Visible Waves and Photosynthesis computer lab NAME HR /34

Go to the following website:
http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS12/LS12.html

Which colors of the light spectrum are most important for plant growth?

1. **WRITE YOUR HYPOTHESIS HERE** _____

Photosynthesis is the process in which plants use light energy, water, and carbon dioxide to produce food. Plants use the food they make for growth and for carrying out other life processes.

Sunlight is the natural energy source for photosynthesis. White light from the sun is a mixture of all colors of the light spectrum: red, orange, yellow, green, blue, and violet. Light can be either absorbed or reflected by substances called pigments. Most plants are green because the pigment chlorophyll reflects green and yellow light and absorbs the other colors of the spectrum.

In this Virtual Lab you will perform an experiment to investigate what colors of the light spectrum cause the most plant growth. You will calculate the plant growth by measuring the height of each plant under different colors of light. You will compare these measurements and interpret a graph to determine which colors of the spectrum cause the most plant growth.

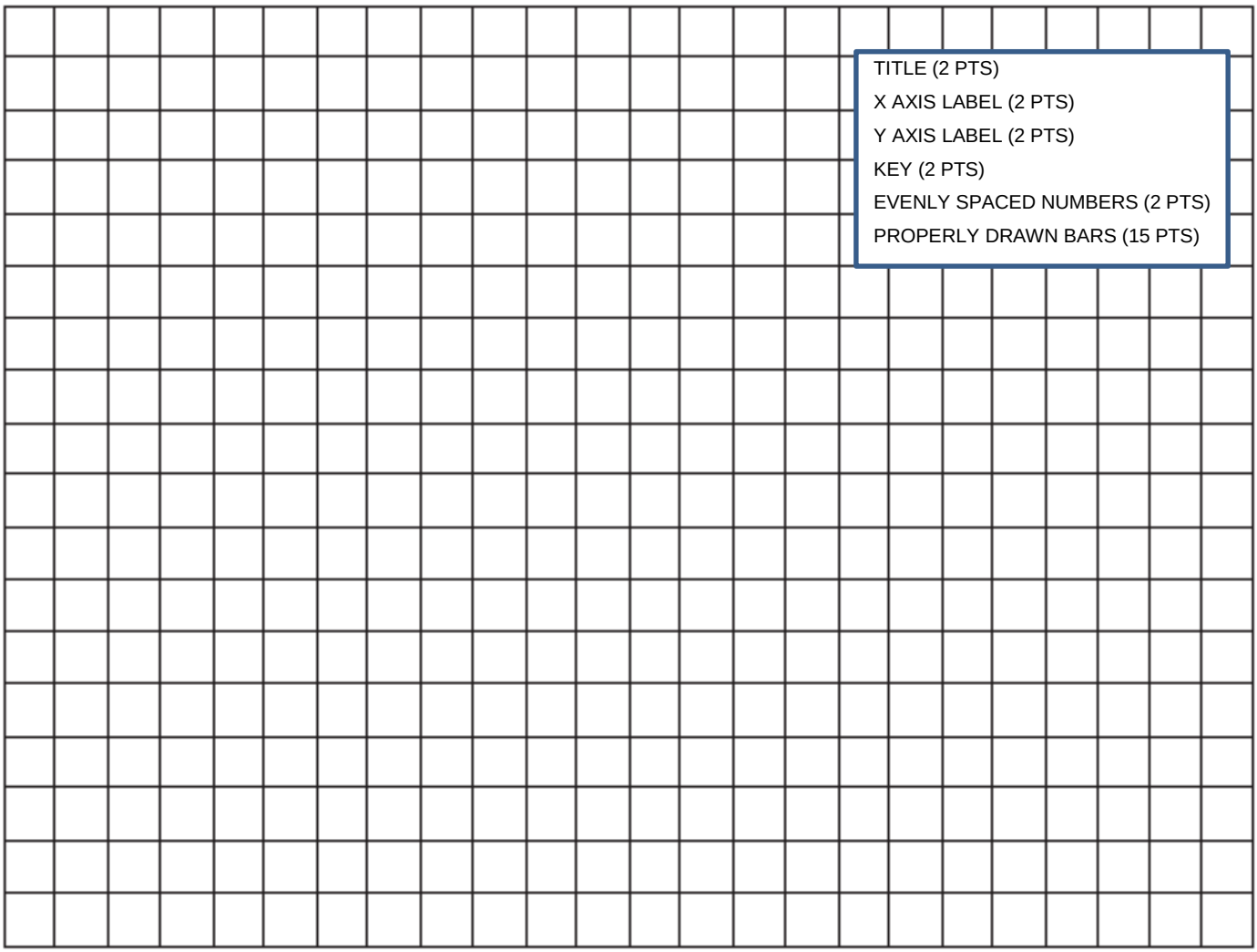
STEP 1) Record the height of each type of plant for each wavelength

	Average Spinach height in cm	Average Radish height in cm	Average Lettuce height in cm
RED			
VIOLET			
BLUE			
GREEN			
ORANGE			

STEP 2 **READ:**
It's within the chloroplasts that all this light absorbing happens. The chloroplasts take the energy harnessed in these light rays and use it to make sugars for the plant to use in building more plant material = photosynthesis. Within the chloroplasts, the molecules that actually do the absorbing are called photopigments (freckles are examples of pigments in humans). A plant has a mix of different types of photopigments so that it can absorb light at different colors. A plant can have one photopigment devoted to absorbing deep blue, another devoted to absorbing yellow, another for orange, and another for red. When full spectrum light, like sunlight shines on a plant all the photopigments are activated and absorb their "specialty" color. A plant's chloroplasts get all the actions of the photopigments coordinated so that they're all working to harness most of the sun's light rays and make plant food.

If there is only one color of light shining on a plant, then only a certain group of photopigments are active. The plant won't be able to make as much sugar or plant food as when there is full spectrum light shining on it, and it may suffer generally. Not only will the plant not have enough light to make lots of food, but the plant uses these different color lights to signal all sorts of other internal processes. If, for example, only blue light was shining on the plant, then all the red-light triggered processes would not occur. Eventually the plant may die because of this lack of full spectrum light and certain processes not happening. It would be like in your body if suddenly your liver couldn't function anymore. Eventually you would die. So, plants need full spectrum (all the colors of the rainbow) light to live productively.

STEP 3) Create a graph from your data. Since the wave colors are the thing you were manipulating as a scientist, they would be the independent variable and should go on the x axis. Be sure to label each axis. Give your graph a title. This graph will be a bar graph. (25pts)



ANALYSIS QUESTIONS:

2. What variable were you manipulating?
3. What variable were you measuring?
4. What was the independent variable in this experiment?
5. What was the dependent variable in this experiment?
6. How did you test your hypothesis?
7. Did your data support your hypothesis? Explain.
8. Did you find any differences or similarities among the seeds? Explain.
9. What conclusion can you draw about which color in the visible spectrum causes the most plant growth?
10. Given that white light contains all colors of the spectrum, what growth results would you expect under white light?