

Lesson 01:

Biology: The Study of Life, Part 1

Reading Assignment: ECB2, pp. 1 - 18

Lesson Video: Play [Lesson 01](#) from the Video File. (Print off notes below before playing.)

Lesson Starts: 7:00 (Fast forward to this point for lecture.)

Students receive a set of fill in the blank notes provided in a digital Student Materials Notebook. Parent/Teacher has the answers and links (as follows) in a Parent Test Manual. This allows the students to listen to the lecture and take notes. The answers are then provided by the parent/teacher so that they can check their work and understanding. The links are provided so that the student can go back to any page viewed directly and review the content.

<http://redwagontutorials.com/AD/HandoutsB/Module01/1stOverhead01.htm>

<http://redwagontutorials.com/AD/HandoutsB/Module01/2ndOverhead.htm>

<http://redwagontutorials.com/AD/HandoutsB/Module01/3rdOverhead.htm>

<http://www.redwagontutorials.com/php/>

<http://redwagontutorials.com/AD/BNotes/BLesson01.pdf>

<http://redwagontutorials.com/AD/HandoutsB/Module01/SampleInformalReport.htm>

<http://redwagontutorials.com/AD/HandoutsB/Module01/FormalReport2a.htm>

Please watch this video before class starts or the session video is viewed:

<http://www.youtube.com/watch?v=CBeCxKzYiIA>

(Parents: Please be advised that these are You-Tube videos. We have no control over the ads that are presented. We do our best to screen the presentations, but ads change daily. Please preview the video environment before your student views the links. We feel that Google Chrome is the best browser for students to watch videos. It screens content very well.)

<https://www.google.com/chrome/browser/>

The four criteria for life are:

- a. All life forms contain deoxyribonucleic acid, which is called DNA.
- b. All life forms have a method by which they extract energy from the surroundings and convert it into energy that sustains them.
- c. All life forms can sense changes in their surroundings and respond to those changes.
- d. All life forms reproduce.

1. According to your textbook author, all live forms contain what?

Answer: All live forms contain DNA. (Deoxyribonucleic acid.) The information stored in DNA turns lifeless chemicals into a living organism. It is the most efficient information storage device in Creation. If all of the contents of the world's libraries were to be stored on the best microchip memory boards that we have today, it would create a pile of microchips that would reach HIGHER than the moon. If you could store that same information in DNA, it would take approximately 1% of the space on the head of a pin.

<http://www.dnai.org/>

<http://www.umass.edu/molvis/tutorials/dna/>

2. A mule is a cross between a male ass (a jackass) and a female horse (a mare). It is usually sterile. This means it cannot produce offspring. Is the mule alive?

<http://www.lovelongears.com/>

Answer: Yes, the mule is alive. A mule, although small, has the potential to reproduce. The equipment is there to reproduce, but the cells/gametes necessary to make reproduction happen are few and far between.

3. A virus is composed of genetic material (sometimes DNA, sometimes RNA, or ribonucleic acid). It invades a cell, hijacks the cell's reproductive machinery, and makes the cell start reproducing viruses. The cell eventually explodes due to the huge number of viruses inside. Is a virus alive?

<http://redwagontutorials.com/AD/HandoutsB/Module01/Virus1B.htm>

Answer: No, a virus is not alive. A virus is non-living matter for two reasons: (1) It has no potential to reproduce on its own, and (2) it has no way to extract energy from its environment without the host cell.

4. A Euglena has an eyespot which allows it to sense light and respond to the light. Is the Euglena living? Why?

http://bio.rutgers.edu/~gb101/lab6_protists/r6a1euglena.html

Answer: Yes, a Euglena is living. It has the ability to sense change in its environment and respond to it.

I point out these organisms to you to demonstrate the incredible diversity of life on earth and how carefully things like Dr. Wile's criteria need to be applied. Taken too literally, Mrs. R and I would be considered non-living because we have never reproduced an offspring. I guarantee you she and I are living although some of you may not think so by now.

<https://www.facebook.com/CleosClassroom/>

5. The process by which a living organism takes energy from its surroundings and uses it to sustain itself, develop, and grow is called what?

Answer: Metabolism is the process by which a living organism takes energy from its surroundings and uses it to sustain itself, develop, and grow. Metabolism is composed of two opposite reactions.

<http://www.estrellamountain.edu/faculty/farabee/biobk/BioBookGlyc.html>

a. Anabolism is the sum total of all processes in an organism which use energy and simple chemical building blocks to produce large chemicals and structures necessary for life.

b. Catabolism is the sum total of all processes in an organism which break down chemicals to produce energy and simple chemical building blocks.

6. Where does the process of metabolism begin?

http://photojournal.jpl.nasa.gov/jpegMod/PIA03149_modest.jpg

Answer: Metabolism begins with the sun. The sun releases energy in the form of photons which travel to earth at the speed of 300,000,000 meters/sec or 6 trillion miles in one year (one light year).

7. The process by which a plant uses energy of sunlight and certain chemicals to produce its own food is called what?

Answer: Photosynthesis is the process by which a plant uses energy of sunlight and certain chemicals to produce its own food. **In photosynthesis, six water molecules and six carbon dioxide molecules in the presence of chlorophyll and sunlight become one glucose molecule and six oxygen molecules.**

<http://cfile227.uf.daum.net/image/122482464FCC4FBA1E4D84>

8. There are two words given in your text that signify an organism that makes its own food. What are they?

Answer: Producers or autotrophs are organism that makes their own food.

<http://en.wikipedia.org/wiki/Autotroph>

9. Heterotrophs are organisms that depend on other organisms for food. What are the two kinds of heterotrophs mentioned in your book?

Answer: Consumers and decomposers are the two kinds of heterotrophs mentioned.

<http://redwagontutorials.com/AD/HandoutsB/Module01/Figure1.2.htm>

10. There are three kinds of consumers listed in your book. What are they, and what do they eat?

Answer:

✚ Herbivores are organisms that eat plants exclusively.

<http://citadel.sjfc.edu/students/naa07113/e-port/squirrel.jpg>

✚ Carnivores are organisms that only eat organisms OTHER than plants.

<http://media-cache-ec0.pinimg.com/736x/bf/23/78/bf23785a29b1cf56b00aa57f5359a4ec.jpg>

✚ Omnivores are organisms that eat both plants and other organisms.

https://en.wikipedia.org/wiki/Giant_panda

11. Plants are autotrophs. Are they carnivores or omnivores? Are they producers or consumers?

Answer: Plants are producers; therefore, the words carnivore, omnivore, or consumer do not apply.

12. I have an article about a lioness that WILL NOT eat meat. This animal would literally starve to death before it would eat meat. It only eats oats, grain, eggs, and milk etc. Is it an omnivore, carnivore, or herbivore?

<http://www.answersingenesis.org/creation/v22/i2/lion.asp>

Answer: The lioness is an omnivore. Because this animal has been bred to only eat a vegetarian diet and will never eat meat, it is an omnivore.

13. Can you name some omnivores other than humans?

Answer: Some omnivores other than humans include: apes, turtles, cranes, ostriches, many crabs, raven, songbirds, foxes, iguana, etc.

<http://en.wikipedia.org/wiki/Omnivore>

14. A fungus is a decomposer. Would you classify it as an omnivore or carnivore?

<http://www.pbrc.hawaii.edu/bemf/microangela/cheese.htm>

Answer: Neither. Fungi and certain bacteria are decomposers and not consumers. They comprise their own nutritional category.

15. Are decomposers autotrophs or heterotrophs?

Answer: They are heterotrophic in that they cannot produce their own food; however, under the classification scheme in your book, they have a separate division under heterotrophs. Remember the two divisions of heterotrophic organisms are (1) consumers and (2) decomposers. Fungi fall into the latter. (There is a better word for them which we will learn in module 2. They are also called saprophytes.)

<http://en.wikipedia.org/wiki/Decomposer>

Anyone confused? ([open blank page](#))

16. Are there any living organisms that have no receptors?

Answer: No, there are not any living organisms that lack receptors. They may not have nerve cells, but even single cell bacteria can sense a change in their environment and respond to it.

http://s3.amazonaws.com/readers/2010/11/19/bac2_1.jpg (Staph Aureus)

17. Do humans reproduce asexually?

Answer: Yes, humans do reproduce asexually on a cellular level. The cells of your body are constantly reproducing themselves. In fact, your whole body, with the exception of your brain, is regenerated in about one year's time. Nerve cells are the exception. They are very slow to reproduce, if they do at all. That is why it is so important you protect your brain cells. You literally have a limited number of these! DON'T DO DRUGS.

<http://faculty.washington.edu/chudler/cellcerebell.html>

18. Can you see an advantage to asexual reproduction in terms of the survival of a species? What about a disadvantage?

Answer:

In asexual reproduction, there is no need for a partner; hence, no chance for a new genetic disorder to be passed on. Only what is already in the parent will be in the offspring.

The disadvantage is that there is no partner; hence, no exchange of genetic material. If the parent has a mutation, the mutation will be in the offspring. There is no chance of genetic recombination to get rid of the bad trait.

http://en.wikipedia.org/wiki/Asexual_reproduction

19. Can you see an advantage to sexual reproduction in terms of the survival of a species? What about a disadvantage?

Answer:

An advantage is that there is a partner; hence, there is exchange of genetic material. If one parent has a genetic defect, there is a chance of getting a bad trait out of the gene pool in sexual reproduction.

The disadvantage of sexual reproduction is the need for a partner, and hence, the chance for genetic disorders to be passed on. For example, if both parents have the trait for sickle cell anemia, there is 50-50 chance that the offspring will have the disease.

http://en.wikipedia.org/wiki/Sexual_reproduction

20. Scientists have successfully cloned several organisms. Is this creating life?

Answer: Cloning is not creating life. The cell that was used to make the animal was already living; hence, scientists are stimulating a cell to do what God has already designed it to do. Science has its limitations. It can only take what God did and try to imitate it.

<http://en.wikipedia.org/wiki/Cloning>

21. Was Dolly an exact replica of her “mother”?

Answer: No, Dolly was not an exact replica of her “mother.” Dolly’s life was cut short because science was not able to reproduce the exact genetic sequence to give Dolly a long, healthy life.

22. The discovery of Neptune is an excellent example of the scientific method in use. Scientists had noticed that the planet Uranus did not orbit around the sun exactly as Newton’s Universal Law of Gravitation predicted. French scientist Urbain Jean Joseph Leverrier assumed that this was because a previously undiscovered planet was interfering with Uranus’ movement. He made some calculations using Newton’s Universal Law of Gravitation and determined where this undiscovered planet had to be in order for Uranus’s motion to be consistent with Newton’s law. German scientist Johann Gottfried Galle used a telescope to look in the sky at the position that Leverrier predicted, and he saw the planet on the very first night of the search! The planet was named Neptune.

<http://sen.com/Uploads/images/page/50402717e98e4d17a1aaa7bc6c3f814c.jpg>

<http://media-cache-ak0.pinimg.com/736x/ee/00/93/ee00938c1a85af2a704768f290320c97.jpg>

a. What was the observation that started the use of the scientific method in this instance?

Answer: Scientists had noticed that the planet Uranus did not orbit around the sun exactly as Newton's Universal Law of Gravitation predicted.

b. What was the hypothesis?

Answer: French scientist Urbain Jean Joseph Leverrier assumed that this abnormal orbit was because a previously undiscovered planet was interfering with Uranus' movement. He made some calculations using Newton's Universal Law of Gravitation and determined where this undiscovered planet had to be in order for Uranus's motion to be consistent with Newton's law.

http://en.wikipedia.org/wiki/Urbain_Le_Verrier

c. What was the experiment to confirm the hypothesis?

Answer: German scientist Johann Gottfried Galle used a telescope to look in the sky at the position that Leverrier predicted, and he saw the planet on the very first night of the search!

http://en.wikipedia.org/wiki/Johann_Galle

d. At the end of the story, as written here, is the presence of Neptune in space a scientific law or a theory?

Answer: At the end of the story, the presence of Neptune in space would be a theory. More observations are needed to find out if Neptune is really the source of Uranus's movement. (As it turns out, both Neptune and Pluto--which was not discovered until later-- affect Uranus' orbit.)

23. In terms of the scientific method, where is the idea of evolution?

Answer: Evolution is still a theory because its assumption of macroevolution as fact has not been proven.

<http://www.answersingenesis.org/articles/nab/hasnt-evolution-been-proven>

24. What lessons can we draw from the story of spontaneous generation?

Answer: Even though a scientific law seems to be supported by hundreds of years of experiments, it might very well still be wrong because the original experiments might have been flawed.

Scientific laws are not 100% reliable.

http://www.answersingenesis.org/docs2002/dw_origin.asp

25. Does the current version of spontaneous generation have experimental evidence?

Answer: No. To date, no scientist has taken chemicals and created a living organism.

<http://pandasthumb.org/archives/2010/02/03/PrimordialSoupPPR.jpg>