FLUID DYNAMICS!

Student Notebook of Aerodynamics and Hydrodynamics!
First Timers

Learn more about Fluid Dynamics than you imagined possible, you'll never look at swimming and flight the same!
You'll see dolphins, boxfish, seals tigers, noses and more as
Unfathomably complex marvels, engineered by the Creator of all things
As a wonderful gifts of His great love to you!

CROSSWIRED Science

Profoundly showing the glory of God through the things He has made.

THIS IS A SHORTENED VERSION OF OUR 110 PAGE PRINTABLE FOR FLUID DYNAMICS AND 100 OTHER SCIENCE AREAS CROSSWIRED INTO IT

Written by Don Miller.
CrossWiredscience.com

CROSSWIRED

Science

FD Table of Contents Month 1

DAYS	ACTIVITY
1	Core videos 1,2 Links Drawings Devotions Verses
2	Core videos 3,4 Links Drawings Devotions Verses
3	Core videos 5,6 Links Drawings Devotions Verses
4	Core videos 7,8 Links Drawings Devotions Verses
5	Reading
6	Hunt: Fins And Swim Patterns 3d-flat
7	Dissection 1
8	Link Lesson Info
8	Links–General 1–Lesson #1
8	General Links 1,2 Unit Links. Link List Record
9	Experiment: Mini's
10	Reading
11,12	BUILD A SMASHBOOK!
13	Wind Bag and Bernoulli's Principle
14	Links–General 1–Lesson #2
15	Reading
16	Gold Digs 1
17	Links–General 2–Lesson #1
18	Reinforcement #1
19	Fluid Dynamics Races
20	Reading

KEY

Green	=	General Links 1
Yellow	=	General Links 2
Blue	=	Unit Links
Black	=	Reading
Orange	=	Gold Digs
Drk Blue	=	Choose and Field trips

CROSSWIRED

FD Table of Contents Month 2

DAYS	ACTIVITY
21	Core videos 1,2 Devotions Acrostic
22	Core videos 3,4 Drawings Devotions Verses
23	Core videos 5,6 Crossword Devotions
24	Core videos 7,8 Drawings Devotions Verses
25	Reading
26	Gold Digs 2
27	Links–General 2–Lesson #2
28	Research #1
29	Dissection 2
30	Reading
31	Gold Digs 3
32	Links–General 2–Lesson #3
33	Reinforcement #2
34	Gold Digs 4
35	Reading
36	Gold Digs 5
37	Links–~~Unit~~–Lesson #1
38	Research #1
39	Fluid Dynamics Acrostic Origami
40	Reading

CROSSWIRED

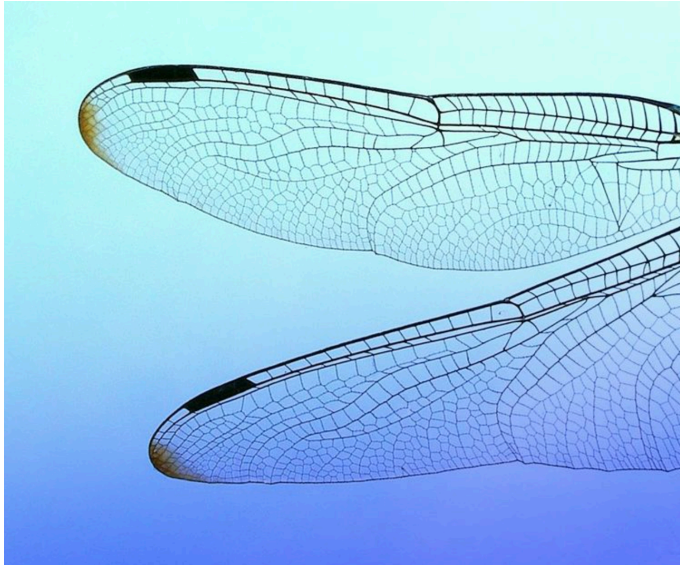
FD Table of Contents Month 3

DAYS	ACTIVITY
41	Uchoose and Field Trips 1
42	Links–~~Unit~~–Lesson #2 Crossword #2
43	Core videos 1,2 Quiz L2 Awesome Genius Devotions
44	Uchoose and Field Trips 2
45	Reading
46	Uchoose and Field Trips 3
47	Links–~~Unit~~–Lesson #3
48	Core videos 3,4 Quiz L2 Awesome Genius Devotions
49	Uchoose and Field Trips 4
50	Reading
51	Uchoose and Field Trips 5
52	Links–~~Unit~~–Lesson #4
53	Core videos 5,6 Quiz L2 Awesome Genius Devotions
54	Uchoose and Field Trips 6
55	Reading
56	Uchoose and Field Trips 7
57	Links–General 1–Lesson #3
58	Core videos 7,8 Quiz L2 Awesome Genius Devotions
59	Uchoose and Field Trips 8
60	Reading
60-80	Conclusion The 1 Month "BIG PROJECT"
60-65	WK1 Add in General Links 1
65-70	WK2 Add in General Links 2
70-75	WK3 Add in Unit Links 1
75-80	WK4 Add in Unit Links 2

2a. Devotion: (10m)

Read this devotion in FD in Devotion #1. Write several personal applications.
For younger children, we suggest using the book “Indescribable” Louie Giglio.

Teen Devo: Doubts and Prayer



2b. Concept Drawing: Dragonfly Wing (15 min)

Choose and Draw a Dragonfly Wing!

The dragonfly is considered to be the lion of the insect world, one of the most agile flyers on earth. Zipping along at 40 miles-per hour, these aerodynamic wonders can fly forward or backward or up and down like a helicopter. Notice that the wing isn’t shaped with a foil (wing bump) like our plane have. Lift is achieved by changing wing angles.
Look at the amazing spacing of the “cells” created by the ribbing in the wings. God created a masterpiece with light-weight strength in all the right places.

3. Watch and Write: 2 Links (15 m)

Watch the 2 links below. Make a mind map about each .
Google "Science mind maps" for examples. You do not need pictures like this example unless you want.
https://www.mindmapart.com/chemistry-mind-map-jane-genovese/

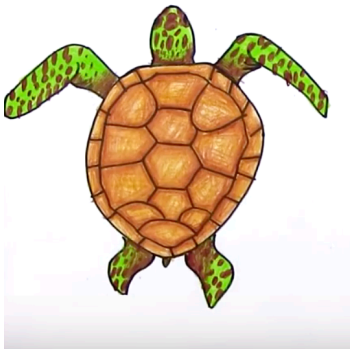
Gen 1: L1 3a. BW: Slimed By Giant Slugs! (7min) **Note: Advanced**=**Gen.1 L2 1a. BBC: Young Fox Hunting In Snow**

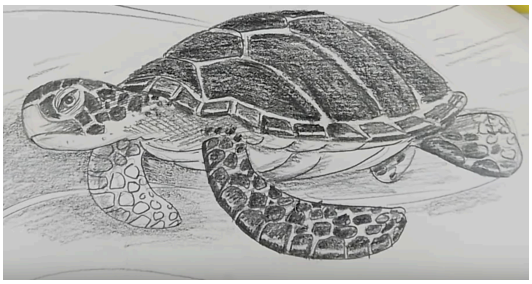
Gen 1 L1 2b. SSK: Your Body Human Body (20min) **Note: Advanced**= **Gen.1 L3 1a. SED: Slow Flipping Cat Physics**

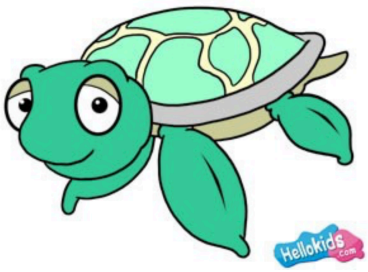
"Great is our Lord …His understanding is infinite.
Psalms 147:5

God effortlessly made *all* His insects perfectly.
He created the DNA sequences to build dragonfly wings with just the right materials in just the right places.
Trust the beauty and love of God to use His infinite wisdom and intelligence to put all the right pieces together in all the right ways to make your life a masterpiece of His working.

4. Drawing: Sea Turtle. (15







A. https://www.youtube.com/watch?v=6DXTWTbd8G4

B. https://www.youtube.com/watch?v=jkI2vNOycSg

C. .http://www.hellokids.com/c_21250/drawing-for-kids/draw-with-jeff/how-to-draw-a-sea-turtle

1. Watch & Write ~~2~~: 2 Core Videos (15m)

Watch the 2 Fluid Dynamics (FD) Core Videos for today. Twice. Then, write THE two *most* interesting facts about each. Using key words or a picture for each concept is acceptable.

Carb Venturis

Planes, Whiskers and Alulas

"My heart is steadfast, O God.
I will sing, I will sing praises with my soul."–Psalms 108:1

When you encounter something difficult, remember the elegant landings of birds.
The Birds of the world are equipped by the Maker to have alula feathers.
These give them perfect landings.
Trust God to help you land wonderfully
when you try amazingly good things for others' sake
or when you encounter problems you'd rather not have.

2a. Devotion: (10m)

Read this devotion in FD in Devotion #1. Write several personal applications.
For younger children, we suggest using the book “Indescribable” Louie Giglio.

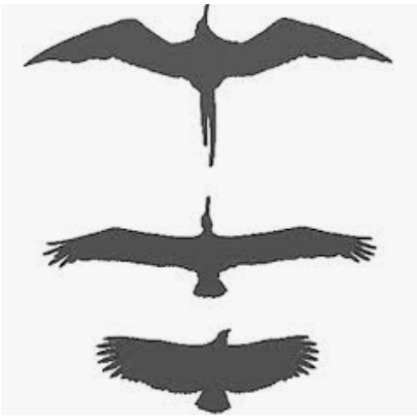
Petty and More Petty

Super-Speed Pointed’s
These are falcon wings. Falcons hit 240 mph in dives.

Triangle Pointed‘s
High speed wings which are longer than the bird’s body.

Skinny Fingers
Long skinny wings used for soaring and flapping.

Fat Fingers
Soaring wings, great for riding thermals.



2b. Concept Drawing: Bird Wing Shapes(10 min)

Draw: General shapes of Bird Wings!
Use the silhouettes above. Label them also.

Birds and their Wing Shapes - Cornell Lab of Ornithology
https://www.birds.cornell.edu/k12/wp-content/uploads/2018/11/Bird-Wing-Types-Handout.pdf

1. Watch & Write ~~3~~: 2 Core Videos (15m)

Watch the 2 Fluid Dynamics (FD) Core Videos for today. Twice. Then, write THE two *most* interesting facts about each. Using key words or a picture for each concept is acceptable.

Hummers & Dolphins

Box Fish and Penguins

"Because he has loved Me, therefore I will deliver him;
I will set him securely on high, because he has known My name.
"He will call upon Me, and I will answer him; I will be with him in trouble;
I will rescue him and honor him." –Psalms 91:14,15

God took two difficult places on earth, the Antarctic and the swirling waters of coral reefs and worked exquisitely in creating the Boxfish and the Emperor Penguin which can navigate them with ease.

As you follow God, you will take on challenges which are greater than you. But, like the Boxfish and the Emperor Penguin were not difficult challenges to Him, you'll see your difficulties are not in the slightest either.

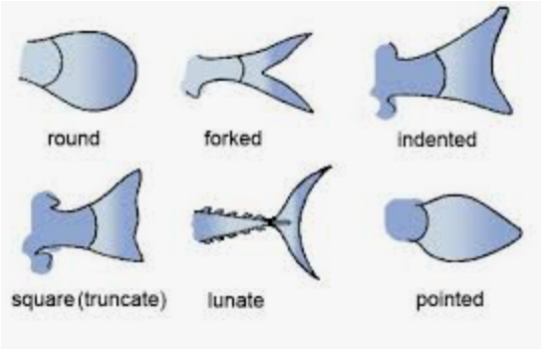
You will call upon Him and the Creator of the boxfish and the penguin will work His surprising solutions for you.

2a. Devotion: 5m

Read this devotion in Sci-Devotionals. Write several personal applications.
For younger children, we suggest using the book “Indescribable” Louie Giglio.

Also, answer the five questions at the bottom of the devotionals. You’ll have to do this tomorrow because you cannot save your answers. (The quiz involves both devos.)

Brain at the Speed of Light



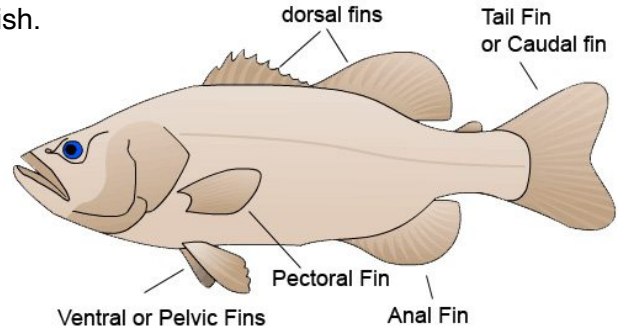
Leisure pro.com https://www.leisurepro.com/blog/explore-the-blue/fish-identification-guide-fish-anatomy-part/

4b. Concept Drawing: Fish Fins 15m

Draw and color the types of caudal fish fins (the tail fin) which you see above.

3. Drawing: Fish and Fins. (15 m)

Draw and label all the fin types of a fish.



"Praise the Lord in song for He has done excellent things."
Isaiah12:5

When God exerts His power, He doesn't just exert power.
He exerts His power in excellent ways that bring superbly excellent results.
There are a million ways we'll need God to help us to help others.
All will need His help, His creativity and His wisdom…
Read: *A Million Little Ways* by Emily Freeman

1. Watch & Write 4: 2 Core Videos (15m)

Watch the 2 Fluid Dynamics (FD) Core Videos for today. Twice. Then, write THE two *most* interesting facts about each. Using key words or a picture for each concept is acceptable.

Nose Aerodynamics

Dog Slobs and Cats

"…He created the stars also…" ***Genesis 1:16***

God shows His power through His creation of the stars. Our galaxy has about 200 billion, which is enough to give everyone on earth 30 stars. One star is so big that a million earths will fit into it! Thirty stars is unbelievable!

When you hear something like "God put the right tongue-lapping speeds to drink water into the DNA for all different-sized cats from kittens to tigers"–you are getting a little idea of how thorough God is. ***He thinks of everything.***

As you continue walking with God, He will work greater miracles and show you that He is thinking about things in your life even more than you are!

3. Watch and Draw: 2 Links (20m)

Watch the 2 links below. Make a mind map about each .

Google “Science mind maps” for examples. You do not need pictures like this example unless you want.
https://www.mindmapart.com/chemistry-mind-map-jane-genovese/

Gen 2 L2 2a. BD: Buddy Davis Explores Cave (3min)

Note: Advanced= Gen 2: L3 2a. BBC: Caribou Spot Wolves Using UV Vision

“Be anxious for nothing …” –Philippians. 4:6

God shows His amazing ingenuity through crazy creatures like the box fish.

We thought this little guy was just cute and a bit funny looking –and he is….but we never imagined that he’s actually quite hi-tech and hydrodynamic–in ways we didn’t understand.

When you’re being squeezed by tough things in life, ***continually*** give God your concerns about the "what if’s?” and “what about’s?”.

Like with the box fish, He is working in ways you don’t expect which will bring unexpected beauty into your life.

Gen Link 2 L1 3a. BW: Sloth Vs Sloth! (6min) **Note: Advanced=Gen 2: L3 1b. SED: How To Fly To The Space Station (10min)**

Fish & Fins 3-D Flat Montage

DAY 6 p.1

SUPPLIES

- ☐ **Scissors**
- ☐ **Glue**
- ☐ **Tape**
- ☐ **Creative Stuff**

We're watching you. No messing around!

PROCEDURE

An Overview

YOUR GOAL IS TO DO A STUDY ON BOTH THE FINS AND THE DIFFERENT METHODS GOD HAS GIVEN FISH TO MOVE THEMSELVES–SPECIFICALLY THE DIFFERENT MOVEMENTS OF THEIR BODY AND THEIR FINS. Today's activity is to build what we call a 3-d Flat Model. It is the "experiment" in Fluid Dynamics Experiment Lesson with the titled "Fish and Swim Patterns 3-D Flat Model". We summarize it here, but greater details are on the journal pages you go to if you click the icon. There you will also see many examples. You need to look at these.

You may build your 3-d flat model on the next 4 pages in this printable, or you may get heavier weight paper and build one page or many pages with this paper type. The montage should be gathered from your photos, magazines you cut out, or screen shots you gather and print from the web–or all three. This montage can take between 1 and 10 hours. You can make it 1 page or many, depending on the size of the images you chose to use. Very small images might use 1 page.

1. Getting Your Base.)Your "base" is the 4 pages following or different weights of paper or?

You'll possibly be putting your creation into a sheet protector and putting it into your Sci-notebook. Your "base"–whether it be paper, heavy card stock paper, plastic, a thin sheet of wood, piece of metal, or plastic– has to fit into a sheet protector. You can keep your "base" rectangular (8"x11") or cut it into shapes that you tape into place in a sheet protector.

If you want larger images, you can have two or more 8"x11"bases and put them in sheet protectors back-to-back. (All this is if you opt to not use the following pages in this printable.)

2.Spiffing up Key Images

In this 3-d model, you will have many KEY images on the "base" that you will "spiff up."

3. Adding Picture Details

Make your images of anything or all things about birds. You can copy these, print these or freehand sketch, paint or draw these. You can even add additional pics you get from the web. For resizing an image, do this. (Command shift 4 on a Mac gives you a cutting screen-shot tool on the Mac. Pasting a screen shot on a "Pages" or "Google Docs" page gives you the ability to shrink/ expand it. If your screen shot image has a strange "bar" attached to the bottom when you drag it into a Pages document on your computer, drag it from your desktop **onto the white border around your paper** (in Pages). **DON'T DROP IT IN THE MIDDLE OF THE PAGE.**

Fish &Fins 3-D Flat Montage

DAY 6 p.2

have fun.

PROCEDURE

4. Snazzing It Up

Once you get all your desired images and they are the size you want and are printed and cut out, THE NEXT GOAL IS TO PASTE OR TAPE THEM INTO PLACE AND DECORATE AND SNAZZY UP YOUR CREATION AND MAKE EACH PART "3-d". Do this by having many of the parts rising 1/16"-3/32" off the paper.

NOTE: If you chose to make a collage over the next 4 pages we provide in this printable, making it 3-d can be skipped. Unless you can put the "3-d" images into a sheet protector, it'll be tough to keep them from being damaged.

If you chose to not make it 3-d, then still add many creative touches, like using varieties of paper, materials etc. You may also add drawn pictures that you make. Or glitter or a 1000 things

5. Snazzying Up The Details

You could make some "fun parts" of your 3-d Flat out of home-made shrink-dinks, others out of torn tissue paper or aluminum foil. Anything goes. You can use spaghetti pieces, thin wire, yarn, pipe cleaners or ribbon for lines and other decor.

Candy sprinkles, colored sugar, m&m's, colored sand, cooked-cut-dried pasta can add fun if you glue them on… You can also add string, cut pen parts, hardened beads of hot glue, pipe cleaner pieces, puff balls, glitter paint, UV paint made from markers (see UV Experiment), etc.

6. Cleverly Raiaing the Inmages

Lift some of your pics by putting a small piece of styrofoam from a hamburger carton from a fast food place behind it. You can use foam you can buy from a craft store.. You could cut 10 pieces of aluminum foil to raise it 1/8 inch or fold paper to make springy parts. You can add widows like an Advent calendar. You can make borders for images out of pipe cleaners, or cut aluminum foil etc.

7. Adding the Short Important Info

Cleverly add information by short key written bits. For example, you could say "Shape = bunch of grapes" and point to the lungs of a bird. You can print these, calligraphy them or draw them.

That's it! Enjoy yourself and learn a ton! Get bonus points –a 5-10 minute oral presentation!

Be brave! Tell your group or family what your creation is all about!

Fish &Fins 3-D Flat Montage

DAY 6 p.3

Link Info Page 1 So fun!!!

This is a Link Lesson. These first two pages are info about Link Lessons. We call it a link Lesson, but technically we ought to call it a Linked Video lesson, but we like “short" better. So this is your first “Link Lesson”!

If you are a Level 2 or 3 student, you should watch at least 45 minutes of videos. If you are a level 1 student, you can just do 30 minutes.

Here are the directions to remember.

1. In each session you must watch at least two Level 1 videos,
This is regardless of the level of student you are. (See reasoning for this below on the next page.)

2. Write the number of the lesson of Links in the box we provide for every link. (ie: 3a.1,3)
There are two lessons of General Links and one of Unit Links in the Global Topic Lesson Page. General Links cover any subject and Unit links cover the Global Topic. See below for the Link Lists where you record what links you watch. Notice that there are 3 Link List Recording Sheets. Each has extra spaces.

3. We will always tell you the Link List you are to get your link selection from for each lesson.
See that at the top of the third page below that it says Links–General 1–Lesson #1 . The General 1 means that it is in the first lesson of “General Links”. The symbol #1 tells you that this is the first Link lesson in this printable for General 1 Links.

4. There is a separate recording page for each set of the 3 sets of links, General 1, General 2 and Unit Links. You will do many lessons on Links, but you will always come back to these pages to record those you have seen. (The Record pages are those below that have a LOT of boxes on them.)

5. Every Link has a number. Write this number in the Link Lesson box.
When you go into any of the lessons on Links, you will see that every one has a number with an “a” or “b” by it. 1a, 1b, 2a, 2b, 3a, 3b, etc. You write the Link Lesson number that you viewed the link in.

For instance, this is Lesson #1 for links (see this red box > Links–General 1–Lesson #1 This means you will write a “1” by any links you watched fo this lesson. Say you watched 3a. You would put a number 1 behind the number in the box.

6. You are allowed to watch Links only twice for “credit” now. If you watched 3a for the Link Lesson 3 also, your first Link list look like this 3a. 1,3. Like this>

3a.	1,3

7. Whenever you watch anything two times, lightly circle the numbers with a pencil.

8. WRITE YOUR NUMBERS SMALL. AS THE YEARS GO BY, YOU WILL AGAIN REVIST THESE LINKS. YOU WILL NEED TO BE ABLE TO WRITE AT LEAST 6 NUMBERS IN THE BOX BY THE LINK NUMBER.

9. Put a zero in the boxes of the Links you watched for lesson 1-4 in this printable.
For instance, if you watched 6b in the 4th Fluid Dynamics lesson, you would write a 0 behind it:
6b. 0 . *You watched 8 Links in the first 4 lessons . Put the 8 0’s in the first Link Record List.

(Go to Day 2 page 3 to see an example of the links this is talking about.)

What Level Links Do I Watch?
Everyone watches two Level 1 videos each Link Lesson.
Why?

This is a little question with a BIG answer!!
You can choose the videos you want to watch. You can watch any level of links, no matter what level you are. But you must watch at lest 2 Level 1 Videos every Link Lesson. This means the following.

Here's what we consider a really big deal. If you are an AP Biology or AP Chemistry student, we want you to watch L-1 videos, too. In fact you are required to watch at least 2 every session. Why would we do this. Several really good reasons.

1.We can all learn from most every Link we give you.
All of us at CWS learn from all 3 levels of Links.

2. It's important that you higher level students join hands with younger ones,
whether they be your own brothers and sisters or others at your school or maybe a school you are working with.

It's incredibly important that we all serve those younger than ourselves. Jesus said, "Let him who is greatest among you be servant of all."

Being able to love and reach out to this younger than yourself is critical…

3. Watching things young students watch and doing it regularly gives you shared times with youngers.
It could be your own siblings…it could be other kids. It helps you to understand how they think. It will also help you to learn more and more about the fantastic skill of communicating to people of all ages.

4, You learn about film and animation techniques that will more than likely help in many things as you grow older.
Because society has moved where everyone can be a producer of multi-media, we can say with nearly 100% certainty that you will be astonished with how God uses skills here to do significant things in your life in the future.

5. It opens the doors for ministry with kids of all ages.
And we at CWS believe that everyone should be involved with ministry to children in some capacity. Even Jesus was.

6. You will probably have children someday. This wii help you be a better lover of your own children.
As you grow older and you have children of your own, you will be astonished how involved the whole process is to raise kids to adulthood. At this point in your life, you will send us chocolates and flowers thanking us for forcing you to be involved with "little's" of all ages.

7. It is soooo fun and such a blessing to be involved with loving kids.
It really is. We don't want you to miss out on one of the great joys of life.

With all that said, you can launch into your first Link Lesson. You'll love these lessons!

General Links 1 Link List Record

DAY 8 p.4

L1

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.	

L2

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.	

L3

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.	

General Links 2 Link List Record

DAY 8 p.5

L1

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.	

L2

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.	

L3

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.	

Unit Links Link List Record

DAY 8 p.6

L1

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.	

L2,3

1a.		1b.		11a		11b.		21a		21b	
2a.		2b.		12a		12b.		22a		22b	
3a.		3b.		13a		13b.		23a		23b	
4a.		4b.		14a		14b.		24a		24b	
5a.		5b.		15a		15b.		25a		25b	
6a.		6b.		16a		16b.		26a		26b	
7a.		7b.		17a.		17b.		27a		27b	
8a.		8b.		18a.		18b.		28a		28b	
9a.		9b.		19a.		19b.		29a		29b	
10a		10b.		20a		20b.		30a		30b	

L3

1a.		1b.		5a.		5b.		9a.		9b.	
2a.		2b.		6a.		6b.		10a		10b	
3a.		3b.		7a.		7b.		11a		11b	
4a.		4b.		8a.		8b		12a		12b	

Experiments: Mini's (60 m)

Today is Potpourri Experiment Day. So fun!

You have three experiments sections here. You can get details about them in either experiment lesson (They both have the same material in them.) Add a few comments here about your experiences with your little experiments. The wind bag is in the experiment Pak for Mighty Feathers… (See top of the Printable and in the Mighty Feathers Unit.) If you are in a "Booky mood" today, reprint the yellow sheets above used for the 3-D Fins and do "Feather 3-D Flat Model" in the Experiment Lesson "Box".

Build the rocket from the video. It is astonishing if you get the aerodynamics right, It will go a football field!

The World's Best Paper Plane & Rocket——AMAZING!

Wind Bag and Paper>

The Concord's Delta Wings

Ball, TP & Blowers

1. BUILD A SMASHBOOK! 2 hours+

Your goal for two days is to build a Smashbook on Fluid Dynamics.
You can keep it broad or center in on any topics in the Core Videos or anything else you can find dealing with Fluid Dynamics. The link below gives the official description of a Smash Book, but here's our take on it.

The Rebel Scrapbook

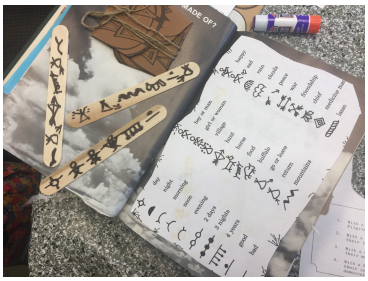
A Smashbook is a scrapbook on steroids. You can basically do whatever you want and smash it all together.

You can add parts of cut-out newspaper articles, magazines etc. Then add every kind of yarn, pipe cleaners, stars, toothpicks and glitter–basically anything that you'd use in a scrapbook. But there are several big differences.

1. YOU CAN ADD ANYTHING YOU WANT. IT JUST HAS TO SMASH TOGETHER.
You could add feathers, claws, owl pellet bones, etc. You could even add a nest if you wanted! But you'd have to do quite a job squeezing it! (Elephant step on it?) Probably, realistically, you'd want to add some of the straw and small sticks of a nest in it…making it more smashable. Smash-inees is key!

2. YOU CAN LET THINGS HANG OUT OF THE PAGES
Tidiness isn't a rule with smashbooks. Things can go outside the pages. Things can hang out. Papers can shoot past the book edges.

3. YOU CAN USE ANY BOOK YOU WANT TO.
You can get an old snazzy book, photo album, composition book or encyclopedia and begin popping all kinds of things on the pages. You can rip out all the pages but 20 and go crazy decorating and adding cool info onto these.



4. SUBJECTS CAN GO ANY ORDER YOU WANT AND THEY CAN BE TOTALLY MIXED TOGETHER.
Tight organization is NOT necessary. You can throw in 2 pages on nests then 10 on bird bills, then come back to 3 on nests and then off to birds wings. You can even come back to nests 10 more times as you explore new things.

The fun of this is that you can concentrate on making everything rich and fun and creative…and not spend all your time carefully organizing and reorganizing things.

Visit this website for ideas!

https://www.muminthemadhouse.com/how-to-make-a-smash-book-scrapbook-for-kids-a-step-by-step-guide/

Have fun!

1. Wind Bag and Bernoulli's Principle 2+ hours

This assignment was begun in Mighty Feathers, Add to it. If you've done nothing on it or want to significantly add to what you've done already, combine these 2 lessons with the first U-Choose lessons in the third month of this printable.

DO ALSO: Links–General 1–Lesson #2 (30 minutes)

Do 30 minutes of Links as your 2nd Link Lesson>Record all on the first Link List Record.

This set of experiments is packed. Some are simple, others are much more involved. The windbag is a fun one that you need to purchase. It's in the Mighty Feathers Experiment Pak, if you have it.

Daniel Bernoulli Info

List 10 interesting facts about the life of Daniel Bernoulli from the Experiment Journal pages or from other sources.

1.

2.

3.

4.

5.

6.

7.

8.

9.

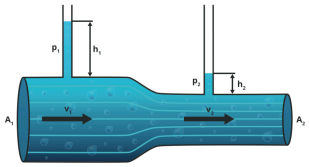
10.

Visit these websites for ideas!

https://www.famousscientists.org/daniel-bernoulli/

https://www.thefamouspeople.com/profiles/daniel-bernoulli-4716.php

Wind Bag and Bernoulli's Principle



Bernoulli's principle is one of those science laws that has a surprising amount of application in our lives. We'll look some of these applications here.

Bernoulli's Principle: Concepts and Applications

List 10 interesting facts about the Bernoulli's Principle and its applications from the Experiment Journal pages or from other sources such as the videos mentioned in the Journal pages.

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Visit this website from NASA for ideas!

https://www.nasa.gov/sites/default/files/atoms/files/bernoulli_principle_5_8.pdf

Wind Bag and Bernoulli's Principle

List your favorite Bernoulli's Principle's Experiments that you did from the dozens listed on the Journal pages. Describe them and tell your results. Use the back of this page if you need to.

1. Gold Digs 1 (60m+)

Parents Note:
An option for some is to watch "Absolute Genius" Videos in Fluid Dynamics General Links 1

GD1: Bones

The "Gold Dig" Theme for Fluid Dynamics is "Bones". It's a wild and exciting journey into hundreds of amazing ways God has designed our bones.

Directions
If you are older and Gold Digs is not too difficult, **Read FIRST TIMERS Gold Digs and take the quiz.**

Then title and draw 2 pictures of the most interesting concepts about this Gold Dig in the boxes on the left.

If you are younger, read the material for 30 minutes (or have it read to you) and draw the 2 best concepts here and 2 more on the back, (or on another sheet), for 4 pictures total.

There are 5 lessons doing First Timers Gold Dig on Bones in this printable. Then for those of you who are older, there are 5 more lessons taking the quiz again at the Second Timer's level.

Picture Title:

Picture Title:

Reinforcement #1 (60 m)

Today is a Reinforcement day. Be creative.

The purpose of the reinforcement lessons is to reinforce any aspect of the Global Topic that is being studied.

For instance, you could do a **5-minute puppet show** with emoji faces drawn on milk cartons. Or you could **act out** with a friend or sibling being the DNA of different animals talking about their tasks. You could be more serious and do an **intense investigation** about a topic, or design a **multimedia project** showing something specific taught.

You could do a **3-d Flat Montage** about a subject not listed in the Experiment pages , or **teach a little kid's lesson** about some of the things you are learning. **Making a game or running a game** on the facts is also a-ok! Anything is great….just review or expand on a lesson.

Give a summary of what you did below. Add pictures on the back and put this in a sheet protector.

See the Experiment Journal pages in the Experiment lesson for more ideas.

Title **Date:**

1. Fluid Dynamics Races 2+ hours

"Fluid Dynamics Races" are meant to be fun and challenging. These can be done individually or as teams of two or more. You can have unlimited time or be racing against the clock. Your teacher will give you a topic or topics and make each a race to 10 or 20.

If you are doing this as classwork and not as a contest, we've assigned three topics for you. You'll know which three by the apple by them .(See below also)

Look over the list of "Races" and then read the next gray box and we'll explain how to do this.

The Fluid Dynamics Races!

1. Names of Species of Penguins and Pictures of Them
2. Box Fish Facts
3. Applied Bernoulli's Principle Examples (new ones)
4. New Facts about Orville and Wilber Wright
5. Very Different Flight Patterns of Birds
6. Alula Feathers fascinating info
7. Facts about Hummingbirds
8. Dolphin Swimming Fascinating Info
9. Facts about Penguins
10. Truths about Dolphins
11. Nose Turbinates fascinating info
12. Wild Truths About Fluid Dynamics
13. Fish Swimming Interestables (fascinating facts)
14. Bird Flight Interestables (fascinating facts)

Fluid Dynamics Races

How Ya Do It

On the pages following you will see a couple sheets to use./////// Self-paced students see note below.

Your teacher will assign you a topic(s). You will then begin a mad scramble with your team to complete 10 or 20 of what your teacher assigns.

PICTURES AND WRITTEN:
Most of the Races involve pasting screen shots into the sheets below or ones of your own making. There is also some writing, either the name of something or its function or some details about it**.**

WRITTEN ONLY:
No topics need writing only. Even technical topics like "Bird Eye Interestables" ought to have some great screen shots as well as info.

When you are done, print your sheets and put them into your Crosswired Science notebook..

YOU NEED:
You need at least one computer per team. You need to make a sheet of your own on a document like Pages for Macs or whatever you like to use for PC's if you want to type onto it. The document you chose must have the ability to shrink and expand images. (the ones below cannot be typed onto.)

PRINT THEM OUT. KEEP THE FUN FOREVER.
You may opt to crowd all your color screen shots on a paper and print them on one sheet. Then you can cut them out and tape them onto a Mighty Feathers Sheet. You could then put your paper into a sheet protector and put them in a CWS notebook for an inexpensive keep-forever alternative.

SCREEN SHOTS
Hold COMMAND SHIFT 4 and drag to give screen shots on a Mac.

GENERAL USE SHEET
We included a blank sheet at the end of this activity in case you want to vary the size of your images.

IMPORTANT TEACHER'S NOTE:

By increasing the search number to 20 items it is easier to get to deeper critical thinking and real hunting. Ten "finds" is easy; but 20 greats of any one topic make diligent searching necessary.

Self-Paced Students

If you are not part of a class but are on your own, you must do 3 hunts, the "Appled" ones on the first page. You must do this many of each…complete with screen shots.

2. Box Fish Facts 10

8. Dolphin Swimming Fascinating Info 20

13. Fish Swimming Interestables (fascinating facts) 10.

Bird Races Topic

Name:
Date:

Screen shots or drawings

1.

2.

3.

4.

5.

6.

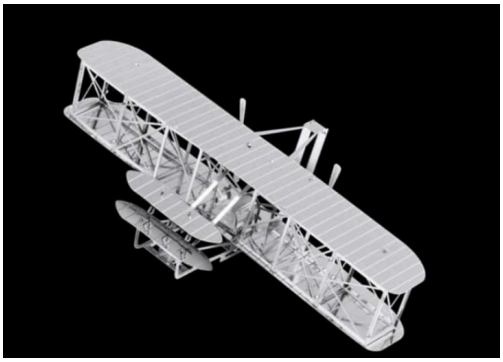
7.

8.

9.

10.

1. Watch & Quiz 1: 2 Core Videos + L1 Quiz (15m)



Take the First Timers Quiz

Watch the 2 Fluid Dynamics (FD) Core Videos for today, **FD and Bernoulli** & **Wrights and Foils** Twice. After the second time, **take the quiz at the First Timer's Level.** Try to take the quiz without looking back in the video. It is ok if you do, but first see how much you remember simply by watching the Core Videos two more times.

2. Read and Record an Instagram Devotional (10 m)

Read a CWS Instagram Devotional and Apply It

Crosswired Science has a number of Instagram Devotionals at this URL:
https://www.instagram.com/crosswiredscikids/
For younger children, we suggest using the book "Indescribable" Louie Giglio.

a. Choose and read one and write the title below.

b. Write down 2 ways that it applies to your life on the lines below.

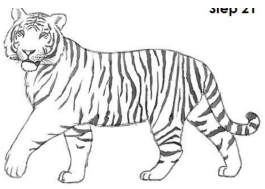
Title:

3. Drawing: Tiger (15 m)

1. https://lifestyle.howstuffworks.com/crafts/drawing/how-to-draw-a-tiger.htm

2. Tablet: http://www.yedraw.com/how-to-draw-tiger.html#.XbRv1y2ZPjA

3. https://www.youtube.com/watch?v=CTwpCDDSyAk

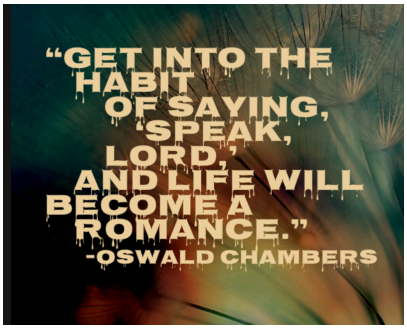


4. https://how2drawanimals.com/8-animals/28-draw-tiger.html

"In the beginning was the Word, and the Word was with God,
and the Word was God.He was in the beginning with God
All things came into being through Him,
and apart from Him nothing came into being that has come into being."
–John 1:1-3

Your Savior is the same one through whom the Universe was created.
He is before all things and "*in Him all things hold together.*"

He wants to guide you into all He has for you to do and to experience. Your part involves seeking Him every new day, walking with Him, loving and forgiving others, keeping all areas of your life surrendered to Him and trusting Him in new things and in difficulties.



Research #1 **(60 m)**

It's time to do some Research!

This lesson is straight forward. Research any topic you like dealing with the topics presented or in something related to these lessons.

You need to follow your instructor's directions as to how to research and how to present your research. If you have no instructions, find 25-50 facts on your subject area–25 if they are involved, and 50 if they are shorter. Use the box below and the next sheet to list your research findings.

See the Experiment Journal pages in the Research lesson for ideas and possible topics.

You have many UChoose lessons in this Global Topic. If research is a love of yours, there are many opportunities to continue it in Uchoose lessons in this printable.

CWS Suggestion: Dolphin Hydrodynamics (How they swim fast), Bird Aeronautics, How Planes Work, Jet wings. Plane control systems.

Title **Date:**

Experiment: Dissection (60 m)

Today is a dissection day. So fun!

In this Global Topic, **you have four different dissections which are detailed in the Experiment lessons: Fish, Starfish, Shark and Squid.** You can choose any two. ***Where to get the supplies and how to do the dissections is all in the Experiment lessons.***

You may go down to the supermarket and buy a trout from the supermarket and dissect it. You can even cook it and eat your way through the dissection! You'll lose a little educational value, but, hey, it can taste pretty good! You can always buy another fish from the store and hit again, or just go out and go fishing–easy!

The box on this page and the next is for you to put pictures you have taken or to draw different parts of what you discover and to label these parts. Do a nice job, then come back and do another dissection this year or in another year and add to the details you discover.

Our goal is to make you a Vet-Grade Anatomist of the animals you chose.

My Dissection: **Date:**

Exp. My Dissection:

Reinforcement #2 (60 m)

Today is a Reinforcement day. Be creative.

The purpose of the reinforcement lessons is to reinforce any aspect of the Global Topic that is being studied.

For instance, you could do a **5-minute puppet show** with emoji faces drawn on milk cartons or using regular puppets. Or you could **act out** with a friend or sibling being the DNA of different animals talking to each other about their tasks. You could be more serious and do an **intense investigation** about a topic, or design a **multimedia project** showing something specific taught.

You could do a **3-d Flat Montage** about a subject not listed in the Experiment pages , or **teach a little kid's lesson** about some of the things you are learning. **Making a game or running a game** on the facts is also a-ok! Anything is great….just review or expand on a lesson.

Give a summary of what you did below. Add pictures on the back and put this in a sheet protector.

See the Experiment Journal; pages in the Experiment lesson for more ideas.

Title **Date:**

1. Gold Digs 5 (60m+)

Parents Note: An option for some is to watch "Absolute Genius" Videos in Fluid Dynamics General Links 1

GD5: Bones

The "Gold Dig" Theme for Fluid Dynamics is "Bones". It's a wild and exciting journey into hundreds of amazing ways God has designed our bones.

Directions
If you are older and Gold Digs is not too difficult, **Read FIRST TIMER'S Gold Digs and take the quiz.**

Then title and draw 2 pictures of the most interesting concepts about this Gold Dig in the boxes on the left.

If you are younger, read the material for 30 minutes (or have it read to you) and draw the 2 best concepts here and 2 more on the back, (or on another sheet), for 4 pictures total.

There are 5 lessons doing First Timer's Gold Dig on Bones in this printable. Then for those of you who are older, there are 5 more lessons taking the quiz again at the Second Timer's level.

Picture Title:

Picture Title:

Research #2 (60 m)

It's time to do some Research!

This lesson is straight forward. Research any topic you like dealing with the topics presented or in something related to these lessons.

You need to follow your instructor's directions as to how to research and how to present your research. If you have no instructions, find 25-50 facts on your subject area–25 if they are involved and 50 if they are shorter. Use the box below and the next sheet to list your research findings.

See the Experiment Journal pages in the Research lesson for ideas and possible topics.

You have many UChoose lessons in this Global Topic. If research is a love of yours, there are many opportunities to continue it in Uchoose lessons in this printable.

CWS Suggestions: Turbinate Bones, Box Fish Swimming Dolphin HydroDynamics, Bird Aeronautics, Plane aeronautics, Ship Hydrodynamics, Ship Hull designs

Title **Date:**

Title Date:

3. Fluid Dynamics Acrostic (20 m)

The Rules:

You've learned a even more about Fluid Dynamics.. But now's your chance to test your mastery again! Everything on this page must be new.

Take every letter below and tie a great concept to it. If you're going for *a Level 3 student,* no "easies" allowed. If you're *Level 2* you can have 4 "easies". What's an "easy"?

An easy is any one word answer" like I for "I like fluid dynamics." What you are looking for is "interestables"–exciting or interesting information for each letter. Are you up for the challenge?

H

Y

D

R

O

A

E

R

O

D

Y

N

A

MICS :)

5. Fluid Dynamics: Origami (60 m+)

Have some fun making some Fluid Dynamics creatures!
Engineering with Origami WOW **!!https://www.youtube.com/watch?v=ThwuT3_AG6w&t=376s**

Seal
https://www.youtube.com/watch?v=SqYAwb7fMbw

https://www.youtube.com/watch?v=U3SH59mHURA

Penguin
https://www.youtube.com/watch?v=iHQMzLUQMmg

Tiger
https://origami-art.us/instructions/234-origami-tiger

Tiger Face
https://www.giladorigami.com/origami-database/Tiger%27s%20head%20Roma

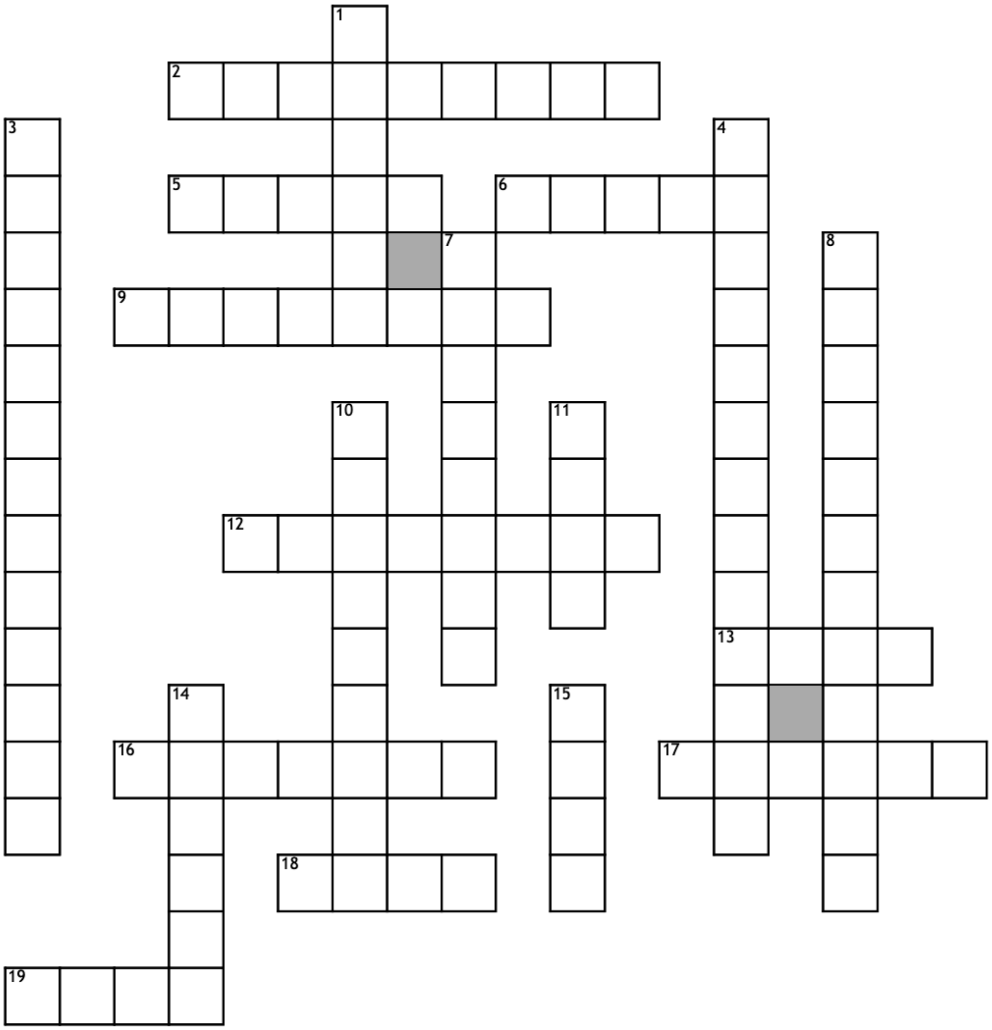
Sea Turtle
https://www.youtube.com/watch?v=CCqxMhV-3pE

3-D Penguin
https://www.youtube.com/watch?v=k_W8IiOytM4

2. CWS Fun: Crossword Puzzle #2 (25 m)

Give this Crossword Puzzle a try.
(For the answers, they are in the CrosswiredScience.com "Parent Section".
NOTE: The questions are repeated on the next page in an easier-to-read format.

Fluid Dynamics FT #2



These questions are on the next page only larger.

Across

2. This is the other name for whiskers like a seal's whiskers.
5. This animal's horn is made of the same protein that feathers are made of.
6. _____ feathers help birds to land elegantly.
9. Water sticks to the cat's tongue because of a_____ .
12. Little air or water "tornadoes"are called what? Birds, boxfish and all swimmers and flyers have to deal with these.
13. This part of a cat's paw is made of the same substance as a feather is.
16. The p_____ feathers for flight are found at the end of wings.
17. _____ Bernoulli was born in 1740. He lived at the same time as George Washington.
18. The harbor _____ is perhaps the best fish tracker of the sea. It uses the stirring of the water the fish makes to track it.
19. The mother penguin places her egg on the male's _____ .

Down

1. Scientists are studying hi-tech tongues, elephant _____ and octopus tentacles in hopes of making soft robots.
3. Studying how a turtle or a dolphin swims is part of the science of h_____ .
4. Bernoulli was a Swiss m_____ that developed a principle that describes the speed air flowing and its pressure.
7. _____ can jump between 16 and 20 feet high.
8. A_____ is the study of air in motion. Engineers use this branch of science to build better planes.
10. Three t _____ bones in your nose help with guiding the air flow inside your nose.
11. S_____ dogs have well-developed nose turbinates which make long, hard treks much easier.
14. The _____ Brothers invented the first effective airplane in 1903.
15. The bottom of an airplane wing has _____pressure than the top of the wing.

1. CWS Fun: Crossword Puzzle #2. (25 m)

These questions are the same as on the previous page only larger.

Across

2. This is the other name for whiskers like a seal's whiskers.

5. This animal's horn is made of the same protein that feathers are made of.

6. _____ feathers help birds to land elegantly.

9. Water sticks to the cat's tongue because of a_____ .

12. Little air or water "tornadoes"are called what? Birds, boxfish and all swimmers and flyers have to deal with these.

13. This part of a cat's paw is made of the same substance as a feather is.

16. The p_____ feathers for flight are found at the end of wings.

17. _____ Bernoulli was born in 1740. He lived at the same time as George Washington.

18. The harbor _____ is perhaps the best fish tracker of the sea. It uses the stirring of the water the fish makes to track it.

19. The mother penguin places her egg on the male's _____ .

Down

1. Scientists are studying hi-tech tongues, elephant _____ and octopus tentacles in hopes of making soft robots.

3. Studying how a turtle or a dolphin swims is part of the science of h_____ .

4. Bernoulli was a Swiss m_____ that developed a principle that describes the speed air flowing and its pressure.

7. _____ can jump between 16 and 20 feet high.

8. A_____ is the study of air in motion. Engineers use this branch of science to build better planes.

10. Three t _____ bones in your nose help with guiding the air flow inside your nose.

11. S_____ dogs have well-developed nose turbinates which make long, hard treks much easier.

14. The _____ Brothers invented the first effective airplane in 1903.

15. The bottom of an airplane wing has _____pressure than the top of the wing.

Links–General 1–Lesson #3 (45-60 m)

DAY 57 p.1

Today is Links. Amazingly Interesting! *Write 2 great facts from 3 of your favorite Links. (Look back at previous Link lessons for detailed directions.)*

NOTE: YOU ARE DOING GENERAL LINKS 1 AGAIN!

Advanced Students : ALSO DO BONES 2 AGAIN. Take quiz for "Second Timers".

Link1:

Save Awesome Genius Videos for later. Only 1 at the most here.

Link 2:

Link 3:

1. Watch & Quiz 4 : 2 Core Videos + L2 Quiz

Take the Second Timers Quiz.
Watch the 2 Fluid Dynamics (FD) Core Videos for today, **Nose Aerodynamics** & **Dog Slobs & Cats** Twice. After the second time, **take the quiz at the Second Timers Level.**

Try to take the quiz without looking back in the video. It is ok if you do, but first see how much you remember simply by watching the Core Videos two more times.

2. Watch an "Absolute Genius" link + 5 Great Facts (30 m)

General Links 1 has 6 Absolute Genius Videos in it. General Links 2 has 3. You Tube has more. Watch one and put 5 great Facts on the next sheet. If one is not available to you, watch others that are 30 minutes long (or several on the same person that total 30 minutes,)

3. Read and Record an Instagram Devotional (10 m)

Read a CWS Instagram Devotional and Apply It
Crosswired Science has a number of Instagram Devotionals at this URL: https://www.instagram.com/crosswiredscikids/ For younger children, we suggest using the book "Indescribable" Louie Giglio.

a. Choose and read one and write the title below.
b. Write down 2 ways that it applies to your life on the lines below.

Title:

Absolute Genius Link-Notes

Scientist:

1.

2.

3.

4.

5.

Uchoose & Field Trips 8

This is a Science-Free-For-All!
The U-Choose lesson icon contains truckloads of great ideas! Summarize the project you choose here, Add a picture or two–or a dozen– here, too.

Go For Whatever -U-Want! Field Trips included! Yippee!

Title

The 1 Month "BIG PROJECT"

This is your exciting Science Project for this Year.

Scientists all have projects they are working on. It's what science is all about. If you are 5 or18, it's a great idea to have a Project each year you are doing through school. Why?

It gives you the chance to rigorously pursue something you are interested in. It gives the opportunity to deeply experiment with some ideas you have. For some, it gives them the chance to "shadow" an occupation they are very interested in, like being a vet, helping in a lab, or being a ranger. For others it can mean thoroughly investigating interests they have, or going on incredible field trips.

It can mean learning all you can from a dozen websites dealing with something you want to be a specialist in. Or it can involve learning great amounts in filming, animation and other film and photo software programs. It can also mean doing such fun things as caving, digging dinosaur bones or rafting the Grand Canyon and learning Creation geology.

In so many ways, having month-long projects each year can be life-shaping. Pray about what the Lord would have you do. He will take you places you never dreamed!

These sheets are identical to those in Fluid Dynamics.

If you want to do 2 months of special projects, use both sets of paper work. If you only want to do one month. discard one set.

Be sure to look at the many ideas in Reinforcement, Research, UChoose and Field Trip lessons.

My Project: **Date:**

- Shadow a Science Occupation. (see above)
- Investigate an audio resource like Jonathan Parks.
- Investigate different websites like Smarter Every Day or Brave Wilderness. Make a website of your own.
- Learn software like Adobe Photoshop, After Effects, and Illustrator and use them to make projects to show the wonders God's Creation.
- Go on mind-blowing Field Trips.
- Go to Science Seminars.
- Help with Creation evangelism.
- Read Sci- Biographies.("Benge" are Great)
- Read loads of Creation Magazines
- Concentrate on "power"experiments like making Borax and other crystals, making a laser- sound transmitter, building your own sound system, etc.
- Enter a Science Fair.
- Master Puppetry and use it in Science Camps
- Do Science camps around your city during school breaks. Try going with a team into really poor areas. Do them in other countries.
- Plan and preform Science exhibitions for large groups with Christian messages.
- Help campus Creation outreaches.
- Read 50 articles, watch 30 videos from Creation ministries more read 5 Creation books..
- Listen to 50 Creation messages.

The 1 Month "BIG PROJECT": LINKS 1 hr/wk

4 Weeks

Watching Links Each Week

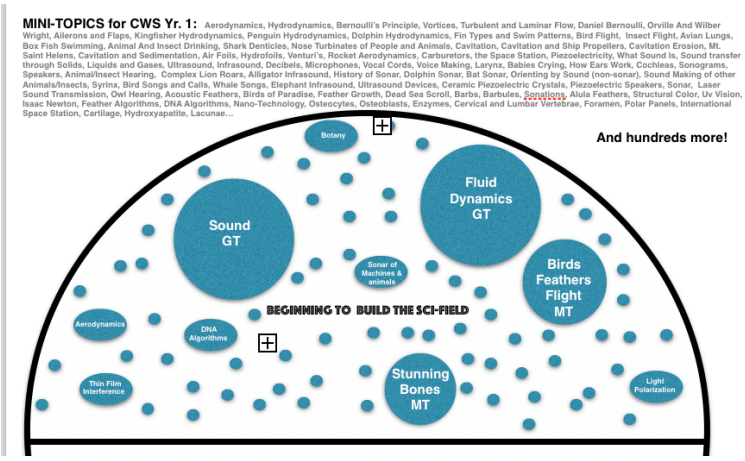
- On each week of your project month, watch thirty minutes of Links from this Global Topic. Pick what you feel are the best 30 minutes of videos.
- For the General Videos, you may chose from either General 1 or 2. For Unit videos, select from these.
- Write 3-10 detailed notes on each. You must have at least 20 good concepts total. This will take the additional 30 minutes. (concepts are more than a single fact. They are a group of interrelated facts.
- Use 1 printable page per lesson. Use both sides. (There are 4 below)
- Star the best two concepts from each Link. Put a #1 by the best concept.

The Link Plan

60-65	WK1	Links in General Links 1
65-70	WK2	Links in General Links 1
70-75	WK3	Links in General Links 2
75-80	WK4	Links in General Links 2

Your grade is based on your selection of your Links, \which ones you consider best. It is also dependent on how good your concepts are.

Why Do This?



You are "building the field" of critical mini-concepts in your mind.

(See CWS 1 Year Theory)

Link-Notes General Links 1

1.

2.

3.


LOONEY TUNES
"That's all Folks!"