

DNA Sequence Assembly—Student Worksheet



About This Worksheet

This worksheet complements the Click and Learn “DNA Sequence Assembly” developed in conjunction with the 2010 Holiday Lectures on Science, “Viral Outbreak: The Science of Emerging Disease.”

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Answer the following questions as you proceed through the slides.

1. Read the information on slide 1 and watch the video clip. Explain what the amount of DNA sequence that can be generated for a dollar reveals about sequencing technology?

2. Summarize how *Sanger sequencing* works.

3. What is the upper limit for the number of nucleotides that can be read using Sanger sequencing? Explain why this is the limit.

4. Read slide 4 and provide an example of an *overlap sequence* in the space below.

5. Using your own words, describe *shotgun sequencing*.

6. Describe *deep sequencing*.

7. Read slides 7 through 16 and answer the following questions as you proceed through the slides.
- a. How is overlapping text used in this example?

- b. Explain in your own words what it means to “align” text or sequence. (You may use an example if it helps.)

- c. How can discrepancies be reconciled?

- d. What are the first eight words of the sample assembly on slide 16?

8. What is a major challenge in deep sequencing?

9. Read slides 18 through 27 and answer the following questions as you proceed through the slides. Be sure to watch the embedded video clips also.

- a. What is a *consensus sequence*?

- b. How are gaps in a sequence filled in? Explain your answer. (Be sure to include the terms “PCR” and “Sanger sequencing” in your explanation.)

- c. Make a list of the technologies used to sequence the genome of a newly discovered virus.

10. More and more research labs are becoming “interdisciplinary.” In your own words, explain why it is important to have computer scientists who understand biology and biologists who understand computer science.

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