



Laboratory Experiment – Mr. Galloway BS, M.Div. - SoulCare.ORG

“MEALWORM METAMORPHOSIS”

"What do MEAL WORMS become after metamorphosis (born again physically)?"

(Video - [2 min time lapse metamorphosis](#))

"What will YOU become after your metamorphosis?"

Mr. Galloway's BIBLICAL INTEGRATION - God's Word about His World:

STRONG'S Concordance – word # G3339 Greek = μεταμορφω
= (*metamorphoō*) = to change into another form, to transform, to transfigure

Bible Usage of the Greek term - metamorphoō

[Mat 17:2](#) Jesus was **transfigured** (*metamorphoō*) before them; and His face shone like the sun, and His garments became as white as light.

[Mar 9:2](#) ... Jesus took with him Peter, and James, and John, and led them up to a high mountain apart by themselves: and he was **transfigured** (*metamorphoō*) before them.

[Rom 12:2](#) Do not be conformed to this world: but be **transformed** (*metamorphoō*) by the renewing of your mind, so that you may prove what is the good, and acceptable, and perfect, will of God.

[2 Cor 3:18](#) But we all, with unveiled face, beholding as in a mirror the glory of the Lord, are being **transformed** (*metamorphoō*) into the same image from glory to glory, just as from the Lord, the Spirit.

The word "Gospel" means Good News. It is God's promise that anyone who has submitted to Him, trusting the work of Jesus Christ as personal Lord and Savior, will be transformed (metamorphosis) into His pure, sinless character (Rom. 8:28-29). Once a person is born again, God says that God Himself will eventually make that person pure and mature, spiritually and physically, forever. The good news includes the wonderful fact that God never ABORTS any of His children. The Bible, God's Word, promises that when a person becomes "saved" (born again), God begins a three part process that God WILL complete at the final resurrection.

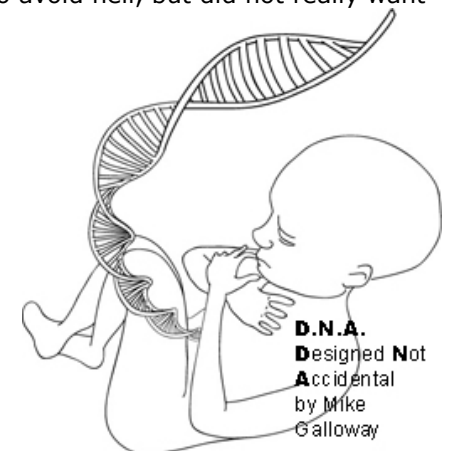
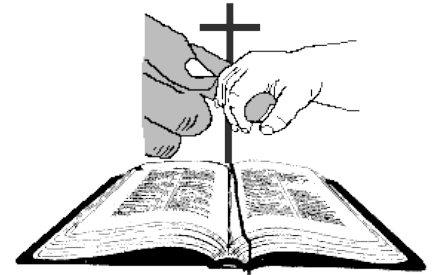
The FIRST part of the process is called JUSTIFICATION. The human part of this process is when a person realizes that he or she cannot pay the penalty for sin and cannot be good enough for God's pure, sinless heaven. That person then chooses to trust Christ's work for forgiveness and change. God then immediately and legally justifies that person, by apply Jesus's perfect *moral* life and Jesus's payment of death on the cross for that person. God's Holy Spirit joins with the person's human SPIRIT, so that Christ's goodness is now present at the person's *spiritual* core. (1 Cor 6:17; 2 Cor 5:17)

God's SECOND step in the process is called SANCTIFICATION. It is God's progressive, gradual teaching, training, and disciplining of a new born again Christian. It continues all throughout a person's life here on this old, sin-infected Earth. The person's SOUL is gradually changed and grows into the new attitudes and desires of Christ (Romans 12:1-3). Yes, a Christian can choose to rebel. IF the person really is born again (1 John 2:19), then God will discipline (Heb. 12) and ensure growth. Sadly many people who think they are born again Christians are not, because they have never seriously submitted to Christ (Matt 7:23). They only prayed a prayer to avoid hell, but did not really want God to change them into the moral character of Christ.

God's THRID step is called GLORIFICATION. It WILL happen when God resurrects a Christian and gives him or her a new, perfect BODY. This new body will not have mutations, never have disease, never suffer, and never die. It will then be a full part of God's new, perfected Heaven and Earth. (1 Cor 15:42-49; Rev 20-22)

* See also Mr. Galloway's webpages: ([Good News](#)) and ([Beliefs](#))

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D.N.A.
Designed Not
Accidental
by Mike
Galloway

GOOD SHEPHERD CREATOR'S CREATURE CARE CONTRACT:

(see also Mr. Galloway's webpages: ([Man's Animal Abuse](#)) and ([Christ's Creature Compassion](#)))

STUDENTS, remember that God's Word, the Bible, uses the term "nephesh" to describe certain animals that can think and feel. The God's Bible definitely calls all vertebrate animals "nephesh". But it doesn't say whether or not invertebrates like worms, oysters, or beetles have "nephesh". Since, they might, then we should treat them humanely. That means, if you ever have to kill an animal, you should do it as quickly as possible. Therefore, as part of this class, you need to read and check the following items, this sign below.

_____ I recognize mealworms are living things that might have nephesh.

_____ I agree to treat the mealworms in a humane way.

_____ I will not harm the mealworms in any way.

_____ I will handle the mealworms carefully.

Student Signature:

A sculpture can be beautiful, yet broken.
Earth is broken due to the FALL - until Christ returns.
Genesis 1:26-31; Isaiah 11



Which **WAY** is the way of the Good Shepherd Creator?

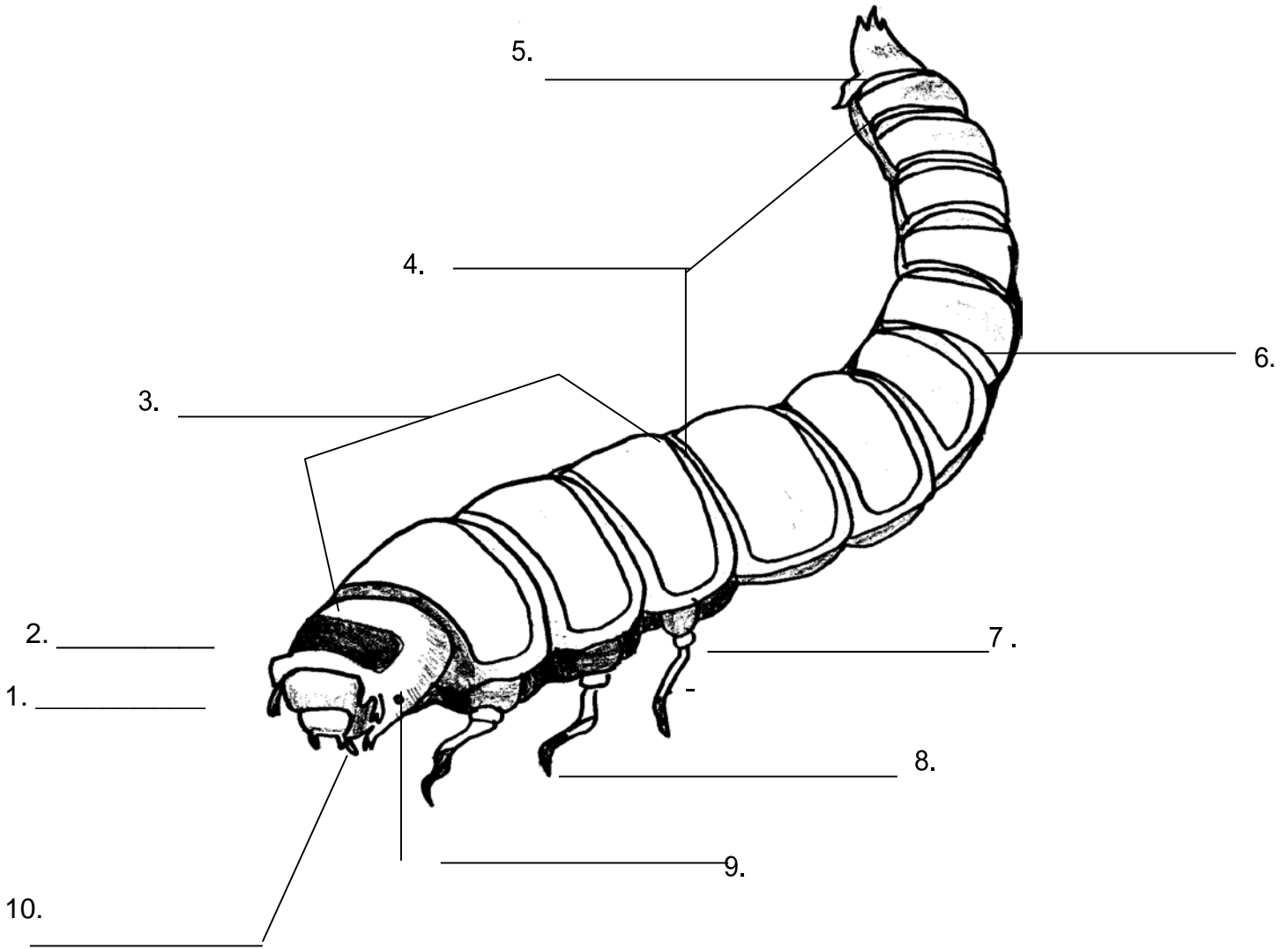
"the **creation** itself also will be **set free** from its **slavery** to **corruption** into the freedom of the children of God."
Romans 8:21

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REMEMBER, in God's New Creation, the wolf and lamb will live together as friends - the lion, leopard, and bear will be vegetarian just as they were in God's original Garden of Eden.

"the wolf will dwell with the lamb,
... the calf and the lion ... together;
And a little boy will lead them.
⁷ Also the cow and the bear will graze,
Their young will lie down together,
And the lion will eat straw like the ox.
...⁹ They will not hurt or destroy in all
My holy mountain,
For the earth will be full of the
knowledge of the LORD"
ISAIAH 11:6-9

* REMEMBER, every BIO-FORM has a BIO-FUNCTION, intelligently designed by God. All PARTS are involved in PROCESSES. Using the word bank down below, label as many parts of the mealworm that you can. COLOR the mealworm. (adapted from http://www.caboces.org/sites/default/files/mst/Meet_the_Creatures_-_Student_Activity_book.pdf).



Abdomen
Anal-leg
Antennae
Claw

Head
Larval-eye
Leg
Mandible-jaw

Segment-of-abdomen
Thorax

Observe your mealworms. Check any boxes below that apply. (This is adapted from, http://www.caboces.org/sites/default/files/mst/Meet_the_Creatures_-_Student_Activity_book.pdf)

Use a HAND magnifier OR A LOW POWER MICROSCOPE to find those same parts.

Write any notes in the last column of the chart about other things you observe.

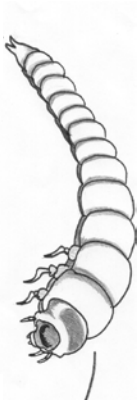
	With Only your Eye, Can you see			Magnifying Glass Can you see ...			Add any EXTRA Notes
	Yes	No	Unknown	Yes	No	Unknown	
1. Head?							
2. Tail?							
3. Legs?							
4. Eyes?							
5. Body segments?							
6. Hair?							
7. Antennae?							
8. Feet?							
9. Mouth?							
10. Skeleton?							
11. Sense of smell?							
12. Sense of touch?							
13. Sense of taste?							
14. Sense of sight?							
15. Sense of hearing?							

LIFE CYCLE OF A GRAIN BEETLE

Name each stage of the cycle of a grain beetle and identify the FORM & FUNCTION of each.
(adapted from http://www.caboces.org/sites/default/files/mst/Meet_the_Creatures_-_Student_Activity_book.pdf).



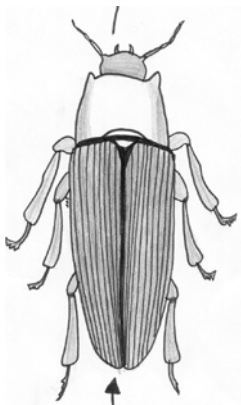
Stage _



Stage _



Stage _



Stage _

REVIEW Mr. Galloway's Science Investigation Process:

1. Observation: Observations use our five senses.

Romans Ch. 1 says observing God's WORLD demonstrates that: God Exist, God is Powerful, God is Intelligent. But we need God's WORD to know that He is good, because the world is infected by sin and suffering now.

2. Questions: Curiosity is the heart of science.

- To answer questions & solve problems
- To know God and cooperate with Him



3. Data Gathering:

- Samples of a population for example, must be a large number & randomly selected
- Measurable data collected, SI units (System International), based on the metric system
- Organize the data - graphs, charts, etc

4. Hypothesis:

- Hypo/Thesis (= Underlying belief). An **"If . . . Then"** statement that makes a testable prediction
- Cannot be proven true, but can be proven false (falsifiable).
- Simplified Example:
"If plants are sprayed with weed killer, then the plants will die."
Now you state some hypotheses that can be tested (can be verified).

5. Testing:

- Surveys = must be large & random
- Lab tests (blood or urine test, etc.)
- **Controlled Experiment** is one of the most important tests conducted by scientists.
 - Variables** = factors that can change, but the scientist must control (like temperature, amount of water, etc.)
 - Independent Variable** = manipulated variable, which is altered by the scientist
 - Dependent Variable** = responding variable, which depends on the independent variable.
 - Two groups are tested in a controlled experiment (control and experimental)
 - Control Group:** all the variables stay the same
 - Experimental Group:** The scientist manipulates the independent variable to test how the dependent variable responds.
 - * EXAMPLE of a SIMPLE experiment: If we put weed poison on weeds, then they will die.
 - * EXAMPLE of a BETTER experiment: If we put a 10% solution of weed poison, then they will die.

6. Analysis: Similar methods as "Data Gathering" Measurable data collected

- SI units (System International) based on the metric system
- Organize the data into graphs, charts, etc
- Making inferences about the results

7. Conclusion: based on your experiment's results must be formed by logical (logikos) thinking.

- **Theory:** A hypothesis is eventually called a THEORY when it has been supported by many repeated tests and never yet falsified. It is a broad comprehensive conclusion about what is "believed" to be true.
- **Law:** A theory is eventually called a LAW when it has been tested for many years and never proven false (never falsified).

Applying Mr. Galloway's Science Investigation Process for Mealworm Metamorphosis:

- * Use the 7 steps below to design (create) your own experimental process using mealworms.
- * *IN CLASS* together we will discuss, dialog, debate, and develop possibilities for each step.
- * *IF YOU MISS CLASS*, contact other students or Mr. Galloway to find out what we discussed.
- * Then adapt our discussion to develop your own unique experiment on the next page.

1. Observation: Use ALL five senses to examine and describe your mealworms.

2. Questions: What science questions will you try and answer about mealworms through your experiment?

3. Data Gathering: What facts can you find by research to help design your experiment?

4. Hypothesis: Write a formal ("If, then,") testable prediction that your experiment will test.

- * Be sure to include some of the basic procedures you plan to apply, possible stages of mealworm development, and of course the final outcome you expect.

5. Testing: Applying Your Own Controlled Experiment

Control Group: Remember that this group is the one that has all the same variables **BUT NOT** the independent.

Experimental Group: This is your separate group that has all the variables of the control group **PLUS** your manipulation (the change) you do as the scientist (which is called the independent variable).

List all possible variables you must try to control in your two groups:

Independent What is the factor that YOU as the scientist will manipulate (change) in the experimental group?

Dependent What is the factor that will be the response to your manipulation?

EXPERIMENT MATERIALS:

1. **Containers:** clear plastic punch cups
2. **Mealworms:** three sizes - Super, Giant, Regular
3. **Platform:** table or counter top
4. **Food Source:** grain meal
5. **Water Source:** gel cubes
6. **Covers:** clear clinging plastic wrap
7. **Cover Holders:** rubber bands or tap
8. **Labels:** Permanent marker
9. **Heat Source:** (optional) heating pad



EXPERIMENT PROCEDURES: You decide what & how you will setup & conduct your experiment.

Each week, record the number of your mealworms that are in the different stages:

Week	Larva	Pupae	Adult
1			
2			
3			
4			
5			
6			

YOUR LAST TWO STEPS IN THE SCIENTIFIC INVESTIGATION PROCESS:

6. Analysis: Design charts and/or graphs to represent in a visual way the data you recorded on the last page.

7. Conclusion: Based on the data resulting from your experiment and using logical (logikos), critical thinking, what are some conclusions you can make?

