

Contact Information

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Title: Viruses Not Welcome

Abstract:

The author proposes that an initial virtual exploration on DNA replication will serve as an introduction to a difficult yet integral concept of biology. Activities, including but not limited to research, classroom field trips, and lectures will serve as a vehicle to assist students in understanding of DNA replication and its importance to the field of emerging pathogens.

Mission Statement:

This proposal will enable students to gain a valuable understanding and respect for the field of emerging pathogens. It will serve as an introduction to students to cutting edge technology in the fields of biotechnology and research, as well as an integration of technology into the curriculum. After implementation, students will understand the importance of the replication process to contemporary emerging pathogens. Additionally, collaborative efforts both school and county-wide will allow students to assist their local communities in attaining a global perspective on biotechnology, epidemiological research, and emerging pathogens. The acquisition of knowledge on this will allow a more global awareness that will decrease the effectiveness of these organisms.

Unit Description:

The unit on DNA replication will include the following activities:

- DNA Webquest (to serve as a review)
 - Virtual DNA replication lab (to serve as an enrichment tool)
- Site: http://highered.mcgraw-hill.com/sites/007352543x/student_view0/chapter12/dna_replication.html
- Research paper and visual aid creation on a pathogen of choice (list provided by teacher)
 - Design a timeline of the discoveries in the field if molecular biology, virology, or immunology
 - Real DNA extraction lab (strawberry)

Experience of Principal Investigator:

BA in Biological Sciences

Surgical Technology Diploma

Scripps Research Institute- Biotechnology Research Internship

UF-ICORE Institute- Emerging Pathogens Internship

3 years Professional Teaching Experience

Literature Cited:

HHMI Institute Professors

Budget:

Bio-Rad Immunoassay TSWV Kit (1) = \$179.80 (to be re-visited)

Bacteria Wanted

Bacteria or Virus Wanted Poster

What is the scariest Bacteria or Virus ?

If a bacterial disease were considered to be human, it would probably be arrested for its crimes. But before you can arrest someone, you need to let people know about them. Thus the development of a Wanted Poster.

We are going to make Wanted Posters for various bacteria. The Bacterium for the poster will be chosen by the student. He or she will then perform some research on the disease for the poster. There is a link below to help find some information about bacteria.

The poster will be interesting to look at, as well as very informative.

It will include the following:

- Pictures: Drawn or actual (downloaded)
- Name of Bacteria: common and scientific
- Shape of Bacteria or Virus
- Where and whom does it affect?
- How it can be contracted?
- What lasting health problems (if any) does it cause (liver issues, etc)?
- How dangerous are these symptoms?
- Identifiable Characteristics? Incubation period?
- How many people contract the disease every year?
- And here's a new one, what impact in History has this bacteria caused (i.e. The Bubonic Plague wiped out one third of the population in Europe)
- Reward. This is completely student developed. The Reward must fit the crime. No more than \$100,000. I will be grading on how well this decision is made (Hint: Bacteria that does not kill should not get the highest Rewards).

[Bacteria Web Site](#)

This link is to the Center for Disease Control. If you go under the section "Site Listing," click on the link for [Disease Listing](#) to see an alphabetical list of diseases. Be sure to check under the General Information to find out if this disease is a Bacterium or not. You are doing a poster on Bacteria only!

DNA Replication & Protein Synthesis Webquest

Taken from <http://www.techbostonacademy.org/staff/science/louis/wp-content/uploads/2009/05/dna-webquest-09.doc>

1. What does DNA stand for?

ANS:

2. What is DNA's primary function?

ANS:

3. What is the function of proteins?

ANS:

4. What are the repeating subunits called that make up DNA?

ANS:

5. Name the 3 parts of a DNA nucleotide.

ANS:

7. Name the 4 nitrogen bases on DNA.

ANS:

8. What is the difference between a purine & a pyrimidine?

ANS:

9. Name 2 purines.

ANS:

10. Name 2 pyrimidines.

ANS:

11. Who is responsible for determining the structure of the DNA molecule & in what year was this done?

ANS:

12. The model of DNA is known as a

ANS:

13. What makes up the sides of a DNA molecule?

ANS:

14. What makes up the "steps" of a DNA molecule?

ANS:

15. How did Rosalind Franklin contribute to determining the structure of DNA?

ANS:

16. What type of bonds holds the DNA bases together? Are they strong or weak bonds?

ANS:

17. What makes up the "backbone" of the DNA molecule?

ANS:

18. On DNA, a _____ base will always pair with a _____ base.

19. What is the most common form of DNA found in organisms?

ANS:

20. How many hydrogen bonds link cytosine & guanine? adenine & thymine?

ANS:

21. Why must DNA be able to make copies of itself?

ANS:

22. Define DNA replication.

ANS:

23. What is the first step that must occur in DNA replication?

ANS:

24. What acts as the template in DNA replication?

ANS:

25. What is a replication fork?

ANS:

26. What enzymes help separate the 2 strands of nucleotides on DNA? What bonds do they break?

ANS:

27. What is the function of DNA polymerases?

ANS:

28. _____ are joined to replicating strands of DNA by _____ bonds.

29. If the sequence of nucleotides on the original DNA strand was A – G – G – C – T – A, what would be the nucleotide sequence on the complementary strand of DNA?

ANS:

30. Does replication of DNA begin at one end and proceed to the other? Explain.

ANS:

31. When replication is complete, how do the 2 new DNA molecules compare to each other & the original DNA molecule?

ANS:

32. Is DNA replicated (copied) before or after cell division?

ANS:

33. What is a mutation?

ANS:

34. Name several things that can cause DNA mutations.

ANS:

35. What sugar is found on DNA?

ANS:

36. What base is missing on RNA, & what other base replaces it?

ANS:

37. Uracil will pair with what other on DNA?

ANS:

38. Is RNA double or single stranded?

ANS:

39. Name the 3 types of RNA.

ANS:

40. Which type of RNA copies DNA's instructions in the nucleus?

ANS:

41. What does tRNA transport?

ANS:

42. Define transcription.

ANS:

43. In which organelle are proteins made?

ANS:

44. Where does RNA polymerase bind to the DNA it is transcribing?

ANS:

45. What bases pair with each other during transcription?

ANS:

46. mRNA's full name is

ANS:

47. What makes up proteins, what are the subunits called?

ANS:

48. How many different kinds of amino acids are there?

ANS:

49. What is the genetic code & why is it important?

ANS:

50. What is a codon & what does each codon code for?

ANS:

51. How many codons exist?

ANS:

52. Name the amino acid coded for by each of these codons:

Codon	Amino Acid (AA)
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a. UUA

b. AUU

c. UGU

d. AAA

e. GAG

f. UAA

53. What codon starts protein synthesis?

ANS:

54. What codons stop protein synthesis?

ANS:

55. Define translation & tell how it starts.

ANS:

56. What is an anticodon & where is it found on tRNA?

ANS:

57. What codon on mRNA would bind with these anticodons: (use your codon chart)

a. AAA

b. GGA

c. UAC

d. CGU

58. The start codon, AUG, pairs with what anticodon on a tRNA molecule?

ANS:

59. What amino acid does the start codon always carry?

ANS:

60. What type of bonds are the ones that attach amino acids to each other in a growing polypeptide?

ANS:

61. What would the translation of these mRNA transcripts produce?

a. UAA CAA GGA GCA UCC

ANS

b. UGA CCC GAU UUC AGC

ANS