



Purpose:

In addition to classroom activities and investigations, science learning takes place when students are required to read from a textbook and “make notes” for homework. This is not an easy task, nor is it something that comes naturally to most students. However, once a student knows and develops this skill, it is invaluable for future science classes as well as other subject areas.

Once a passage has been read and good notes have been taken, the student should have a clear and concise set of information, a summary of important facts, relevant data and ideas that will help them understand the current topic, while possessing a set of information for future subjects.

Prior to any note-taking assignment, students will engage in a “Tour of the Textbook” activity. Through this activity, students will 1). Become familiar with the textbook layout 2). Scan through various chapters 3). Look for bold-faced words and their definitions 4). Locate the glossary and index 5). Read the annotations to diagrams and end-of-chapter summaries 6). Discover the practice test questions and new vocabulary presented in the chapter.

Description of Activity:

At the start of the school year, science teachers will model note-taking from the textbook, showing students how to decide on important facts. This would literally involve the teacher walking the class through the procedure and making a set of notes with them on a specific reading assignment. Whether this modeling activity uses the textbook and a blank sheet of paper, or an outlined handout, the teacher will demonstrate how to begin a note-taking assignment.

Other important skills that the teacher would share during the discussion would include:

- Taking notes using bullet points, no full sentences
- Use of headings
- Use of colors
- Spacing the notes on a page, avoiding cluttered notes
- Use of annotated diagrams

Two handouts will be shared with the students:

- **Reading a Science Textbook** – which goes along with the Tour of the Textbook activity and suggests ways for the students to find information in the book. The teacher will discuss each of these with the students, especially 2 and 3 level classes.
- **Taking Effective Classroom Notes** - which more specifically addresses note-taking during classroom lectures, discussions or activities. Again the teacher will discuss and model this form of note-taking with the class, emphasizing when an important fact should be written down, how to make it easy to read at a later point and how to avoid condensing too many words onto a single page.

Sample activities:

1. Tour of the Textbook (9 level Biology)
2. Scientific Method Notes outline (9 level Biology Textbook, pages 3-9)



3. Evolution Notes #1 (9 level Biology Textbook, pages 369, 376, 382 – 386)

Checking for Understanding:

Following a reading and note-taking homework assignment, a reading quiz can be given to the class in order to check for student understanding. Students would be allowed to use their notes to answer any questions. This way the students would be able to see if they had actually written down the things that the teacher feels is important enough to ask as a quiz question.

Another way for the teacher to check on the quality of the students' note-taking is to collect the notes and skim over them. The most important part of this activity would be to provide feedback to the students on the quality and content of their notes.

Reflection:

The amount of direct instruction regarding note-taking will vary with the level of the class taught. Students entering their freshman year really have never been taught this skill, and it is worth our time as science teachers to model the steps involved in taking notes, choosing important facts, and learning diagrams.

Students in 4 level classes will probably require less direct instruction, although it will be worthwhile to spend part of a period at the beginning of the year on this skill. Students in 3 level classes will vary greatly in their reading and note-taking experiences, and again a few days of modeling will set them up for success, not only in science, but in other subjects as well. Students in 2 level classes will greatly benefit from any handouts that outline the notes to be taken, listing the important ideas, topics and vocabulary.

Throughout the note-taking teaching process, it is imperative that teachers also show students how to use their notes on a daily basis to review concepts previously learned.

Adaptation for Different Levels:

Before each assignment, students will be given a handout of the most important topics, vocabulary, and ideas as they read the relevant pages. Having a handout that lists topics or new vocabulary words helps the student look for important data and information, thus making the art of note-taking much easier in the initial stages. As time goes on, it would be expected that students in 4 level classes make their own notes directly from their reading. Students in 3 level classes would take notes from an outline or handout listing the major topics provided by the teacher. Students in 2 level classes would be given more detailed outlines that include more of the 'fill in the blank' or detailed handouts.

Name: _____
Biology 139

Tour of the Textbook

This exercise will help you learn about your textbook and how it can help you in your studies this year. The book is very good – it contains a wealth of information. We will always have readings assigned as we explore different aspects of biology, and I expect you to read and study the material so that you can be prepared to take part in class discussions and activities. I know the book is large and heavy, but it will be well worth your effort to read.

Use Chapter 1 and other appropriate sections of your book to answer the following questions.

1. There are 4 major sections in Chapter 1. These are shown as Section 1-1, 1-2, 1-3 and 1-4. Write down the titles of each of these 4 sections.

2. Each chapter contains many important new vocabulary words. Describe *two* ways in which the authors help you to locate (NOT define) these words. (**Hint:** look at the beginning of the chapter as well as on the individual pages.)

3. Name the 4 major topics (concepts) covered in Chapter 2.

What are the 2 ways you can quickly identify the major topics (concepts) in this chapter?

4. Before you begin reading a section, how can you find out in advance what you are supposed to learn about?

5. Find a picture in Chapter 27-1 (beginning on pg 682). Give the page you've selected that the picture is on and describe what the picture is about.

6. If you want to define Archaeobacteria, where can you go in the book to find this information?
7. If you want to learn more about Archaeobacteria, name 2 places that would give you the pages containing information about Archaeobacteria.

Use these pages to determine the types of environments that these organisms could be found in.

8. In which part of a chapter can you find an overview of all the important information in the chapter?
9. Which chapters in the textbook talk about plants?

And, where did you go to find this answer?

10. Obviously we will have tests and quizzes all year. At the end of each chapter there is a section called "Assessment". How could this be useful to you all through the year?
11. Please read Section 1-1 and answer the following questions.
 - a. What is the goal of science and what makes it unique compared to other human endeavors?
 - b. How are the vocabulary words **observations** and **data** related?
 - c. What is the difference between quantitative and qualitative data?
 - d. Explain the difference between an inference and an observation.
 - e. What is a scientific hypothesis? Why must it be testable?

12. The *scientific method* allows individuals to investigate the world around us and share information in an organized manner. Please read Section 1-2, *Designing an Experiment* only (pgs. 8-10) and answer the following questions.
- a. Once a person asks questions about the world around them and formulates a hypothesis, then they are able to test the hypothesis. Explain how a controlled experiment can help to test a given hypothesis.

b. Once an experiment is completed, what must a scientist do next in the scientific method?

Scientific Method Notes

1. _____: Investigating the world around us. Taking particular note of natural phenomena. This is one of the most important steps. It requires curiosity and creativity.

2. _____: Identifying a problem to be solved by asking a question.

3. _____: Based on your observations and reasoning skills to form an educated guess as to what the solution or answer to the problem. Often as an "If...then" statement.

4. _____: Devise and explain an experiment that could show if the hypothesis is false.

a. Identify the following:

_____ : student controls and manipulates this

_____ : this is dependent upon what happens to the independent variable

_____ : kept constant during the experiment

_____ : the independent variable is not changed, this group is used as a source for comparison

_____ : the independent variable gets changed and all other conditions are identical to the control

b. _____: Develop a list of items used up & items used over and over again.

c. _____: Write the steps so that anyone could repeat the experiment to verify it.

d. _____: Devise a manner in which to record your data. Be sure that the data is properly labeled.

5. _____: Interpret results of experiment.

6. _____: Explain whether or not the hypothesis was supported by the data. Also state sources of error and possibly restate hypothesis.

Evolution Notes #1

What is the difference between the meaning of the word “theory” as it is used in science and in everyday language?

Evolution -- _____ over time

Before Darwin:

Mechanisms of Evolution – HOW evolution occurs

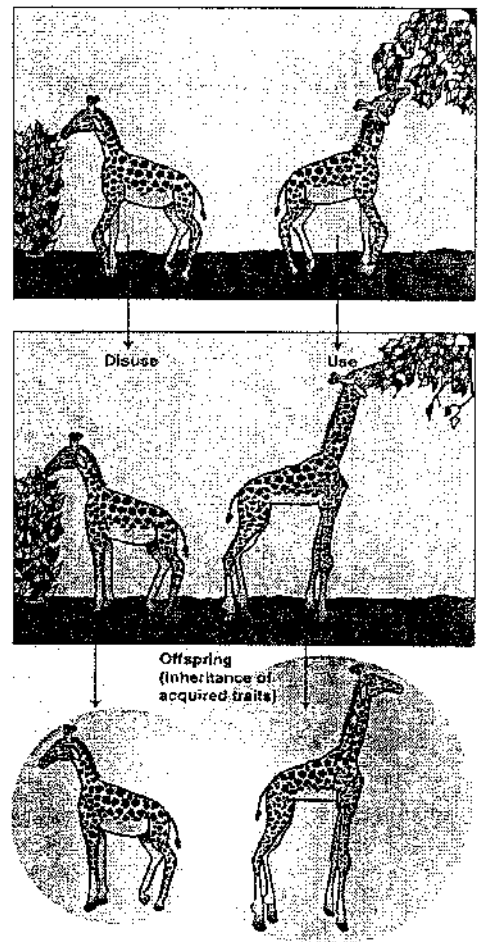
Lamarck's hypotheses:

1. Use and Disuse –
2. Inheritance of Acquired Traits –

Ex.

How can you disprove Lamarck's hypothesis

What part(s) of Lamarck's hypotheses are valid?



Evidence for Evolution:

I. _____ Record

Fossil –

Why is fossil record incomplete?

Transitional Fossils –

Ex.

II. _____ Anatomy

_____ -- structures that are reduced in size and have little or no use

Ex.

_____ -- Structures that share a common ancestry

Ex.

_____ -- Structures that serve a similar purpose, but do **NOT** show common ancestry

What they **DO** show is _____ to a common environment

Ex.

III. _____

Organisms share common path of development

All chordates (vertebrate phylum) share in common:

IV: Molecular Biology (DNA or Amino Acid Analysis)

Organisms that are closely related have very few _____ in DNA sequence

Organisms more distantly related have _____ differences in DNA sequence

V. Biogeography

Ex.

Name: _____

Reading Quiz

Pages 378- 386

1. What does survival of the fittest mean?
2. What are homologous structures? Provide an example.
3. What does it mean to have "common descent"?
4. Name four out of the five points of Darwin's theory of evolution.

Bonus: What is name of the islands Darwin wrote about and what flying animals did he highlight in his book?

THINKING SKILLS**Reading a Science Textbook**

How do you read a book? Do you just dive in and read every word? Or do you skip through it, reading a page here and a paragraph there?

Tools in Your Textbook

Here are some tools that will help you get the most out of your science textbook:

- **The Table of Contents**—At the front of your textbook is a table of contents, which is an overview of each chapter of the book. By checking the table of contents, you can see what topics are in your textbook.
- **Section Objectives**—At the front of each section you will find a list of objectives, which shows you what specific information is covered in a section.
- **The Index**—At the back of most nonfiction books there is an index. The index is more specific than the table of contents, and it usually lists the people, places, things, and ideas in the book. For *aliens*, you could look up the words *alien*, *UFO*, or *spacecraft*.

Finding Information in a Book

Reading is one way to get information from a scientific book or article. It allows you to absorb all the information. But there are several other ways to get information from a book.

- **Section headings, illustrations, and captions**—When you find a page that seems to have useful information, read the section headings on that page to see if they relate to your topic. Then look at any pictures, diagrams, charts, or maps on the page to see if they relate to your topic. Be sure to read the captions under the illustrations.
- **Find key words in the text**—Any word in **boldface type** or *italics* is an important word in that section. By looking at the key words, you can quickly see the main ideas in that section.
- **Read the first and last sentences of each paragraph**—Often, the main idea of a paragraph is in the opening sentence. The last sentence often restates that idea. By reading only the first and last sentences of a paragraph, you can tell if the paragraph is useful.
- **Scan**—Read only a few words here and there. Scan a passage in order to find important key words. By scanning, you can decide which parts of the text you want to concentrate on or skim. In the paragraph on page 19, the key words and ideas are circled.
- **Skim**—Read only one sentence or paragraph here and there. Look for sentences that seem especially important. Skim a passage to get a general idea of what it is about or to determine if you want to read some parts more carefully. In the paragraph on the next page, the sentences you might skim are underlined.

TAKING EFFECTIVE CLASSROOM NOTES

- 1) Use a loose-leaf notebook or spiral notebook with lined paper. The loose-leaf has the advantage of permitting insertion of handouts or rearrangements of notes so materials are in a logical order. The spiral notebook has the advantage of keeping all of your notes securely bound. You will need to keep handouts in a separate folder.
- 2) Date and title each day's notes
- 3) Leave margins so you can insert something you may have missed, or you can mark your notes for ease in reviewing later.
- 4) Write down what your teacher puts on the blackboard or overhead. Those are usually very important items you are responsible for knowing, and often it is not material found in the textbook.
- 5) Do not stop taking notes during discussion periods or toward the end of class. Very often key ideas are presented at these times.
- 6) Review your notes as soon as possible after class. If some words are not readable, this can be corrected while the material is still fresh in your mind. If there is something that makes no sense, put a question mark in the margin and clarify the point with a classmate, the text, or the teacher.
- 7) Develop a system for taking notes that helps you learn and study. Many people take notes in an outline form. Others skip lines between main points and then use different colors to highlight or accent main ideas, definitions, examples, and other such items notes would include.