

Answers to Chapter 4

4.1	Systems in Plants
2	<p>a) Plants produce their own food (animals do not) and plants have no need to move (and animals do!...to find food).</p> <p>b) Plants do not need digestive system or musculoskeletal system or nervous system as these all relate to sensing environment and moving around to sense and obtain food. Animals need these systems to sense and obtain food.</p>
4	<p>The basic function of the stem is to support the plant and transport nutrients. The leaf's main function is to photosynthesize. So the stem is providing the leaf with water it needs. The stem also holds the leaves up to the sun. Stem and leaves generally have very different jobs but they work together.</p>
5	<p>The root is support for the plant and absorbs water and minerals. The water absorbed is often sent to stem to be transported to leaves. Just like in #4 – root and stem do different jobs but they work together.</p>
6	<p>a) The flower's primary function is to reproduce. It is the reproductive system of the plant. There are male structures (pollen) and female structures (eggs). After pollination (pollen meets egg – ie: fertilization), the female part produces seeds.</p> <p>b) Pollination can occur by wind or by animals. Grasses are often wind pollinated – the wind blows the pollen onto the female parts with eggs. Large colourful flowers are often pollinated by insects. The colour and fragrance attracts insects/animals and they carry pollen to female parts.</p>
7	<p>Food storage (a.k.a. – food we eat!)</p> <p>Roots – potatoes, carrots, ginger</p> <p>Stems – celery</p> <p>Leaves – lettuce, spinach, tea</p> <p>Flower – (not asked for but couldn't resist) – broccoli (we eat the broccoli flowerets!), cauliflower.</p>

4.2	Plant Tissue Systems
2	<p>Dermal tissue – covers outside plant – functions: absorb water & minerals from soil, produce waxy cuticle to waterproof leaf, defence (think sharp hairs with chemicals...or cactus needles)</p> <p>Ground tissue – filler cells between dermal and vascular, they photosynthesize (in shoot system only), store carbohydrates (food) mostly in root system, and provide support (stem)</p> <p>Vascular tissue – transportation system that moves water, minerals and chemicals around.</p>
3	<p>Xylem – <u>structure</u> = elongated cells that are hollow tubes. No cytoplasm, nucleus or other organelles. In mature plant, xylem cells are not living. (they are similar to a straw)</p> <p>- <u>Function</u> = moves water and minerals from ground UP to leaves.</p> <p>Phloem – <u>structure</u> = elongated cells but they are always alive.</p> <p>- <u>Function</u> = move nutrients and hormones around plant. Maybe move nutrients down to roots or storage. Maybe move nutrients up to leaves (like sugar maple trees do in spring – that's why we can 'tap' them for maple syrup.)</p> <p>Xylem & phloem both involved in transport. Xylem only goes up / Phloem goes up & down. Xylem is often non-living cell / phloem is living cells.</p>

4.4	Tissues Working Together
2	Palisade layer – tightly packed – lots of chlorophyll – top part of leaf – these are major PHOTOSYNTHESIZERS Spony mesophyll – loosely packed – in middle/bottom of leaf. Loose arrangement allows for passage of gases (CO ₂ and O ₂). They can do some photosynthesizing.
3	The middle layer is loosely packed so that CO ₂ and O ₂ can move around freely. This way all cells have access to CO ₂ and can get rid o O ₂ .
4	a) Cuticle is waxy and prevents water loss by evapouration. Guard cells work in pairs to close down and prevent water loss too. b) Cuticle – just sits there and always prevents water loss whereas the guard cells can be open (to allow water to evapourate) or closed (to prevent water from evapourating). Cuticle – is on top and bottom of leaf whereas guard cells are only on bottom. If the ‘holes’ the guard cells make where on the top, sunny side of leaf, too much water would evapourate!
7	When there is lots of water, the guard cells puff up and curve (like a kidney bean shape). This creates the opening – the stoma. Then the plant does loose some water, but its ok...it has lots. When there is NOT a lot of water, the guard cells are NOT puffy and they relax & collapse and so does the stoma (hole). The hole is no longer there and water does NOT evapourate. Clever, eh?