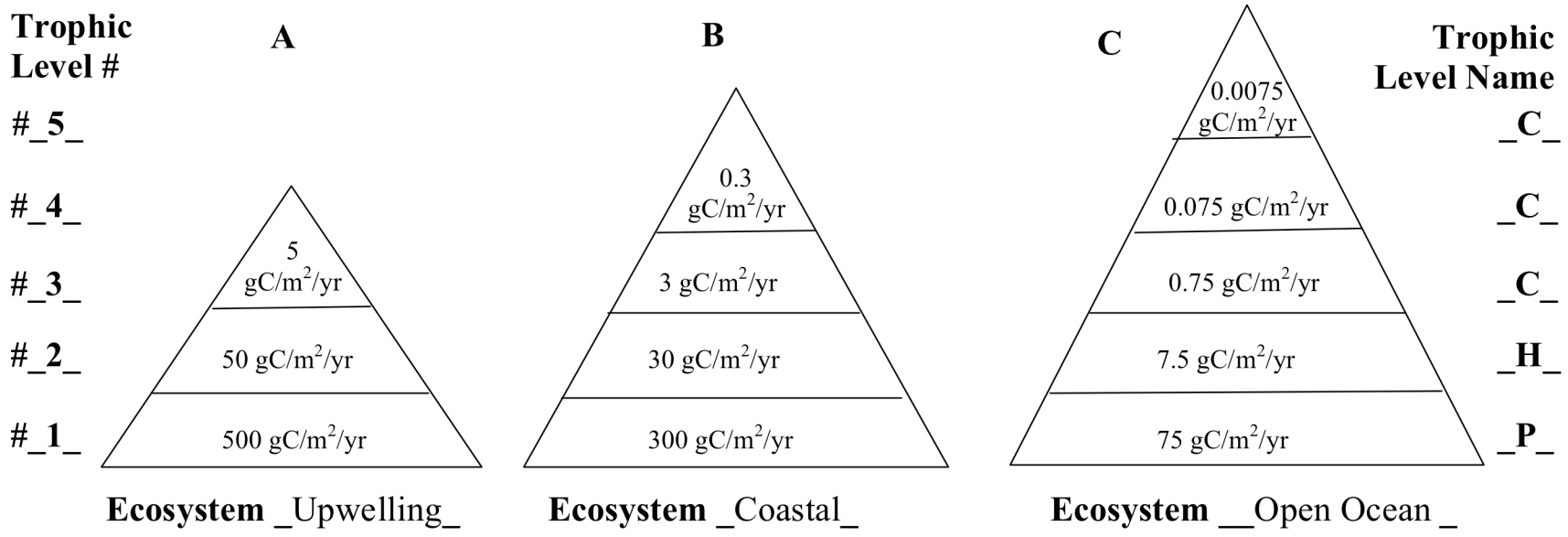
Name _____ _____ **TA** _____

Oceanography 200, Spring 2008 **Class Activity 3, Food Chains (15 points)**

This assignment has 3 purposes:

- To familiarize you with the conventions and terminology of simple ocean food chains and some diagrams used to represent them
- To acquaint you with examples of organisms that occupy various trophic levels in different categories of ocean ecosystems
- To give you experience calculating estimates of organic production at various trophic levels in different ocean ecosystems using some simple ecological principles.

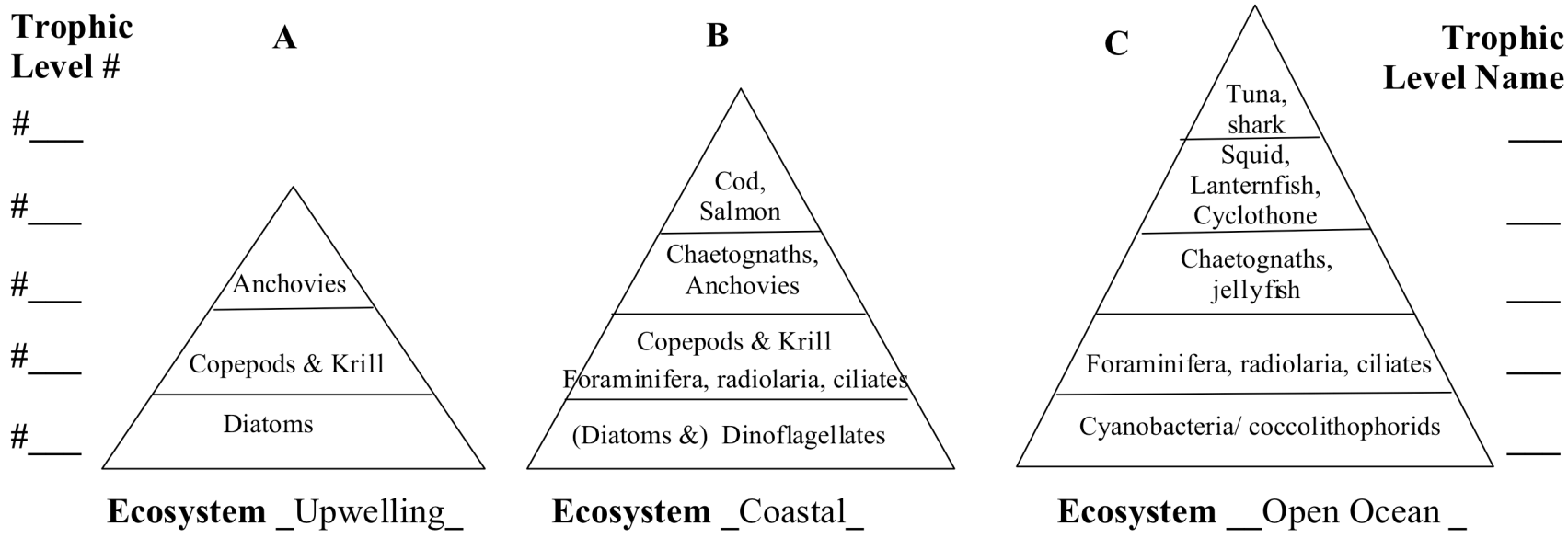
The diagram depicts "trophic pyramids" (A, B, & C) representing simplified food chains that lead to **commercially harvested** nekton in three marine pelagic ecosystems. They are modeled after Figure 15.12 p. 383 in S&A.



1. Using the blanks at the left of the diagram, number the trophic levels, beginning with level #1, as appropriate. Using the blanks at the right of the diagram, label each trophic level as "**P**" (primary producer), "**H**" (herbivore). or "**C**" (carnivore)
2. Using the blanks at the bottom of the diagram, label which pyramid (A, B, C) represents an open ocean ecosystem, which represents an upwelling ecosystem, and which represents a non-upwelling continental shelf ecosystem. How can you tell?

The farther the ecosystem from shore, the greater the number of trophic levels to reach harvestable nekton. This is because a) smaller phytoplankton species dominate farther from shore, so it takes more trophic levels to reach a given size of nekton; b) the farther from shore, the larger and more valuable the nekton species needs to be for it to be economically viable to harvest.

3. At the first trophic level of each pyramid, enter a representative value for primary productivity (there is a wide range of possible values in S&A pp. 318–382; for simplicity use the values in S&A Table 15.2 p. 382).
4. Assume that the trophic transfer efficiency is 10% in all three systems. Calculate the secondary productivity at each trophic level in each system and enter in the representative blank on the diagram.



5. Selecting from the names provided below of organisms described in S&A, enter the name of at least one appropriate **dominant** organism in each trophic level of each pyramid construct a representative food chains.

Diatoms (pp. 391-392)	dinoflagellates (p. 393–394)	cyanobacteria/coccolithophorids (pp. 394–398)	lanternfish & *Cyclothone* (pp. 433 & 436)
copepods & krill (pp. 398–399)	Anchovies (p. 435 & 437–438)	Salmon (pp. 435 & 438)	Blue shark (p. 434 & 440)
jellyfish (pp. 401-402)	tuna (pp. 435 & 438)	chaetognaths (p. 399–400)	Foraminifera, radiolaria. & ciliates (p. 400)
Cod (pp. 440–441)	squid (p. 431)		

6. What trophic level of prey would the blue whale eat in these ecosystems? _**2-3**__ What level would the sperm whale eat? _**4-5**__