

TABLE 3. Assessment questions

Question Number	Open-ended questions (2003)	Online multiple-choice questions ^a (2004 and 2005)
1	Design an experiment to measure the genome-wide response when a cell becomes infected with a virus.	You are interested in a bacterium that grows in high temperature conditions. One interesting observation is that it is green when grown at the normal high temperature, but colorless when grown at a temperature that is 20 degrees below the optimal growth temperature. Which of the following would be the best description of the way you could investigate this difference using microarrays? (Isolate total RNA from the organism grown at the two temperatures, reverse transcribe it with dyes to cDNA and incubate with the microarray)
2	What controls would you need for this experiment?	A smoker and a coal miner both got lung cancer. The cancers are histologically identical, but there might be functionally important differences in gene expression in the two cancers which would allow personalized treatment. Which of the experiments is the best design to determine appropriate treatment for the two lung cancers? (Compare the gene expression profiles of the two lung cancers to lung samples without cancer)
3	What are the technical limitations to the method(s) you chose?	You are investigating the changes in gene expression in cancer cells compared to normal cells by labeling of RNA samples. When you look at your entire microarray after performing the scan in both dye channels, you observe spots with several shades of green, but no red spots. Which of the following best explains the data? (Poor labeling of one of the samples)

^a Correct multiple-choice answer provided after the question, in parentheses.