

CHEMISTRY 101

An Overview of God's Chemical World

Course Accreditation Program

Westfield
Studios



101

Name of Student _____ Age _____

Start date _____

Completion date _____

Total hours taken to complete program _____

Welcome to Chemistry 101! ***An Overview of God's Chemical World***

We are very excited for you to watch these films and learn new and wonderful information about our God and His creation!

The DVD films are the heart of this program. The films contain the distilled basics of beginning chemistry that you can watch over and over. If you grasp these issues, you'll have a rock-solid understanding of God's chemical world.

For further study, the Guidebook puts most of the DVD content in print and adds lots of interesting information. Included at the end of each chapter are discussion questions and a quiz covering that segment.

For those looking to fulfill a required one-year high school credit, the Accreditation Program is for you! Typically, one credit requires between 120-180 hours of study. There are about 155 hours worth of projects and study in the Chemistry 101 High School Credit Program. You don't have to do all of them and the course is *very flexible* to meet your schedule and what fits your family best. Program activities include:

- using the DVD's and Guidebook
- making a Chemistry 101 Notebook to record all your work
- research and lab reports
- interesting discussion questions
- conducting "mini-labs" using items mostly found around your home
- taking field trips
- using resources on the web and at your local library

Part of your reading even includes choosing chemistry books from the juvenile section of the library! These publications typically present the information in an interesting and easy to understand form and they are filled with entertaining and relevant information. This helps make learning possible as well as fun.

We hope your whole family enjoys the process of learning together. *Solve et Coagula!*

-The Olson family at Westfield Studios

GETTING STARTED

1. **PRINT THE GUIDEBOOK.** This file is found on the last disc. Probably the best way is to take the disc to a print shop like Staples. Print it in black and white, double sided, spiral bound with a clear front cover and black back cover. The copyright section on this page gives you our permission.
2. **PRINT THE "CHEMISTRY 101 EXTENDED PERIODIC TABLE."** On the last DVD disc are printable files including the Chemistry 101 Extended Periodic Table. It comes on three pages because it is the extended version. You can either print the three pages from a home printer at a local print shop like Staples. Cut the excess margins off the pages so you can tape them together and form one long periodic table. You will refer to this often while watching the films. Also on the same disc, you will want to print off a copy of "*Road to the Periodic Table-the Scientists*". Print it in color if you can; it will be handy for study.
3. **CREATE A CHEMISTRY 101 NOTEBOOK.** Students are asked to start a "Chemistry 101 Notebook" in segment one. All the work, research and reports should be recorded in this book.
4. **READ AHEAD.** Read what is expected of the student before you begin each segment. That way you can gather any needed items and prepare what you will be doing. Nearly everything you will need for mini-labs you already have in your home or is easily obtained at the grocery store. Plan on accomplishing about one segment per week.
5. **WATCH THE FILM & DISCUSS.** Once you have an idea of what is ahead, watch the film together and do the *Discussion Questions* found at the end of each segment in the Guidebook. Then formulate a plan of how you want to do the activities in the Accreditation Program.
6.  **15:00 MINI-LABS & 200 WORD REPORTS.** Students will repeat many of the mini-labs seen in the film. This icon means the experiment is located about that many minutes into the film giving a quick way to locate that section. In addition, students are usually required to do a brief research and ♦write a 200 word report on the topic of the mini-lab after they conduct the experiment. (To give you an idea of length, this paragraph and the one right before it, together are 200 words long. Unless otherwise stated, all *Chemistry 101* reports are 200 words long.) You can use library books, encyclopedias or internet articles to gather the information. These 200 word reports should be read aloud by the student to the family or to the teacher.
7. **SIGN OFF EACH TASK.** A lot of learning is gained by having to explain a concept to someone else. All sections accomplished, especially those orally presented to another person should be signed off by the person who heard the presentation or by the instructor.

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Segment 2 The Birth of Modern Chemistry

ACTIVITY	Target hours	Actual hours	Sign off
DVD: Watch "The Birth of Modern Chemistry" Review with your instructor and/or family what was on the film.	1 hr		
Read and study the Guidebook on Segment 2	½ hr		
DISCUSSION			
Talk about the "Discussion Questions" at the end of Segment 2	½ hr		
READING & RESEARCH			
After your Mini-labs, do research on the candle experiments. Explain why the candles go out in each situation. ♦Write your 200 word report	1 hr		
MINI LAB			
Mini-Lab #1 Conduct the carbon dioxide & candle experiment seen in the film ⌚25:00	1 hr		
Mini-Lab #2 Conduct the phlogiston experiment in the film. You can use a mason jar to cover the candles, Play-Doh to hold the candles and a dish to stick the Play-Doh on. ⌚9:10	2 hr		
FINAL			
DVD: Watch "The Birth of Modern Chemistry" Read the Guidebook on Segment 2 again	1 hr		
Take the quiz at the end of Segment 2	½ hr		
TOTAL HOURS FOR MODERN CHEMISTRY	7½ hr		

Segment 7 Periodic Table - The Main Group

ACTIVITY	Target hours	Actual hours	Sign off
DVD: Watch "The Periodic Table - The Main Group." Review with your instructor and/or family what was on the film.	1 hr		
Read and study the Guidebook on Segment 7	½ hr		
DISCUSSION			
Talk about the "Discussion Questions" at the end of Segment 7	½ hr		
READING & RESEARCH			
Make your own "Periodic Table of the Crayons" and explain to a family member how this corresponds to the Periodic Table of the Elements. ⌚ 3:00	1 hr		
Draw the main group on the Periodic Table <ul style="list-style-type: none"> • Label the elements and families. • Include hydrogen and helium. • Outline the metalloids Show and explain your work to someone.	2 hr		
♦List the eleven elements that have odd abbreviations & why the abbreviation is what it is.	½ hr		
Read a juvenile or adult library book or web articles of your choice on the Hindenburg disaster. ♦Write a brief 50 word report	1 hr		
FINAL			
DVD: Watch "The Main Group" Read the Guidebook on Segment 7 again	1 hr		
Take the quiz at the end of Segment 7	½ hr		
TOTAL HOURS FOR THE MAIN GROUP	8 hrs		

Segment 8

Periodic Table - Quantum Mechanics

ACTIVITY	Target hours	Actual hours	Sign off
DVD: Watch "The Periodic Table - Quantum Mechanics" Review with your instructor and/or family what was on the film.	1 hr		
Read and study the Guidebook on Segment 8	½ hr		
DISCUSSION			
Talk about the "Discussion Questions" at the end of Segment 8	½ hr		
READING & RESEARCH			
In the film there is a mechanical machine made entirely of wood illustrating Newtonian Mechanics. Pick two of the gearing mechanisms you like and read an article about what that gear is and how it works. ♦Write a 100 word report about what you found. ⌚4:30	1 hr		
Read a couple of article on Quantum Mechanics. ♦Write a summary on what it is and how it differs from Newtonian Mechanics.	1 hr		
Draw an illustration of the various models of the atom from the solid billiard ball to the quantum model. Then draw an imaginative model of what it may look like in the future.	1 hr		
FINAL			
DVD: Watch "The Periodic Table - Quantum Mechanics" Read the Guidebook on Segment 8 again.	1 hr		
Take the quiz at the end of Segment 8	½ hr		
TOTAL HOURS FOR QUANTUM MECHANICS	6½ hrs		

Segment 10 Compounds & Molecules/part 1

ACTIVITY	Target	Actual	Sign off
DVD: Watch "Compounds & Molecules/part 1" Review with your instructor and/or family what was on the film.	1 hr		
Read and study the Guidebook on Segment 10	½ hr		
DISCUSSION			
Talk about the "Discussion Questions" at the end of Segment 10	½ hr		
READING & RESEARCH			
Read a web article or library book on compounds and molecules	½ hr		
Do research on covalent and ionic bonding. ♦Write your report & illustrate your notes. Explain it to someone ⌚12:00	1 hr		
MINI LAB			
Mini-Lab #1 Conduct the Mentos Experiment. ⌚03:20 Before you do the experiment do a little research on the Mentos experiment and ♦Write your 200 word report. (You will likely have an audience at this lab.) At the experiment read your report to the audience	2 hr		
Mini-Lab #2 A Mini-Lava Lamp (not shown in film.) 1. Fill a jar or bottle 3/4 with inexpensive vegetable oil and 1/4 with water. 2. The oil floats. Sprinkle salt on the oil until it sinks. After awhile, it floats back up again. 3. Add 10-12 drops of food coloring. 4. Divide an Alka-Selzer® tablet in eight pieces and drop a piece in the jar. Oil and water don't mix or form a compound. Water and food coloring do form a mixture. As the carbon dioxide bubbles are released from the tablet, they bind to the color blob and float to the top. When they arrive, they burst and the blob of color floats back down. When the fizzing stops, you can cap the bottle and the blobs will join and form a sort of color wave in the jar. Oil is less dense than water...it floats. Salt is more dense than water and drags the oil to the bottom. When the salt dissolves in the water, the oil comes back up.	2 hr		
FINAL			
DVD: Watch "Compounds & Molecules/part 1" Read the Guidebook on Segment 10 again	1 hr		
Take the quiz at the end of Segment 10	½ hr		
TOTAL HOURS FOR COMPOUNDS & MOLECULES/PART 1	9 hrs		

Segment 15 Non-metals & Poor Metals

ACTIVITY	Target hours	Actual hours	Sign off
DVD: Watch "Non-metals & Poor Metals" Review with your instructor and/or family what was on the film.	1 hr		
Read and study the Guidebook on Segment 15	½ hr		
DISCUSSION			
Talk about the "Discussion Questions" at the end of Segment 15	½ hr		
READING & RESEARCH			
<p>Do some research on "Dry Ice." Answer the following questions:</p> <ol style="list-style-type: none"> 1. What is dry ice 2. What is it used for? 3. How do you safely handle dry ice? 4. What are the dangers of putting it in a sealed container? 5. How long will it last in a container? Hours, days, weeks? 6. Search the web and list 2 experiments you can do with dry ice. <p>♦Write a report on what you found on "dry ice" then do Mini-lab #2.</p>	1 hr		
MINI LAB			
<p style="text-align: center;">Mini-Lab #1.</p> <p style="text-align: center;">Heat Dissipation Experiment (not shown in film)</p> <p>The space shuttle tiles are made of materials from the poor metals and metalloid groups as they can dissipate heat more quickly than regular metals.</p> <p>Fill a balloon half full of water. Take another and blow it up with air. Place a small candle in the sink and lower the air balloon over the flame. What happens?</p> <p>Now do the same with the water balloon. Does it ever burn through? What if you actually touch the flame with the surface of the balloon? Did the balloon burn or can you wipe the black carbon off? Like many of the non-metals, the H₂O combination dissipates heat. The water absorbs the heat and dissipates it thus keeping the balloon intact.</p>	1 hr		
<p style="text-align: center;">Mini-Lab #2.</p> <p style="text-align: center;">Dry Ice Experiments (not shown in film)</p> <ol style="list-style-type: none"> 1. Do your research on dry ice in the <i>reading & research</i> section above. 2. Call a welding supply store and tell them you need a couple of pounds or so of dry ice. Tell them you are studying the non-metals of the periodic table for a school science experiment. Ask them the price, what you need to transport it and safety procedures in handling and breaking up chunks of it. <p style="text-align: center;">Two possible experiments</p> <ol style="list-style-type: none"> 1. Put some in a bowl of water. Use cold then hot water. 2. Stuff some inside an uninflated balloon and tie the end. <p style="text-align: center;">Record the results</p>	2 hr		
FINAL			
DVD: Watch "Non-metals & Poor Metals" Read the Guidebook on Segment 15 again	1 hr		
Take the quiz at the end of Segment 15	½ hr		
TOTAL HOURS FOR NON-METALS AND POOR METALS	7½ hrs		

Segment 18

The Future of Chemistry/part 1

ACTIVITY	Target hours	Actual hours	Sign off
DVD: Watch "The Future of Chemistry/part 1" Review with your instructor and/or family what was on the film.	1 hr		
Read and study the Guidebook on Segment 18	½ hr		
DISCUSSION			
Talk about the "Discussion Questions" at the end of Segment 18	½ hr		
READING & RESEARCH			
What is the Manhattan Project? ♦Put your answer in your notebook.	½ hr		
Explain the difference between fission and fusion - both controlled and uncontrolled. ♦Write your report.	1 hr		
Watch the part on how a nuclear power station works. Draw your own diagram illustrating this process then explain it to someone ⌚7:00	1 hr		
FIELD TRIP!			
Find out where electricity is generated in your area. It may be from a coal-fired plant, a nuclear plant or hydro electric. Call the facility and explain you are in a class on beginning chemistry. Ask if someone there could take 15 minutes to show the kids how it works. Ask lots of questions like: <ul style="list-style-type: none"> • How is the electricity generated from here? • How much is generated? • What is the greatest risk that causes a shut down? <p>If they do not give tours, go to the facility and stop into the front desk and pickup any literature they have. Have a look around and give yourself a tour of as much as you can see. Then go have an ice cream cone to help make up for the fact that they wouldn't give you a tour.</p>	3 hr		
FINAL			
DVD: Watch " The Future of Chemistry/part 1" Read the Guidebook on Segment 18 again	1 hr		
Take the quiz at the end of Segment 18	½ hr		
TOTAL HOURS FOR FUTURE OF CHEMISTRY/PART 1	9 hrs		