Name: _____

Period: _____

Date: _____

The Mystery Disease: A Probability Simulation

The Scenario:
We have blood samples from four people. All of them have exhibited symptoms which have their doctors worried. They may have something as easy to treat as allergies, or they may have a seriously dangerous new disease (Esperitis Canyonosis). You have a series of graphs showing the blood profile of a person afflicted with four known diseases. Notice that no profile is shown for the mystery disease - no one knows what that profile is yet. Remember that we do not know what kind of blood profile the mystery disease produces. Just like in real life, it is possible that two or more people might have the same disease.

As you work, you may sample as many times as you like, but the cost for sophisticated medical research such as this is very high. It will cost you $1000 for each sample. Your task is to accurately determine which disease each person has. Your reputation as a researcher is at stake here. If you diagnose incorrectly or spend too much money, there could be consequences.

One final note - keep good records! Once you move on to a new sample, the old data will not be saved on the computer. Good luck!

Instructions:
Answer the questions in your packet as you work through the simulation. Use complete sentences when appropriate.

Patient 1

To take a sample, click on the [Take Sample] button. Take 5 samples (the total number of samples is recorded in one of the boxes along the bottom of the screen). Pause here and try to diagnose what the disease is.

I think that patient 1 has _____ .

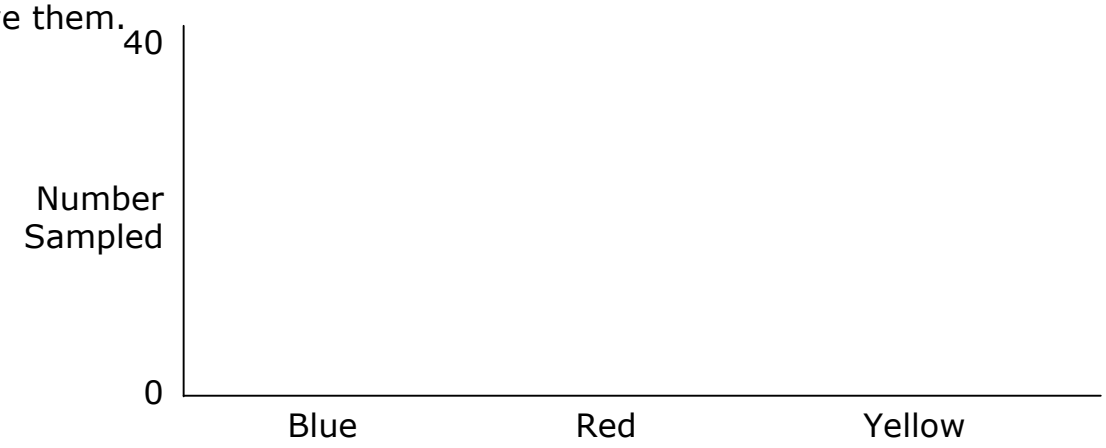
Take 5 more samples. Has your diagnosis changed?

I think that patient 1 has _____ .

Continue taking samples until you are sure you know what patient one has. Pause after every 5 to modify and/or record your diagnosis. If you decide to stop at a number that is not a multiple of 5 (for example, after 18 samples), simply record the final number of samples and your final diagnosis.

# samples	diagnosis
_____	I think that patient 1 has _____ .
_____	I think that patient 1 has _____ .
_____	I think that patient 1 has _____ .
_____	I think that patient 1 has _____ .
_____	I think that patient 1 has _____ .
_____	I think that patient 1 has _____ .
_____	I think that patient 1 has _____ .
_____	I think that patient 1 has _____ .

Sketch a bar graph below showing your results. On the graph, record the numbers of blue, red, and yellow cells you sampled. Use colored pencils if you have them.



This patient will be billed (# samples x $1000) _____

Close the Patient 1 simulation window.

Patient 2
Take samples as in the first example, stopping every 5 to modify and/or record your diagnosis. Continue taking samples until you are sure you know what patient two has. If you decide to stop at a number that is not a multiple of 5 (for example, after 18 samples), simply record the final number of samples and your final diagnosis.

# samples	diagnosis
_____	I think that patient 2 has _____ .
_____	I think that patient 2 has _____ .
_____	I think that patient 2 has _____ .
_____	I think that patient 2 has _____ .
_____	I think that patient 2 has _____ .
_____	I think that patient 2 has _____ .
_____	I think that patient 2 has _____ .
_____	I think that patient 2 has _____ .

Label the graph below as you saw for patient 1. Sketch a bar graph showing your results. On the graph, record the numbers of blue, red, and yellow cells you sampled. Use colored pencils if you have them.

This patient will be billed (# samples x $1000) _____
Close the Patient 2 simulation window.

Patient 3
Take samples and record your data as before.

# samples	diagnosis
_____	I think that patient 3 has _____ .
_____	I think that patient 3 has _____ .
_____	I think that patient 3 has _____ .
_____	I think that patient 3 has _____ .
_____	I think that patient 3 has _____ .
_____	I think that patient 3 has _____ .
_____	I think that patient 3 has _____ .
_____	I think that patient 3 has _____ .

Label the graph below. Sketch a bar graph showing your results. On the graph, record the numbers of blue, red, and yellow cells you sampled. Use colored pencils if you have them.

This patient will be billed (# samples x $1000) _____
Close the Patient 3 simulation window.

Patient 4
Take samples and record data as before.

# samples	diagnosis
_____	I think that patient 4 has _____ .
_____	I think that patient 4 has _____ .
_____	I think that patient 4 has _____ .
_____	I think that patient 4 has _____ .
_____	I think that patient 4 has _____ .
_____	I think that patient 4 has _____ .
_____	I think that patient 4 has _____ .
_____	I think that patient 4 has _____ .

Label the graph below as you saw for patient 1. Sketch a bar graph showing your results. On the graph, record the numbers of blue, red, and yellow cells you sampled. Use colored pencils if you have them.

This patient will be billed (# samples x $1000) _____
Close the Patient 4 simulation window.

Summary Info:

Patient 1 has _____ at a cost of _____

Patient 2 has _____ at a cost of _____

Patient 3 has _____ at a cost of _____

Patient 4 has _____ at a cost of _____

TOTAL COST _____

Did anyone have the mystery disease? _____ If so, what would the percentages be on a blood profile graph for that disease? Hint: Use the information you recorded on your graphs.

blue _____ red _____ yellow _____

What factors played a role in your decision as to when you had enough samples to make an accurate diagnosis?

_____

_____

_____

_____

How soon (after how many samples) can you identify a trend/pattern in the data (leading hopefully to an accurate diagnosis)?

_____

_____

_____

Looking back at your data, did your diagnosis change as you took additional samples? _____

If so, what do you think the positive and negative tradeoffs of making a diagnosis early in the sampling process would have on the patient?

_____

_____

_____

What are the positive and negative tradeoffs of taking lots of samples?

_____

_____

_____