How to Succeed in Biology
(Without really trying)
FIRST LET’S MAKE SOME FRIENDS.....

• Find your partner with the matching puzzle piece
• Share with each other your
  • Name
  • Major
  • What Biology class(es) you’re currently in
  • A scale of 1-10 of how confident you are to do well and why
• Feel free to write right on the puzzle piece!
IF YOU HAVE THE RIGHT MENTAL ATTITUDE, NOTHING CAN STOP YOU FROM ACHIEVING YOUR FOOTBALL GOALS.

GREAT MINDS THINK FIT.
What to Study...from the textbook

- **Pertinent Information**
  - Make sure what you’re reading aligns with teacher’s notes/study guide

- **Figures!**
Microspores and megasporas are formed on sporophylls in male and female cones respectively. Each scale in the male cone has two sporangia in which meiosis occurs to produce tetrads of spores, just as in a fern sporangium. Male gametophyte development starts in the microspore (or pollen grain) before it is shed. Mitotic divisions result in two prothallial cells, a tube cell and a generative cell. The sporangium breaks open to shed the immature gametophytes which are carried on the wind and may chance to arrive at a sporophyll on a female cone. In the female cone each scale bears two megasporangia - ovules in which a single mother cell undergoes meiosis to produce four megaspores. One megaspore develops into the female gametophyte which contains thousands of cells and is considerably larger than the male gametophyte.

Male gametophyte development has to wait up to a year for the female gametophyte to mature and produce two or three archegonia with egg cells. The pollen tube grows slowly through a pore in the integument of the megasporangium and eventually the generative cell divides to produce two sperm cells. One of these fertilizes an egg cell to produce a zygote. Usually only one archegonium will produce a zygote in each megagametophyte so that there is only one embryo per seed.

The mature seed consists of three generations of tissues: maternal sporophyte tissue (seed coat and nucellus), gametophyte and daughter sporophyte (embryo). After about two years the mature seeds are shed. Conifer seedlings have several needle-like cotyledons in a whorl and the seedlings produce scattered leaves until adult foliage develops.
THE IMPORTANCE OF FIGURES
OR WOULD YOU RATHER READ THIS...
If there’s not a picture/figure available….draw one yourself! We’ll come back to this later....
Science is a language. Amount of new vocabulary words presented in a science class is more than an introductory foreign language class.
WHAT TO STUDY ... VOCAB WORDS

- Foolproof way to learn vocab words
- On one side write the word, phrase or idea
- On the other side write down the
  • Definition
  • Process it’s used for
  • Picture if needed

- Always make two stacks of notecards: ones you know and ones you don’t know
  • Visualize!
  • Talk out loud!
WHAT TO STUDY... BIG PICTURE!

Don’t Miss the Shoe for the Shoelace!
• Often in biology classes, knowledge and content are cumulative from test and test and more importantly class to class.

• It is imperative that you go back once a week or so and do a keep read through of your old notes from your biology class.

• Keeps it fresh in your mind for your final, next class, MCAT, etc.
HOW TO STUDY... GENERAL TIPS

• Finding a space is half the battle
  • Good vs. Bad places to study

• Take a break. 50 minutes on, 10 minutes off.

• Don’t cram! Cramming does not equal long term memory commitment.
How to Study....If You Insist on Cramming

1. Accept that it’s going to be a long night.
2. Don’t freak out about how much you don’t know
3. Try to figure out a little bit about every topic instead of all the details of one specific topic
4. Coffee becomes your best friend
5. Try to get a few hours of sleep. Save time for studying in the morning. I.e.) If your class is at ten, try to sleep a bit between 2-6.
Take a **BIG** and break it down into **smaller** more manageable ideas.

Just be sure to put it all back together and keep the big picture in mind!!!
HOW TO STUDY...AN EXAMPLE OF BREAKING IT DOWN

• You’re a smart student and started preparing for your BIO 221 a week before the test. You’re freaking out though because there’s too much material!

• First, take a deep breath.

• Second, break it down. Spilt your knowledge into two areas: cardiovascular and respiratory. Then, break it down again, cardiovascular becomes heart and vessels. Then break it down again, heart becomes cardiomyocte contraction and blood flow through the chambers.

• Do this for each subsection but keep the big picture in mind that the heart pumps the blood to supply the oxygen obtained from the lungs to the different organs.
HOW TO STUDY...MAKING CHARTS
Just like a flow chart, but includes pictures too!
Sometimes silly, but if they work, who cares?
HOTOS...USING THE STUDY GUIDE

• They exist for a reason

• Making a good study guide is more than half the studying

BIO108: Human Biology
Study Guide Test #1

Read and understand all of the articles that have been posted on the course website.
Review the notes and handouts that have been provided for you.
What are the major organ systems in humans, and what are the general functions of each? Be able to
give examples of structures included within each system, and provide examples of how different systems
are uniquely modified in humans compared to other animals.
Be able to describe and explain what you feel are the three most significant biological differences that
separate humans from other animals.

What is the scala nature? Is it correct? Give examples of how it affects our thinking and language.
Understand the biological classification of humans, from the kingdom to the species. Which features
unite humans with other animals at each level? Give examples of equivalent groups for comparison at
each level. What do humans have in common with single-celled organisms? What do humans have in
common with mammals? What is a primate — are humans primates? What is the difference between a
monkey and an ape? Are humans monkeys, apes, or neither?
Understand the logic behind the theory of natural selection. What did Darwin observe to formulate this
theory? Which parts of this theory are factual observations, and which are inferences that must follow
from these facts? Is evolution by natural selection a random process? If Darwin had not been born,
would the theory of evolution have been formulated?
In terms of evolution, what is fitness? What is the simplest definition, correct of evolution? Does
evolution always proceed toward increasing complexity?
What is the answer to the question posed in the title of the article "Was Darwin Wrong"? Give examples.
How did Darwin's ideas influence biological thought and human philosophy about our place in nature?

What structures are included in the integumentary system? How have they been modified in humans
relative to other primates?

What functions does the skin provide? Compare and contrast the layers of the skin – epidermis, dermis,
and hypodermis. What are the roles of the proteins collagen, keratin and melanin?

Explain the global distribution of skin pigmentation. What factors favor dark skin? What factors favor
lighter skin? Were the earliest humans most likely dark- or light-skinned?

What is the relationship between sunlight, vitamin D, and bones? What is the relationship between spin
bifida, folic acid, vitamin, and sunlight?

Compare a mole and a freckle. What is melanoma, and how is it recognized?

What is meant by the statement, "there are no races, only clines"? Do you agree? Besides skin color,
give examples of other traits that are continuously distributed. Is race a "real" biological concept?

Compare the concepts of race and ethnicity. Is it important to consider race in the management and
treatment of certain diseases? (Give examples)

What is meant by the statement "Darwin's idea turned the chain of being into a bush"?

Why does the body need oxygen? What is it used for? What is produced?

Understand the difference between the right and left sides of the heart. Compare and contrast atria and
ventricles. What are arteries, veins and capillaries? Why are capillaries important?
What are red blood cells, white blood cells, and platelets?

Understand the major events involved with a heart disease. Know the concepts arteriosclerosis,
thrombus, myocardial infarction, ischemia, angina. How is a stroke like a heart attack? How can
damaged coronary arteries be surgically treated? How do blood-thinners (anticoagulants) lower the risk
• Make your own questions and answer them!
• Multiple choice, free response, short answers, calculations
HOW TO STUDY... WHEN YOU’RE STRESSED

Learn to turn your stress into adrenaline!
How to Study...group time

- First study by yourself...
- Then study in a group
How to Study...a few notes on group study

- Right size, right dynamic
- Try to stay on task
- Three step process
  - Review
  - Question
  - Quiz
HOW TO STUDY...ONLINE RESOURCES

- Google
- Wikipedia
- YouTube
  - [http://www.youtube.com/watch?v=QnQe0xW_JY4&list=SP3EED4C1D684D3ADF](http://www.youtube.com/watch?v=QnQe0xW_JY4&list=SP3EED4C1D684D3ADF)
- Kahn Academy
  - [https://www.khanacademy.org/science/biology](https://www.khanacademy.org/science/biology)
- MIT Open Course
  - [http://ocw.mit.edu/courses/biology/](http://ocw.mit.edu/courses/biology/)
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