Homework Answers – Ecosystems

2.2 Introducing Ecosystems page 35 # 1,2,3,4, 5	
1	Temperature – abiotic Bacteria – biotic Wind – abiotic Sunlight – abiotic Dead leaves – biotic Mosquitoes – biotic Sand – abiotic, Milk – biotic Ice – abiotic Plastic – abiotic Empty snail shell – biotic
2	A community does NOT include abiotic features – just living organisms. An ecosystem contains all living organisms plus the abiotic features.
3	Truly – almost all of these examples could be considered ecosystems if you consider microscopic organisms and bacteria. But… **Backyard pond** – ecosystems – many different living things (fish, algae, misquito larvae etc.) **All the cats** – population – not an ecosystem **Tree** – could be considered a single organism (1 tree) or consider microscope organisms/insects and its an ecosystem **Schoolyard** – ecosystems – lots of living things there **Vase of cut flowers** – could be considered just organisms but you could go microscopic here too. This ecosystem is NOT sustainable though. It will fade away as the plants die. **Potted plant** – same as flowers above **Digestive system** – could consider part of an organism but actually our gut has lots of necessary bacteria etc. and could also be considered an ecosystem.
4	False statement. Human activities also change the abiotic parts of an ecosystem. Releasing CO_2 as we burn fossil fuels is warming our planet (temperature is an abiotic feature). Humans often remove soil when we build on a site (soil is an abiotic feature). We dam rivers and drain ponds, lakes etc…
5	A large city would be a community – there is more than one species (not just humans) living there. Also: skunks, raccoons, trees, insects….

2.4 Energy Flow in Ecosystems page 41 # 1,2,3,5,6,7, 10, 12	
1	Only 0.023% of sun's energy is absorbed by plants and converted into energy via photosynthesis. The rest is absorbed by land and ocean, atmosphere or reflected back to space.
2	Photosynthesis creates energy rich **sugar**.
3	We know plants produce energy-rich substances because we can eat then to sustain life. WE need energy to live.
5	Photosynthesis and cellular respiration are said to be complementary reactions. Essentially they are the reverse of each other. Take a look at the chemical equations.
6	Producers (green plants) and consumers both use the process of cellular respiration to obtain energy to grow, move, reproduce, and live essentially. Only producers (green plants) photosynthesis.
7	Any plant we eat contains energy: corn, wheat, potato, carrot, apple, banana etc.
10	Energy in the form of sugar or more complex substances move through organisms. So the plant's sugar energy is taken in by an herbivore (say a rabbit) and when the carnivore (say a fox) eats the

	herbivore, the carnivore gets the energy. The arrows in a food chain or web show the movement of this food energy.
12	Plants have the advantage of being able to make their own energy however, they often cannot move on their own accord. Usually they are rooted in place. They also can only make food in the presence of sunlight so they could not live in places that are always dark (like a cave or deep in the ocean).

2.5 Food Webs & Ecological Pyramids page 47 # 1,2,4,6,7,8	
1	An ecological niche is the function a species serves in its ecosystem including what it eats and what eats it and also how it behaves. An example of an ecological niche: A black bear for example eats berries and fish. Nothing eats a bear. Bears hibernate in the winter and in the spring the female usually has 1 or 2 cubs.
2	A food chain is a simple line of who eats who. A chain is more realistic and shows more eating relationships. It is not simply a straight line.
4	Total energy decreases as you move up the food chain. The energy disappears in the organisms in many ways: energy to grow, move, reproduce and also as heat.
6	The upper trophic levels are occupied by carnivores. Producers, herbivores and omnivores occupy the lower trophic levels.
7	Bison, zebra and kangaroos are all large herbivores but are not in the same food web because they live in entirely different areas. Kangaroos are in Australia, zebras in Africa and the bison in north America.
8	a) If the red fox disappeared, then there would be more rabbits, mice and squirrels as that is what the red fox eats. There would be less predatory pressure on these animals. b) The hawk would benefit if the red fox disappeared since it would have more to eat. The rabbit, mouse and squirrels would also benefit since they are not hunted as much. c) The food the rabbit, mouse and squirrel feet on might decrease. In particular, all 3 eat berries and with many more rabbits, mice and squirrels, the berries might get all eaten up!

2.6 Cycling of Matter in Ecosystems p. 51 # 2,3,4,5,7	
2	Biogeochemical cycles are sustainable because they recycle. The substances (water, nitrogen and carbon) do NOT get used up but rather just move through a large circular path. For example: water may fall to earth as rain, soak into the ground, end up in the river and evapourate back into the air. It recycles back to the air. This can be demonstrated in the carbon and nitrogen cycle too.
3	Carbon enters into the air by: 1) burning fossil fuels and wood, 2) cellular respiration (remember the equation?), 3) volcanic action
4	The carbon cycle include the flow of food energy through the food chains. Food always has some carbon in it!
5	Humans influence a) **Water cycle** – we dam rivers, we pave over grass and increase run-off and global warming is melting more of the polar ice. b) **Carbon cycle** – most dramatically, humans are increasing the amount of CO2 in the atmosphere as we burn fossil fuels. We are also cutting down forests which is a large carbon sink (pulls carbon OUT of atmosphere). c) **Nitrogen** – we add fertilizers to gardens and crops, thus adding nitrogen to the soil
7	To slow climate change, humans need to burn much less fossil fuels (coal, oil and natural gas) and we need to slow down the rate at which we cut down forests! We need to replant actually.