MSI Summer Work

STEM

science
engineering
mathematics

E=mc²
Dear Advanced Algebra II Students,

Attached, you will find a review over linear expressions and equations. These are concepts that have been learned and reviewed since junior high, so it is expected that you have these skills mastered before beginning Algebra II coursework. If you need review for any of the concepts, there are many free resources available online, including Khan Academy (https://www.khanacademy.org/) and Purplemath (http://www.purplemath.com/).

The completion of this review packet is essential for your success in Advanced Algebra II, and is not optional. This will be considered your first assignment for the course and is due the first day of school. There will also be a test during the first week of school covering this material.

Have a great summer,

Rachel Griffin
Advanced Algebra II Teacher
rmgriffin@mabankisd.net
Advanced Algebra II
Summer Assignment

Find the slope of the line through each pair of points.
1) \((-7, 11), (-14, -3)\)  
2) \((7, -10), (-5, -20)\)

Find the slope of each line.
3) \(y = 1\)  
4) \(y = -\frac{1}{2}x + 5\)

Find the slope of a line parallel to each given line.
5) \(y = x + 2\)  
6) \(y = -\frac{3}{5}x - 5\)

Find the slope of a line perpendicular to each given line.
7) \(y = -x - 3\)  
8) \(y = x - 4\)

Find the slope of each line.
9) \(9x + 2y = -8\)  
10) \(y = 0\)

Write the slope-intercept form of the equation of each line given the slope and y-intercept.
11) Slope = \(\frac{3}{5}\), y-intercept = 3  
12) Slope = \(\frac{4}{5}\), y-intercept = 2

Write the slope-intercept form of the equation of each line.
13) \(x - y = -7\)  
14) \(x - 2y = -2\)
Write the slope-intercept form of the equation of the line through the given point with the given slope.

15) through: \((-1, 5)\), slope = \(-2\)

16) through: \((-1, -2)\), slope = 6

Write the slope-intercept form of the equation of the line through the given points.

17) through: \((4, 4)\) and \((3, 5)\)

18) through: \((2, 3)\) and \((0, 5)\)

Write the slope-intercept form of the equation of the line described.

19) through: \((-2, 5)\), parallel to \(y = \frac{9}{2}x + 3\)

20) through: \((-3, 4)\), parallel to \(y = -\frac{2}{5}x\)

21) through: \((1, 3)\), perp. to \(y = \frac{3}{7}x + 2\)

22) through: \((-2, -2)\), perp. to \(y = \frac{3}{2}x + 3\)
Sketch the graph of each line.

23) \( x = -4 \)

24) \( y = -\frac{7}{2}x + 2 \)

25) \( x + 4y = 8 \)

26) \( y = \frac{1}{4}x - 3 \)
Solve each equation.

27) \(-17 = 1 - 3m - 3m\)

28) \(6 = 4p - 6p\)

29) \(-7(1 - 8x) + 2 = -5 - x\)

30) \(-16 + 6a = -7(a - 7)\)

31) \(-4(11m + 7) = 2(1 - 7m)\)

32) \(3(x - 1) = -9(-x + 7)\)

Simplify each expression.

33) \(-4n - 7n\)

34) \(10 + 2b + 5b\)

35) \(\frac{3}{5}a + \frac{1}{5}a\)

36) \(\frac{4a}{9}x - \frac{7}{4} + \frac{12}{7}x + 1\)
Sketch the graph of each linear inequality.

37) \( y < -\frac{7}{3}x + 4 \)

38) \( y \geq \frac{2}{5}x - 1 \)

39) \( 3x + 2y \geq -10 \)

40) \( x > 5 \)

Evaluate each using the values given.

41) \( \frac{k + k - 8j}{6} \); use \( j = 8 \), and \( k = 9 \)

42) \( q + r - 1 + \frac{P}{4} \); use \( p = 8 \), \( q = -8 \), and \( r = -7 \)
Solve each system by substitution.

43) \[5x + y = 5\]
\[-7x - 7y = -7\]

44) \[x + y = 5\]
\[-6x + 5y = 14\]

Solve each system by graphing.

45) \[y = -\frac{1}{2}x - 4\]
\[y = x - 1\]

46) \[y = -3x + 4\]
\[y = 3x - 2\]

Solve each system by elimination.

47) \[-4x + 3y = 26\]
\[-x + 6y = 17\]

48) \[-15x - 9y = -6\]
\[5x + 8y = -3\]

49) The senior classes at High School A and High School B planned separate trips to the indoor climbing gym. The senior class at High School A rented and filled 2 vans and 13 buses with 620 students. High School B rented and filled 10 vans and 11 buses with 616 students. Every van had the same number of students in it as did the buses. Find the number of students in each van and in each bus.

50) The school that Jasmine goes to is selling tickets to a play. On the first day of ticket sales the school sold 3 senior citizen tickets and 5 child tickets for a total of $114. The school took in $258 on the second day by selling 6 senior citizen tickets and 12 child tickets. Find the price of a senior citizen ticket and the price of a child ticket.
AP Biology Summer Assignment

Greetings and welcome to AP Biology! Here you will find the guidelines for your summer assignment. The scavenger hunt, macromolecule assignment, and learning style assignment are due on the first day of class. The summer reading of Demon in the Freezer by Richard Preston is due September 4. The book report will be a summative grade in the grade book. The other three assignments will all be formative grades.

Assignment 1: Biology Activity Scavenger Hunt

Complete the task listed, and provide the appropriate documentation (indicated in parentheses). You must complete five of the following options, documented as listed. For each additional five you complete, with appropriate documentation, you will receive five bonus points added to your first unit test. Many of the documentations require photos – you must be in the photo!

You will need to compile your photos into a PowerPoint presentation. There are a variety of short instructional videos and documents on how to do this through Google and YouTube. One slide for each activity. Each slide should be titled with the specific activity that corresponds with the photo.

1. Go to two state parks and take a walk (photos AND maps)
2. Feed ducks on three separate occasions (photos)
3. Grow a plant (living plant brought to class- please take home after grade is confirmed)
4. Go swimming in one of Texas many reservoirs or the Gulf of Mexico (photo)
5. Go to the Gulf of Mexico and collect a jar of sand (sealed)
6. Sleep outside under the stars. (photo)
7. Identify 3 species of tree in your neighborhood (leaves & genus/species of each)
8. Hold an earthworm OR slug OR snail OR beetle (photo)
9. Go fishing (catch and release) or dip netting. Identify the fish you caught. (photo)
10. Visit the PEROT Museum in Dallas. (Photo)
11. Go snorkeling, kayaking, boating, hiking, etc. (photo)
12. Observe the nine banded armadillo native to Texas (Photo)
13. Observe a bee visiting flowers (photo)
14. Identify 3 flowers in your neighborhood (flowers & genus/species of each)
15. Watch a sunrise and a sunset (photos)
16. Climb a tree (photo- and a short tree that is your height doesn’t count!)
17. Visit the Dallas World Aquarium (photo)
18. Go Geocaching at a State Park (Photo with coordinates of the log signed. Go to tpwd.texas.gov/spedest/activities/outdoor_recreation/geocache/

Note: Some of these can count for more than one activity. If you are on vacation in another state, their local museums and parks may be substituted!
Assignment 2: Science Book Review

You will be reading the book Demon in the Freezer by Richard Preston. You can either purchase this book online or at a book store, but you might also find a copy at your local library. Complete the attached questions based on the text. We will be using this book as we cover cells and viruses in the first quarter of the year. The assignment is attached and is due Tuesday, September 4, 2018.

Assignment 3: Macromolecule Assignment

Complete the attached Macromolecule assignment. This assignment covers the first three weeks of materials for my class. It is VERY important that you get this completed.

Assignment 4: Personal Learning Style and Study Skills Inventory

Go to http://www.whatismylearningstyle.com/ and take one of the learning style tests to find out your learning style. Then research and find studying tips for the AP Biology class and exam, making sure to state your source in your paper.

Type up to 1 page, double-spaced, stating your learning style, ways you can successfully study that fit your learning styles, and how you plan to do well in AP Biology.

Have a great summer! I look forward to having you in my class soon!

Zach Williams
AP Biology Instructor
Mabank HS
Please use the internet such as (Khan academy) or other credible websites to answer the following questions.

Q1- List the four major classes of macromolecules.

1. 

2. 

3. 

4. 

Q2- Explain the difference between a monomer and a polymer? Give an Example.

Q3- Most polymerization reactions in living things are condensation reactions. Explain the difference between Condensation reaction and Hydrolysis reactions.
Q4- Sugars are the smallest units in carbohydrates and they serve as fuel and carbon sources. Carbohydrates are classified by the number of simple sugars. *Explain* the difference between Monosaccharide, Disaccharides and polysaccharides.

Q5- Polysaccharides, the polymer of sugars, have storage and structural roles. *Starch* and *glycogen* are two most common storage polysaccharides.

1. *Briefly* describe the structure and function of both polymers. (You can Sketch)

2. What are the major sources in the human diet for starch?
3. Where is glycogen stored in human and other vertebrates?

Q6- Structural polysaccharides include chitin and cellulose. Explain the difference in structure and function between cellulose and chitin.

Q7- Lipids are diverse group of organic compounds that are insoluble in water, but will dissolve in non-polar solvents such as (ether, chloroform and benzene). Important groups are fats, phospholipids, and steroids.

Fats store large amounts of energy that constructed from Glycerol and Fatty acids.

Describe the structure of a fat macromolecule and make sure to define the terms (fatty acid- Glycerol- Ester linkage-triglyceride). (You can sketch the macromolecule).
Q8- List some of the characteristics for fat.

•
•
•
•

Q9- In many commercially prepared food products, unsaturated fats are artificially hydrogenated to prevent them from separating out as oil (e.g., peanut butter, and margarine).

Fat serves many useful functions: list four of these functions.

1.
2.
3.
4.
Q10- Explain the difference between saturated and unsaturated fat (give examples).

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<th>SATURATED</th>
<th>UNSATURATED</th>
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Q11- Explain the difference between Phospholipids and steroids in structure and function.
(Give examples).

Q12- Proteins: The molecular tools of the cell

*Polypeptide chains* = are polymers of amino acids that are arranged in a specific linear sequence and are linked by peptide bonds.
Protein - A macromolecule that consists of one or more polypeptide chains folded and coiled into specific conformations.

Please list eight varied and important functions in the cell.

1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 

Q13- Amino acids are the building blocks of a protein. Explain and sketch the general structure of an amino acid.
Briefly Describe the four different levels of protein structure, and give examples.

1. Primary structure

2. Secondary structure

3. Tertiary Structure

4. Quaternary Structure
Q14: Nucleic Acids: Informational Polymers

Protein confirmation is determined by primary structure, in turn, is determined by genes; hereditary units that consist of DNA, a type of nucleic acid.

There are two types of nucleic acids: DNA and RNA

**Explain** the difference in structure, function and location of DNA and RNA

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<th>DNA</th>
<th>RNA</th>
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Q15- Inheritance is based on precise replication of the DNA double helix. In 1953, James Watson and Francis Crick proposed the double helix as the three dimensional structure of DNA; Explain.
BOOK ASSIGNMENT: THE DEMON IN THE FREEZER

STUDENT NAME: ___________________________ GRADE: _________
DATE: _________________________________

This assignment is designed to accompany the book “The Demon in The Freezer” by Richard Preston, ISBN: 0-345-46663-2. This book can be found in most public libraries or can be purchased at our local bookstores or online (amazon.com, barnesandnoble.com, bigwords.com, etc.). This assignment is worth 100 points.

To receive full credit for this assignment please answer the questions and indicate the page number(s) where you found the answer to the questions.

Something in the Air

1. Is anthrax a Gram + or a Gram – bacteria? How can you tell? (i.e. what color do these bacteria stain?)

2. What is so dangerous about dry anthrax spores vs wet spores? Explain your answer.

3. Who is Dr. Lisa Flannagan?

4. When Dr. Sherif Zaki cuts into the lymph nodes of Robert Stevens, what did he discover?

5. What is the HMRU? Where is it stationed? What is the function of the HMRU?
6. What is the name of the principal biodefense laboratory in the United States?

7. Give a brief description of a level 4 bioprotective space suit.

8. According to the author, where are the only 2 repositories where the smallpox virus officially exist?

9. What are cytokines? What is their function?

10. *Variola* is the scientific name for smallpox. What does “*variola*” mean in medieval Latin?

11. The genome of the smallpox virus consists of approximately how many letters/nucleotides?
12. According to the book, HIV is a jumper-virus. What hosts did it jump from to eventually infect humans?

13. What are the 3 groups of insect poxviruses?

14. In Hindu Religion, what is the name for the goddess of smallpox?

15. The word “vaccine” is derived from the Latin word that means what?

16. What is the Rahima smallpox strain? Who took care of the 6 scabs that ended up at the CDC?

17. What is Yersinia pestis?

18. What is India-1? What was India-1 used for?
19. What are the names of the two scientists who officially co-discovered the Ebola Reston virus?

20. In what year did pox virologist Joseph Esposito and genomic scientist J. Craig Venter decode the entire DNA of the Rahima strain?

_A Woman With A Peaceful Life_

21. Where did Lisa Hensley get her Ph.D. degree from?

22. What kind of research did Lisa Hensley do at the USAMRIID?

23. What are HeLa cells and what are these cells used for?

24. Who is Ronald J. Jackson and what kind of research was he working on?

25. What is “The Harper” smallpox strain and when was it collected?
26. What happened to monkey C099?

The Anthrax Skulls

27. At the USAMRIID there’s a place called “The Submarine”. What is “The Submarine”?

28. How much larger is an anthrax spore than a smallpox particle?

29. Why was the Brentwood mail-sorting facility closed down by order of the postmaster general?

30. What is Bacillus thuringensis (BT)? What is it used for?
31. Who is Ken Alibek and what is he well-known for?

32. What technique was used to test and detect any human DNA present on the paper envelopes used by the bioterrorists to send the powdered anthrax?

33. Who is Barbara Hatch Rosenberg and what are her beliefs about who was responsible for the anthrax attacks?

34. What's an STLV?

**Superpox**

35. According to the book, what could happen if the human IL-4 gene were put into the smallpox virus?
36. What is the name given to a virus that has been engineered in a laboratory?

37. Approximately how many DNA letters does the human genome contain?

38. Where did Dr. Nanhai Chen get the IL-4 gene from and how much did it cost him?

39. What are the 2 ways to vaccinate a mouse against mousepox?

40. While exploring a dark basement corridor at the Indiana University School of Dentistry, what did the professor find that once belonged to Dr. William Schaffer, a long-dead pathologist?