



Biology Study Strategies Study Packet

Study Strategies for Science Students:

How to Support Your Students' Preparation for Assessments in Biology

*Genius is one percent **inspiration** and ninety-nine percent **perspiration**.*

- Thomas Edison

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What is Effective Studying?

Effective studying is *more* than just reading over class notes or a textbook the night before a test. Studying is an **active** process and, just like any other skill, strong study habits – which are essential for success in college – **can be developed through effective, DAILY practice.**

Here are the four study strategies that we learn and practice in Biology:

1. Crib Sheets (Shrink Notes)

A crib sheet is a study tool used in preparation for exams that require students to recall a large amount of material. Students re-write notes from a notebook or text in a small space. The crib sheets can be hand-written or typed and both approaches can be equally effective.

The process of consolidating notes to a crib sheet involves:

1. identifying the most important information on the topic
2. writing down the essential material in a format that is most logical for the student, and
3. reviewing the content of the crib sheet for accuracy and completeness
4. commit the information on the crib sheet to memory through daily practice

This multi-step process results in far greater long term retention of the information contained on their crib sheet.

In general, students who create high quality crib sheets earn higher grades on their exams. Very few students with poorly constructed crib sheets do well on the tests.

Criteria for Success:

A quality student crib sheet...

- Demonstrates a student's ORIGINAL work - no portion is copied directly from a text.
- Use 1 side of standard, 8½" by 11" sheets of paper
- Contains content spanning the entire review text

2. Science Vocabulary Note Cards

Biology students are often challenged by the large amount of unfamiliar vocabulary taught in the course. However, without a strong foundation in the science vocabulary, they will not be able to master complex biological concepts. The words students learn become stepping-stones to the next concept – and without those words, further learning becomes difficult, progress becomes slower and frustration results.

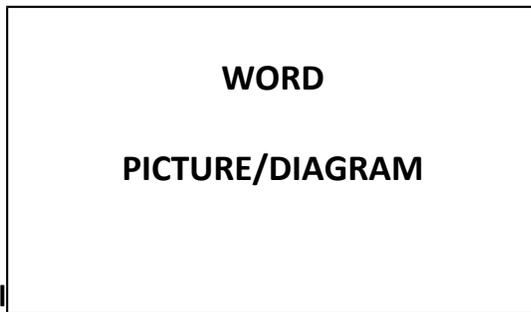
There is a strong correlation between reading comprehension and vocabulary development. “Teaching words well means giving students multiple opportunities to learn how words are conceptually related to one another in the material they are studying” (Vacca & Vacca, 2002, p. 160). The regular creation and practice with Science Vocabulary Note Cards should become a foundation to increasing reading comprehension.

Criteria for Success:

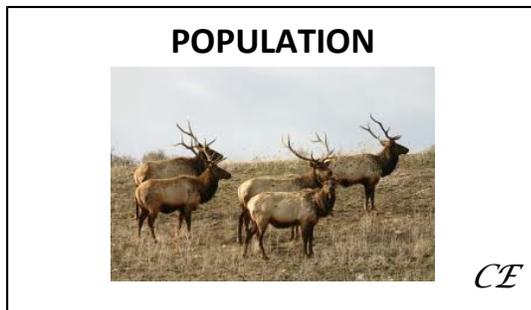
A quality set of Science Vocabulary Note Cards...

- Demonstrates a student’s ORIGINAL work
- **Front of Card** includes: the student’s initials, the word spelled correctly and a picture or diagram
- **Back of Card** includes: a textbook definition with page number, an example of that term, and the word used in an original sentence

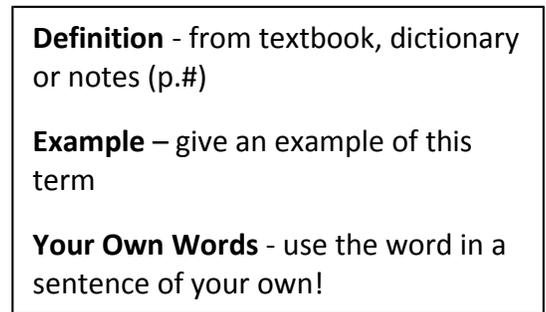
Front:



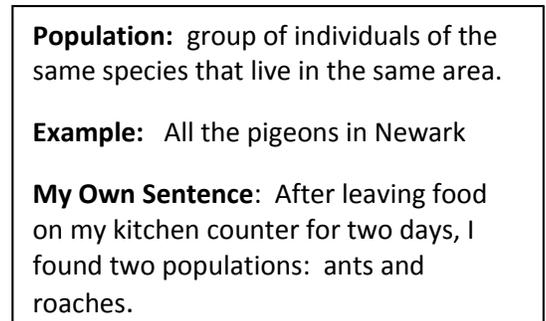
Example
Front:



Back:



Back:



3. Memory!

Memory is a children's game that can be modified for study purposes and used in preparation for exams. The process of creating memory game cards involves:

- (i) determining relationships between terms and concepts that will create a matching pair (i.e. words + definitions; words + examples; words & pictures)
- (ii) creating the memory cards
- (iii) developing concentration and memory skills through game play

Criteria for Success:

A quality student-prepared memory game ...

- Includes cards whose matches have a defined relationship (i.e. words + definitions; words + examples; words & pictures)
- Includes cards that demonstrate a student's ORIGINAL work
- Game set includes 20-36 cards

Directions for Play: The MEMORY game consists of a set of cards that is shuffled and placed face down in an orderly arrangement (square). The cards are exposed two at a time and a matching pair of cards must be exposed simultaneously to be captured by a player. This requires players to remember the relationship between the cards, the appearance and the position of the cards to be successful in capturing them. Play continues until all of the pairs have been captured. The person who captures the most pairs wins!

Sample Cards - Play Ecology Memory! 😊

Predation

Symbiosis

Commensalism



An interaction between two species where at least one organism benefits; the other may benefit, be harmed, or be largely unaffected

Birds follow swarms of army ants in the jungle. The ants stir up flying insects the birds can eat. Birds benefit; ants are neither helped nor harmed.

Parasitism

Mutualism

Competition

An interaction in which one organism benefits while the other one is harmed. For example: the interaction of mosquitos and humans.



The bird gets a meal; the croc gets clean teeth!

Organisms in an ecosystem must compete for limited resources

Cooperation

Competitive Exclusion

Carrying Capacity

Organisms working together to increase their chances of survival.

Two species **compete** for the same resource. One of the two competitors will always eventually take over the resource completely and the other species will be forced to find a new location to gather resources or will become extinct.

The maximum population size that a particular environment can sustain for survival.

4. Study Deck Games

A study deck is a deck of study cards that are used to increase comprehension of biological concepts as students prepare for class, quizzes or exams. The learning occurs during the creation of the cards and through consistent review of questions and answers.

Creating a Study Deck is easy!

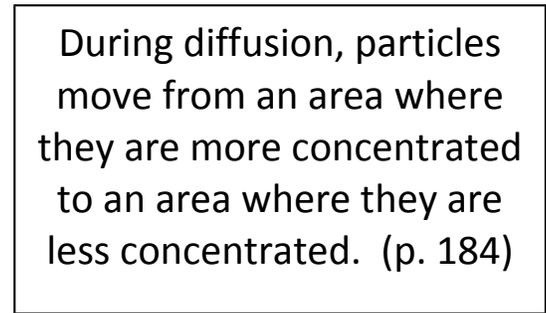
1. Gather approximately 20 blank index cards. Place your initials in the bottom right hand corner of each card just in case they get lost!
2. Identify questions to write on the front side of each card. Sample questions can be found in the following places:
 - a. Textbook section reviews
 - b. Textbook chapter reviews
 - c. Old quizzes and tests
 - d. Class notes
 - e. The Internet
3. Once you have your pile of study cards, answer the questions **IN COMPLETE SENTENCES** found on the front of the card on the back of the card using your notes, textbook, or any study resource. Start with the easy ones and work up to the more difficult questions. Include a page reference to the correct answer.

Example:

Front:



Back:



Criteria for Success:

A quality student-prepared study deck ...

- **Front of Card** includes: the student's initials, and a concept question
- **Back of Card** includes: a correct answer to the concept question written in complete sentences
- Includes cards that demonstrate a student's ORIGINAL work
- Game set includes a minimum of 20 cards

Recommendations for Study Deck Games on Next Page!

GAME TIME!

Once you have completed your study deck, it is time to practice answering the questions! Below are three ways that you can use study decks to study:

- a. **Individual** – Pick up the card from the top, look at the question, and think to yourself: “the answer is...”. Then turn the card over to see the correct answer. Put the card in one of two piles on the table: The ones you knew (got the answer right on the first time **without looking**) and the ones you didn’t know. When your hand is empty, you pick up the deck with the questions you didn’t know, and start over. For each time you do that the “did know” pile on the table will be a little bit bigger. Finally, when your hand is completely empty, you may simply start all over again. **You will be surprised how quickly you learn!**
- b. **First to Finish** – Use the same technique above, but with a partner where you are asking one another the questions. The first one to get all of the answers correct wins! Play until both partners can get all of the answers correct from start to finish!
- c. **Tic-Tac-Toe** – Create a tic-tac-toe board on a piece of scrap paper and decide which player will be X’S and which player will be O’S. Player X asks player O a question from the study deck. If player O gets the answer correct, they get to make a move on the tic-tac-toe board. If player O gets the answer wrong, they lose their turn. Quiz your partner using this game strategy until someone gets tic-tac-toe. Best out of three wins!
- d. **BOOM! Bag** – Place the entire Study Deck into a brown paper bag. In addition, place several (4-6) cards with the work BOOM! written on one side into the brown paper bag. Players take turns answering the questions pulled from the bag. If a player answers the question correctly, they maintain possession of the question card. If a player does not answer the question correctly, they must return the question card to the brown paper bag to be played again. If a player pulls a BOOM! card from the paper bag during the course of play, all of the questions the player captured must be returned to the paper bag, and the player loses a turn. The player with the most cards captured at the end of the game play wins.

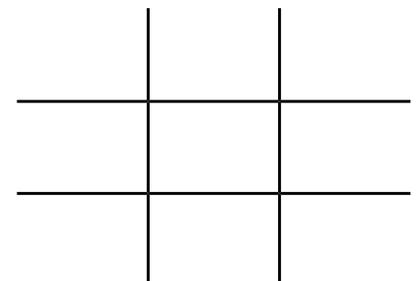
Your Turn!

Play Tic-Tac-Toe with a partner using the study deck cards you created.

TIC-TAC-TOE

Reflection Questions:

1. What are the benefits of using this technique?
2. The benefits of partner study are most apparent when practiced on a regular basis. How might you integrate partner study into your family’s daily routine?



Part 2: How to Create a Study Schedule

We all have only 24 hours in a day, seven days in a week. It isn't the amount of time you have that makes a difference between success and failure, but how your student uses the time they have. Time management can help your student keep control of one of their most valuable assets so that they can achieve their most important goals in high school.

Steps for Creating and Using a Study Schedule (for students):

1. Make out a new schedule for each week (ideally on Sunday night), keeping your completed schedules in a three ring binder. This way you can keep a paper trail of your activities throughout the semester and better analyze the reasons for your accomplishments or disappointments after finals as you prepare for the next semester.
2. Determine your goals for the semester, one that you can attain if you really commit yourself to achieve it, but not one that is either unattainably high or one that is so easy to achieve that you feel no challenge in making it. Document your semester GPA goal in the lower left corner of your Study Schedule each week.
3. Determine your study goals for each class. You might have to modify your study goals per class as you familiarize yourself with the study demands for each class. Document your weekly study hour goal on the bottom of your Study Schedule each week.
4. Mark off all of your classes and solid commitments (like a job) in ink. This reminds you to go to class and go to work. You cannot erase ink!
5. Pencil in your sleeping, eating and planned open times. Do as much as you can to plan for 7-8 hours of sleep per night.
6. Pencil in the number of hours you plan to study. You will use a pencil because "things come up" that might cause a change in your study plans. If you erase four study hours on Monday, for example, then pencil in four hours elsewhere in your Study Schedule into the rest of your week. Try to schedule all of your study time so you can be done by Friday night. That way, if you don't make it by Friday night, you have Saturday and Sunday as "buffer time" to catch up. If you do make it, you then have the weekend to catch up on housework, have fun, and prepare for the following week.
7. Pencil in a certain amount of "fun time" during the week as well as on the weekend. Time away from studying is essential for maintaining your study efficiency. Planning for fun time and exercise reduces the temptation to "skip out" of planned study time to go have fun. It also reduces the tendency to feel guilty during the week when you are engaged in recreation, and additionally improves your concentration when you *are* engaged in study or project time.
8. At the end of the week, add up the number of hours you actually studied and document them in the lower right corner of the Study Schedule. If you don't make your goal, don't try to "piggy back" them onto the next week's schedule. Make up a new Study Schedule and begin again.
9. Try not to study a given subject more than two hours at a time, as study efficiency goes down dramatically after that. Also, if you have two very similar subjects, try not to study them back to back. Instead, "sandwich" a subject that is very different from the two classes in between the two classes whose subjects are very close to each other. This improves study efficiency for all three subjects.

Weekly Planner For.....

Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
6.00-7.00							
7.00-8.00							
8.00-9.00							
9.00-10.00							
10.00-11.00							
11.00-12.00							
12.00-1.00							
1.00-2.00							
2.00-3.00							
3.00-4.00							
4.00-5.00							
5.00-6.00							
6.00-7.00							
7.00-8.00							
8.00-9.00							
9.00-10.00							

