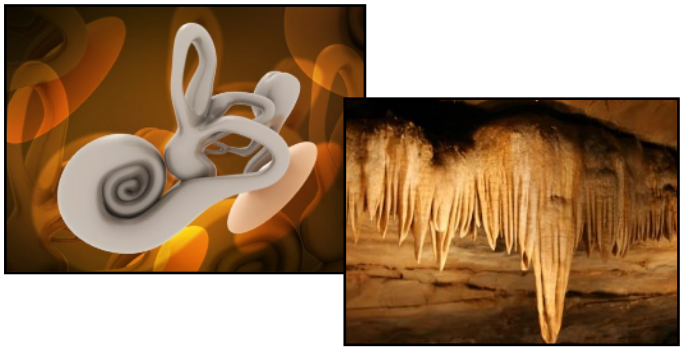
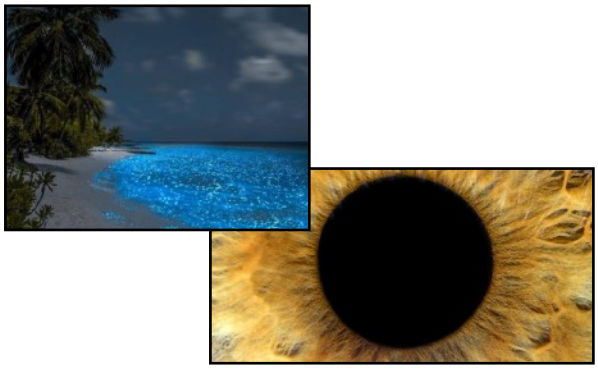
# CrossWired Science

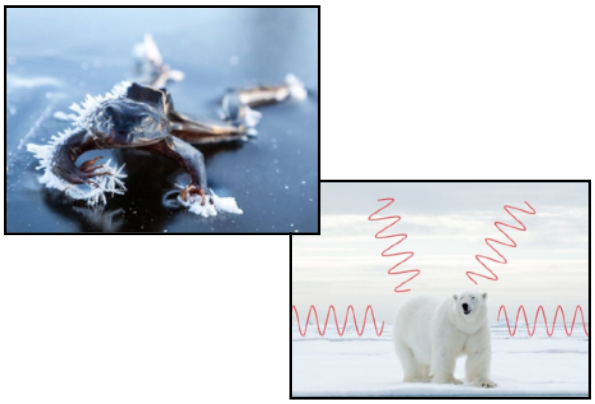
## BIOLOGY/CHEMISTRY/PHYSICS

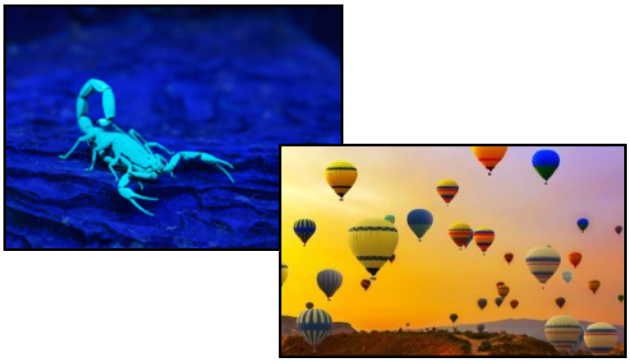
### Student Notebook - Year 3

**Semester 301**









*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 301/302

### Welcome to Biology/Chemistry/Physics - BCP 301/302

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 3.** They may be printed module by module.

- **Bio/Chem/Physics 301 12 MODULES**
- **Bio/Chem/Physics 302 12 MODULES**

**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-8th Grade).

- **Modules in BCP 301 & 302 correspond to the Module Lessons in the CWS Core 3 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 te 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. CWS is organized with Global Topics.** These bring out God's wonders in different subject areas. Each Global Topic has a lesson page. The *BCP Modules* accesses these lessons and many more and schedules the lessons for the students, just click on any blue, hyper-linked text to access. **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 on the Lesson Page by clicking (hyperlinked), unless you are in the Parent or Admin Account. (If parents are logged on in 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 Deepers 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 Deepers 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.

# CWS - Bio/Chem/Physics 301/302

10 Sections

Module 1

## 1. Power Topic

**Power Topic A: Radiohalos ruin radiometric dating CMI 28**

Write 10 interestables below. Star the best 2.


1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

**PTB: Noah's Ark Fact or Fiction CMI 28**

Write 10 interestables on the back. Star the best 2.

# POWER TOPIC SHORTS: DISMANTLING EVOLUTION BIT BY BIT

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

**Boulders moved over 500km!** 1 min CMI

**Sedimentary blankets - evidence for Noah's Flood**
1 min CMI

**The Fossil Record** TAF 2 min

# 1.5a Polarized Light Experiment Block (3+ Hours over 3 Weeks) pg.1

**Mod 1-3**

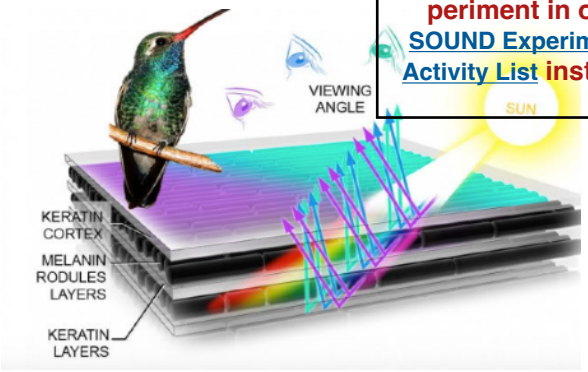
***Your Previous Experiment Block Is Due Today. You have 3 weeks to complete this experiment. Flight Patterns Hunt( the 3-Month Project) is due today.***

## STRUCTURAL COLOR & Thin Films

"The precious possession of a man -and woman– is diligence." –Proverbs 12:27

**NOTE: This is in the official Experiment Blocks of CWS. You may do any experiment in our SOUND Experiment/ Activity List instead.**

**NOTE:**
**This introduction has nothing to do with the experiment we will do with Polarized light. However, it does involve "creating " color that is not there in an object. We wanted to give you an introduction to thin films which cause interference of light which gives different colors and then get into Polarizing filters which also create colors.**




*Hummingbirds use thin films in some feathers, also.*

### Bubbles and Puddles

Bubbles and oil coated puddles that you see on a road after a rain have colors that are not in the bubbles or the oil films. Instead there are nano-sized layers that alter the incoming white light in ways to reflect colored light.

### Hooke and Newton and Feathers

Robert Hooke and Isaac Newton were the first ones to grasp that the peacock feather didn't have any color in it. Instead the color was in the light, not in the feather. They thought the feather was doing something to the light to change it. This was such a radical idea that few people could comprehend it; but Hooke and Newton were spot on.

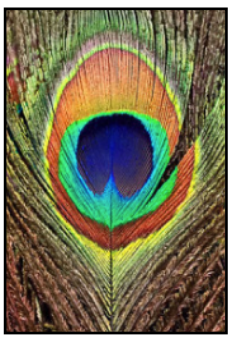
### Peacock Feathers'n Thin Layers!

The peacock feather uses what we call "thin films to cause "interference" to create color.

There are one million micro-miniaturized flat, super-thin multilayered mirrors that give one peacock feather its beautiful colors. The mirrors are like a layered-sandwich in that they have precise layers (See above). These mirrors are made mostly of keratin, the same protein that makes up our fingernails, hair, outer skin, rhino horns and animal claws.

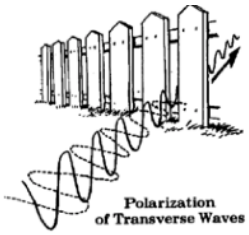
The thickness of the tiny "mirrors" has to be extremely exact to give the colors we see. Where the mirrors change the feather from one color to the next in the design of the "eye" of the peacock feather (left), the multi-thickness mirrors have to change thickness at that exact place. WOW!!!

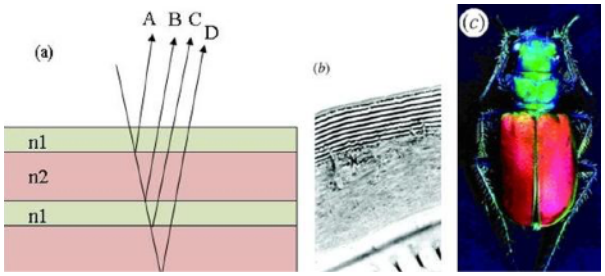
***All the color in this incredible feather is made by layered, clear nano-thin mirrors! There are 1 million mirrors in one feather!***



**Write 5 interestables on Thin Films on the back of this sheet**

# POLARIZED LIGHT




***Above: Multiple thin film layers for the colors of a beetle's exoskeleron. This same thing is happening with peacock feathers. This is NOT caused by light being polarized . God is great at adding beauty by sophisticated color!***

## INTRO:

Polarized light is different than light reflected from thin films…kinda. You'll see what we mean next week.

**Using the Polarizing Filters**
In this fascinating experiment you are going to use two pieces of polarizing plastic sheeting. These polarizers are not just ordinary pieces of plastic. Isaac Newton would have been shocked if he had them. If he'd understood what they are doing, he would have unravelled some of the greatest mysteries in the universe, those dealing with light.

**Polarizing Light and Fence Slats**
Imagine a fence with 10,000 miniature slats all running the same direction imbedded into these pieces of plastic. (See the slats above.) This is a little what these are like. If you had eyes to see this small, you'd see 10,000 lines that look like this running parallel across the surface of the plastic.

## Exact accuracy

Photo by Jatin Sindhu

The peacock feather has exactly the correct thicknesses of micro-mirrors to create the colors to make the peacock feather eye. The colors of the feathers are cause by thin films NOT polarized light.

## INTRO cont.

Put simply, these "slats" prevent all light from passing through except the light waves that are aligned correctly to them so the light waves can "slide" between the "slats". When you have one piece of plastic polarizer, it cuts about 90% of the light. All that gets through is light that that can get through are light waves that are aligned correctly (See diagram with slats, top left.)

When you have a second polarizer and turn it and put something like layers of the rock mica between the two, strange things happen.

The second polarizer only lets certain light through and the layers of the mica reflect light certain ways because of their thin layers of mica. This causes different colors to filter out and give you interesting patterns.

We'll have you do this in a very easy experiment. Then we'll have you make a great little thin film device out of clear regular plastic and packing tape. You'll love what it does!

**Write 5 interestables on Polarized Light on the back of this sheet**

# 1.5a Polarized Light Experiment Block (3+ Hours over 3 Weeks) pg.3

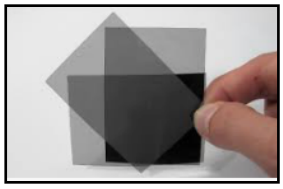
**Mod 1-3**

**SUPPLIES:** *If you click on these you will see what they are and where you can buy them. Most are only sold in bulk, but you will be able to see exactly what to get. These will be available in the BCP Experiment Pak #1 in September 2023.*

Polarized light art by A. Comaro

- ☐ 2 polarizing plastic sheets about two square inches each
- ☐ Plastic sheet to put tape creations on (sheet protectors work)
- ☐ Thin mica sheet-any size (optional)
- ☐ Velvet Bag to hold polarizers (Optional) Bigger than 3x3 is best.
- ☐ Packing tape or magic scotch tape (Packing tape works a little better)
- ☐ Clear plastic fork and plastic plates
- ☐ Other plastic items (i.e. a plastic case that holds pencil leads, scotch tope plastic holder ,etc.)

## Procedure #1: Plastic silverware, plastic plates, etc and polarized light



*Turn your polarizer like this keeping it parallel to the other one but when outside, use two and separate them and put the object you are viewing between them. Look toward light. The polarizer furthest from you polarizes the light. The one closest to you affects the polarized light from the first one.*

### ■ Use 1 Polarizer

Stand in front of a white computer screen. (ie use a open text document on your screen), Hold one of the the polarizing sheets flat between you and the screen. Look at the white screen. Turn it clockwise like you would a dial. You should see the screen fade to black as you turn it. (If it does, this means it is giving off polarized light)

### ■ Try a Thin Sheet of Mica (if you have some.)

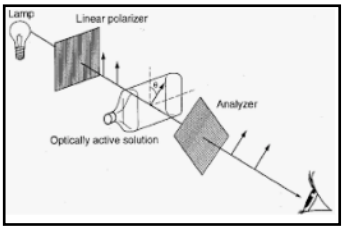
Put your piece of mica between the polarizing sheet and the computer. Turn the sheet.

You should see places where many colors of light are shining off the mica.

Color is caused by the light reflection off different micro-thicknesses of the mica going through the polarizer.

### ■ Try Plastic silverware, plastic plates, plastic pencil lead containers, clear plastic tape dispensers, etc. Twist the object.

As you put each object in 6" or so front of a computer screen, twist the object and turn the sheet behind. You should see colors stronger were the object is experiencing the most stress.




### Take objects outside

You can also do this while outside using just the sun as your source of polarized light. Put the object being viewed in-between the two polarizing sheets. See picture below left but imagine the sun is the light source). Turn the sheet furthest from your eye while holding it parallel to the other sheet as you hold it. (See below if you need further description.)

## Procedure #2: Microwaved grapes and orbees

How Microwaving Grapes Makes Plasma **Ver 8m**

**Now for some excitement.**

Do the experiment shown in this video with with grapes and with the clear orbees. Check it with a polarizer to see if there is only polarized light being given off. (Turn the polarizer and see if it fades to nothing like your computer screen did.)

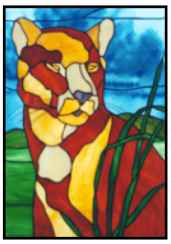
## Procedure #3
## Tape Mosaics & Polarizers

This is amazing. This is polarized light art.

Cut off a 3"x3" section of the transparency. (Any clear piece of plastic will work…ie a deli container, sheet protector etc. Cut up the packing tape into little pieces –(1/4" on each side works well.)

Cut the tape into 100 or so pieces and arrange them in all different patterns on the clear square of transparency like papers would be randomly piled onto of each other if 100's of them covered a desk.

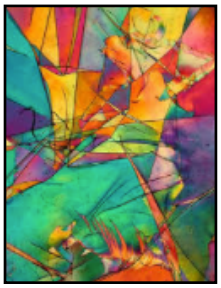
View them close to a white computer screen through 1 p-filter. Turn the filter as you view it. You should see an amazing array of colors. (Or put it between 2 filters and view it outside.)



**Your polarized filter tape creations could be souped-up to look like this. (This is NOT easy! There is an easier way. More on that later.**

***"How countless are your works, LORD! In wisdom you have made them all; the earth is full of your creatures." Psalms 104:24***
God's infinite intelligence pulled off some pretty great things here on earth!! (Below)

**Additional Designs**
You can use the rest of the transparency to make additional designs of pieces of layered tape like your name, pine trees, rockets etc.



You can get more plastic transparencies from a stationery store and make an entire collection of incredible designs. Or try a sheet protector piece as your base.

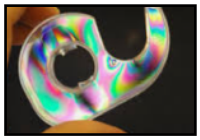
View these outside in the sun as well, you just need to use both filters with one between the light source and the tape design you made and one p-filter close to your eye. It works well to view these close to a lamp with the lamp shade taken off.

A few other tapes work as well as packing tape. See if you can discover other types of clear tape that work.

Note: The tape is birefringent which means that certain colors of light pass through it at different speeds separating out the colors of light.

Sheet protectors, like those you can buy at Costco work fine for the base of the Tape Mosaics.

*All kinds of animals and insects use sunlight that is polarized to navigate and migrate. Cuttlefish even make polarized light from sunlight with their skin to send secret messages to each other! God understands His creation perfectly and knows how to use it in His animals and insects!*



## Inside/Outside (Review)
**You can view objects outside** or in front of a white computer screen. Put one polarizing sheets close to your eyes and look through it at objects you are looking at and twisting. (Look at the object and the screen of the computer which is giving off polarized light through the sheet.) The twisting affects the polarized light and gives it color.

**You can view objects in sunlight.** Put the object between the sheets and turn the polarizer closet to your eyes. Light from the sun will give you the color when seen through the sheets.

Mod 1-3

# 1.5b WONDERS TRACK *Experiments!*

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

## Exp 1:

## Exp 2:

## Exp 3:

# 2a. Super Article: SOUND 5: Sound Makers Sections A-E 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.

# 2b. Standard Article

**Mod 1**

Annotate this article; underline what is interesting and star the best info.
Write 7 clipped-sentence interestables on this article on the page following.

## Diabolical ironclad beetles inspire extra-strong joints

***by Dr. Jonathan Sarfati 10/21***

One type of beetle is so tough that you could run it over and it would still walk away. This is the 'diabolical ironclad beetle' (*Nosoderma diabolicum*, formerly *Phloeodes diabolicus*), found in the southwestern USA.

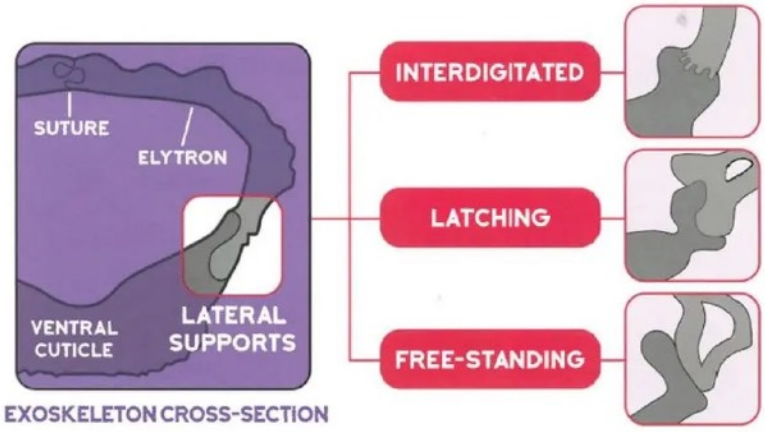
This beetle is only 2 cm long, or under an inch, but can survive a force of 149 newtons. This is equivalent to the weight of 15 kg, or about 39,000 times the beetle's own weight. It is also 2.5 times as much as the average male university student can exert between thumb and index finger,[1] and about 10 times the bite strength of potential predators. The ironclad beetle is sometimes known as 'pin-bender', because pins will bend rather than penetrate, unless a hole is drilled first.[2]'

## What makes the ironclad beetle so tough?

> *The diabolical ironclad beetle is sometimes known as 'pin-bender', because pins will bend rather than penetrate.*

This beetle's toughness was intriguing, especially with no mineral in its exoskeleton, unlike shells or bones.[3] A team led by David Kisailus, a materials scientist and biomimeticist at University of California, Irvine, worked out the intricate fine structure that greatly increased toughness.[4]

The wing-cases (*elytra*, see box) are joined to the underside of the exoskeleton. Over the beetle's vital organs, the join is *interdigitated*, i.e. similar to interlocking fingers. Like columns of a bridge, the 'fingers' resist compression. But resistance can only go so far. Sometimes material must yield or break. This is why tall buildings in earthquake-prone areas are often supported on flexible bearings that allow some swaying.[5] So too with the beetle: in places further from the vital organs, the joints are latched or free-standing, which allows the exoskeleton to yield under pressure.



# 2b. Standard Article

**Mod 1**

Annotate this article; underline what is interesting and star the best info.
Write 7 clipped-sentence interestables on this article on the page following.

## Diabolical ironclad beetles inspire extra-strong joints

***(Continued)***

The other feature is the suture joining the two elytra. The suture comprises interlocking halves called *blades*, and they are shaped like jigsaw puzzle pieces. The blades have an elliptical shape, which turns out to be stronger than triangular or semicircular blades found in other beetles.3 Dr Kisailus said, "If you take two pieces of that jigsaw puzzle, and you try to pull them apart, once they're attached, it's a pretty robust interface. And so that is what provides the beetle with strength."2

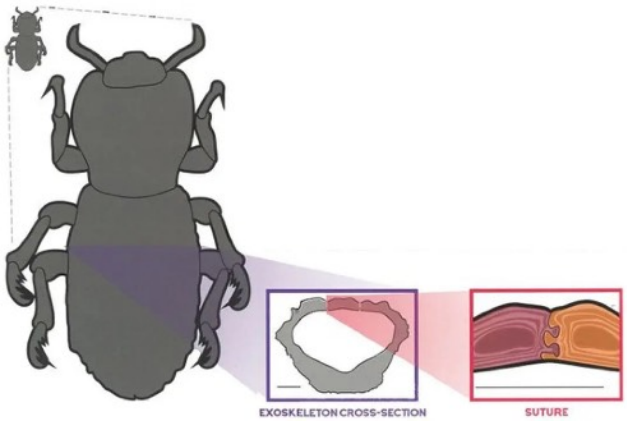
Another strength enhancer is the layered (laminated) structure. Kisailus explained (emphasis in original), "*That's* what defines the toughness in this organism—it provides a lot of energy dissipation instead of failing brittlely. It just de-laminates."2

## Application to aircraft design

Often, joints are the weakest part of any structure. They can fail catastrophically, which can be deadly, e.g. in airplanes. The newest airplanes are often made largely of composite materials that combine lightness and strength. However, it's hard to make strong joints between different types of material, such as carbon-fibre composites to metals. Rivets and glues can fail, as can traditional fasteners.

> *Insect exoskeletons have a laminated structure, so cracks can't propagate through the layers, making the exoskeleton hard to break.*

Kisailus and his team joined carbon-fibre-reinforced composite to aluminium plates with a traditional fastening pin used in aerospace engineering. Then they made plates with a laminated structure and edges milled to mimic the ironclad beetle's suture




Under stress, the traditional fastener failed catastrophically. However, with the beetle mimic, the delamination took much of the energy, and the separation of layers made the structure expand and grip more tightly. Any fracturing is both more gradual and more predictable, which could lead to easier inspection to detect cracking earlier.3

Rather, it makes more sense to use an argument from analogy, as Darwin often did. That is, it took intelligent engineering to make the copies, so how much more so to make the originals?

# 2b. Standard Article: Extra Required Assignment

**Mod 1**

Read this section of the article on ironclad beetles. Find 20 beautiful beetles like those below and place their photos on a document. Print them and put them in your notebook.

## Diabolical ironclad beetles inspire extra-strong joints (cont.)

### BEETLES

Beetles belong to the insect order Coleoptera (Greek *koleos* = sheath, *pteron* = wing). Aristotle (384–322 BC) coined this name because both forewings are thickened to form protective sheaths called elytra (singular elytron). Flying beetles lift up their elytra to free the hindwings to fly. Non-flying beetles often have their elytra fused.

Coleoptera is the largest order of any animal—400,000 species, about 25% of all animal species.[7] Biblical creationists in general point out that the created kind usually comprises different 'species' and even different 'genera'.

About 20% of beetles are weevils (Family Curculionidae). Beetles live everywhere on the earth apart from the sea and on ice. They include the largest living insect, the Goliath beetle—mass 115 g (4.1 oz) and length 11.5 cm (4.5 in). Some beetles are pests, because they eat crops, but others, such as ladybugs, eat pests.

Beetles, like other insects, have exoskeletons made of protein plus chitin, a polysaccharide. This combination forms fibres that form a laminated structure. This structure means that cracks can't propagate through the layers, making the exoskeleton hard to break. But this alone is insufficient to explain the extra toughness of the ironclad beetle.[9]

The atheistic evolutionist J.B.S. Haldane often said that if a creator exists, then he "has an inordinate fondness for stars and beetles" because he made so many of them.[10] Dr Gordon Wilson replied:

"When God makes the kinds, there are many roles for them, only one of which is ecological. It's easy for biologists to miss other things, like the creativity and lavishness of God. And the aesthetic value—they exist for His pleasure as well as ours. Many beetles are incredibly beautiful."[11]

# Diabolical ironclad beetles inspire extra-strong joints

Write 7 interestables on this article. Clipped sentences are fine. Star the best one.

1.

2.

3.

4.

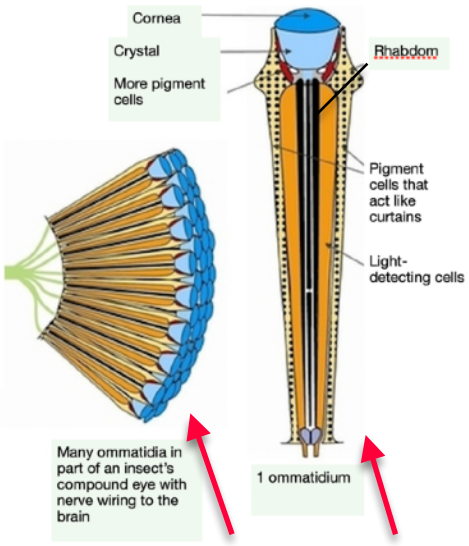
5.

6.

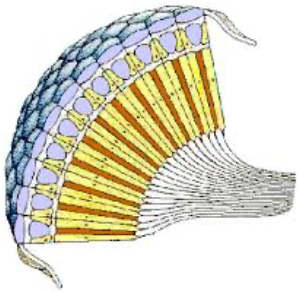
7.

## 3. Concept Drawing (20 min)

Draw this diagram. Label it.




**Draw this and this.**



Above: The top of each ommatidium makes a hexagon which makes the compound eye look a bit like a honeycomb!

## *Amazing Insect Vision!*

***Compound eyes and Ommatidia***

*If all we ever saw was one insect eye, that ought to be enough to convince us that evolution is impossible. They are amazing!*

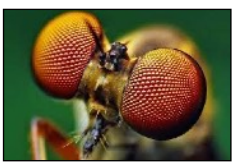
*If you look closely at the eye of an insect, you will see the hexagon lenses of the ommatidia (singular=ommatidium). Light goes in the crystal and is focused down the black tubes called the rhabdom. As it travels down the rhabdom, it is detected by the light-detecting cells.*

*The pigment cells act like curtains to make certain no light goes outside the one rhabdom to the one next to it, The helps the insect to see more clearly. The more ommatidia the insect has, the better it sees. The dragonfly has wrap-around eyes with 25,000 ommatidia to help it see insects it is hunting flying as fast as cars travel through towns.. An ordinary beetle might have only 2000 ommatidia and a bee has 5000. Each ommatidium has its own glass-like crystal to help in focusing the light.*

*Bug eyes are quite a marvel of God's light-detecting engineering which the bugs DNA makes out of the plants and other things it it eats!*

## Insect Eyes

**Write 5 interestables about this on the back.**



***Bug eyes come in all kinds of shapes and sizes, all designed by God!***

***Horsefly eyes!***

***Dragonfly wrap-around -the-head super-eyes!***

# 4. Research



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**_____

# 5a. SPECIFIC VIDEOS: **Watch each video. Write 5 "Interestables" for each one.**

**Remember make it easy and use clipped dance sentences! Use the back, too!**

There is a video series you might enjoy called **John 10:10.** You may substitute in the video below for the amount of minutes it is for that amount of time for any of those below. (For instance, it the John 10 video is 5 minutes, you could watch 5 minute less of the Veritasium video below. Record the interestables in the box on the next page called "Extra Video". Mark which video you took the time off by writing, for example, "**-5 minutes".**

**(Notice on the next page that we assigned it this week.)**

**This Mod's John 10:10 video is:** **It's a Wonderful Telescope** JN10 5 min

**BIOLOGY:** **Complexity of Hair** DR 2.5 min

**BIOLOGY:** **How Different Species of Fireflies Blink** SED 10 min

**METEOROLOGY:** **Making a Hurricane Indoors (For Science)** BE Smart 11 min

*A comment is made that humans are increasing the temperature of the earth. This is hotly debatable. Many scientists attribute heat increases with the earth are due to solar cycles.*

# 5b. SPECIFIC VIDEOS: Watch each videos and write 5 "Interestables" for each one. Mod 1

**Remember make it easy and use clipped dance sentences! Use the back, too!**

**BIOLOGY:** Chameleons Change Color Ver 6 min

**ENGINEERING:** Robot Piano Catches Fire Playing Rush E (World's Hardest Song) MR 11 min

**ASTRONOMY** It's a Wonderful Telescope JN10 5 min **(We assigned this video this week)**

# 6. Core Videos (15+ minutes)

**Mod 1**

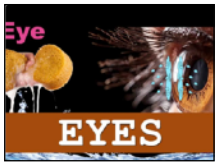
**TAKE THE SECOND-TIMER QUIZ,** then write 3 new fascinating facts (interestables) from this Core Video and star the best one.

**FD Video** V1 **FLUID DYNAMICS AND BERNOULLI**
**All Students:** Follow directions above.

1.

2.

3.




**Eye Video** V1 **LIVING CORNEA**
**All Students:** This quick review needs you to find 5 "compound interestables". These interestables will have 3 or more facts tied together into one concept. For instance, in this video you could write: Hydrodynamics is a branch of Fluid Dynamics. Example:The sharks dorsal fin helps its hydrodynamics by its dermal fibers which stiffen it for high-speed swimming."

1.

2.

3.

# 6. Core Videos (15+ minutes)

**Mod 1**

**Aim Video**
**V1 HORNED LIZARDS**

**DO NOT DO THE QUIZ.** Find 5 interestables from these Core Videos and star the best one of each. Mark the second best one with the phrase "2nd". **Complete on the back.**

1.

2.

3.

**Aim Video V2 LEAFHOPPER LEAPS**
**All Students:** Follow directions above.

1.

2.

3.

**Aim Video V3 BOLAS SPIDER**
**All Students:** Follow directions above.

1.

2.

3.

**7. Verse** - Write the verses here, explain what they mean and 2 ways they apply to you or things you have seen. Then memorize them.

**Colossians 1:15-17**

**8a. CWS DEVOTIONALS:** There is a devotional on the next page. Follow the directions and follow the directions regarding the 3 below.

## Additional Devotionals

**Teen Devotion:** Envelopes And Oranges
**Science Devotion:** The Sun In Its Might
**Bible Devotion:** YAKES AND OAKES

*On the back, 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!”

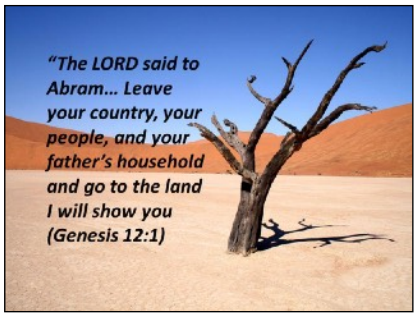
Yep. What an exciting mission we have!

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 exceeding-ness 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**

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.

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 out 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 persons 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!

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***"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.Sound Unit Links Choose and watch 30 minutes of links.

**Today is a"Unit Links" Lesson where YOU pick what Links to watch.**
***Write 2 great facts from the videos you watch.***
**IMPORTANT: For clickable links you must be logged into the Parent User and access the links from the Parent/Teacher tab. Sound Unit Hyperlinks**

### Link 1:

### Link 2:

**Build your Science Field**
**Scroll down the linked page to read about it!**

### Link 3:

**9. VIEW RECORD SHEET** - Log in to access. Choose 30-45 min of links.

Log in to parent account for **HYPERLINKS**. Record the date watched.

## Level 1

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1a. | | 1b. | | 7a. | | 7b. | | 13a | | 13b. | |
| 2a. | | 2b. | | 8a. | | 8b. | | 14a | | 14b. | |
| 3a. | | 3b. | | 9a. | | 9b. | | 15a | | 15b. | |
| 4a. | | 4b. | | 10a | | 10b. | | 16a | | 16b. | |
| 5a. | | 5b. | | 11a | | 11b. | | 17a | | 17b. | |
| 6a. | | 6b. | | 12a | | 12b. | | 18a | | 18b. | |

## Level 2

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1a. | | 1b. | | 7a. | | 7b. | | 13a | | 13b. | |
| 2a. | | 2b. | | 8a. | | 8b. | | 14a | | 14b. | |
| 3a. | | 3b. | | 9a. | | 9b. | | 15a | | 15b. | |
| 4a. | | 4b. | | 10a | | 10b. | | 16a | | 16b. | |
| 5a. | | 5b. | | 11a | | 11b. | | 17a | | 17b. | |
| 6a. | | 6b. | | 12a | | 12b. | | 18a | | 18b. | |

## Level 3

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1a. | | 1b. | | 7a. | | 7b. | | 13a | | 13b. | |
| 2a. | | 2b. | | 8a. | | 8b. | | 14a | | 14b. | |
| 3a. | | 3b. | | 9a. | | 9b. | | 15a | | 15b. | |
| 4a. | | 4b. | | 10a | | 10b. | | 16a | | 16b. | |
| 5a. | | 5b. | | 11a | | 11b. | | 17a | | 17b. | |
| 6a. | | 6b. | | 12a | | 12b. | | 18a | | 18b. | |

## 10a. Additional Resources: Creation/Evolution

Getting an early introduction to the powerful science substantiating the Creation story is life changing!

**Watch:** **How are Enormous 'Mega-Sequences' Evidence for the Global Flood?**
**Dr. Steve Austin IGH 18 min** (This is involved. Watch it 5 minutes at a time if necessary.)
Write 10 great interestables from this video on the back and star the best two.

**The resources below are optional.**
**Use the numbered section below and the back of this sheet for your answers.**

## 10b. Additional Resources: The 101 Series

We highly recommend using the Chemistry and Physics 101 Series as an **optional resource**. You can purchase them from Amazon, Christian Book Distributors, or get them streamed for one year.
*You might want to do only one this year and one next year, or neither.*

**CHEMISTRY 101:** Do #1 Lesson. Write 10 interestables (interesting concepts). Star the best 2.
**PHYSICS 101:** Do #1 Lesson. Write 10 interestables (interesting concepts). Star the best 2.

## 10c. Additional Resources: Select Crash Course Videos #1

**BIOLOGY INSIGHTS: CRASH COURSE BIOLOGY #1 Carbon Everywhere 10m**
Write 10 interestables (interesting concepts). Star the best 2.

## 10d. Additional Resources: Select Crash Course Videos #2

**CHEMISTRY INSIGHTS: CRASH COURSE CHEMISTRY #1 The Nucleus 10m**
Write 10 interestables (interesting concepts). Star the best 2.

## 10e. Read Books: **It can be great fun to cozy up on Fridays and read Science.** 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 the best 2.

1.

2.

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