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Marine Science Midyear Exam Study Guide & Review

This packet will be collected on the day of the exam for **2 HOMEWORK GRADES**.

Topics:

- Intro: the water planet; scientific method
- Properties of Water
- Tides, Waves and Currents
- Marine Ecology: food chains, webs and energy
- Marine Environments and Ocean Life Zones
- Unicellular Organisms: bacteria, diatoms and dinoflagellates
- Ocean Acidification
- Algae and Marine Plants
- Zooplankton
- Sponges
- Cnidarians

Intro: the scientific method & the water planet

1. What is an independent variable?

2. What is a dependent variable?

3. Water takes up _____ percent of the Earths surface. (P361)

4. When two continents lie close together, a smaller part of an ocean called a _____ is formed. (P361)

5. Which has greater density; salt water or fresh water? Why?

6. Which has greater density; hot water or cold water? Why?

7. How much of Earth's water budget is made up of freshwater? Salt water?

8. What 4 main oceans are created by the continents? Which is the largest?

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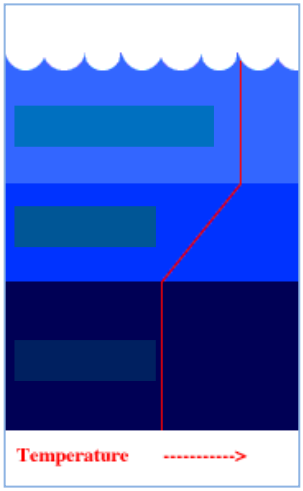
9. What is happening to the sea level? Explain.

10. What is the average salinity of the ocean? What are the two main ions dissolved in saltwater?

11. Why is salinity highest at the mid-latitude (near equator)? Why is it lower at the edges of the continent?

12. What is the difference between euryhaline and stenohaline species? Give an example of each.

13. What are the 3 main layers of the ocean? Label them on the diagram. Which layer has the most drastic temperature change?



14. Which is more dense, warm or cold water? Explain (tell me about the molecules).

15. What is the average salinity of the ocean? What is the relationship between ocean depth and salinity?

16. Why is it easier to float in saltwater than in freshwater?

17. What happens when carbon dioxide dissolves in water? How does this affect the pH?

18. Explain how the pH of the ocean is kept constant between 8-9. Give 2 reasons and one example.

19. Why is dissolved oxygen highest at the surface of the ocean? Name two ways that oxygen is dissolved in the ocean.

20. What happens to water pressure as you go deeper in the ocean?

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Tides, Waves and Currents

1. What are tides? How are tides produced? Be specific in your answer (mention sun, moon and Earth).

2. What are some differences between neap tides and spring tides?

3. What is a wave?

4. What are the 3 things that affect the size of a wave?

5. Draw a regular wave and label it (*wavelength, wave height, crest, and trough*).

6. What happens to wave motion as you go deeper? Where do you stop feeling the motion of a wave?

7. What is a current?

8. What is the Coriolis Effect?

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Marine Ecology: Food Chains, Webs and Energy Pyramids

1. Define: producer, herbivore, carnivore, omnivore, detritivore, and decomposer.

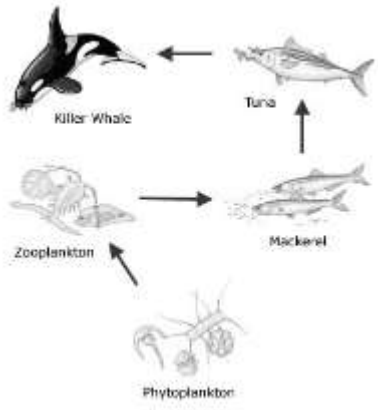
2. The levels in an ecological pyramid are called _____ levels.
3. What is the main source of energy for ALL organisms? _____

4. In an energy pyramid, which level provides an ecosystem with the **most** energy? _____

5. In an energy pyramid, which level provides an ecosystem with the **least** energy? _____

6. What does the arrow → mean in a food chain? _____

7. Define **autotroph** and **heterotroph** and give **AND** example of each.



Algae → crab →tuna → orca whale

8. Which organism is the **producer**? _____

9. Which organism is the **primary** consumer? _____

10. Which organism is the **secondary** consumer? _____

11. Which organism is the **top** consumer? _____

12. Is the **crab** an herbivore, carnivore, detritivore, producer or decomposer? (**circle one)**

13. What is the difference between **abiotic** and **biotic** factors (give examples)?

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Marine Environments and Ocean Zones

1. Label the following ocean zones on a diagram: **pelagic, oceanic, benthic, photic, aphotic, and neritic.**

2. Describe the main characteristic of each of the following ocean zones: **pelagic, oceanic, benthic, photic, aphotic, and neritic.** (P64-67)

3. Describe the main characteristic of the **subtidal**, **intertidal** and **supratidal** zones.(P61-62)

4. What is the strandline? (P61)

5. Describe the characteristics of the **sandy beach** environment AND one organism adaptation for living there.

6. Describe the characteristics of the **rocky shore** environment AND one organism adaptation for living there.

7. Describe the characteristics of the **estuary** environment AND one organism adaptation for living there.

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8. What are the three types of estuaries? (P74-76)

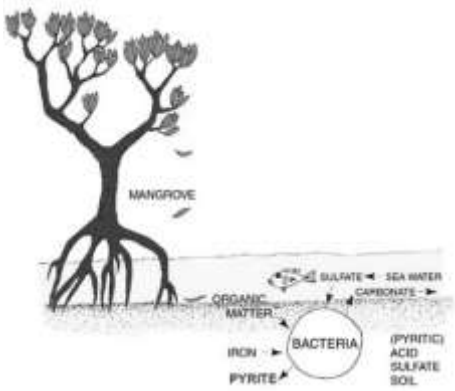
9. What is brackish water? (P74)

10. Describe the characteristics of the **mudflat** environment AND one organism adaptation for living there.

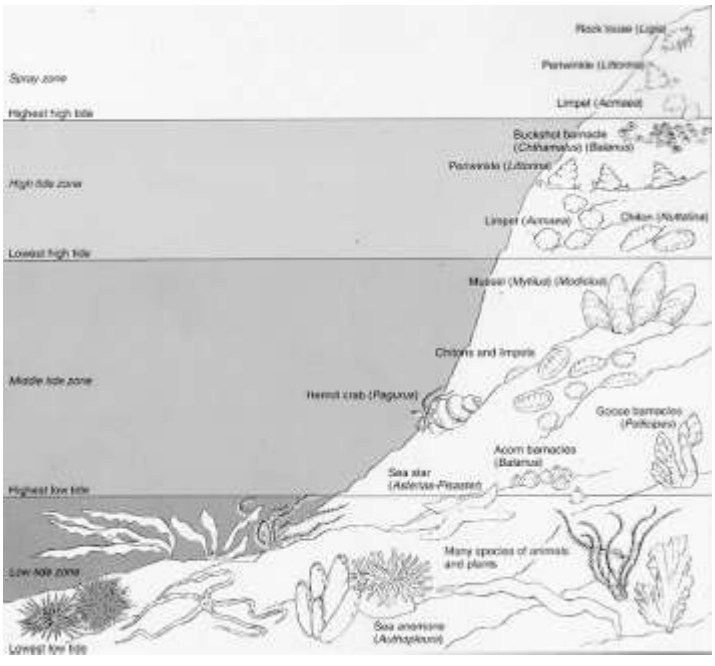
11. Describe the characteristics of the **salt marsh** environment AND one organism adaptation for living there.

12. Describe the characteristics of the **mangrove** environment AND one organism adaptation for living there.

13. Where do the plankton in a mangrove community receive nutrients? (P80-81)



14. Describe the characteristics of the **coral reef** environment AND one organism adaptation for living there.



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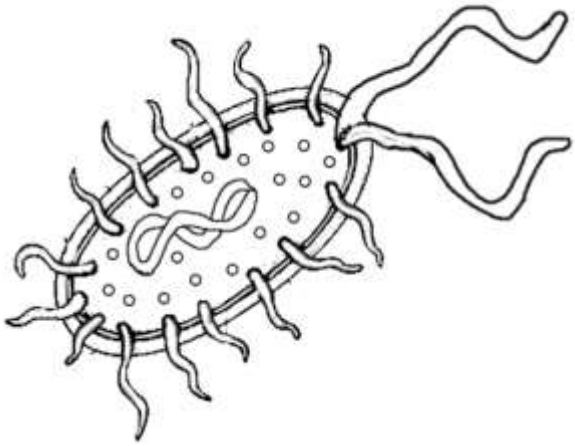
Unicellular Marine Organisms: bacteria, diatoms, and dinoflagellates

1. Are bacteria prokaryotic or eukaryotic? _____
2. What kingdom do bacteria belong to? _____
3. L**abel** the parts of the bacterium diagram**: cell wall, pili, nucleoid region, flagella, ribosomes, cytoplasm, and cell membrane.**



4. Explain **2 ways** that bacteria obtain energy (get food).
5. Which type are the **only** bacteria that can perform photosynthesis? What **green pigment** do they contain that helps them perform photosynthesis?
6. Name and draw the three **bacteria shapes**.
7. What is **chemosynthesis**? What chemical is broken down? Which type of bacteria performs this?
8. What does it mean to be planktonic?
9. Which kingdom do diatoms and dinoflagellates belong to? Are they prokaryotic or eukaryotic?

10. Describe the structural characteristics of **diatoms**, how they **eat**, how they **move**, how they **reproduce**, their **shapes** AND what happens when they **die**.
11. What happens during an **algal** bloom? Why is this bad?

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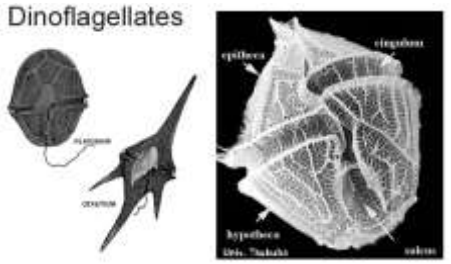
12. Describe the structural characteristics of **dinoflagellates**, how they **eat**, how they **move**, their **shapes** AND what happens when they **die**.

13. What type of unicellular marine organism causes **red tide?** Why is red tide **bad**? What specific ***species*** causes red tide?



Marine Photosynthesis & Ocean Acidification

1. Where do nearly all living things obtain energy from? In what chemical form do cells use energy?

2. What is the difference between autotrophs and heterotrophs? Give an example of each.

3. What does the word photosynthesis mean?

4. Which ocean zone does the most photosynthesis occur in? Why? Where on the globe does the most photosynthesis occur?

5. Algae and cyanobacteria perform photosynthesis, but they do NOT have chloroplast. What do they use?

6. What is ocean acidification? (give full definition)

7. How does photosynthesis help to control ocean acidification? What is increasing to in the atmosphere to break up the carbon cycle?

8. What is formed when carbon dioxide is dissolved in water? How does this affect the pH of oceans?
9. What chemical compound do coral and shelled organisms rely on?

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10. What are humans doing to cause such an increase in carbon dioxide emissions?

11. Where is the rate of ocean acidification the highest? Why?

Algae and Marine Plants

1. What phylum do green algae belong to? (121)

2. Describe each of these green algae: (P123)
   - *Enteromorpha*:
   - *Codium*:
   - *Acetabularia*:

3. What is the function of these *Fucus* structures? (P124)
   - Holdfast:
   - Airbladders/floats:

4. What pigments do brown algae have?

5. Describe each of these brown algae: (P124-125)
   - *Fucus:*
   - *Kelp:*
   - *Sargassum:*
6. Describe each of these red algae: (P126-127)
   - *Porphyra:*
   - *Irish Moss:*
   - *Corallina:*

7. Describe each of these algae chemicals:
   a. alginates (P125):
   b. carrageenan (P126):
   c. beta carotene:

8. How is the prickly pear cactus adapted to living on the upper beach? (P128)

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9. How is cordgrass adapted to living in the salt marsh? (130)

10. What is the name of the structure that anchors mangrove trees into the ground? (P132)

11. What adaptations do mangrove trees have for survival in their environment? Give 3.

12. How do the roots of mangrove trees help other organisms survive?

13. Why can red algae be found at greater depths than either brown or green algae?

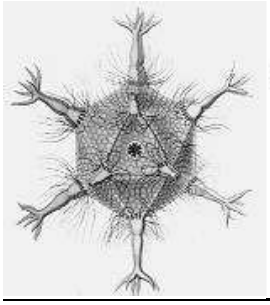
14. Which species of brown algae forms large floating mats out at sea? Where is it now causing major problems?

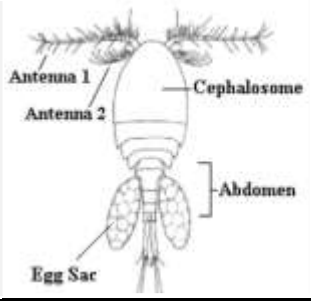
Zooplankton and Sponges

1. What is an animal? What are the characteristics of an animal? What DOMAIN do animals belong to?

2. Which kingdom are zooplankton and protozoa members of? Why?

3. Label the three permanent plankton that we learned.





4. Give three examples of temporary plankton.

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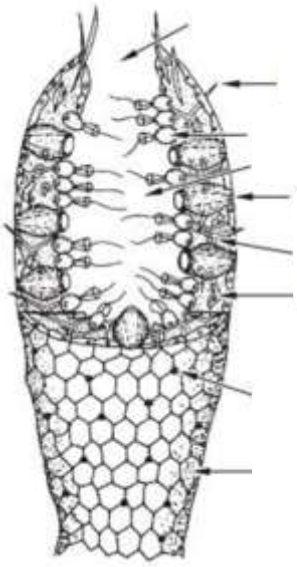
5. What makes plankton so important to an ocean ecosystem/food web?

6. What is considered the first true animal?

7. What phylum are sponges in?

8. Label the sponge diagram with the following terms: ***endoderm, ectoderm, mesenchyme, ostia, osculum, choanocyte, amoebocyte, and spicule.***



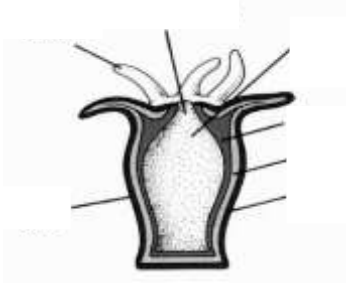
<u>Cnidarians</u>

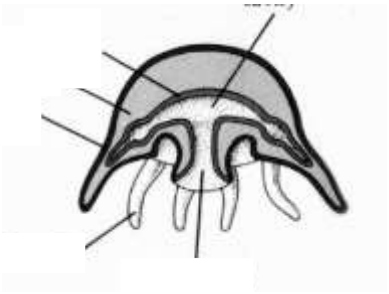
1. What are the 3 characteristics common to all Cnidarians?

2. What are the two main life stages of Cnidarians? Describe each.

3. What are the 4 classes of Cnidarians? Identify one organisms from each.

4. Label the following parts on this jellyfish diagram: polyp, medusa, mouth/anus, tentacle, gastrodermis, gastrovascular cavity, body stalk, epidermis, mesoglea (some of these may be used more than once!)





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5. Describe how a cnidarian eats (be sure to use the words: tentacle, mouth/anus, gastrovascular cavity, enzymes).

6. Describe how jellyfish reproduce sexually. Include all of the reproductive stages.

7. What is the major difference between corals/anemones and jellyfish?