

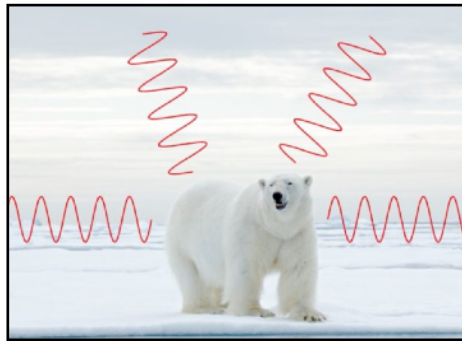
CrossWired Science



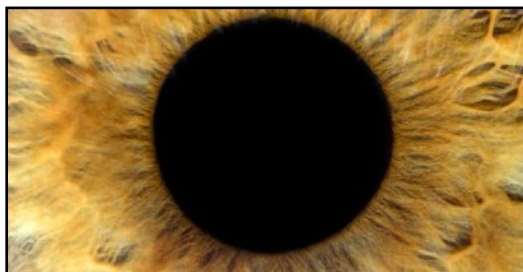
BIOLOGY/CHEMISTRY/PHYSICS

Student Notebook - Year 2

Semester 201



*An incredible journey
into the Life , Physical
and Earth Sciences
that powerfully shows
the beauty, power,
intelligence and the
love of the God who
created all things.*



Quick Start Info

CWS: Biology/Chemistry/Physics 201/201

Welcome to Biology/Chemistry/Physics 201/202

We are quite excited to take you on a thrilling journey to learn about God's handiwork as we study Biology, Chemistry and Physics together. Our prayer is that you will come to know the power, love intelligence and beauty of the Lord more than you ever thought possible through the things you learn in this course!

PLEASE READ THIS BEFORE BEGINNING.

1. Be sure to be logged in when you are using the downloadable Student Printable Modules. The printable Student Modules will schedule and navigate every lesson of the year. (The online calendars are for those using CWS as a supplement). These printable Student Modules are the **ONLY way** to effectively access the online lessons and videos. **All blue print is hyperlinked.**

2. There are 24 Student Notebook Modules for Year 2. They may be printed module by module.

- **Bio/Chem/Physics 201 12 MODULES Global Topics Eyes/Insulation**
- **Bio/Chem/Physics 202 12 MODULES Global Topics Heat & Cold/Bioluminescence**

3. Integrating BCP with our younger program, CrossWired Science Core (First Timers).

There are 24 "Student Modules each year for both **Biology/Chemistry/Physics** (High School) & **CrossWired Science Core** (K-9th Grade).

- **Modules in BCP 201 & 202 correspond to the Module Lessons in the CWS Year 2 Core Curriculum**
- Some lessons each week overlap for all of children, Kindergarten through High School, including: Experiments/Video Links/Core Videos/Specific Videos/Gold Digs/Memory Verses/Devotions/Concept Drawings/and Scientists (K-8th grade). Each age has its own level of work in each of these content areas..

4. There are references to First Year Students and Second Year Students in many Modules.

These refer to existing students and students entering into a group studying CWS materials. If you were a member of a CWS group last year and a friend wants to join it this year, you would be the second year student and he would be the first year student. Your assignments are sometimes slightly different because he does not have the same background you have. We did this so new students can join an existing group.

5. There are 10 Regular Sections in each Module: (+ one sometimes for experiments)

- 1. Power Topic:** The special topic for the week.
- 1.5 Experiment Blocks and Hunts:** 3 week experiment blocks and Long-term hunts.
- 2. Super and Standard Article:** Super=from CWS website. Standard= from a Creation Scientist.
- 3. Concept Drawings:** Drawings that help solidify important concepts and train the eyes.
- 4. Research:** Research Creation Scientists and scientists from the past.
- 5. Specific Videos:** Important videos for all levels of CWS to watch.
- 6. Global Topics-Core Videos:** Videos designed to lay a foundation for seeing God's wonders.
- 7. Verses:** Verses from the Bible to memorize.
- 8. Devotionals:** CWS Devotionals of all kinds.
- 9. General and Unit Links:** Others links to broaden Science knowledge and solidify topics.
- 10. Additional Resources:** Bonus resources to help solidify the basics of Biology, Chem & Physics.

Quick Start Info (cont.)

6. You do not need to print the Student Modules. You can save money and use them electronically and simply use a regular notebook to record your student's work. You can also use an editing tool to type in these electronically. If you print them, we highly recommend the **EPSON ECOTANK COLOR PRINTER 3760 SE** (Costco/Sam's club). Printing costs to print the first 12 modules for CWS in color is about \$5 TOTAL. This printer is a homeschooler's dream come true. The ink lasts forever and refills are VERY inexpensive.

7. There are Global Topics in CWS. These bring out God's wonders in different subject areas. Each Global Topic has a lesson page. The Lesson page for the Global Topic Fluid Dynamics looks like this:

LESSON PAGE. To access this, go to "Curriculum" in the top menu. Click *First Timers* or *Second Timers*. Chose *Fluid Dynamics*. You will see the "Lesson Page". The *BCP Modules* accesses these lessons and many more and schedules the lessons for the students. Each lesson has three red buttons in the top right hand corner: "Directions", "Info" and a "Quick Look" video. These explain the lesson and how to do it. Global Topics are arranged like this for students using CWS as a supplement. **If you are a student using CWS as a full year's curriculum, you will use the Modules to access ALL lesson components.**

8. Hyperlinked General Links and Unit Links. "General Links 1", "General Links 2" and "Unit Links" are not accessible by clicking (hyperlinked), unless you are in the Parent or Admin Account. (If parents are logged on in their user, you can see General Links and Unit Links when you click on the Parent Tab in the top menu. These General and Unit Links are immediately accessed when an image is clicked. **To get to the links in the student user,** you must copy and paste the Link in the URL bar at the top of every link. We realize this is inconvenient. We do this to add a tiny amount of internet protection.

9. Interestables and Clipped Sentences. We will often ask students to find "Interestables". These are interesting—even fascinating—facts and concepts. We want Note Taking about them to be as easy and pleasant as possible. We encourage using "Clipped Sentences" for note taking, which are shortened notes like those taken in a college class. An example of a clipped sentence for, "The iris is the colored part of the eye. It grows and shrinks to let different amounts of light into your eye." Clipped: "Iris colored. Grows shrinks. Adjusts light."

10. Review is an essential component to a CrossWired approach. Review is VERY important for detailed long-term memory! *You will see materials brought back to your students at regular intervals.*

The material in Core Videos and some in Gold Digs and Digging Deeper will need to be mastered over the course of 3-4 years in Biology/Chemistry/Physics (BCP).

When you watch a Core Video of each Global Topic the first time, 3-5 notes are taken on it or an easy First Timer Quiz is taken. The third time there is a little more difficult Mastery Quiz. BUT, even after these 3 sessions with every Core Video you are not done with the material.

There is a very novel Mastery System we will be introducing. It will take all the material of all the Core Videos/Gold Digs and Digging Deeper and assess by Computerized Super-Reviews what a child knows and doesn't know. The students will be helped to get 100% in every Review by in-built video-based animated sessions. The more the student masters the material in their three interactions with the material before the Super-Review, the more enjoyable "Super-Mastery" will be. Super Mastery is mastering ALL CWS Core material.

11. Go at your OWN pace! We encourage you to choose what sections fit your students' needs and spread out the lessons over as much time as needed. The goal is to create a LOVE for learning about God's handiwork, NOT to create head-smart but heart-ignorant young people!

12. Stay Connected - Join our [CrossWired Science Community Facebook Group](#) and join our email list at contact@crosswiredscience.com if you do not receive our weekly devotional emails.

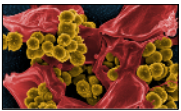
POWER TOPICS (mini): DISMANTLING EVOLUTION BIT BY BIT

Find "Interestables" (Interesting concepts) for each video and record in the box. You do not have to write in full sentences; you may use clipped sentences. (Clipped sentences are shortened notes like what you would take yourself in a college class.) As always, use the back if more room is needed.

Write 3 INTERESTABLES (great concepts) for each video. Star the best one.



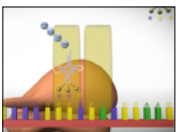
[Superbugs: Evidence for evolution?](#) CMI 4 min



[Superbugs: Weaker than normal bacteria](#) CMI 3 min



[Chimp DNA](#) TAF 2 min



[Cell Origins](#) TAF 2 min

Power Topic - (Major)

Mod 1

Noah's Ark Fact or Fiction CMI 28 min

Write 10 interestables below. Star the best 2.



1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

1.5a UV Mysteries Experiment Block (3+ Hours over 3 Weeks)

Mod 1-3

NOTE: Supplies for this experiment will be available in the new BCP Experiment Pak coming out in September 2023.

In this Experiment Block you will experiment with UV light.

1. Fun with a marker.
2. Search for UV fluorescing objects.
3. Surprising mystery of Using UV light with clear orbees.
4. Testing for chlorophyll in leaves with UV light.

Take 1-3 Pictures of your experiments & tape them in the boxes below or tape them on the back of this sheet.

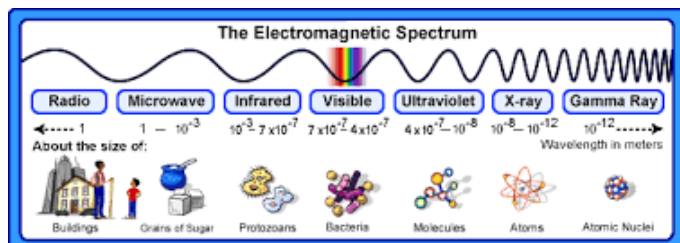
NOTE: This is the official Connected Experiment Block of CWS.

You may do any experiment in our [SOUND Experiment/Activity List](#) instead.

1. UV EFFECTS

SUPPLIES:

- ☐ **UV flashlight** (Purchase from Amazon)
- ☐ 3 AAA batteries
- ☐ 2 Yellow + 1 Pink Sharpie highlighter
- ☐ 3 small clear cups
- ☐ **Polymer spheres** (Purchase from Amazon)



PROCEDURE #1:

Take your yellow highlighter and write on a paper or your fingernails or your hand. Shine the UV light on it. (try other colors of high-lighters too)



Research:

1. What is the wavelength range of UV light?
2. What is the weakest wavelength of UV light?
3. What is the strongest wavelength of UV light?
4. What happens when invisible UV light strikes something and a color can be seen that is not normally there in the object? (When the object fluoresces?)

PROCEDURE #2:

1. Find 20 objects that re-emit photons we can see when a UV light shines on them: Ideas include: (Circle which ones do this)

- Blond hair, tennis shoes, detergent, scorpions, compare veg oil and olive oil...
- Look for chlorine in someone's lighter-colored hair. It will look green under a UV light. Look at transparent highlighting markers, rocks, labels on bottles...
- Teeth, tonic water (quinine in it), chlorophyll in a leaf (get it out by mashing ie spinach or swiss chard in a small amount of alcohol), your washer and dryer area...
- Vitamin A, vitamin B12 dissolved in vinegar is strong, toothpaste whiteners, anti-freeze, blood, newer \$20 bills and other larger \$ bills, light bulbs, scorpions, mine trailings...
- Other cleaners, banana spots, some toys and plastics, white paper, cosmetics, some corals, fish, mushrooms, jellyfish, vaseline, olive oil, rock salt, turmeric (the spice), canola oil...
- Honey, some postage stamps, catsup, cotton balls, pipe cleaners (chenille craft sticks)
- Fungus that causes Athlete's Foot, Shells (the aragonite of the nacre in them can fluoresce green, red or blue depending on the wavelength of the UV shining on them (try different angles) Abalone works well.

2. INVESTIGATION / UV POLY-SPHERES

UV HIGHLIGHTERS & POLYSPHERES

NOTE: The Flight Patterns Hunt 3-Month Project from Lesson 3 is due in 3 weeks.

SUPPLIES:

- **Polymer spheres** Amazon
- 3 small plastic cups
- 2 **Yellow + Pink Sharpie highlighters** Amazon



PROCEDURE 3

- Remove the yellow and pink ink cartridges from the markers and squeeze the contents into 2 cups.
- Put 6 spheres in the cup with the yellow dye and 6 in the cup with the pink dye. Add 1/2" of water to each. Let them sit 1 day. Pull them out and shine UV light on them
- Put each color of spheres into their own small plastic cups (clear is best). Do not put in a paper cup!)
- Take 1/2 of the yellow spheres and put them into a 3rd cup. Put 1/2 of the pink spheres on top of them. Let sit 2 days Look at the 3 groups of spheres with the UV light after 2 days.

PROCEDURE 3 (continued):

- Look at your pink and yellow highlighter spheres from in a darkened room from above the spheres. There will be a reflection from the UV light on the spheres. (It looks like the bright spot on a bubble). What color is each? Why?
- With the pink highlighter spheres on the top of yellow ones, after one day, carefully observe the spheres in a darkened room with a UV flashlight from the top and from the bottom. What do you see? Why? Why is there a bright lining around the very edge of the spheres?

PROCEDURE 4:

- Make a mixture of Spinach leaves chlorophyll as described in #5 below. Put 5 of your orb spheres into the alcohol/chlorophyll solution. Observe in one day with a UV flashlight. Was the chlorophyll absorbed into the spheres?
- Add two tablespoons of water into the alcohol solution. Add another batch of spheres. Let sit one day. Did they absorb the chlorophyll molecules now that more water is there to be absorbed by the spheres? Do the spheres absorb concentrated alcohol?

Sphere Art For Fun:

- Place 1/2 of each of the 3 cups of spheres neatly on a stack of 3 napkins (or 6 sheets of folded TP (3"x6"). Spread out the spheres about 1/4" from each other.
- Observe after 2-3 days with and without the UV light. Move the spheres 1/4 inch from where they are on the napkin. You should see a spot of color where they were. Let them rest in their new spot a couple days. Move them and you'll have fluorescing "art" on your napkin. Save the napk in a sheet protector in your sci-notebook (tape it to a paper). Compare the size of the spheres on the napkin with those not on it.

Questions:

1. What do the spheres look like with the UV light on day 1? Are they clear or opaque?
2. What do the mixed spheres (1/2 on top of 1/2) look like after 3 days? Are the mixed ones opaque when viewed from the top? Are the mixed ones opaque when viewed from the side? What's going on?
3. Did the ones on the napkin grow or shrink? Why?

SOMETHING YOU MIGHT LIKE TO DO: Glow in the dark bones.

To make glow in the dark bones, take the fluorescent dye from a yellow or pink highlighter and mix it with about 1/8 cup of water and drop in a bone and let it sit until it is coated with dye (3 to 7 days) Wipe it off and hit it with a UV light and it glows wildly! Start with vertebrae of chicken from your Bones experiment and then try hunks of beef bone. Why do they coat differently?

3. TESTING FOR CHLOROPHYLL—and its buddies

SUPPLIES: All the leaves and plant parts are not necessary. Leaves are best.

NOTE: The Flight Patterns Hunt 3-Month Project from Lesson 3 is due next week.

- ☐ Leaves: Spinach, juvenile, “black”, Fall leaves. Avocado, Kiwi
- ☐ Green peppers, cucumber, Green beans, lettuce, kale
- ☐ UV light, 70 or 91% Alcohol 3 coffee filters
- ☐ Microwave

REVIEW:

- UV light is part of the electromagnetic spectrum. It is the photons of light whose wavelength is 400nm-10nm. 10 nm (ten nanometers) is the short, powerful wavelength of UV light.
- UV B is more powerful UV light than UV A. It has greater energy. This causes it to have a higher frequency than UV-A light (the photon moves up and down more often and more quickly than those of UV-A).
- Remember, longer wavelength UV is weaker: it doesn't have as much energy,
- Solar cells used in producing solar panels must have glass on them that is of the right type and thickness to allow the right amount of UV light to pass through.
- Insect eyes have mini-lenses in the ommatidia. The parts of the compound eyes that detect UV light must allow it to enter the eye or the insect eye couldn't detect it.



Questions:

1. Did you see any other colors than green in the chromatography?
2. What color does the chlorophyll fluoresce under UV light?
3. Why does it look one color under the UV light? Why does it look another color when the light is under the mix and black when from the side.



UV light fluoresces Chlorophyll molecules. Chlorophyll molecules are inside the donut-shaped chloroplasts inside the pancake-stacked thylakoids. (see right) They are so tiny that you could put more than a billion into a dust particle. But each is very precisely made.

PROCEDURES 5-10

5. Break up 3-5 spinach leaves into 1” pieces (Leave out the stems). Mix with 10 tbs of alcohol (70 or 91%) and mush the leaves down into the alcohol. Let sit 20 minutes or more. Look at under UV. Strain out the roughage by pouring it through a strainer or a coffee filter. Observe again with UV light.

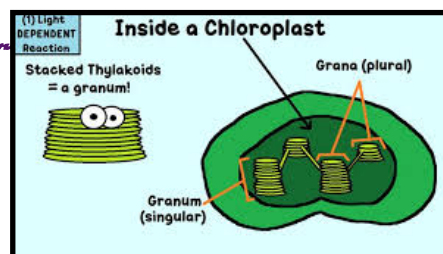
6. Put 1/2” of the spinach solution in a small glass. Put a 1”x7” cut-out strip of coffee filter in the mixture with 1” sticking in the water and the other 6” up the glass and out. Let the mixture be absorbed by the filter. Note the chromatography. Do you see orange? If you do, it is carotene, the pigment that makes carrots orange. Look at the strip with UV.

7. Look at the remaining mixture under a UV light. (In a clear glass) Shine the UV light from the top and from the side and from underneath and from the far side. What does look like in each case? (Record all observations on an experiment sheet.)

8. Testing different leaves as you did in #5 above for their chlorophyll content. Crush 5 new leaves in separate alcohol batches of 5 tablespoons of alcohol (see leaf requirements below).. Compare the deepness of the red color of light they fluoresce in UV light to determine if they have chlorophyll, and, if they do, how much each set of leaves have in comparison to each other.

9. Try also: light green baby leaves from a plant (juvenile leaves), celery, green pepper, avocado (the inside green part), purple plum leaves (they appear black-get from a nursery), fall leaves from deciduous trees (test ones that are yellow, orange and red), green bean skin, lettuce, kale, kiwi pulp, lime peel.

10. Lab Report: Make a Lab Report. The question you'll be investigating is “Do different leaves and plant parts contain chlorophyll?”



1.5b WONDERS TRACK *Experiments!*

Record what experiments you did this week from Wonders Track. Write 3 interesting things you learned from each and the best part of the experiment or activity.

**Exp 1:****Exp 2:****Exp 3:**

1.5b Flight Patterns Hunt #2 (1st, 2nd Timers and Bio/Chem/Physics)

Mods 1-12

This Hunt is your second one in this area. The purpose of this experiment block is to get you thinking more deeply about aerodynamics and to apply your knowledge to living things. You have the next 3 months to find 20 flying creatures with different flying patterns and analyze the aerodynamics involved in each. You may include flying mammals, and insects and birds. The analysis of their flights may be researched or hypothesized. You must see each one personally. We've listed 6. Write in your analysis of these two and do likewise for your remaining flight patterns. (Put the remaining 5 on the back)

Flight Patterns Hunt

1. **Dragonfly** (See [Dragonfly Flight Design](#))
2. **Butterfly** (See [Red Admiral Flight](#), [Designer Wings](#), [Photonic Structures](#) for beauty)
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.

2a. Super Article: Bones 5 Sections A-D

Mod 1

This is your “Super Article” for this week.

Go to this link. Read the next letters listed above.

Write 7 of the best interestables you found in this reading here.

Star the best interestable.



1.

2.

3.

4.

5.

6.

7.

Annotate this article; underline what is interesting and star the best info.
Write 5 clipped-sentence interestables on this article on the back.

Lizard skin inspires lubricant-free slipperiness

by David Catchpoole

Engineers now frequently copy designs in nature—a field known as biomimetics—resulting in many great gains in our technology.¹ But sometimes even the engineers themselves are surprised at just how dr

A recent example featured in the *Bioinspiration and Biomimetics* journal is the copying of the scaly skin of the sandfish skink lizard (*Scincus scincus*).² Engineers already knew that the shape and pattern of its non-overlapping scales make the skin ‘slippery’ when going forwards, but give it high resis-



tance to movement in the opposite direction (thus helping the creature to propel itself forward). And they knew it was achieved without lubrication, as the skinks do not secrete oils or other liquids onto their skin.

So, wanting to see if this feature might be usefully applied in engineering, researchers Christian Greiner and Michael Schäfer of the prestigious Karlsruhe Institute of Technology (Germany) etched similar scale shapes and patterns onto flat steel using laser surface texturing. When they slid the steel across a smooth, dry sapphire surface, they were astonished to discover that the lizard-inspired etched pattern lowered friction by an amazing 40%.

“If we’d managed just a 1% reduction in friction, our engineering colleagues would have been delighted; 40% really is a leap forward and everyone is very excited!” said Greiner.

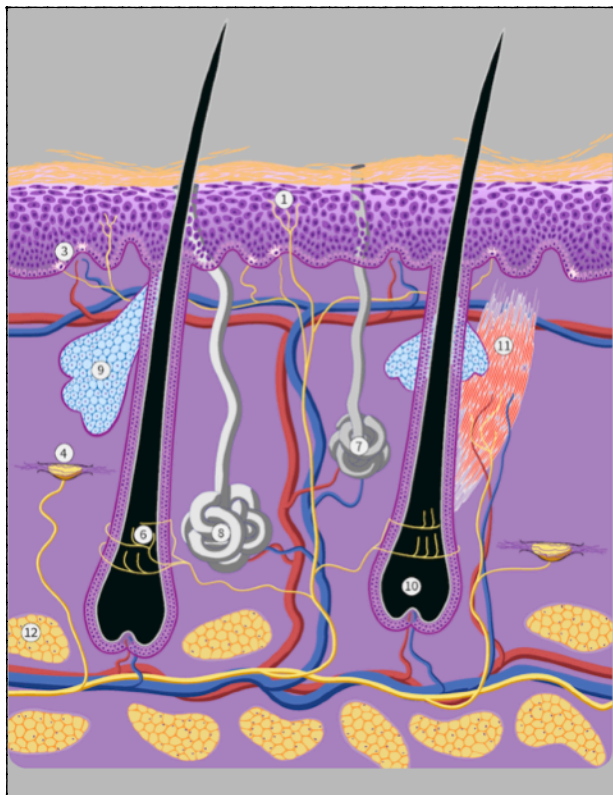
It’s easy to see why. This discovery could help to reduce friction in machines that cannot be lubricated, e.g. miniature devices in which lubricants tend to hinder and gum up moving parts—in fact, under lubrication, this scaly structure *increased* friction threefold compared to a smooth surface.² It could also be used to reduce friction in the sensors used in anti-lock braking systems and computer hard-disk drives, and in the accelerometers used in cell phones. Furthermore, preliminary results suggest that the scaly texture also reduces wear.²

With further refinement, the potential applications could include making lizard-inspired robots useful for exploring extremely dusty environments (where oily lubricants are notoriously difficult to manage and keep clean).

Of course, given the *inspiration source* of all these applications, one should always remember that God thought of it first! Unfortunately, the researchers instead wrongly ascribe design in nature to being “the result of a long evolutionary adaption process.”² But how does that make any sense, given the many thousands of research hours and top-flight engineering intelligence employed in merely *copying* biological design—does it not rather point to there being a Designer behind it all? No wonder that the Designer inspired the Apostle Paul to write that God’s power can be perceived in the things that have been made, “so that they are without excuse” ([Romans 1:20](#)).

3a. Concept Drawing (20 min)

Draw this diagram. Label it.



1. Dead epidermis cells 3. Nerve 4. Heat detectors 6. Hair 7,8 Sweat glands
10. Artery in the hair follicle
11. Hair erecting muscle 12. Fat

The Profound Gift of Skin!

As I've grown in my understanding of God in science, skin has become something that often causes my heart to rise in praise to Him.

Skin is not at all simple like it appears. It is saturated with wiring, extremely sophisticated detectors, lubricators, and thousands of miles of piping and millions of bio-electrical wires. Every square inch of it has hundreds of wires streaming information to the brain and is at the same time receiving impulses from the brain to put different mechanisms into active status.

The hair is built from blood parts coming in from piping at its base. The living skin is in the dermis which is under the dead epidermis cells on the outside of our skin. These living cells are constantly being pushed upward after they are made. As they ascend, they multiply the strong protein keratin inside them and eventually die becoming the smooth protective layer that God made our skin to be.

God wanted us to be able to feel warmth and coolness all over our bodies so He put sophisticated bio-devices all through our skin with nerve wires directly to our being to keep us informed. Our brain can tell exactly where the messages are coming from even through there are millions coming every second from hundreds of miles of wiring from our skin.

Fat cells multiply under our skin to provide warmth for us. Without the fat just under our thin layer of skin, we would freeze in the mildest cold weather!

What wonder-filled hi-tech gift from God our skin is! As you are blessed by skin, never stop praising the One who created it for you!

Skin

Write 5 interesting things about this on the back.

3b. Concept Drawing (20 min)

Draw this illustration. Label it

DNA Translation

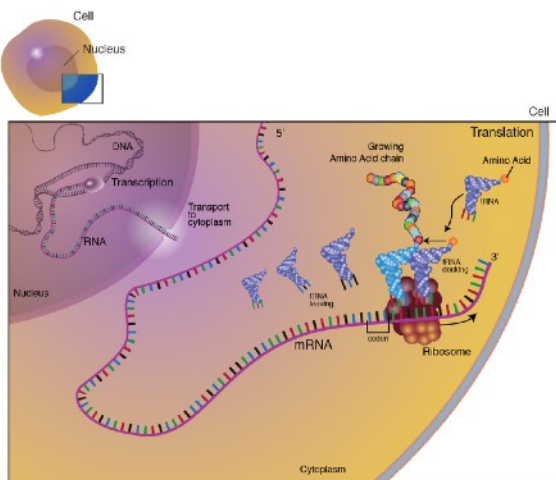
In "Translation" the mRNA copy of the DNA comes from the nucleus to a ribosome. Here it is "translated" into an order of Amino Acids that will make a precise protein.

Each tRNA molecule (transfer RNA) has an amino acid hooked to each one. These float around near the ribosome. When the mRNA copy of the DNA runs through it, it will read 3 letters of the mRNA at a time. Each 3 will code for one specific Amino Acid. The order of the nucleotides (the A, U, C and G) determines the order of the Amino Acids in the protein chain.

NOTE 1: Remember that the nucleotides in DNA are A, T, C, AND G. In RNA, the T is substituted for a U. (Uracil is substituted for Thymine)

NOTE 2: The 20 amino acids that the human body uses are 2 different kinds. There are nine essential amino acids which we need to eat because we can not make them. **These are: phenylalanine, valine, tryptophan, threonine, isoleucine, methionine, histidine, leucine, and lysine.** The mnemonic PVT TIM HaLL ("private Tim Hall") is a commonly used device to remember these amino acids.

Nonessential amino acids include: **alanine, arginine, asparagine, aspartic acid, cysteine, glutamic acid, glutamine, glycine, proline, serine, and tyrosine.**



Draw and label. (Answer on back)

- Which is the mRNA?
- Which is the tRNA?
- Which is the DNA?
- What does the tRNA do?
- What does the mRNA do?

DNA TRANSLATION

4. Research

Mod 1

Research and record 10 especially interesting concepts about any topic in any of the Global Topics you have watched the Core Videos from. We are looking for 10 fascinating interestables!

GLOBAL TOPIC _____

5. Specific Videos

Mod 1

All students taking Year 2 (201, 202) Biology/Chemistry/Physics (BCP) watch these videos—both Year 1 students and Year 2 students. Approximately 1/3 of these videos are review of Year 1 BCP. Review is VERY important for detailed long-term memory! Sometimes there will be different directions for Year 1 students and Year 2 students.

Use the back for extra space. Write 5 NEW interestables for each video if no other directions are given.

Year 1 students are those whose first year in BCP is this year. (In Groups, some new Year 1 students will be added Year 2.)

Year 2 students are those who have already had a year of BCP.

ETHOLOGY (Animal Behavior)]. [Cat Flip](#) SED 6m Destin is a Christian. He will sometimes make reference to a Bible verse. He's one of the world's most popular science YouTubers. He shows by his life and the wonders he brings out that the Lord is real. He is a NASA engineer and is close friends with Derek (below) of Veritasium. Derek very much admires Destin and has said it on his videos. The Lord is slowly working on Derek through Destin.

ARACHNIDS [Why Are Scorpions Fluorescent?](#) Ver 9 min.

Derek is an evolutionist. There is a slight reference to evolution @6:33. As to scorpions "coming out of the water", the professor is referring to the completely unsubstantiated myth of the fish of the earth having evolved first and then changing and becoming terrestrial (land) creatures. This requires the addition of complex information on an organism's DNA which has 1. NEVER been observed and 2. Is beyond-belief mathematically impossible.

IMMUNOLOGY: [How The Immune System ACTUALLY Works](#) KR 9 min (Complex but interesting)

ZOOLOGY: [Backyard Squirrel Maze](#) 2.0 MR 19 min

Mark is an ex-NASA engineer evolutionist who knows very little about evolution. You can pray for him and Derek and other non-believing engineers and scientists we bring to your attention. No one can bring another person from darkness into fellowship with the living God...but God is able.

1. YR 1 students: List 5 amazing abilities God has placed in squirrels.

2. YR 2 students: List 10 things God built into a squirrel's genetic code to enable it to do what it does.

(Either coding for the wiring of its brain for behavior or how its codes are designed by God to build its body.)

15:31 Evolution is referred to : "Squirrels 30 million"

Minute 15 "Squirrels around 30 million years and evolved very little."

What Mark means by this is that squirrels have been found in layers that are supposedly 30 million years and they are just like squirrels in your backyard. Nope. This just means that squirrels were squirrels when they were buried by Noah's flood.

6. Core Videos (20+ minutes)

Watch Fluid Dynamics (FD) and Eye Core Videos

ALL students: The first time you see a Core Video, you write down 5 interestables on the back about it. The second time you see certain videos, you will take the First Timer Quiz.

Year 2 students: For Core Videos you saw last year, you will take the Second Timer Quiz.

FD Video: V1: [FD AND BERNOULLI](#)

First Year Students: Do NOT do quiz. Write down 5 interestables on back.

Second Year students: DO [SECOND TIMER QUIZ](#). Score: _____



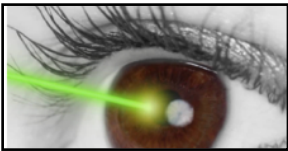
FD Video: V2: [WRIGHTS AND FOILS](#)

First Year Students: Do NOT do quiz. Write down 5 interestables on back.

Second Year students: DO [SECOND TIMER QUIZ](#).

Eye Video: V1: [LIVING CORNEA](#)

All Students: Do NOT do quiz. Write down 5 interestables on back.



Eye Video: V2 ALL: [LASIK & CORNEA PUMPS](#)

All Students: Do NOT do quiz. Write down 5 interestables on back.

Note: There are optional worksheets for these videos.

They can be downloaded from the top left hand corner of the lesson once you open the lesson.

7. Verses

Write the verses here, explain 2 ways they apply to you or things you have seen and & memorize.

Ephesians 1:18,19

8a. CWS Devotionals: Three devotionals are given below. Yr 1 students, chose one. Year 2 students, chose one you didn't chose last year. Below, describe the message of this devotional and give two ways it applies in your life.

Title: _____

Devotionals:

Teen Devotion: [A Backpacking Trip](#)

Science Devotion: [Hearing Plants](#)

Bible Devotion: [A Hike To What We Never Want To Have](#)

Describe the message of one these devotionals and give two ways it applies in your life.

8b. CWS Devotionals: Read the devotional. Write what it means and add a couple personal applications in the space below or on the back—either a need you have or an answer God gave you.

Disneyland Verses The Hummingbird pg.1

God's creatures are built by a code that is too small to see. They are constructed atom by atom and are wildly elegant. It would be impossible for any of our computers or computerized accessories to be assembled without oversight and intensive planning by their manufacturers. I have a friend who spearheaded building one of Apple's computers. The planning needed to pull it off was mind-boggling.

Complexity cannot arise from chance. For complexity to self-assemble is insanely impossible. It takes ten times more information to self-assemble something than it takes to run it.

We were at Disneyland recently. We had just visited one of the new Star Wars rides. In one part of it, a robotic fleet commander talks to your group. One of my sons commented, "Wow, it certainly is lifelike!"

I agreed with a little thought of how pathetic our attempts are to create brainless robots that resemble humans. I remembered how it was recently discovered that our brains process more information per second than the entire worldwide web. We've got a LONG LONG way to go! And besides having zero brainpower, the Star Fleet Commander has quite a bit of animatronic ability to go to hit what I just saw in the Olympic performance that took the gold in figure skating!



After the ride, we headed to Tom Sawyer's Island, for those of you who know it by its old name. After going through the caves, climbing the rocks, crossing the crazy bridges, and enjoying some of the peaceful nature hidden on it, we sat waiting for the barge to come to get us and return us to the mainland.

8b. CWS Devotionals: Read the devotional. Follow the directions below.

Disneyland Verses The Hummingbird pg.2



A hummingbird just across from us started flitting about feeding from flower to flower while airborne hitting 80 wing flaps per second. As dozens of people filed by us without a person giving our aerodynamic wonder a second of praise, I quipped, "It's amazing to me that so many can be excited about one of the brainless robots here at Disneyland and not see the wonder of one right in front of them that self-assembles and is a million times more complex! What a mission we have to help people see the hidden staggering wonder!"

Yep. What an exciting mission we have!

When you see one of God's creations that self-assembled and you see them do amazing things, realize again and again that their exquisiteness is meant by the Lord to send us a profoundly wonderful hidden message, "I, the Creator of all things



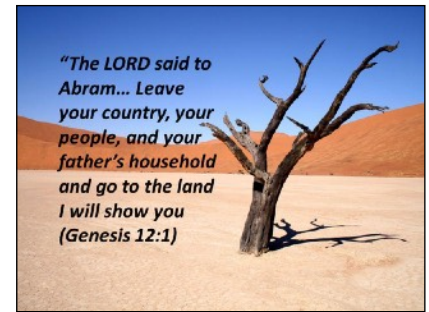
think about you constantly. I love you deeply. Don't worry about anything. I am wholly aware and wholly able. NOTHING IS IMPOSSIBLE FOR ME. I will do what has never entered your mind. TRUST ME."



Write what this means in your own words and add a couple personal applications here and on the back—either a need you have or an answer God gave you.

God Will Give Much More...and Different! pg.1

It is very much worth the time to spend time with the Lord and bring situations and people to Him. In doing so, when we let His Word seep into our minds and hearts, it lifts us to the greatest reality where God in His love, power and omniscience is present. This heart movement into the presence of the One who made the stars and who placed us here on earth brings His goodness in might upon needs and desires we have for ourselves and others.



Isn't this what we really want and need? We don't desire just the meager results we can bring by our own doing. We desire God's much more. We want the great good that only He can bring—for ourselves, our families and other very beloved ones whom He has placed in our hearts.

God's Giving To Abraham

Abraham lived a simple life before God. As best as we can tell, he was never hurried. He took time to pray and be with God. During these times God met him. Genesis 15:1 reads, "After these things, the word of the LORD came to Abram in a vision, saying, *"Do not be afraid, Abram. I am your shield, your exceedingly great reward."* In verse 7, God added, *"I am the LORD, who brought you out of Ur of the Chaldeans, to give you this land to inherit it."*

What's so significant is that God said, "I will GIVE you..." What God was wanting to do came about because God was going to give what was needed to accomplish His desire to bless Abraham and also give all that was needed for each of the ways he was intended by God to help and bless others.

In our zeal and hurry, we can neglect the very things that carry the Might we so deeply want to affect everything our life is about. But hurriedness does not help with God's plans, it hinders.

Look at Genesis 18:17-19. It's quite amazing, *"And the LORD said, 'Shall I hide from Abraham what I am about to do?' Abraham will surely become a great and powerful nation, and through him all the nations of the earth will be blessed. For I have chosen him, so that he will direct his children and his household after him to keep the way of the LORD by doing what is right and just, so that the LORD will bring about for Abraham what he has promised him."*

None of this involves hurriedness on the part of Abraham. Abraham was to walk before the Lord and take time to be involved with the relationship with God of his children and others. And, the exceedingness of what God was going to give was off the charts: God was not going to hide from Abraham what He was going to do, and nations were going to be blessed through his life.

This is all about God doing exceeding, abundantly beyond all Abraham could ask or think.



Walking And She Shed Building

Abraham's life deeply speaks to me. Even in little things like walking. There are many times when I'd love to go on a walk with the Renita or as a family, but hurry grabs me and I start thinking there is no time. But then I remember how God blessing what we do is what makes the really good things happen in our lives. I remember Abraham walking from place to place and realize again that if I don't have time to take walks, something is really off. When this happens, I take time before the Lord to adjust goals, activities and

schedules so there is again time.

8c. CWS Devotionals: Read the devotional. Follow directions at the bottom.

God Will Give Much More...and Different! pg.2



Walking And She Shed Building

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Recently we found ourselves in a situation where, after praying a whole lot, we determined that we needed a little "She shed" for some things that we felt the Lord was leading us to do. We were going to place some money we saved into a better car we needed but decided that it would be better spent

building a she shed.

I was divided. We built our house and guest house. I know well the time it takes to build things. I felt way too busy to build something else. And we decided on a gambrel design which I knew nothing about. But I felt it was needed in many ways and that it would be a tremendous experience for our younger children.

Gritting my teeth, I began.

We had prep work to do and knocked it out. We've been in the wall framing stage for the last week. With six kids on the project, I can hardly believe the amount of blessing the Lord has brought already. It has been one wildly fun and productive and instructive day after another. We've snapped hundreds of pictures. Everyone is excited and exhausted.

What will our she shed do for time and eternity? I have no idea...but we already have a number of friends who want to come and visit and we'll have a place for them to stay. We also have an international ministry. It'll greatly help in giving us a place for some from overseas to stay in also.

All this is part of a quite radical set of decisions we made to move ourselves into position where we would be more available to help others. We, like Abraham had to step into the unknown. I, for one, was afraid. I got "bit" when I took a similar course earlier in my life. But we decided that we only live once and we only have one life to serve the Lord and that we needed to try.

The results have been extraordinary! Getting off the path and being different is bringing some of the most astonishing blessings the Lord has ever brought to Renita and me.

Seek For God's More

Can I encourage you?

Seek more for God's more. Try—as one person said—"to ruthlessly eliminate hurry". Take baby steps toward the higher things that Jeremiah 6:16 talks about, *"Stand at the crossroads and look and ask for the ancient paths where the good way is, and walk in it, and you will find rest for your souls."*

8c. CWS Devotionals: Read the devotional. Follow directions at the bottom.**God Will Give Much More...and Different!** pg.3

Don't we all want rest for our souls more? Don't we all want God to give more so we can help and bless more? Don't we all want to walk more closely with the Lord every day? Don't we want to stand in the beauty of His presence more? Don't we want to hear more from Him every day and have more of His wonders happening in our lives?

You know we do. I'm sure you do, too. Let's all seek better to spend more time seeking Him and determine to be a little more courageous in doing things differently when God nudges us to. Let's join those who more and more are saying, "We welcome God's different!"

And be sure to take those walks when walkers or otta-be-walking-nudges knock!



***"I have made the earth, the men
and the beasts which are on the face of the earth
by My great power and by My outstretched arm,
and I will give it to the one who is pleasing in My sight."***

Jeremiah 27:5

God gives when we live in ways that are pleasing to Him. Abraham in his simplicity never frantically hurried, yet God freely gave him impact over countless multitudes of people over the last 4000 years. Ruth pleased God by loving one person in a hidden place where only the Alpha and the Omega saw what happened. Then she went daily to glean a field to help this person again. God saw it all. When God gave to Ruth, she became the owner of that field!

It's not by might nor by power, but by His Spirit that we receive what He wants to freely give. The doorway is not striving, it is by pleasing the One whose opinion matters *everything*.

"How blessed is he whose help is the God of Jacob, whose hope is in the Lord his God, who made heaven and earth, the sea and everything that is in them."

Psalms 146:6

Yes !

Write what this devotional means in your own words and add a couple personal applications here and on the back—either a need you have or an answer God gave you.



9. **FD Unit Links** Choose 30 minutes of links to watch.

Today is a “Unit Links” Lesson where YOU pick what Links to watch.
Write 2 great facts from the videos you watch. We do not give a View Records Sheet for Unit links. Record links watched on a separate paper.

IMPORTANT: For clickable links you must be logged into the Parent User and access the links from the Parent/Teacher tab.

Link 1:

Link 2:

Build your [Science Field](#)
Scroll down the linked page to read about it!

Link 3:

10a. Additional Resources 1: Creation / 101 Series

Mod 1

CREATION SCIENCE 1: [Radiohalos ruin radiometric dating](#) CMI 28min

Find the best 10 interestables and star the best 2.

The [101 SERIES](#). We recommend using these as an optional resource - you can purchase from Amazon or Christian Book Distributors for about \$58, or get it streamed for one year [101 SERIES](#).

CHEMISTRY 101: 1st. Year Students Do #1 Lesson. Watch 2 times. Write 10 interestables on separate sheet.

2nd Yr. Students: Find the 5 best interestables and tell why they are the best.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

10a. Read Books: It can be great fun to read **Science on Fridays**. We highly recommend [Creation Magazine](#). [Answers Magazine](#) is also good. We have some books listed on our [BOOKS PAGE](#) (Log in). We especially like the highly visual science books like those dealing with Creation Evolution. The [Wonders of Creation \(older books\)](#) series is great. Write 10 interestables (interesting concepts). Star best 2.

10b. Additional Resources 1: Crash Course+ Misc: **OPTIONAL** Mod 1

A. 1st Year Students: BIOLOGY INSIGHTS: Week 1

Watch 2 times. Write 10 interestables. Star the best one.

[Crash Course Biology](#) Carbon Everywhere

B. 1st & 2nd Year Students: CHEMISTRY INSIGHTS:

Watch 2 times. Write 10 interestables. Star the best one.

Year 1 Crash Course: [The Nucleus](#)

Year 2 Crash Course: [Types of Chemical Bonds](#) Week 2 (Week 1 was last year)

C. 2nd Year Students: PHYSICS INSIGHTS: Week 2

Watch 2 times. Write 10 interestables. Star the best one.

(Choose 1)

Physics 101 #1

Physics Girl: [1D Motion & Kinematics](#)

Crash Course : 1 [Motion in a straight Line](#)

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Video Title

- 1.
- 2.
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- 10.

10b. Additional Resources 2: Extra sheet

Mod 1

Record 10 interestables. Clipped sentences are fine! Star the best TWO.
If it is the second week you are doing this video, give ten more interestables and also star the best 2.

Video Title

- 1.
- 2.
- 3.
- 4.
- 5.
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- 9.
- 10.