Swallows cut though the air (1)_________________ as Jenny and her grandfather walked to the pond. In the distance they could hear the croaking if bullfrogs. “Look at the herons.” Jenny pointed to a pair of birds with legs like stilts (2)_________________ standing among the tall plants at one edge of the pond. “They’re eating cattails, Grandpa,” she said. “Probably not. Herons are meat eater. They eat fish, insects and other small water creatures. They might be looking for frogs,” Grandpa said. “Look at the cattails. They ripple like water. (3)_________________ There are so many of them out there. Doesn’t anything eat them,” Jenny asked. “There aren’t very many things living in that pond that like to see cattails on their plates (4)_________________. Ducks, turtles, some fish and a few snails eat them,” he said. “What does everything else eat?” Jenny asked. “Some of the fish eat insects or frogs or other fish. The frogs eat insects. Some insects eat other insects. There are even some big water bugs that eat small fish. And somewhere there’s a big old snapping turtle whose favorite meal is minnows. Everything pretty much eats whatever it can capture. The most important food out there is the phytoplankton,” Grandpa said. “What in the world is that?” Jenny said. “It’s a kind of plankton. Plankton is the name for tiny plants and animals that float in the water. They are too small to see one by one, but there are so many of them that they give pond water its greenish or olive brown color. It’s like a floating world (5)_________________ of tiny plants and animals. Plant plankton is called ‘phytoplankton,’ and animal plankton is called ‘zooplankton.’ Phytoplankton is to the snapping turtle what grass is to us humans. Like grass, phytoplankton makes its own food, using energy from sunlight. If there is no grass for cows to eat, we wouldn’t have any hamburgers. If there were no phytoplankton there would be no zooplankton and no minnowburgers for the turtle. (6)_________________ Nearly all the pond’s animals, large and small, depend on phytoplankton. Zooplankton eats phytoplankton; insects and smaller fish eat zooplankton and phytoplankton; larger fish eat the smaller fish and insects. That’s the food chain (7)_________________ you’ve heard about,” Grandpa said. “Oh, yeah. Energy from the sun gets passed along from plants to insects or small animals and on to larger animals. I guess in the pond the phytoplankton are the primary producers; the zooplankton are the secondary producers; and the birds are the consumers. But what about the fish? I know the big fish eat the little fish, and the little fish eat insects. But you said sometimes the insects eat them. How do you make as chain out of that?” Jenny looked puzzled. “I guess it’s kind of confusing when one animal is on the menu (8)_________________ of several others. There are actually several chains that are all woven together to form food webs (9)_________________.”
“There’s something else I don’t understand. What do people mean when they talk about something being higher or lower on the food chain? How can you be higher or lower on a food chain?”

Jenny unfastened the chain from around her neck and let it hang from her fingers. “If I hold it like this, The top is here between my fingers, but if I hold it here.” — She grabbed the chain from the other end and let it fall—“the top is here.”

“Maybe it would be easier if you thought of it as a food pyramid. The bottom layer of the pyramid would contain all the green plants. Above this would be a smaller layer of the pyramid that would contain all the plant eaters. On top of that pile would be one or two even smaller layers if meat eaters. If you weighed each one of these levels, you would find that the plant layer was the heaviest and that the highest level of meat eaters weighed the least. It takes a lot of food from one level to supply the next level up, just like you have to eat a lot of potatoes to gain pound. In the pond it takes about 10 pounds of food from one level for every pound of weight added to the animals on the next level. This is because the energy in the food is used for a lot of things besides just growing bigger. For example, animals have to swim around to look for food. And just staying alive takes energy. Is that about as clear as the mud in that pond?”

“I don’t get it,” Jenny said.

“OK, Let’s say we have 1,000 pounds of phytoplankton in this pond. That would be the bottom layer of our pyramid, and it would be enough to feed about 100 pounds of zooplankton on the next level. One hundred pounds of zooplankton would feed about 10 pounds of minnows, and that would be enough to add one pound to the weight of the big snapping turtle on top,” Grandpa explained.

“Now I understand. But I’m getting hungry, grandpa. Do you think there’s room at the top of the pyramid for us?” Jenny said.

“We might be able to live off this pond for a few weeks if we were really good fishermen,” Grandpa said. “I don’t think there’s enough food to support big predators like us for long, though. We might have to eat that turtle before it was all over with. I think for this evening I’d rather take my chances at the grocery store and leave Mr. Turtle alone.”

Adds one pound to snapping turtle
10 pounds of minnow
100 pounds of zooplankton
1,000 pounds of phytoplankton