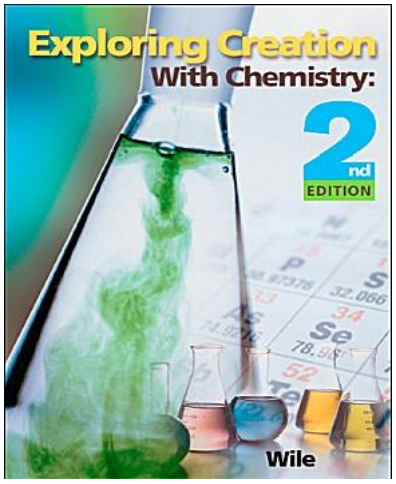
LJ-C2

Apologia "Exploring Creation With Chemistry" 2nd Edition Lapbook Journal



This Lapbook Journal has been specifically designed for use with the book, "Exploring Creation with Chemistry" 2nd Edition by Apologia Science.

Designed by
Cyndi Kinney
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This book is dedicated to my amazing family. Thank you to my wonderful husband, Scott, who ate a lot of leftovers, listened to a lot of whining (from me!), and sent lots of positive energy my way. Thank you to my daughter, Shelby, who truly inspired me through her love for learning. Thank you to my parents, Judy and Billy Trout, who taught me to trust in my abilities and to never give up.

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Welcome to our Lapbook Journal for Apologia's Exploring Creation With Chemistry 2nd Edition by Dr. Jay Wile.
We are very pleased to offer this product, as authorized by Dr. Wile.

So...now you bought it...what do you do with it?

I'll try to answer your questions here. Please note that there are several ways to use our Lapbook Journal, and the BEST way is the way that works for your student.

First, purchase a 4 inch 3-ring binder, and divide it into 4 sections. Your dividers should be labeled as follows:

On Your Own Journal (OYOJ)
Review Questions (RQ)
Practice Problems (PP)
Lab Reports (LR)

You may use the acronyms if your label space is limited.

Now you have your binder ready….so what next?

It's time to print! As for the order or printing...you may choose to print needed pages as you finish one module and begin the next….or you may choose to print everything up front. The choice is yours, but I would suggest marking off some time to print it all at once….that's just my opinion. Obviously, your time will dictate what you print when.

You will find 16 files within this product. These will consist of one file for each module of the book. Within each of these files (one per module), you will find the following:

1. On Your Own Journal Pages
2. Review Questions Lapbook Pages - Booklet Templates
3. Review Questions Lapbook Pages - Background Pages
4. Review Questions Journal Pages
5. Practice Problem Journal Pages
6. Lab Reports (Supplies, Introduction, & Procedure filled out already)
7. Lab Reports (No information already filled in...only the report itself with the title of the experiment at the top)

Now I will go into detail about how to print each of these files, what type of paper to print them on, and how to use them.

As I said on the previous page, there are 16 files (one for each module of the book) included in this product, and within each of these files, you will find the following:

1. On Your Own Journal Pages
2. Review Questions Lapbook Pages - Booklet Templates
3. Review Questions Lapbook Pages - Background Pages
4. Review Questions Journal Pages
5. Practice Problem Journal Pages
6. Lab Reports (Supplies, Introduction, & Procedure filled out already)
7. Lab Reports (No information already filled in...only the report itself with the title of the experiment at the top)

1. On Your Own Journal Pages

Supplies Needed: Regular White Copy Paper (unless you desire differently)

These pages will be solely devoted to the "On Your Own" questions that appear throughout each of the modules. Instead of the student having to re-write the questions in a notebook, we have provided the questions in a "Notebooking" styled setting. There will be ample space for the students to answer the questions within these Journal Pages, and the borders and graphics provide a decorative page for documenting learning.

We recommend that these pages be printed on regular, white paper. There is no need to print these pages on any special type or color, unless that is your preference.

For each module, print these pages, and file them all together under your "On Your Own Journal Pages" divider tab. As your student comes to these questions, he will go to this section to document his answers.

IMPORTANT NOTE About Next Section:

NOTE: There are ***TWO DIFFERENT OPTIONS*** ***for the Review Questions*** *– they are the Lapbook Pages* ***OR*** *the Journal Pages – depending on your student's preference).* ***There is NO NEED TO PRINT BOTH!!!!!***

IMPORTANT NOTE About THIS Section:

NOTE: There are ***TWO DIFFERENT OPTIONS*** ***for the Review Questions*** *– they are the Lapbook Pages (#2 & 3)* ***OR*** *the Journal Pages (#4) – depending on your student's preference).*
There is NO NEED TO PRINT BOTH!!!!!

HOW do I know which one of these options to use????

*** If your child enjoys hands-on projects, scrapbooking, crafty projects, etc., then you will probably want to use the Review Questions Lapbook Pages and their Background Pages (#2 and #3).

*** If your child does NOT enjoy these types of hands-on projects and would rather have a journaling-style area for documenting the answers to the Review Questions, then you will probably want to use the Review Questions Journal Pages.

You may change after a few modules. You may even want to use both...but not at the same time….just every other module.

2. Review Questions Lapbook Pages Booklet Templates & Background Pages

Supplies Needed: Regular White Copy Paper, Colored Paper, White Cardstock Paper (if desired), Glue, Scissors, Metal Brad Fasteners (if desired), Ribbon (if desired), Staples

This section is used with the Review Questions at the end of each module of the book. Instead of writing the questions and answers in a regular notebook, the student would complete these booklets to place in his binder.

This section provides more of a "hands-on" opportunity for your students. It is similar to the traditional lapbooks, but there are no folders in which to place the booklets.
SPECIAL NOTE: Remember, *IF your student DOES NOT want to create the lapbook booklets, we have added another option for the Review Questions, and that is the Review Questions Journal in section 4.*

Review Questions Lapbook Pages Booklet Templates & Background Pages...cont.

We recommend that you print these on the following types of paper:
* Review Questions Lapbook Pages Booklet Templates: colored paper, any weight (we use 24#, multi-colored paper)
* Review Questions Lapbook Pages Booklet Templates Instructions: white copy paper (these will ultimately be thrown away, so the weight of the paper isn't important)
* Review Questions Lapbook Pages Background Pages: white cardstock (These can be printed on white paper, if you prefer. We print on white cardstock because it is more durable, holds the weight of the booklets, and holds up to years of "thumbing through" the pages.)

These lapbook-style booklets will provide a 3-dimensional aspect to your student's learning experience. Science has proven that the more senses a student uses when learning and reviewing new material, the more he will retain. So, by adding this section, your student will be able to use his own hands to create these memories. Also, the colors and shapes of the booklets will stimulate memory as well.

At the end of each module, allow the student time to create these booklets, and place them randomly (be creative!) on the Review Questions Lapbook Journal Background Pages (print as many copies of these as you need).

This is the most time consuming portion of the Lapbook Journal, and I know that time is very precious. So, if you simply cannot make time for creating ALL of the booklets, or if your student is at first resistant to this hands-on method, you may choose to have your student only complete a few of the booklets...maybe the ones that cover areas in which he needs extra study.

Allow the student to have fun with this section. As he cuts, glues, and folds, he will be creating something to look back on for years to come. He will also be creating something that will be WONDERFUL when it comes time to review! There is NO better way to learn, in my opinion, than for the student to be intensely involved in the process by using his hands.

3. The Review Questions Lapbook Background Pages – ***SPECIAL NOTE:*** You will need to print as many of these as necessary. How many you need depends on how many booklets that your student made. Allow your student to arrange the completed booklets in any order he desires – be creative! You may need a bunch of these pages printed if he really gets the hang of this!

4. Review Questions Journal Pages

Supplies Needed: Regular White Copy Paper

This section is OPTIONAL and **could** replace the Review Questions Lapbook Pages These pages will be solely devoted to the Review Questions that appear at the end of each of the modules. Instead of the student having to re-write the questions in a notebook, we have provided the questions in a "Notebooking/Journal" styled setting. There will be ample space for the students to answer the questions within these pages, and the borders provide a decorative page for documenting learning.

If you choose to use these pages, print them, and file them all together under your "Review Questions" divider tab.

5. Practice Problems Journal Pages

Supplies Needed: Regular White Copy Paper

These pages will be solely devoted to the Practice Problems that appear at the end of each of the modules. Instead of the student having to re-write the questions in a notebook, we have provided the questions in a "Notebooking/Journal" styled setting. There will be ample space for the students to answer the questions within these pages, and the borders provide a decorative page for documenting learning.

If you choose to use these pages, print them, and file them all together under your "Practice Problems" divider tab.

6 & 7. Lab Reports

Supplies Needed: Regular White Copy Paper

This section is where the student will document all of the work done on the lab experiments within each module.

I conducted a poll before finalizing this section. I wanted to know if parents would like the Lab Reports to be partially completed….or whether they would rather have the student write in all of the information themselves. The responses were split right down the middle. Then, a really smart mom emailed and said, "Why don't you just put both formats in the Lapbook Journal?" So….that's exactly what I did!

There are **2 different sections of each file** that are devoted to Lab Reports. There will be a section that gives you Lab Reports with the Experiment Title & Number, Supplies, Introduction, & Procedure already filled in. The back of these reports has no information filled in – this is where the student will document his observations, conclusions, etc. and draw any diagrams necessary. The other section gives you Lab Reports with ONLY the Experiment Title & Number filled in...the rest is blank. So, choose which works for you. You may even want to try both...or you may change midway through the year...or depending on your time that week. The choice is yours!

Print these on regular white paper, unless you WANT to print them on cardstock. They are meant to be printed double-sided, but feel free to print them as a 2-page report, if that works better for you (or for your printer!). PLEASE NOTE: Some Lab Reports are longer than others (3-4 pages max), so be aware when printing. File them in the "Lab Reports" section, and refer to them each time your student performs a lab experiment.

BOTTOM LINE:

Here is what your 3-ring binder will look like:

** Section 1: On Your Own
** Section 2: Review Questions (either the lapbook booklets OR the journal pages)
** Section 3: Practice Problems
** Section 4: Lab Reports

ONE OTHER OPTION:

I have had a few moms tell me that they would RATHER divide their notebook into 16 sections – one for each module. These moms said that they put all of the above mentioned items in order in EACH section of the notebook.

The choice is yours.

Frequently Asked Questions:

1. What if I don't have enough time to do all of this? What's ok to leave out?

If you are really pushed for time, please don't feel that you have to "do it all!" I am cursed with this syndrome, and it rears it's head every time I get in a new piece of curriculum. YOU alone know what is best for your student, school, and family.

With that said, I'll say this. If I had to choose something to omit, I would probably first allow my student to use the Lab Reports that are partially filled in. This will save a lot of time….and frustration on the part of the student. If I still needed to omit something, then I would probably allow the student to answer some of the Review Questions either using the journal pages or verbally and only do some of the Lapbook Pages. However, I would be sure to NOT choose the lapbook booklets that deal with the easiest subject matter to leave out. I would allow the questions that deal with the easiest subject matter to be answered orally or via the journal pages, and require that the others be answered within the booklets.

2. What if I only have white paper, and I cannot afford to get (or don't have time to get) colored paper or cardstock?

We have made suggestions as to the colors and paper types that we would suggest, but they are ONLY suggestions. If your daughter is really into pink, and everything has to be pink….then print the whole thing on pink! If you are cramped for extra money, and you only have white paper, then print it all on white! I assure you that the color of the paper will not KEEP your child from learning. There is scientific research to support the improvement in memory when using colored paper, but who says the child can't color the paper themselves (the lapbook booklets)...draw pictures on them...make them his own. Or...just leave them white. The choice is ALWAYS yours.

Frequently Asked Questions...continued...

3. My friend wants to use this Lapbook Journal too. Can I let her use my copy? Oh, and my Co-op might want to use it too.

Our copyright states that any Ebook or CD is purchased for use by ONE household. If your Aunt Mary, Cousin Martha, and all of their children live in YOUR household (God Bless You!), then that includes them. You may print as many copies of the material as you need from the Ebook or CD for those in your household. However, PLEASE do not share these with friends and family who do NOT live with you.

As for Co-Ops, we do have a Co-Op License available. All you have to do is purchase the Ebook or CD version of the product as well as the Co-Op License through our website. In the "comments" section of the purchase, state which product(s) will be used at the Co-Op. That's it! It doesn't matter how many children are represented in your Co-Op….print away!! I assure you that it's WAY less expensive than for each family to purchase their own copy. You can all split the cost, and it comes out great for everyone.

4. Why are there very few color graphics in this product?

After much research, we believe that the children of this generation are visually over-stimulated. Between video games, internet, and television, there is very little left to the imagination. While colors play an important role in memory and retention of information, OVER-stimulation with colors has just the opposite effect.

Research ALSO shows that colored shapes have an effect on the memory that is amazing. Students will remember colored shapes much more than they will remember colored graphics on white paper.

Another reason…..colored ink costs homeschool moms TONS!

Without colored graphics, students will create their own! Allow them to draw pictures, color the borders, use their imaginations.

For these reasons, we have chosen to use few color graphics. We feel that this decision, although not the popular one, will benefit your students in the long run.

Frequently Asked Questions...continued some more...

5. My child doesn't like lapbooks, so why use this product?

If your child has never used lapbooking, he may not know what he's missing. However, if he just doesn't want to do it – no how and no way – then we have included "Review Questions Journal Pages" to replace the lapbooking portion of the product. They are included within the product, right after the lapbooking section.

6. What if I don't have a printer, or my printer isn't working?

Most print shops will allow you to email your document to them for printing. Or, you may choose to burn the Ebook to a CD and take it to them for printing.

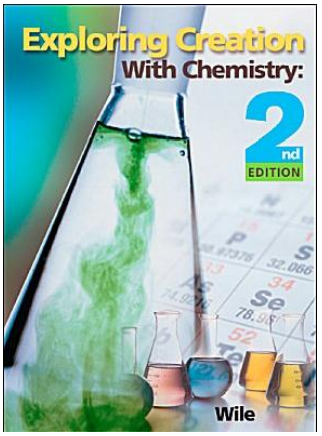
7. Is it OK to burn the Ebook to a CD?

Yes, absolutely! In fact, I would suggest it. My computer crashed last year, and I lost SO many wonderful homeschool products that were in Ebook format!! (still crying!)

8. What if I'm not creative, crafty...etc….and I don't really want to be?

That's ok. Not everyone enjoys working with "hands-on" products. That's why this product will work for you! All of the planning is done, and the instructions are written so that the student can read and follow them without assistance from an adult!

Use the following pages at the beginning of each section of your notebook.



Lapbook Journal
For
Exploring Creation
With Chemistry
2nd Edition

By

_____

Exploring Creation With Chemistry

2nd Edition

On Your Own Journal

Exploring Creation With Chemistry

2nd Edition

Review Questions Lapbook Pages

Exploring Creation With Chemistry

2nd Edition

Review Questions Journal Pages

Exploring Creation With Chemistry

2nd Edition

Practice Problems

Exploring Creation With Chemistry

2nd Edition

Lab Reports

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Apologia Chemistry 2nd Edition
Module 1
The following pages are divided into 7 sections, with a page like this one between each section.

The sections are:

ON YOUR OWN QUESTIONS:

(1) On Your Own Journal

REVIEW QUESTIONS:

(Choose either #2 & 3 OR #4 for these questions)

(2) Review Questions Lapbook Pages – Booklet Instructions & Templates

(3) Review Questions Lapbook Pages – Background Pages

(4) Review Questions Journal Pages

PRACTICE PROBLEMS:

(5) Practice Problems Journal Pages

LAB REPORTS:

(Choose either #6 OR #7)

(6) Lab Reports (Partially Completed)

(7) Lab Reports (Blank)

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The following section is:

Chemistry 2nd Edition
Module 1

On Your Own Journal Pages

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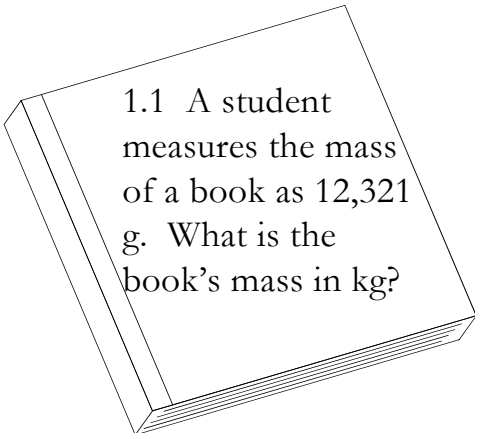

1.1 A student measures the mass of a book as 12,321 g. What is the book's mass in kg?

1.2 If a glass contains 0.121 L of milk, what is the volume of milk in mL?

1.3 On a professional basketball court, the distance from the three-point line to the basket is 640.08 cm. What is this distance in meters?

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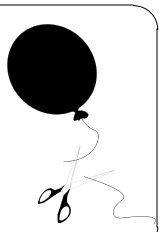
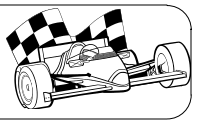
1.4 How many slugs are there in 123.5 kg?

1.5 If an object occupies 3.2 gallons of space, how many liters of space does it occupy?

1.6 A balloon is blown up so that its volume is 1,500 mL. What is its volume is kL?



1.7 If the length of a race car track is 2.0 km, how many cm is that?



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1.8 How many mg are there in 10,000,000 mg?

1.9 A braggart tells you that he walks 100,000 cm each day. He expects you to be impressed with such a big number. Should you be impressed? Convert the distance measurement to miles in order to determine whether or not to be impressed. (HINT: Earlier in this module, you were told how many inches are in a foot and how many feet are in a mile. You must use those numbers to solve this problem.)

1.10 How many cm^3 are in 0.0045 kL?

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1.11 The area of a room is 16 m^2. What is the area of the room in mm2?

1.12 How many significant figures are in the following measurements?

a. 3.0220 cm b. 0.0060m c. 1.00450L d. 61.054 kg

1.13 Convert the following numbers into scientific notation.

(a) 26,789,000 (b) 123 (c) 0.00009870 (d) 0.980

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1.14 Convert the following numbers from scientific notation to decimal form.

(a) 3.456×10^{14} (b) 1.2341×10^{3} (c) 3.45×10^{-5} (d) 3.1×10^{-1}

1.15 The density of silver is 10.5 grams per cm^3. If a jeweler makes a silver bracelet out of 0.081 kg of silver, what is the bracelet's volume in mL?

1.16 A gold miner tries to sell some gold that he found in a nearby river. The person who is thinking about purchasing the gold measures the mass and volume of one nugget. The mass is 0.319 kg and the volume is 0.065 liters. Is this nugget really made out of gold? (Remember that the density of gold is 19.3 grams per mL)

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The following section is:

Chemistry 2nd Edition
Module 1

Review Questions
Lapbook Pages – Booklet
Instructions & Templates

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Chemistry 2nd Edition - Module 1
Review Questions
Lapbook Pages - Booklet Templates
Assembly Instructions

Question 1
Cut out along the outer black lines of the booklet and the text box. Fold, accordion-style, so that the title is on the top. Glue the text box inside the booklet.

Questions 2-3
Cut out along the outer black line edges of the booklet. Fold along the dotted lines so that the questions are on the front of the booklet and the words “Metric System” meet in the middle.

Questions 4-7
Cut out along the outer black line edges of the pages of this booklet. Stack them so that the title is on top. Along the left side of the stack, either staple, or punch holes and secure with metal brad fasteners or ribbon.

Questions 8-10
Cut out along the outer black line edges of all pages of the booklet. Now stack them so that the title is on top, and the questions are in order. Along the top of the stack, staple, or punch holes and secure with metal brad fasteners or ribbon.

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Question #1

Matter

Which of the following contains no matter?

a. A rock
b. A balloon full of air
c. A balloon full of helium
d. A lightning bolt

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Questions #2-3

System			Metric
In the metric system, what does the prefix "centi" mean?			List the base metric units used to measure length, mass, time, and volume.

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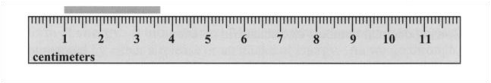
Questions #4-7

Conversions, Measurements, & Significant Figures

How long is the bar in the picture below?



Two students measure the mass of a 502.1 gram object. The first student measures the mass to be 496.8123 grams. The second measures the mass to be 501 grams. Which student was more precise? Which student was more accurate?

Which has more liquid: a glass holding 0.5 kL or a glass holding 120 mL?

How many significant figures are in the following numbers?

a. 0.0120350

b. 10.020

c. 12

d. 3.40×10^3

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Questions# 8-10

Density

A student measures the mass of an object as 2.32 grams and its volume as 34.56 mL. The student then calculates the density to be 0.067129629. There are two things wrong with the student's value for density. What are they?

Question #8

Why does ice float on top of water?

Question #9

Lead has a density of 11.4 grams per mL, whereas gold has a density of 19.3 grams per cc. If I were to make two identical statues, one out of gold and the other out of lead, which would be heavier?

Question #10

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The following section is:

Chemistry 2nd Edition
Module 1

Review Questions Lapbook
Background Page
(print as many as needed)

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Chemistry 2nd Ed – Module 1 – Review Questions Lapbook Pages – Background

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The following section is:

Chemistry 2nd Edition
Module 1

Review Questions Journal Pages

You MAY choose to use these INSTEAD of the preceding Review Questions Lapbook Pages.

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Chemistry 2nd Edition - Module 1
Review Questions Journal

1. Which of the following contains no matter?
    a. A rock
    b. A balloon full of air
    c. A balloon full of helium
    d. A lightning bolt

2. List the base metric units used to measure length, mass, time, and volume.

3. In the metric system, what does the prefix "centi" mean?

4. Which has more liquid: a glass holding 0.5 kL or a glass holding 120 mL?

5. How long is the bar in the picture below?

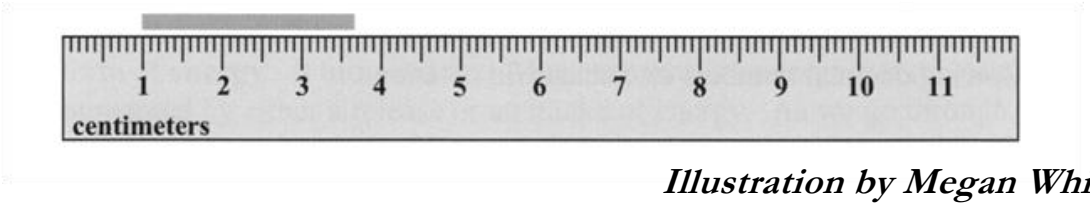

Illustration by Megan Whitaker

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Chemistry 2nd Edition - Module 1
Review Questions Journal

6. Two students measure the mass of a 502.1 gram object. The first student measures the mass to be 496.8123 grams. The second measures the mass to be 501 grams. Which student was more precise? Which student was more accurate?

7. How many significant figures are in the following numbers?
   a. 0.0120350
   b. 10.020
   c. 12
   d. 3.40×10^3

8. A student measures the mass of an object as 2.32 grams and its volume as 34.56 mL. The student then calculates the density to be 0.067129629. There are two things wrong with the student's value for density. What are they?

9. Why does ice float on top of water?

10. Lead has a density of 11.4 grams per mL, whereas gold has a density of 19.3 grams per cc. If I were to make two identical statues, one out of gold and the other out of lead, which would be heavier?

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The following section is:

Chemistry 2nd Edition
Module 1

Practice Problems
Journal Pages

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Chemistry 2nd Edition - Module 1
Practice Problems Journal

1. Convert 1.2 mL into L.

2. Convert 34.50 km into m.

3. Convert 0.045 km into cm.

4. If an object has a volume of 34.6 mL, how many kL of space does it occupy?

5. A box is measured to be 2.3 m by 4.2 m by 3.5 m. What is its volume in cubic centimeters?

6. A nurse injects 34.5 cc of medicine into a patient. How many liters is that?

7. Convert the following decimal numbers into scientific notation:

   123.45
   0.0003040
   6,100,000
   0.1234

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Chemistry 2nd Edition - Module 1
Practice Problems Journal

8. Convert the following numbers back into decimal:

6.54×10^{3}
3.450×10^{-3}
3.56×10^{7}
4.050×10^{-7}

9. Lead has a density of 11.4 grams per mL. If I make a statue out of 3.45 L of lead, what is the statue's mass?

10. Gold has a density of 19.3 grams per cc. If a gold nugget has a mass of 45.6 kg, what is its volume?

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Module 1
Lab Reports
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Exploring Creation With Chemistry 2nd Edition

Lab Report
Experiment #1.1
Air Has Mass

Date: _____ **Name:** _____

Supplies:

* A meterstick (A yardstick will work as well; a 12-inch ruler is not long enough.)
*Two 8-inch or larger balloons
*Two pieces of string long enough to tie the balloons to the meterstick
*Tape
*Safety goggles

Procedure:

1. Without blowing them up, tie the balloons to the strings. Be sure to make the knots loose so that you can untie one of the balloons later in the experiment.
2. Tie the other end of each string to each end of the meterstick. Try to attach the strings as close to the ends of the meterstick as possible.
3. Once the strings have been tied to the meterstick, tape them down so that they cannot move.
4. Go into your bathroom and pull back the shower curtain so that a large portion of the curtain rod is bare. Balance the meterstick (with the balloons attached) on the bare part of the shower curtain rod. You should be able to balance it very well. If you don't have a shower curtain rod or you are having trouble using yours, you can use any surface that is adequate for delicate balancing.
5. Once you have the meterstick balanced, stand back and look at it. The meterstick balances right now because the total mass on one side of the meterstick equals the total mass on the other side of the meterstick. In order to knock it off balance, you would need to move the meterstick or add more mass to one side. You will do the latter.
6. Have someone else hold the meterstick so that it does not move. In order for this experiment to work properly, the meterstick must stay stationary.
7. While the meterstick is held stationary, remove one of the balloons from its string (do not untie the string from the meterstick), and blow up the balloon.
8. Tie the balloon closed so that the air does not escape, then reattach it to its string.
9. Have the person holding the meterstick let go. If the meterstick was not moved while you were blowing up the balloon, it will tilt toward the side with the inflated balloon as soon as the person lets it go. This is because you added air to the balloon. Since air has mass, it knocks the meterstick off balance. Thus, air does have mass!
10. Clean up your mess.

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Lab Report
Experiment #1.1
Air Has Mass

Date: _____ **Name:** _____

Observations:

Diagram:

Summary:

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Lab Report
Experiment #1.2
Air Takes Up Space

Date: _____ **Name:** _____

Supplies:

* A tall glass
* A paper towel
* A sink full of water
* Safety goggles

Procedure:

1. Fill your sink with water until the water level is high enough to submerge the entire glass.
2. Make sure the inside of the glass is dry.
3. Wad up the paper towel and shove it down into the bottom of the glass.
4. Turn the glass upside down and be sure that the paper towel does not fall out of the glass.
5. Submerge the glass upside down in the water, being careful not to tip the glass at any time.
6. Wait a few seconds and remove the glass, still being careful not to tilt it.
7. Pull the paper towel out of the glass. You will find that the paper towel is completely dry. Even though the glass was submerged in water, the paper towel never got wet. Why? When you tipped the glass upside down, there was air inside the glass. When you submerged it in the water, the air could not escape the glass. Thus, the glass was still full of air. Since air takes up space, there was no room for water to enter the glass, so the paper towel stayed dry.
8. Repeat the experiment, but this time be sure to tip the glass while it is underwater. You will see large bubbles rise to the surface of the water, and when you pull the glass out, you will find that it has water in it and that the paper towel is wet. This is because you allowed the air trapped inside the glass to escape when you tilted the glass. Once the air escaped, there was room for the water to come into the glass.
9. Clean up your mess.

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Lab Report
Experiment #1.2
Air Takes Up Space

Date: _____ **Name:** _____

Observations:

Diagram:

Summary:

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Lab Report
Experiment #1.3
Comparing Conversions to Measurements

Date: _____ **Name:** _____

Supplies:

* Book (not oversized)
* Metric/English ruler or rulers
* Safety goggles

Procedure:

1. Lay the book on a table and measure its length in inches. Read the ruler as I showed you in the measurement section above, estimating any answer that falls in between the markings on the scale. Once you do that, convert the fraction to a decimal (as we did in the measurement section above) and round it to the hundredths place, because that's the precision of an English ruler.
2. Measure the width of the book in the same way.
3. Now that you have the length and width measured, multiply them together to get the surface area of the book. Since you are multiplying inches by inches, your area unit should be in^2. Remember to count the significant figures in each of the measurements and round your final answer so that it has the same number of significant figures as the measurement with the least number of significant figures.
4. Now take the length measurement and use the relationship given in Table 1.3 to convert it into cm. Do the same thing to the width measurement, making sure to keep the proper number of significant figures. Note that the relationship between inches and centimeters is *exact,* so the "2.54 cm" should not be taken into account when considering the significant figures, because 1 inch is exactly 2.54 cm.
5. Now use your metric ruler to measure the length and width of the book in centimeters. Once again, do it just like I showed you in the measurements section above. If the scale of the ruler is marked off in 0.1 cm, then your length and width measurements should be written to the hundredths of a centimeter. Compare these answers to the length and width you calculated by converting from inches. They should be nearly the same. If they are different by only a few percent, there is no problem. However, if they differ by more than a few percent, recheck your measurements and your conversions.
6. Finally, multiply the length and width measurements you took with the metric ruler to calculate the surface area of the book in cm^2. Use the relationship between inches and centimeters to convert your answer into in^2. Remember, since you are using a derived unit, the conversion is more complicated. You might want to review Example 1.4.
7. Now compare the converted value for the surface area to the one you calculated in step (3) using your English measurements. Once again, they should be equal or close to equal. If not, you have either measured wrongly or made a mistake in your conversion.
8. Clean up your mess.

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Lab Report
Experiment #1.3
Comparing Conversions to Measurements

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Observations:

Diagram:

Summary:

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Lab Report
Experiment #1.4
The Density of Liquids

Date: _____ **Name:** _____

Supplies:

* Water * Vegetable oil * A large glass *Maple syrup *Safety goggles
* Something that measures the volume of a liquid, preferably in mL or cm^3. A graduated cylinder would be ideal, but measuring cups will work as well.
* A mass scale, preferably one that reads in grams. (The scale should not go much over 500 grams, or it will be very difficult for you to read the mass of the objects in this experiment.)

Procedure:

1. First, measure the mass of the graduated cylinder, or whatever you have that measures the volume of a liquid. Be sure to write it down with the correct precision. If you are using a standard mass scale from a grocery store, its scale is probably marked off in units of 10 grams. Thus, you should be able to report the mass to a precision of 1 g.
2. Next, measure out 50.0 mL (1/4 cup if you are using measuring cups) of syrup. Now put the graduated cylinder (with the syrup in it) back on the scale and measure the total mass. Subtract the mass of the graduated cylinder from this number (using our rules for significant figures) to get the mass of the table syrup by itself This method of measuring mass is called the difference method. Chemists often call it "measuring the mass by difference."
3. Now that you have the mass of the table syrup, and you know that its volume was 50.0 mL (because that's what you measured out), divide the mass by the volume to get the density. Be sure to follow our significant figure rules when you do this! Finally, pour the syrup into the tall glass. Repeat this procedure for both the water and the vegetable oil.
4. Once you have measured the density of all three substances, look at the tall glass. You should see that the table syrup is all at the bottom of the glass, the water forms a layer above that, and the vegetable oil is all in one layer on top!
5. Clean up your mess.

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Lab Report
Experiment #1.4
The Density of Liquids

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Observations:

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Lab Report
Experiment #1.1
Air Has Mass

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Supplies:

Procedure:

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Lab Report
Experiment #1.1
Air Has Mass

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Lab Report
Experiment #1.2
Air Takes Up Space

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Experiment #1.2
Air Takes Up Space

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Experiment #1.3
Comparing Conversions to Measurements

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Experiment #1.3
Comparing Conversions to Measurements

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Lab Report
Experiment #1.4
The Density of Liquids

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Procedure:

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Experiment #1.4
The Density of Liquids

Date: _____ **Name:** _____

Observations:

Diagram:

Summary: