# PIGMENTS

Pigments are colored chemicals that plants make to respond to light.

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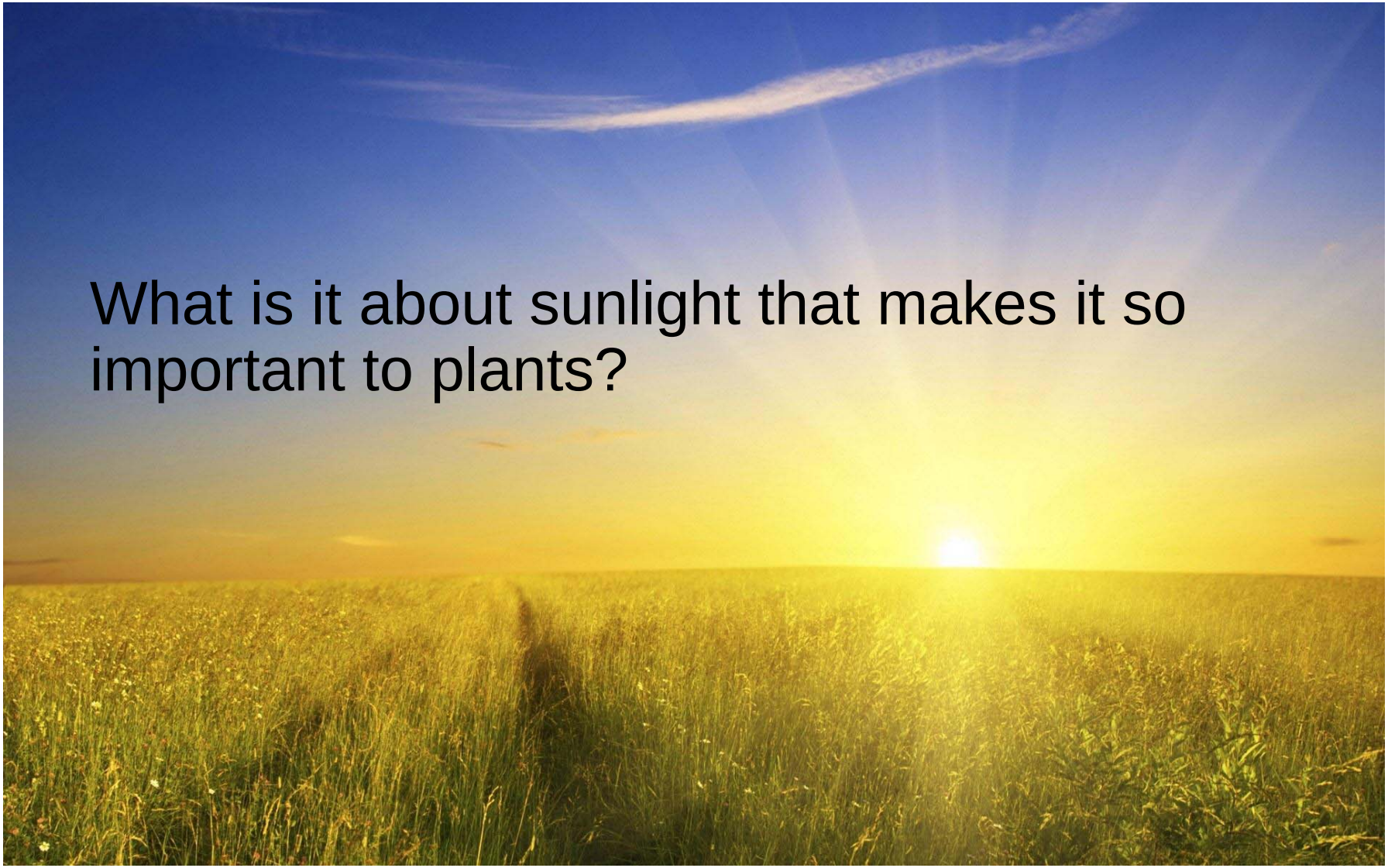
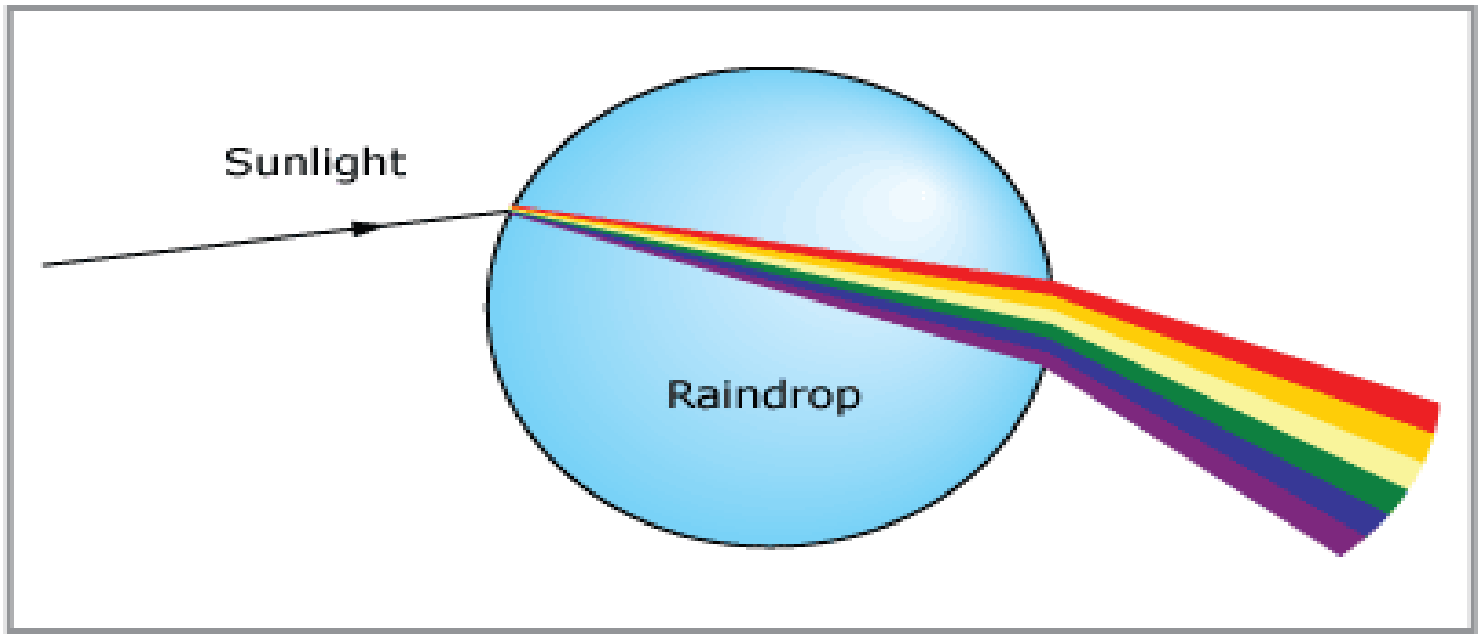
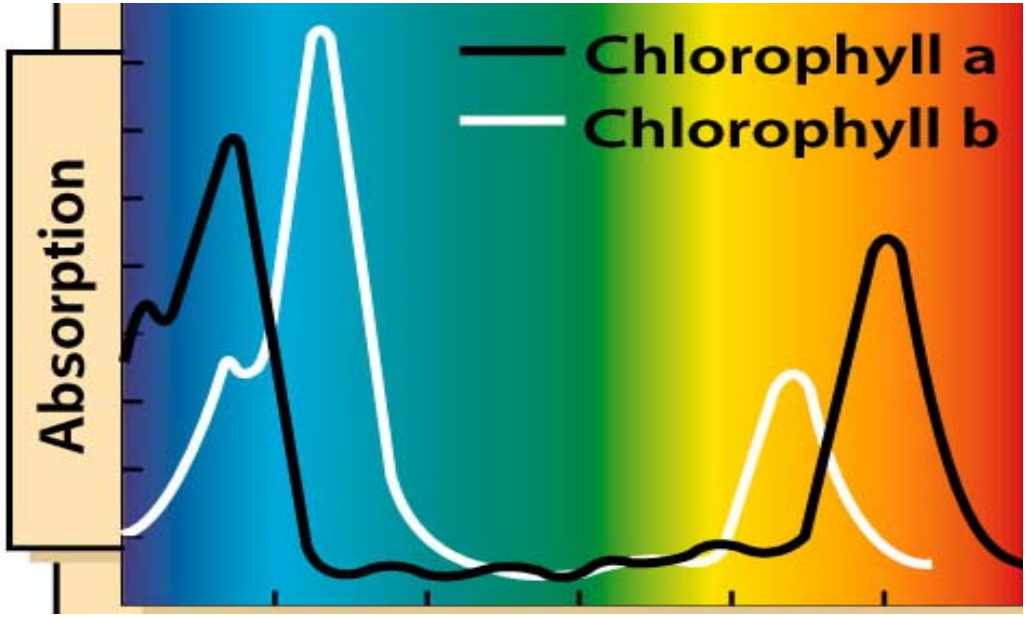

What is it about sunlight that makes it so important to plants?

A raindrop separates the colors in a sunbeam



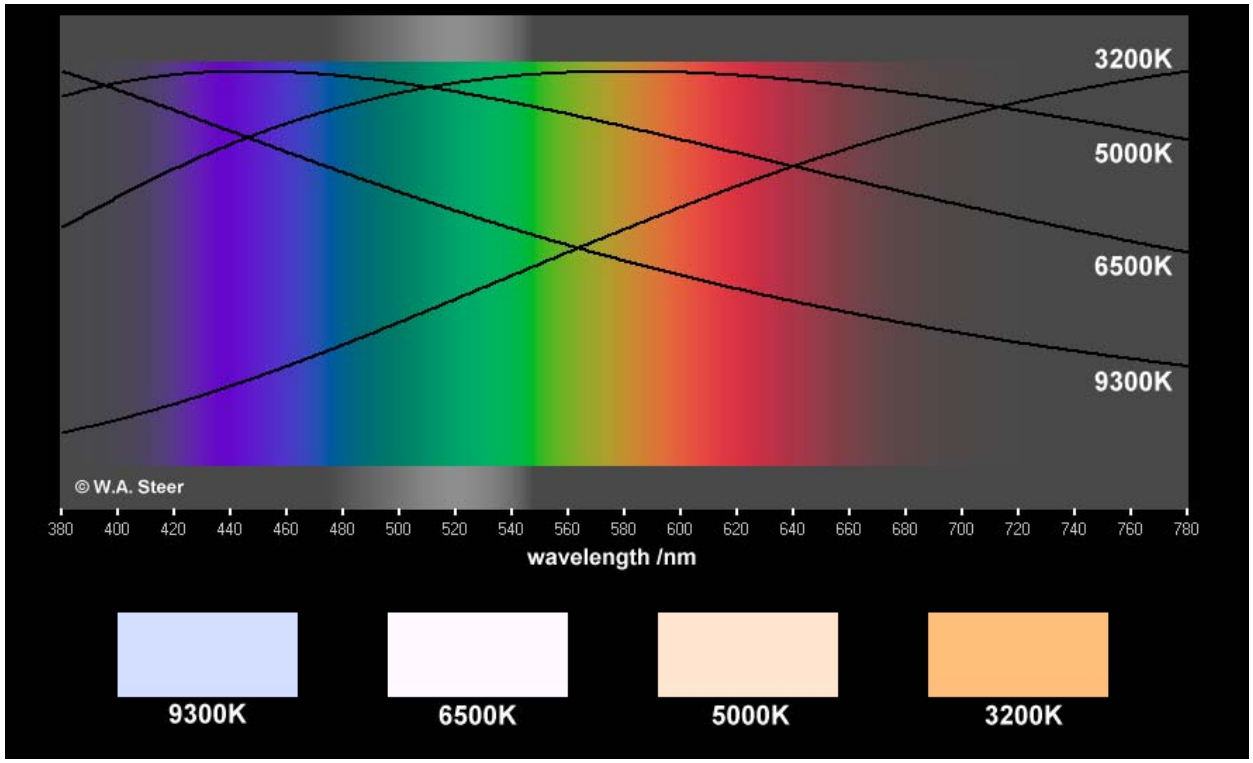

to make a spectrum..

# Absorption spectra of chlorophyll a and b




1. Describe the differences in the absorption spectrum of chlorophyll a and b.
2. Why do you think healthy leaves are green?

# Spectral output of four types of light bulbs

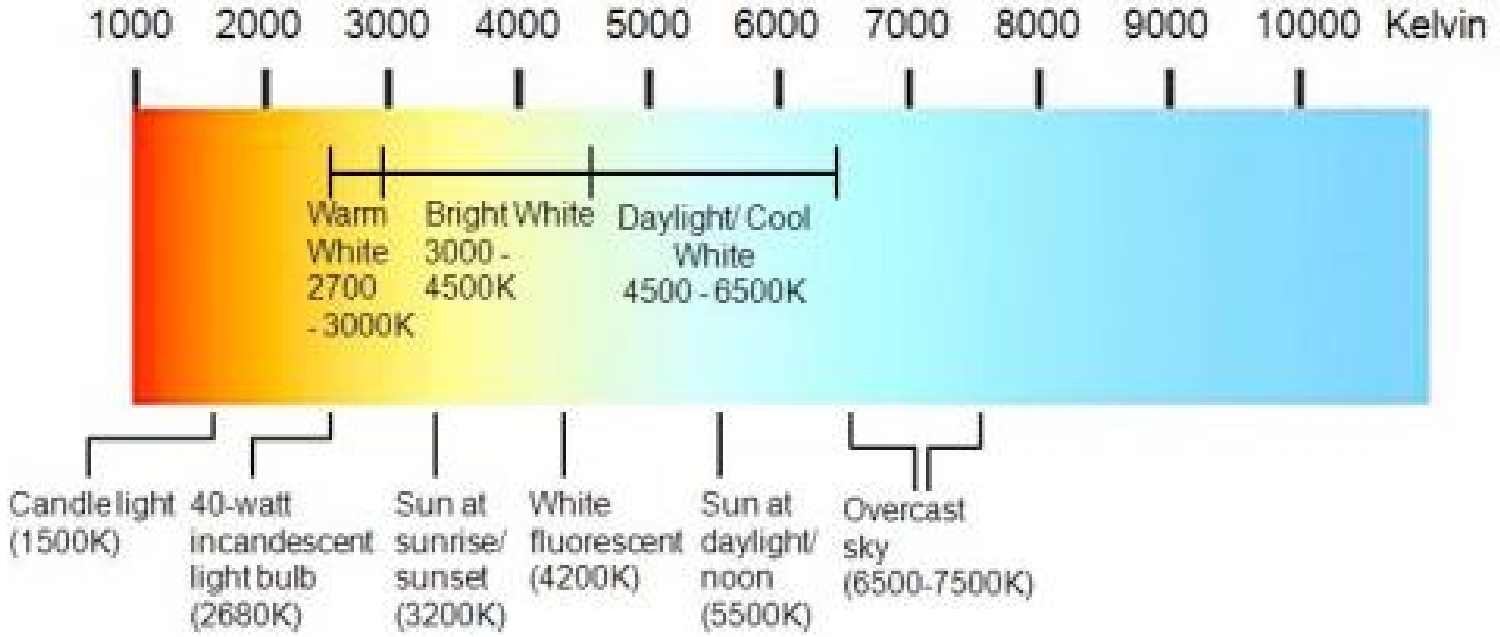



What light bulb that would be best for activating chlorophyll? Explain your choice.

# Questions to think about:

1. Sometimes leaves turn yellow. What is happening in the leaf?
2. How do plants adapt to changes in the seasons?
3. Why is it important for a plant to choose the right season to flower?
4. How might the plant become confused and flower too early or too late?
5. What might happen if a plant flowers too early? Too late?
6. How can a plant keep track of the seasons?

# Kelvin temperature of different kinds of light



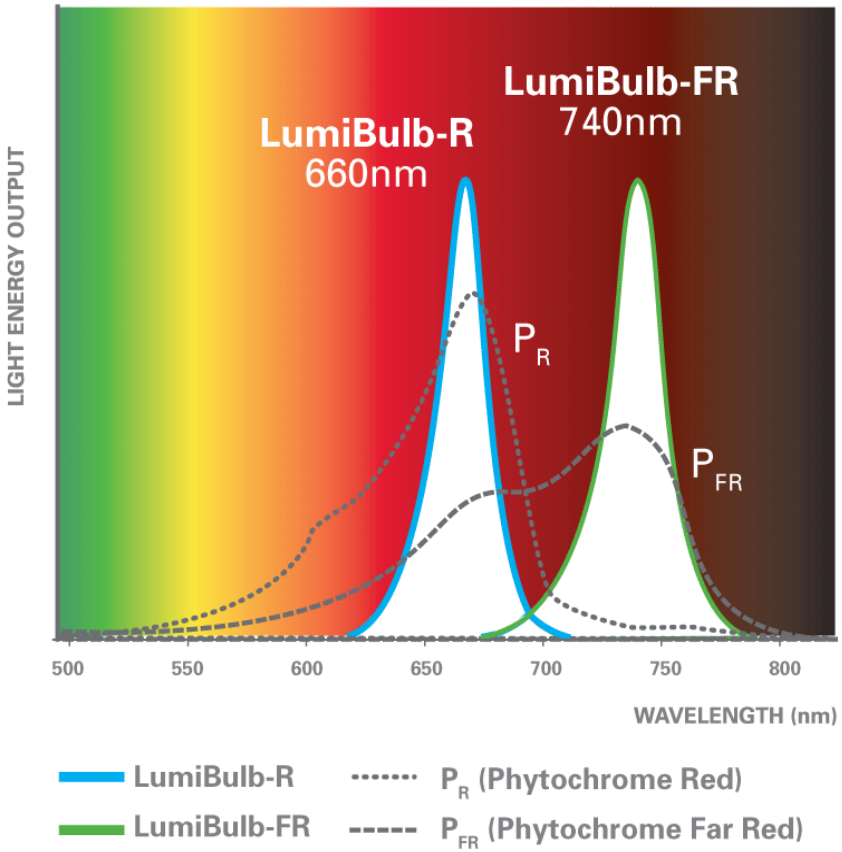

1. How does the spectrum of sunlight at sunrise/sunset differ from the spectrum during bright daylight?
2. What sort of pigment would be able to differentiate between sunrise/sunset and bright daylight?

# Absorption spectrum of two phytochromes

1. How does the absorption spectrum of these phytochromes allow plants to sense sunrise and sunset?

2. How can this be used to measure the length of day?

3. Explain why a LumiBulb is needed to grow plants such as tomatoes, cucumbers, or strawberries indoors (as in the Tower Garden) but it is not needed for lettuce, kale, or parsley.



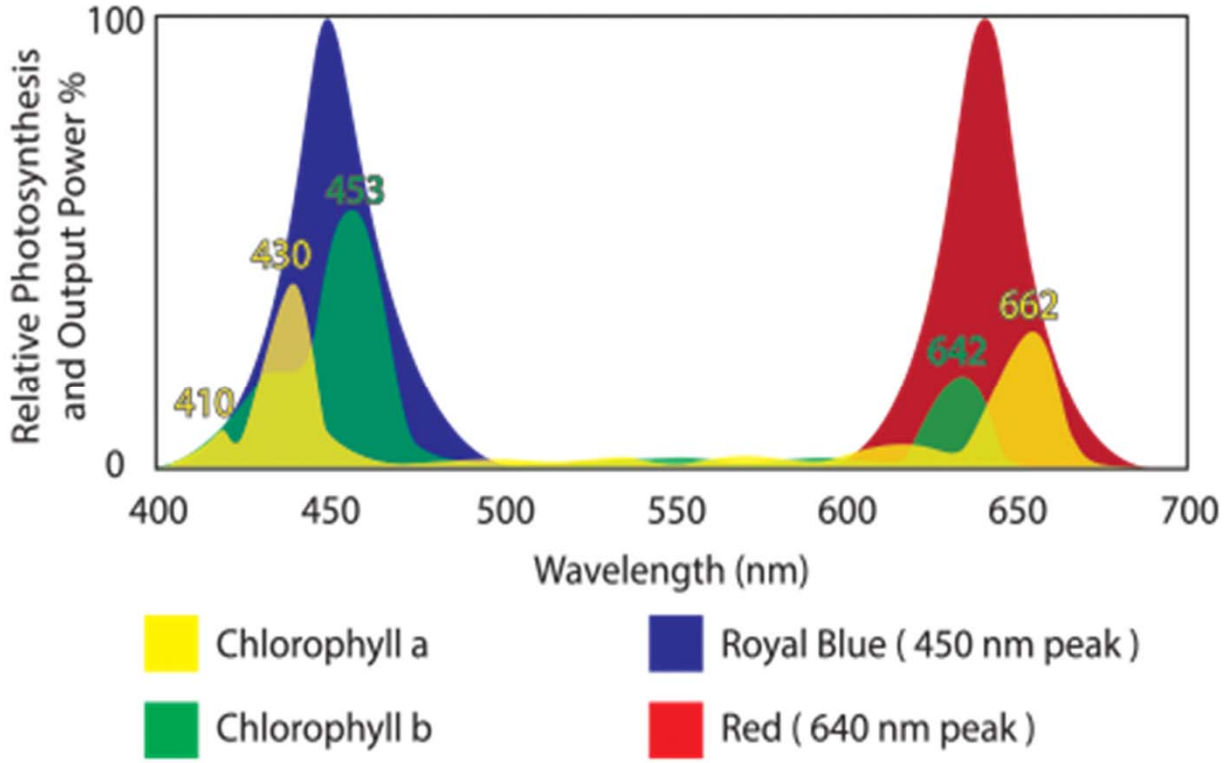
# Extending your thinking…

There are a variety of other light-sensing pigments in plants. Many are also found in animals.

- Cryptochromes and phototropins sense blue light.
- UV-B resistance 8 senses UV-B light.

  - *What aspects of plant behavior might be controlled by these pigments?*

# LED bulbs designed for indoor gardens




Would the leaves of plants grown under LED lights look green? Explain your hypothesis.

# Evaluate what you have learned:

- Imagine you are growing pepper plants in the Tower Garden indoors. The plants are growing, but they aren't producing any peppers, only heathy green leaves. Explain what you would do to get the plants to make peppers.

- Imagine you are growing lettuce and you don't want it to "bolt" (shoot up a bitter stalk and make flowers). Explain how you might keep the lettuce from bolting.