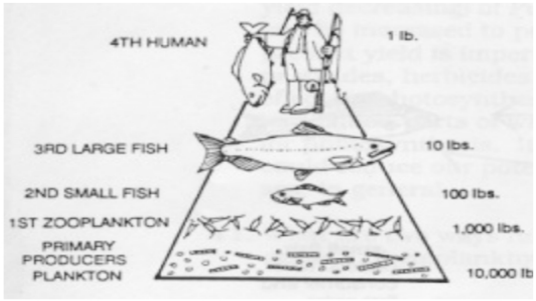
Food pyramid worksheet

On your own paper, answer the underlined questions. (Hint: you will need to read the whole thing to answer these five questions.)

1. Before you start, make a guess: "I think it takes about ... pounds of phytoplankton to make one pound of fourth order consumer."

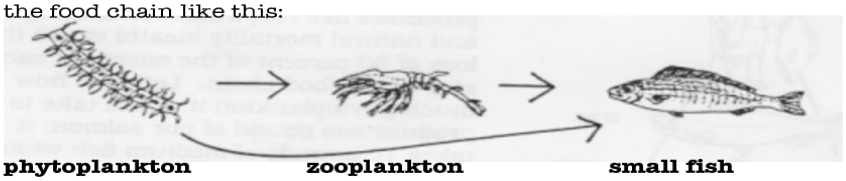


We have a clue. We've seen that processes like respiration (breathing) and natural mortality (death) cause the loss of 90 percent of the energy at each step in the food chain. Let's see how much phytoplankton it would take to produce one pound of our salmon: it takes 10 pounds of medium fish which need to eat 100 pounds of small fish which needed to eat 1,000 pounds of zooplankton which needed to eat 10,000 pounds of phytoplankton!

Sometimes it is helpful for us to know whether the consumer we are talking about was the one who ate the producer, or one who is another consumer. To accomplish this, we call a consumer who eats green plants and algae a **first order consumer**. A consumer who eats a first order consumer is called a **second order consumer** and so on. At each energy transfer, (for example, a second order consumer eating a first order consumer) about 80 to 90% of the energy is "lost"; only 10 to 20% of the energy is available to the higher order consumer. (In reality, you can't *lose* energy, just like you can't *lose* matter. The energy can, however, be *transferred* to another system...like a decomposer or something...and therefore is *lost* from the energy pyramid system we are looking at. Matter, on the other hand, will always stay in our Earth's system.) Because of this energy loss, food chains are seldom over four or five links long.

2. In the food chain shown below, what would we call a medium sized fish that ate the small fish?

"Aha" I hear you say, "What about the Pacific Herring that eats both zooplankton and phytoplankton?" Okay, you've got me. When the herring eats the phytoplankton it is a first order consumer and when it eats the zooplankton it is a second order consumer. We can draw the food chain like this:



phytoplankton **zooplankton** **small fish**

(producer) (1st order consumer) (2nd order consumer **and** 1st order consumer)