Open the TI-Nspire document *Transcription_Translation.tns.*

DNA is the blueprint of life, but how does a long piece of DNA control
the activity of a cell? DNA is **transcribed** into RNA, which can be
translated into the proteins that drive the activity in a cell.
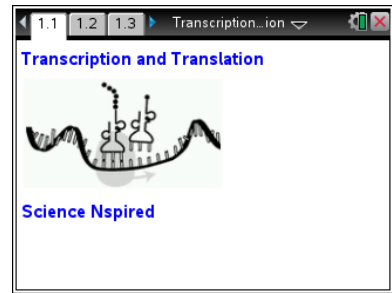This is the Central Dogma of biology:

DNA → RNA → Protein

In this lesson, you will explore **transcription** and **translation**.

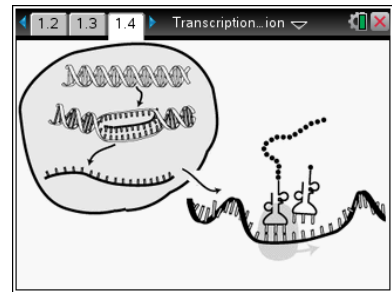Press ⌈ctrl⌉▶ and ⌈ctrl⌉◀ to
navigate through the lesson.

Part 1: The Central Dogma

Move to pages 1.3–1.4.

1. Read the information about the Central Dogma on page 1.3, and
    then move to page 1.4 to explore the different parts of the Central
    Dogma. When the small magnifying glass icon appears, click the
    image and an information box will appear. Click ☒ to close the
    box. If needed at any time during the simulation, you can press
    ⌈menu⌉ to view the directions again.

Move to pages 1.5–1.7. Answer questions 1-3 here and/or in the .tns file.

Q1.   Where does *transcription* happen?

    A.   Nucleus
    B.   Cytoplasm
    C.   Mitochondria
    D.   Cell Membrane

Q2.   Which statement is correct?

    A.   DNA is translated into protein.
    B.   RNA is translated in protein.
    C.   DNA is translated in RNA.
    D.   Protein is translated in RNA.

Q3.   Which enzyme(s) is(are) used in transcription and translation? (Select all that apply.)

    A.   DNA
    B.   Polymerase
    C.   Phosphatase
    D.   Ribosome

Part 2: DNA and RNA- Two Nucleic Acids

Move to pages 2.1–2.2.

2. Read the information about DNA and RNA on page 2.1. Then
    move to page 2.2 to explore characteristics of DNA and RNA.
    Click the right arrow of the clicker to view the similarities and
    differences.
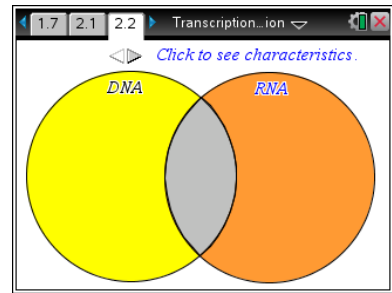
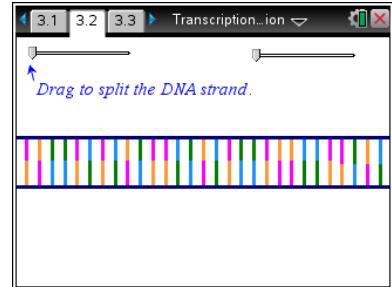**Move to pages 2.3–2.4. Answer questions 4-5 here and/or in the .tns file.**

Q4. State one difference between DNA and RNA.

Q5. What do RNA and DNA have in common?

Part 3: Transcription

Move to pages 3.1–3.3.

3. Read the information about the process of **transcription** on
    pages 3.1 and 3.2. Then move to page 3.3 to simulate
    transcription of a DNA strand. Follow the directions on the
    screen, grabbing the indicated slider.

Move to pages 3.4–3.5. Answer questions 6-7 here and/or in the .tns file.

Q6. What is the product of transcription?

   A. Polymerase
    B. Protein
    C. New DNA
    D. New RNA

Q7. What is one purpose of transcription?

Part 4: Translation

Move to pages 4.1–4.3.

4. Read the information about **translation** on pages 4.1 and 4.2. Then move to page 4.3 to explore the sequential components of translation. When the small magnifying glass icon appears, click the image and an information box will appear. Click ☒ to close the box. If needed at any time during the simulation, you can press menu to view the directions again.
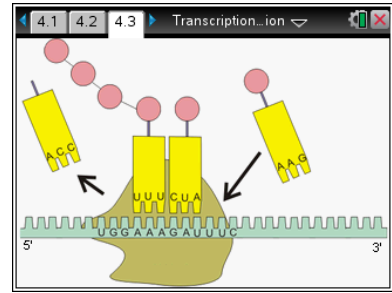
Move to pages 4.4–4.7. Answer questions 8-11 here and/or in the .tns file.

Q8. Which type(s) of RNA is/are essential for translation? (Select all that apply.)

    A. rRNA

    B. tRNA

    C. mRNA

    D. DNA

Q9. What does the ribosome do? (Select all that apply.)

    A. Translate mRNA

    B. Transcribe mRNA from DNA

    C. Match tRNA anti-codons to mRNA codons

    D. Match amino acids in proteins to mRNA codons

Q10. What is the product of translation?

Q11. Based on what you know about the Central Dogma, which molecule will be affected by a mutation in DNA?

Part 5: Translation Game

Move to pages 5.1–5.2.

5. Read the additional information about the process of translation on page 5.1. Then move to page 5.2 to play the translation game. Click the up and down arrows to choose a tRNA to match the mRNA codon in the ribosome. Then drag the tRNA to the ribosome. Click the Reset button ⏮ to go back to the beginning of the game.