

AICE Marine Science
Summer Assignment
Saint Thomas Aquinas High School

Welcome aboard, future Marine Science Student! I can't wait to meet you next school year! As you probably already know, AICE Marine Science is a demanding and fast-paced college level course. You will be responsible for a large amount of independent work. While I will be helping you to develop the necessary skills and to master the content, you will be the main architect of your own learning and success.

In the AICE Marine classroom, the expectation is for you to have a strong background knowledge in both Biology and Chemistry. This summer assignment will wrap some of that basic knowledge up, in preparation for adding other layers of complexity as we dive into the content.

A little about you:

Name: _____ Grade (in fall this year) _____

What Science classes have you taken so far (or will be taking during the coming school year)?

	I already took	Beginning this fall, I will be taking
Biology Regular, Honors, AP?		
Chemistry Regular, Honors, AP?		
Other AICE or AP Courses Be specific.		
Other Science Courses Be specific.		

Are you pursuing the AICE Diploma? _____

PART 1: COMMAND WORDS:

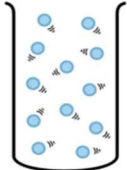
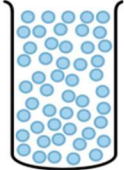
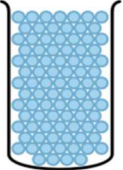
If this is not your first AICE course, you should know how important the command words are for nailing the examination papers. Complete the following table to briefly define some of the most commonly used command words and to classify them into one of the following categories:

Lower Order Questions - LOQ (requiring usually a less detailed, shorter response) and **Higher Order Questions - HOQ** (which require usually longer, more detailed responses)

Command Word	Brief Definition	LOQ HOQ
Analyze		
Compare		
Define		
Demonstrate		
Describe		
Evaluate		
Examine		
Explain		
Justify		
Outline		
State		
Suggest		

PART 2: CHEMISTRY

The Kinetic Particle Theory (aka Particle Theory) describes the movement of particles in relation to each other and the amount of energy within the system. Refer to the Kinetic Particle Theory to **compare** and **contrast** matter in its three most known states.

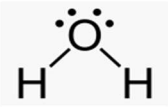
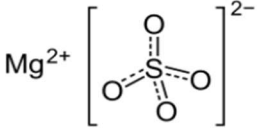
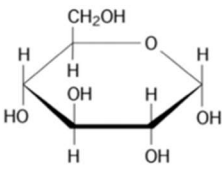
Name the state: →			
Particle's Diagram			
Shape (definite; not definite?)			
Volume (definite; not definite?)			
Mass (definite; not definite?)			
Intermolecular forces			
Distance between molecules			
Compressible?			
Molecules kinetic energy			
Molecules movement			

Define lattice: _____

Based on the Kinetic Particle Theory, explain what happens to water as it condenses:

Complete the table to **identify and classify** the bonding of the following substances:

(Note: bonding can be covalent polar; covalent non polar; ionic)

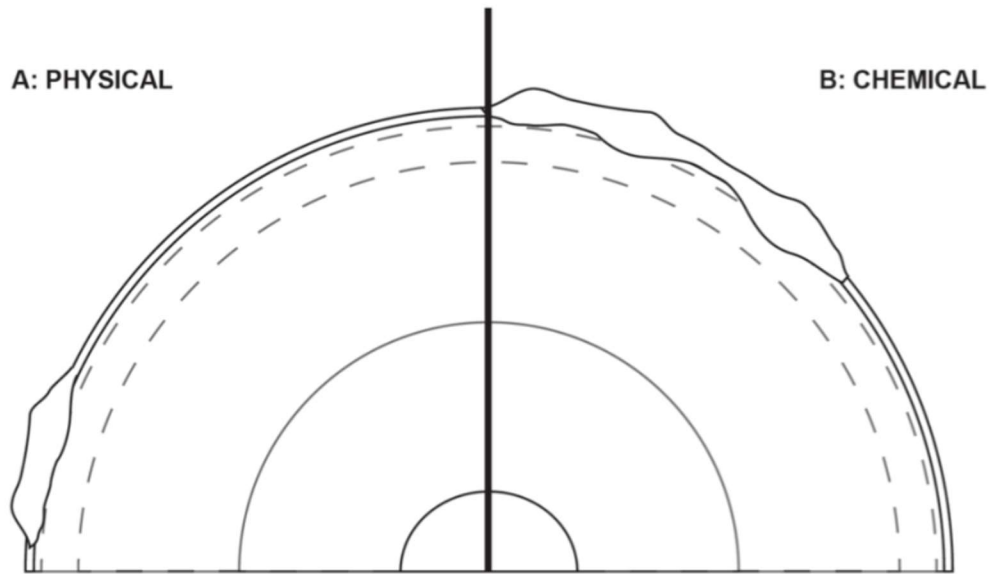
Substance (name)	Chemical formula	Type of bond	Chemical diagram
	NaCl		
			
Calcium carbonate			
			
			
	SO ₂		

Draw an annotated diagram of a Carbon atom (label: proton; electron; neutron; nucleus; electron shells). Note: annotated means that you are labeling the main parts and briefly describing them (Ex: if you are annotating the proton, you will identify and label: proton - a positively charged particle). Use at least $\frac{2}{3}$ of a piece of paper; use a ruler to draw straight lines to identify the parts (no arrows allowed!).

PART 3: GEOLOGY / GEOGRAPHY:

Label the following diagram to correctly identify the five compositional / chemical layers and the three physical / mechanical layers of the Earth.

Note: use a ruler to draw straight lines to identify the parts (no arrows allowed!); text should be vertically written.



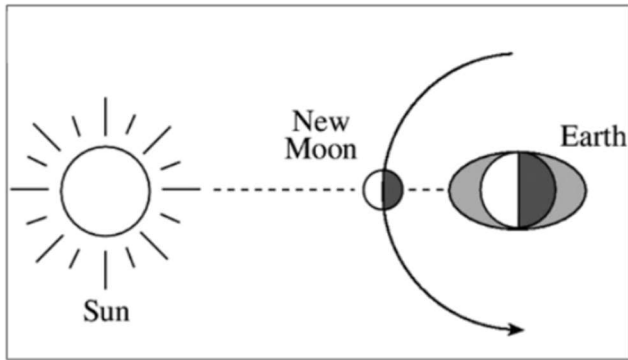
Use the following terms: Asthenosphere; Core; Crust; Inner core; Lithosphere; Mantle; Mesosphere; Outer Core.

State three major lines of evidence supporting the Theory of Plate Tectonics.

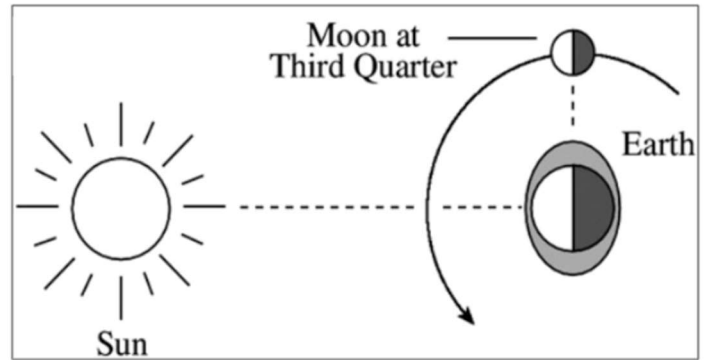
Sketch simple diagrams to show the direction of movement of the plates at each of the following plate boundaries and state one feature located there:

	Sketch of the boundary (arrows)	Feature
Transform boundary		
Divergent boundary		
Convergent boundary		

Identify the two types of tides represented below:



_____ Tide



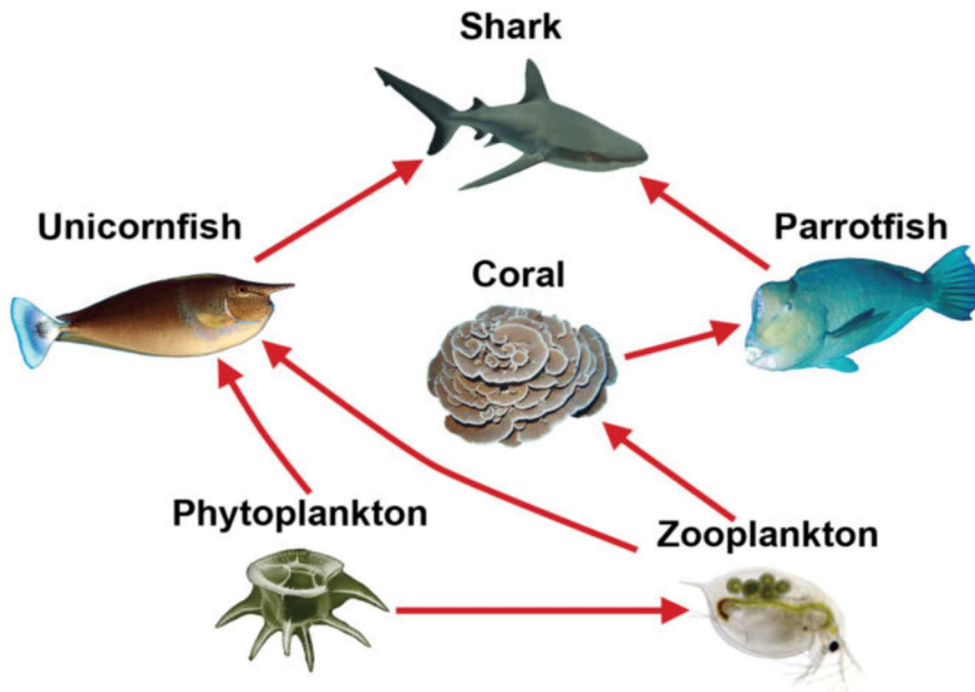
_____ Tide

PART 4: BIOLOGY:

Complete the table to describe and give two examples of each of the following ecological relationships:

Ecological relationships:	Brief description	Two examples
Parasitism		
Commensalism		
Mutualism		
Predation		
Interspecific competition		
Intraspecific competition		

Based on the following marine food web, answer the following questions:



Name an organism directly competing with the coral polyps (coral): _____

Build a food chain with 4 trophic levels (based on the food web above) - just names (no drawings)

Draw the energy pyramid that correctly represents the food chain you drew above. Label the following: apex predator; producer; primary consumer; secondary consumer.

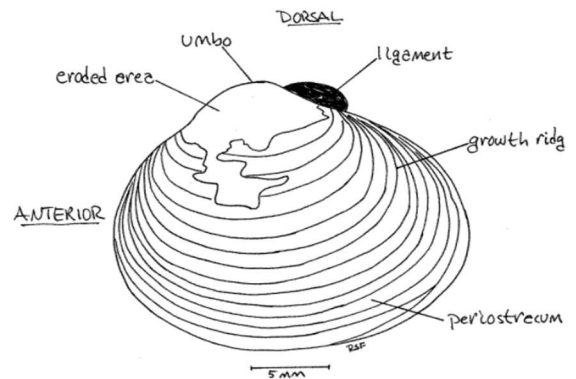
Harmful algal blooms (HABs) occur when some microalgae — simple photosynthetic organisms — grow out of control while producing harmful effects. Suggest five different ways the HABs can negatively affect a marine ecosystem, people and economy.

There are 8 groups of marine organisms that we will be focusing on this year:

- a) Phytoplankton
- b) Zooplankton
- c) Echinoderms
- d) Crustaceans
- e) Bony fish
- f) Cartilaginous fish
- g) Macroalgae
- h) Marine grasses

Select one of the groups listed above and **ON SEPARATE SHEET(S) OF PAPER** (staple to this packet) prepare a detailed description of the group, following the scheme below:

- a) Choose 1 representative organism of the group, prepare a biological drawing of the organism and show the most important features of its external anatomy. You should draw by hand your own drawing - do not print and glue! To the right, there is an example of the external anatomy of a bivalve for you to have an idea.



- b) List 4 main distinctive characteristics of the group
- c) Describe the ecological importance of the group (use 3 facts / reasons).
- d) Describe the economic importance of the group (use 3 facts / reasons).

PART 5: EXPERIMENTAL SKILLS

Use the back of this paper and/or SEPARATE SHEET(s) OF PAPER (staple to this packet) to describe in detail an experiment that you would use to test the effect of the light intensity on the photosynthesis rate of an aquatic plant. Follow the following scheme:

- List in detail the materials you would use (correctly name the lab equipment).
- Name the aquatic plant you would use (common and scientific name).
- Identify your variables (the independent; the dependent, and controlled variables (at least 2 for the controlled variables)).
- List in order your steps.
- Sketch a data table you would use to collect the data (just write the headings, like in the example below).

Table: Salt Concentration and Light Transmittance

Salt concentration (%)	Light Transmittance (%T)					
	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	Average
0						
3						
6						
9						
12						
15						

- What type of graph would you use to visualize your data? Explain your choice.
- In the graph, what would you plot: each trial separate trial (5 data sets), or the average?
- How would you ensure the reliability and accuracy of your results?