CHAPTER 13

1) Be certain to consider properties of the plant life cycle and their influence on the cost and timing of genetic experiments. What is special about the *Arabidopsis* genome, compared to other plants, and to different animals? Why is this important?
2) Be certain to include something about the role of the organs in the life if the plant, and the mechanisms by which they form. How do plant organs compare to those of animals?
3) Synthesis, transport, degradation; and the mechanism of action should be included. How does a cell recognize auxin, and how does auxin move through the plant? How does auxin movement change from the earliest to slightly later stages of embryo development?
4) Include some precautions that need to be taken to make certain that the experiment will work, and that a transgenic plant will be recovered.
5) Comparison to animal stem cell niches would be helpful here –are there differences between plant and animal stem cell niches? Which stem cell niches in plants and animals persist through the life of the organism? Which don't?
6) Discussing the differences in their expression domains, and in interacting genes should help with this. Are there similar genes in root meristems?
7) What do mericlinal chimeras tell us about founder cells for each type of organ? Do plants and animals have similar embryos, and similar modes of postembryonic development?
8) Be sure to include transcriptional control, and roles of small RNAs. Do we know what controls the position where the small RNAs are made?
9) Consider the contribution of auxin synthesis, transport and degradation in leaf positioning – which of these seems most important, and why?
10) What roles could similar movements of other proteins play in root development? Of development in other parts of plants? What sort of mechanism could allow cell-to-cell movement of proteins, and what sort of regulation might be necessary to prevent movement going too far?
11) Are the mutations discussed loss-of-function, or gain-of-function? What mutant phenotype might some of the genes have if they had an opposite effect?
12) Define combinatorial in this context. What is consistently true about the domains of function of the ABC genes? What do you think differentiates the ground plan of an *Arabidopsis* or *Antirrhinum* flower from that of a tulip, where there are no sepals, but rather an outer whorl of organs that appear as petals?
13) Would exchanging the MADS box of AGAMOUS with that from SRF of humans change its function in the plant? Why or why not?
14) Consider symmetry of the flower as well as its constitution of organ types. What else is different between snapdragon flowers and *Arabidopsis* flowers?
15) How might a plant measure changes in day length? What experiment might you do to find if it is day length, or night length, that triggers flowering? Would either mechanism work to give seasonal regulation of flowering?