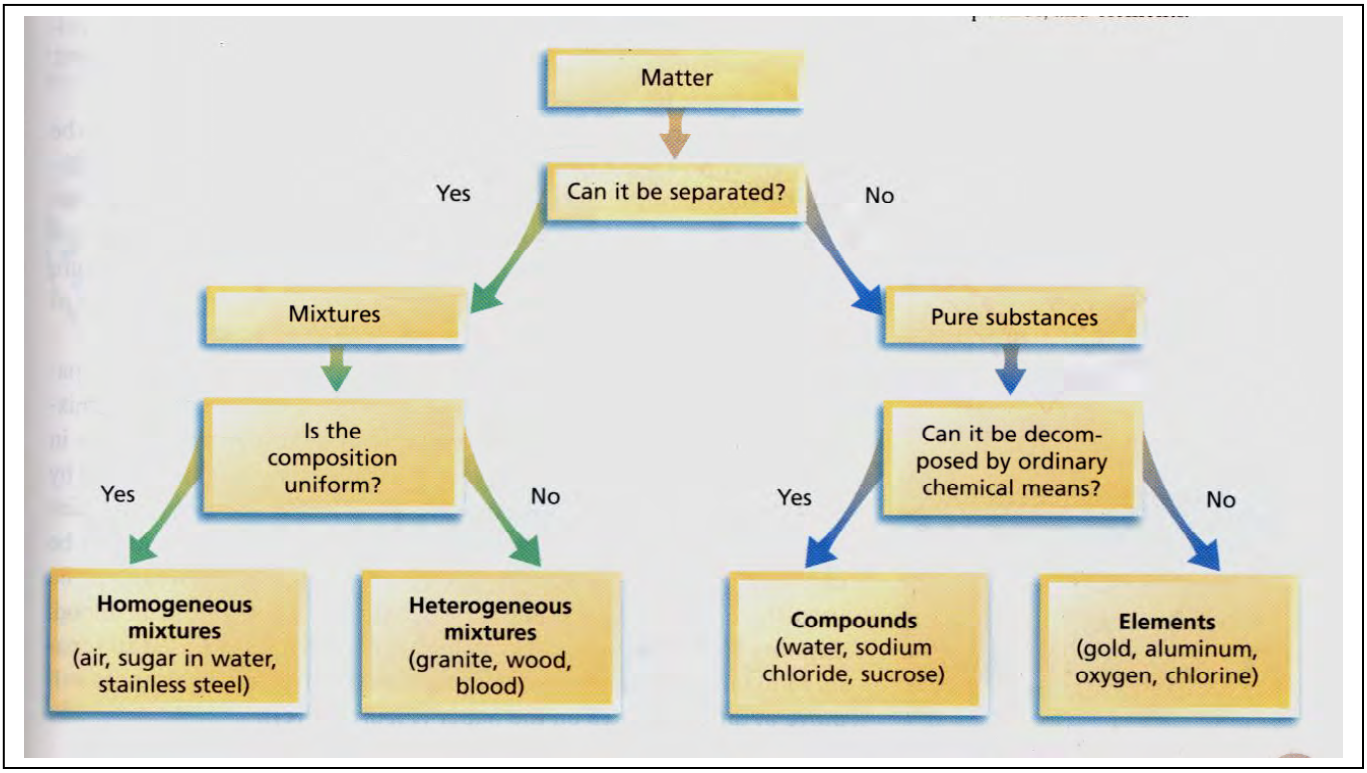
- Signs of a Chemical Change
  - change in color or _____
  - formation of a gas
  - formation of a precipitate (solid)
  - change in _____ or heat

Physical vs. Chemical

- Examples:
  - rusting iron _____
  - dissolving in water _____
  - burning a log _____
  - melting ice _____
  - grinding spices _____

HC 1.2 Describing Matter

II. Classification of Matter



HC 1.2 Describing Matter

✦ Matter is anything that takes up _____ and has _____.

✦ Mass is the _____ of matter in an object.

✦ Mass is _____ _____ _____ along a smooth and level surface (inertia).

✦ Mass is _____ the same as weight.

Units of Measurment SI Units

Little unit _____ number = Big unit _____ number

SI Prefix Conversions

Conversions pp

✦ Change 5.6 m to millimeters _____

25 mg to grams _____

0.45 km to mm _____

35 mL to liters_____

SI Prefix Conversions

1) 20 cm = _____ m

2) 0.032 L = _____ mL

3) 45 μm = _____ nm

4) 805 dm = _____ km

Write the conversion factors for the following

- kilograms to grams. Answer . . .
- 1 kg/1000 g or 1000 g /1 kg
- feet to inches. Answer . . .
- _____ or _____
- 1.096 qt. = 1.00 L Answer . . .
- 1.096 qt/1.00 L or _____

Derived Units

- Combination of base units.
- Volume (m^3 or cm^3)
  - length × length × length

Physical vs. Chemical

- Physical Property - can be observed _____ changing the identity of the substance
- Chemical Property - ability of a substance to undergo _____

Physical vs. Chemical

- Examples:
  - melting point
  - flammable
  - density
  - magnetic
  - tarnishes in air

Extensive vs. Intensive

- Extensive Property - depends on the _____ of matter present
- Intensive Property = depends on the _____ of substance, not the amount

Extensive vs. Intensive

- Examples:
  - boiling point
  - volume
  - mass

- density
- conductivity

Density

✦ D = m / v (triangle method)

✦ An Intrinsic physical property

Calculating

✦ The units tell you how to calculate.

✦ units will be g/mL or g/cm^3

Some of these next problems are not reviewed on the vodcast. You need to do them on your own.

✦ A piece of wood has a mass of 11.2 g and a volume of 23 mL what is the density?

✦ A piece of wood has a density of 0.93 g/mL and a volume of 23 mL what is the mass?

✦ An object has a volume of 825 cm^3 and a density of 13.6 g/cm^3. Find its mass.

✦ A liquid has a density of 0.87 g/mL. What volume is occupied by 25 g of the liquid?

Learning Check D1 pp

Osmium is a very dense metal. What is its density in g/cm^3 if 50.00 g occupies a volume of $2.22cm^3$?

1) 2.25 g/cm^3
2) 22.5 g/cm^3
3) 111 g/cm^3

HC 1.3 Describing Matter

Pure Substances

- Element - composed of _____ atoms
- Compound - composed of 2 or more elements in a _____ ratio

Mixtures - _____ combination of 2 or more pure substances.

Basic Building Blocks of Matter

- Atom - smallest unit of an element that _____ _____ of that element.
- Element - _____ of only one kind of atom.
- Compound - pure substance of atoms of _____ elements that are _____ bonded.

Classification of Matter

- Substance- a particular kind of matter - pure. _____ _____ _____ throughout.
- Mixture- more than one kind of matter, each _____.

Mixtures

- Heterogeneous - mixture is _____ the same from place to place. (Chocolate chip _____)
- Homogeneous - _____ composition throughout. (Kool-_____)

Solutions

- _____ mixture
- Like all mixtures, they _____ the properties of the individual components.
- Can be separated by _____ means

Substances

- Elements - _____ kind of matter
- Compounds are substances that can be broken down by _____ methods
- When broken down, the pieces have completely _____ properties than the compound.

Section 1.1a

WS 1.0 Math Skills Update Show your work!

1. You have 20 beads; 6 of them are red. What is the percentage of red beads?

Ans _____

2. A 150 gram sample of chicken soup is 2.5% chicken. How many grams of chicken are in the sample? Show your work!

Ans _____

3. Convert the following into scientific notation: Guess for now , or you can look in chapter 2. Good luck.

   a. 1500 = _____

   b. 123 = _____

   c. 0.001012 = _____

   d. 1.52 = _____

4. Convert the following into decimal notation (ordinary notation):

   a. 4.59×10^{3} = _____

   b. 5×10^{2} = _____

   c. 280×10^{-4} = _____

   d. -1.4×10^{5} = _____

5. Solve the following equation: $4x - 2 = 30$ For the following problems, Show your work!

   x = _____

6. Given that $PV=nRT$, solve (rearrange) the equation for T.

   T = _____

7. Given the equation: $\frac{c}{3a} = 4b$ a = 7, b = 2, solve for c.

   c = _____

8. Given the equation: $\frac{a}{b} = \frac{c}{d}$ solve for d.

   d = _____

ANS (IRO): -140000, 0.028, 1.012×10^{-3}, 1.52×10^{0}, 3.75, 8, 30, 1.23×10^{2}, 168, 500, 1.5×10^{3}, 4590

Section 1.3 Worksheet (2 pages)

Element Names

Chem Worksheet 1-1

Name _____

Use a textbook or the website http://www.webelements.com to write the name of the element described below.

phosphorus	calcium	iron
nitrogen	chlorine	helium
oxygen	neon	hydrogen
iodine	zinc	carbon
mercury	copper	gold
chromium	tungsten	fluorine
nickel	silicon	sulfur
platinum	sodium	lead

1. This element is the lightest of all the elements and its name means "water generator".

2. This element is the second most abundant element in the atmosphere. It's name means "acid forming". It is essential for life.

3. It is believed that this element's name may be derived from earlier words meaning "holy metal" because of its use in weapons making during the crusades. It is also a key element in hemoglobin.

4. Found in leaves, teeth, bones, and shells, this element is the fifth most abundant element in the earth's crust.

5. This element is a coinage metal with a reddish, shiny appearance. It is an excellent conductor of electricity

6. The name of this element literally means, "bringer of light". It was originally isolated from urine in an experiment conducted by Hennig Brand.

7. This element's name literally means color because of the numerous colored compounds it forms. It gives rubies their red color and emeralds their green color.

8. We get our name, plumber, from the Latin name of this element. It has been used in pipes for years. It was recently used as a gasoline additive.

9. Found in antiseptics and added to salt, this element has important uses by the thyroid gland found in your neck. It is purple in color.

10. This yellow powdery element is used to vulcanize (harden) rubber, kill fungus, and to bleach paper products and fruit.

Section 1.3 Worksheet page 2

11. This element's name means pale green. It is a yellowish green gas that is a respiratory irritant. This substance is found in sea salt.

12. This silvery white metal is very soft. It is found in common table salt.

13. This black element's name means charcoal. It is found in all living things. The pure element is found as diamond or graphite.

14. This element's Latin name means "liquid silver" and it is the only metal that exists at room temperature as a liquid. It is used in thermometers and other measuring devices.

15. This lighter-than-air gas is used to lift large blimps. It is inert (non-reactive).

16. This element has been known about and valued for thousands of years. It is a very soft metal that is used in coins and jewelry.

17. This substance is an inert gas. When electricity is passed through this substance it glows reddish orange. Its name literally means, "new".

18. This element is used in etching glass. It is in the same family as bromine. It has also been proven useful in preventing tooth decay. For this reason it is added to toothpaste and water supplies.

19. This metal is often plated with other metals to increases their strength, such as in armor plating. It gives glass a green color. In actuality this element only comprises 25% of the U.S. five-cent-piece.

20. This is the second most abundant element in the earth's crust. It is found in sand, quartz, and rock crystal. It is used in making semi-conductors.

21. This element is a very inert (non-reactive) metal. For this reason it is used in jewelry and in electrical contacts. It's name means silver, and getting a record made of this is considered an accomplishment.

22. Used in making fertilizer, this element is readily available in the earth's atmosphere. It is a colorless, odorless, gas. It can be compressed to a liquid and used as a refrigerant.

23. This is a lightweight metal that is mixed with iron to 'galvanize' steel. For animals it is an important part of the diet. This element is used to make coins as well (the core of the penny is made out of this metal).

24. The metal with the highest melting point. For this reason it is often used as the filament in light bulbs.

 Name:_____Date:_____Period:____

SHOW WORK FOR ALL CALCULATIONS!!!!!!!!!

A chemical is any substance that has (definite/indefinite) composition. Changes in chemicals, or chemical reactions, take place (only in test tubes/all around us).

The type and arrangement of (particles/crystals) in a sample of matter determine the properties of the matter. Most of the matter you encounter is in (numerous/three) states of matter.

The characteristics of a solid include (fixed/variable) volume and shape. Particles that make up solids are held (loosely/tightly) in a (flexible/rigid) structure, so the particles can (vibrate only slowly/flow past each other).

Liquids have a (fixed/variable) volume but a (fixed/variable) shape. This situation occurs because particles in a liquid are held (tightly/loosely) and (can/cannot) slip past each other.

Gases have (fixed/variable) volume and (fixed/variable) shape. Gas particles may move apart to fill any container they occupy. This behavior occurs because gas particles are (close together/far apart) and are (attracted/not strongly attracted) to each other.

(Physical/Chemical) changes are changes in which the identity of a substance does not change. Thus the changes of state are (physical/chemical).

In a (physical/chemical) change, the identities of a substances change and new substances form.

In the word equation *hydrogen + oxygen + heat → water*, hydrogen is a (reactant/product), and water is a (reactant/product). This is an example of a (physical/chemical) change.

A (physical/chemical) reaction rearranges the atoms that make up the reactant(s). After a chemical reaction, (the same/different) atoms are present in the product(s). Atoms (are/are not) destroyed or created, so mass (does/does not) change during a chemical reaction.

Chemical changes sometimes produce a gas, which you can detect by observing (bubbles/a precipitate) or by a change in (color/odor)

When two clear solution mix and a precipitate forms, the mixture becomes (clear/cloudy)

Mark the following as a Physical Change = P or a Chemical Change = C

_____ Milk Souring _____ Gasoline Burning ____ Ice Melting _____Lighting a Match

_____ Water Evaporating _____ Chopping Wood _____ Burning Wood _____ Cooking an Egg

Scientists often describe properties in quantitative terms, which means that they describe them using _____

(T/F) Odorless and colorless are quantitative terms (T/F) The mass of a gold nugget is 5.0 grams is a quantitative term

12.5 kg = _____ g 3.09 mm = _____ m 0.87 L = _____ mL 12.3 cm^3 = _____ mL 12.3 cm^3 = _____ L

What is the density of a substance with a mass of 23.5 g and a volume of 6.7 cm^3? _____ (D = m/V)

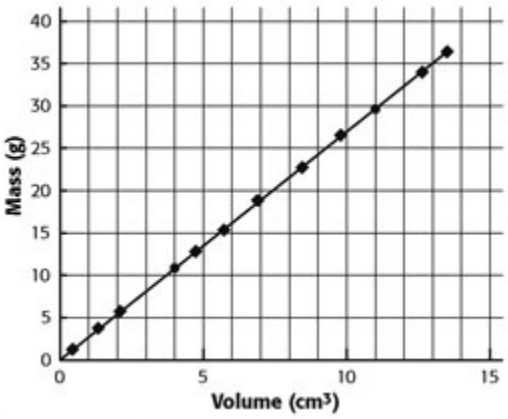
The density of a substance is 1.58 g/ml, what is the mass of 5.6 L of this substance? _____ (D = m/V, isolate the variable)

Test Review WS page 2

What is the volume of 567 g of a substance with a density of 4.5 g/mL? _____

What is the density of 15 g substance with a volume of 26 mL? _____

Calculate the following using the graph below:



At 29 grams the volume is _____

At 30 grams the density is _____

At 2 cm^3 the density is _____

(Pure substances/ Mixtures) have definite chemical and physical properties, whereas (pure substances/mixtures) are a combination of two or more substances that are not chemically combined. For this reason elements and compounds are considered (pure substances/mixtures) and homogeneous and heterogeneous substances are considered (pure substances/mixtures).

(Elements/ Compounds) contain only one kind of atom and (elements/compounds) contain two or more atoms that are chemically combined and have a definite ratio.

In a (homogeneous/heterogeneous) substance the components are evenly distributed and in (homogeneous/heterogeneous) substance the particles are not evenly distributed and settle out easily.

The only type of matter that cannot be broken down into simpler substances is _____

Determine if the following is an: Element = E a Compound = C a Homogeneous Substance = H or a Heterogeneous Substance = He

_____ C_2H_2	_____ Soil w/ Earthworms	_____ Cl_2	_____ CH_3COOH
_____ Carbonated Soda	_____ Salt Water	_____ Orange Juice	_____ Granite
_____ Sand and Water	_____ Gold	_____ Pure Water	_____ Tap Water

Draw a picture of the particle arrangement for an element, a compound, a homogeneous substance and a heterogeneous substance:

Writing Lab Reports

Rules

- Label everything. That means, for example, type the word "Title" and then type in the title.
- Everything neatly presented (legible writing – don't forget extra credit for proper use of 4-color pen).
- Write the procedure on the left side of each composition book page. Use the flow chart method to do this (See the example at the end of this document).
- Use the right side of each page to record your observations for each procedure.
- Graphs
    - They should be scaled to fit full size.
    - Give each graph a title.
    - Use actual graph paper. Do not just do it on computer or by free-hand. It must be accurate.
    - Be sure to completely label the x-axis and y-axis with both the measurement and its units. For example, if temperature will be on your y-axis you need two things: T (for temperature) and ºC (for Celsius degrees).
    - See the "graphing.pdf" on our website for more information.
- Always use pen. Line out any errors or mistakes (scientists never erase!).

Write-up General Format for labs

- Title and Date - inlcude lab number also.
- Name and Partner's Name (be sure and label "Partner" when writing your partner's name)
- Objectives (can be directly copied)
- Lab Book Score – write "Carbons" in your write-up and leave a space for me to put in your composition book score. This is the score you get when I check your composition book to see how you "prepped" for the lab (by paraphrasing the procedure, drawing apparatus set-ups, doing a flow chart, etc.)
- Observations – when asked for in the procedure
- Data Table – when relevant (not every lab has one).
- Calculations - be sure you label each type of calculation as shown in the lab; for example, "Organizing Data," "Inferring Conclusions," etc.
- Questions – same thing here. Label as shown in the lab; for example, "Analyzing Methods," "Relating Ideas"
- Conclusions – same thing. "Relating ideas," "Applying Conclusions," etc.
- Extensions – same here. Examples, "Applying Information," "Applying Ideas," etc.

Write-up General Format for "Book Labs

- These can be downloaded from our website.
- I'll give write-up instructions in class.

Lab Changes

- Many of these labs are also used for honors chemistry classes. I have indicated on your labs the "honors" parts that you do not need to do. Be sure to complete all other parts and questions.

Making Flow Charts of Your Lab Procedure (Do this before we do the lab in class)

- Create a flow chart of each step by drawing pictures of the equipment.
- Be sure to write each step, label the temperature, time, etc. and the flow-chart each step as shown below.
- The next page shows an example of how you can set up a flow chart (complete write-up is not shown)
- The last page shows how to correctly title, label, scale and draw a graph.
- Be sure to look at both examples below!
- Remember, you still need to produce a final write-up according to the directions above. Follow them closely!

The next pages give you 2 examples of how to Pre-write (including flow-charting) your lab. The 1st example is actually our 1st lab so it will train you how to pre-write. It will also show you how to do your final write-up.

.

The 2nd example shows you where to put data tables and also how to draw graphs. Be sure to read the graphing instructions above!

.

THIS PAGE gives you directions on how to do the final write-up. Be sure to read it and compare to the 1st example.

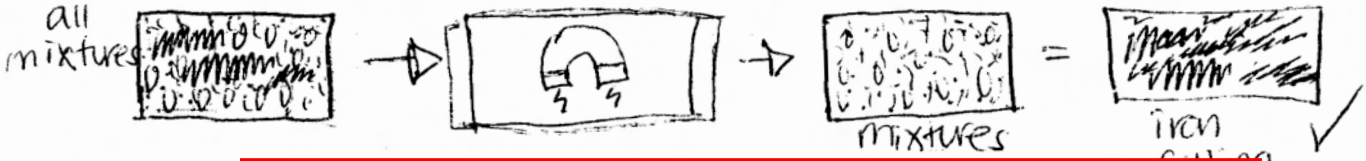
The 1st example: This one shows both Pre-writing and also your final write-up (attach your carbons to that)

Think about the order in which you try your separations. The wrong order will not allow you to separate all components

Sample flow chart for Separation of Mixtures Lab

step 1: prepare by gathering the mixtures

step 2: First try and separate the iron filings. place the mixture on some paper, then set another piece on top of that. Afterwards, run a magnet over the top of the paper. When lifted, the iron filling will be separated.



Step 3: mixtur goes

Do on your own

Do on your own

Step 5. the

Do on your own

110
5ec
115

Title: Separation of Mixtures Date: Aug. 23, 2011

name: Your name here

partners name: Partner's name here

Objectives:

- x Identify ch
- x Relate kn
- x identify as
- x separate th
- x Analyze s
- x Design and implement

write this objective also

Get this from the lab printout.
REMEMBER THAT IF YOU WRITE YOUR REPORT USING 4-COLOR PEN (NOT HIGHLIGHTING) YOU WILL GET EXTRA CREDIT.
.
The 4 colors must be logically arranged. For example, use black for main headings, blue for answers, red for key terms, green for answers to calculations (or make up your own, but it must not just be random coloring - no credit for that!)

Composition Book Scans 50

Observations:

Copy your observations from your lab book to this final report

1. When using the magnet to attract the iron and steel filings
2.
3.

Analysis later tomorrow.

1. Finalizing Results Mr. N says skip this one.

Conclusions

Your own answer goes here. Be sure to write the question (you can paraphrase it in your own words)

Do

3. Evaluation Methods

Use another page if you need to finish a question

Answer "b" here

3. Analyzing Methods

If I were able to do the lab differently, I would:

Give one reason

Give another reason (and you can also give a 3rd, 4th, etc. reason)

4. Applying Ideas

Ms. N says, skip this one

5. Analyzing Conclusions

Iron:

Puppy Seeds:

Salt:

Lead:

6. Evaluating Methods

x Mr. N says, skip this one

7. Evaluating Methods

x Mr. N says, skip this one

Extensions

1. Applying Information

· Mr. N says, skip this

2. Apply Ideas

a:

b.

c.

d.

e. boiling it.