### DNA & Protein Synthesis – Cue Cards

Cut out the diagrams and paste to one side of the cue card. Answer the questions on the other side.

#### 1

![Diagram of a nucleotide molecule]

<table>
<thead>
<tr>
<th>a. Name the molecule.</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>b. What are the 3 parts that make up</td>
<td></td>
</tr>
<tr>
<td>this molecule? Circle them.</td>
<td></td>
</tr>
<tr>
<td>c. What organic molecules are made up</td>
<td></td>
</tr>
<tr>
<td>of this structure?</td>
<td></td>
</tr>
</tbody>
</table>

(a) nucleotide  
(b) nitrogenous base  
(c) phosphate group  
(d) simple sugar  
(e) nucleic acids (DNA, RNA)

#### 2

![Diagram of a purine molecule]

| a. What group of bases is represented            |     |
| by this molecule?                                |     |
| b. Name the two bases that have this            |     |
| general structure.                               |     |
| c. Is this group of bases found in both         |     |
| DNA and RNA?                                     |     |

(a) purine  
(b) adenine, guanine  
(c) yes

#### 3

![Diagram of a pyrimidine molecule]

| a. What group of bases is represented            |     |
| by this molecule?                                |     |
| b. Name the three bases that have this          |     |
| general structure.                               |     |
| c. Is this group of bases found in both         |     |
| DNA and RNA? Explain.                           |     |

(a) pyrimidine  
(b) cytosine, thymine, uracil  
(c) cytosine is found in both DNA + RNA; thymine is only in DNA while uracil is only in RNA
4. a. What is being shown in this diagram?
b. Where would this process occur?
c. Which molecules would undergo this type of reaction?
   (a) condensation reaction
   (b) in replication and transcription to form a sugar-phosphate backbone
   (c) adjacent DNA nucleotides or adjacent RNA nucleotides

5. a. Name this structure.
b. Which molecules contain this structure?
   (a) ribose
   (b) RNA (mRNA, tRNA, rRNA)

6. a. Name this structure.
b. Which molecules contain this structure?
   (a) deoxyribose
   (b) DNA

7. a. Name this structure.
b. What role does this structure have in the process of protein synthesis?
c. What molecules make up this structure?
   (a) ribosome
   (b) moves along the mRNA exposing codons; site for protein synthesis
   (c) tRNA, protein
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a. Name this structure.

b. Compare and contrast this structure to the structure in cue card #8.

(a) RNA
(b) RNA

<table>
<thead>
<tr>
<th></th>
<th>DNA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 strand</td>
<td>2 strands</td>
</tr>
<tr>
<td>linear</td>
<td>helix</td>
</tr>
<tr>
<td>has A, T, C, G</td>
<td>has A, T, C, G</td>
</tr>
<tr>
<td>has ribose</td>
<td>has deoxyribose</td>
</tr>
</tbody>
</table>

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a. Name this structure.

b. Identify functions of this structure.

(a) DNA
(b) controls DNA replication 
   + transcription
   - introduces variation in a population through mutation or new gene combinations
   - controls cell division
   - comprises genes which determine an organism's traits

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a. Name this structure.
b. Where is this structure produced?
c. What is the process that produces this structure called?
d. What is the role of this structure in protein synthesis.

(a) RNA (mRNA)
(b) nucleus
(c) transcription
(d) determines the order and number of amino acids that join together to make a protein
11. (f) HL: helicase, primase, DNA polymerase I, DNA polymerase III, ligase

a. What process is illustrated here?
b. Describe the steps involved in this process.
c. Where does this process occur?
d. What is the end result of this process?
e. Why is this process deemed as being semi-conservative?
f. What enzymes are involved in this process?
(a) DNA replication
(b) see your notes for steps
(c) nucleus
(d) 2 identical molecules of DNA
(e) each DNA molecule consists of one new and one old strand
(f) SL: hom helicase, DNA polymerase

12. (a) transcription
(b) see your notes for steps
(c) nucleus
(d) mRNA
(e) RNA polymerase
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a. What process is illustrated here?
b. Describe the steps involved in this process.
c. Where does this process occur?
d. What is the end result of this process?
(a) translation
(b) see notes for steps
(c) in cytoplasm on a ribosome
(d) polypeptide (protein)

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a. Name this structure.
b. What is the role of this structure in the process of protein synthesis?
(a) tRNA
(b) carries amino acids to the ribosome to join together to make a polypeptide; complementary base pairing occurs between tRNA anticodon and mRNA codon