



High School Science Virtual Learning

# Applied Biological Science

## DNA vs RNA

April 10, 2020



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## Lesson: April 10, 2020

### **Objective/Learning Target:**

Students will be able to compare and contrast structures and functions of DNA and RNA



## Let's Get Started:

1. What are the three components that make up a nucleotide monomer of DNA?
2. What is the function of DNA inside a cell?



## Let's Get Started: **Answers**

1. Bell ringer 1 Answer: Sugar (deoxyribose), Phosphate, Base
2. Bell ringer 2 Answer: DNA provides the template to make proteins, DNA is the “instructions” on how a cell will function



# Lesson Activity:

**Directions: Watch the video below. As you watch, create a graphic organizer showing the similarities and differences between a DNA and an RNA molecule.**

**Link(s):** [DNA v. RNA](#)

# Practice

As you watched the video, you created a graphic organizer showing the similarities and differences between DNA. Because your graphic organizer can be constructed many different ways, the information on the next two slides describes what information should appear in your organizer.

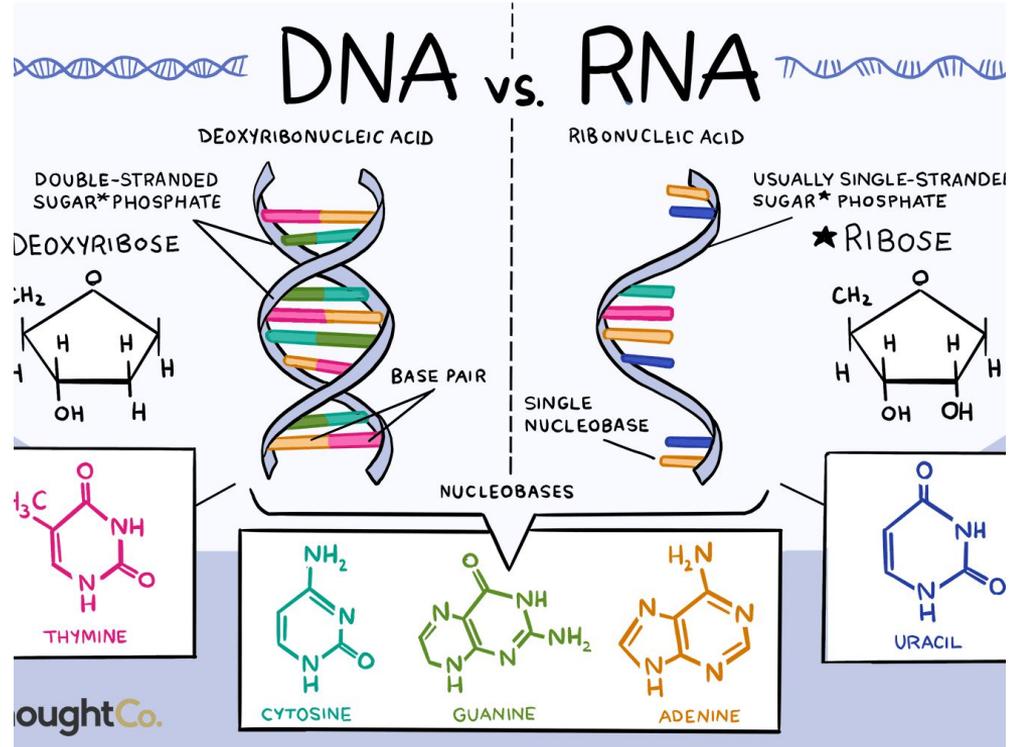
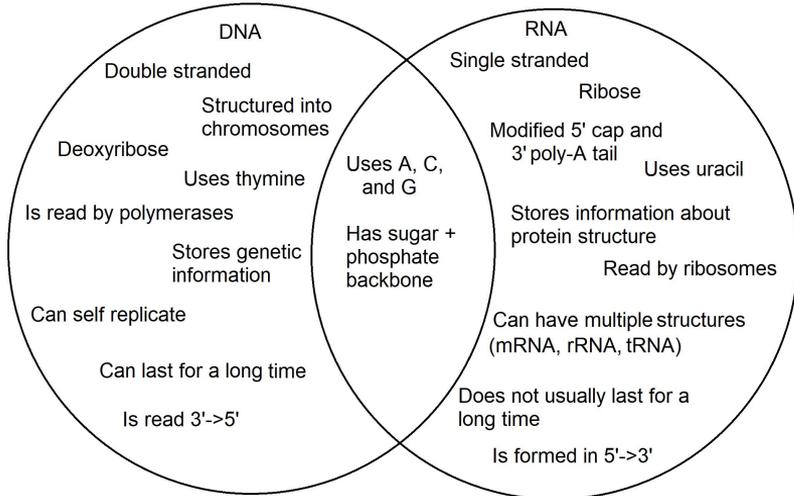
## Similarities between DNA and RNA

1. Both are made of monomers called nucleotides (sugar, phosphate, base)
2. Both contain adenine, guanine, and cytosine bases
3. Both contain a 5 sided (pentose) sugar
4. Both contain a phosphate group, linking nucleotides together
5. Both can be found inside the nucleus of the cell
6. Both are essential for the proper function of a living cell

## Differences between DNA and RNA

1. DNA is double stranded, RNA is a single stranded molecule
2. DNA uses the base Thymine, while RNA uses the base Uracil instead
3. DNA has deoxyribose as its sugar, RNA has ribose as its sugar
4. DNA is usually only found INSIDE the nucleus, while RNA is found outside of the nucleus, in the cytoplasm of the cell
5. There is only one type of DNA, but 3 types of RNA (mRNA, rRNA, tRNA)

# Example Graphic Organizers





# More Practice

You will use the information from the activity and video to answer the questions. Check your answers on the following slide when complete.

## More Practice Questions

1. What is the difference in the base pairing rules for DNA and RNA?
2. The what would be the complementary DNA strand for the following piece of DNA?     5' ATG GCT CTA CGT AAG 3'
3. How would that change if the complementary strand was RNA?



## More Practice Questions

4. The following table lists the relative percentages of bases of nucleic acids isolated from different species. Fill in the chart indicating what type of nucleic acid is present. Also include if it is single stranded or double stranded.

Species	Adenine	Guanine	Thymine	Cytosine	Uracil	DNA or RNA	Single or Double
A	21	29	21	29	0		
B	29	21	29	21	0		
C	21	21	29	29	0		
D	21	29	0	29	21		
E	21	29	0	21	29		

# Answer Key

Once you have completed the practice questions check with the work.

1. What is the difference in the base pairing rules for DNA and RNA? **In DNA, Adenine pairs with Thymine. RNA does not use Thymine bases, therefore Adenine pairs with Uracil instead.**
2. The what would be the complementary DNA strand for the following piece of DNA?     5' ATG GCT  
CTA CGT AAG 3'

**3' TAC CGA GAT GCA TTC 5'**

3. How would that change if the complementary strand was RNA? **If the complementary strand was RNA, Thymine would not be present. Instead, there would be Uracil bases.**

**3' UAC CGA CAU GCA UUC 5'**

# ANSWER KEY

4. The following table lists the relative percentages of bases of nucleic acids isolated from different species. Fill in the chart indicating what type of nucleic acid is present. Also include if it is single stranded or double stranded.

Species	Adenine	Guanine	Thymine	Cytosine	Uracil	DNA or RNA	Single or Double
A	21	29	21	29	0	DNA	Double
B	29	21	29	21	0	DNA	Double
C	21	21	29	29	0	DNA	Single
D	21	29	0	29	21	RNA	Double
E	21	29	0	21	29	RNA	Single



## Additional Practice and Resources

Video reviewing DNA. RNA information starts around 5:45 and ends at 6:30 in the video. [DNA Structure Video](#)

Article with practice questions at the end. To get to the questions look at the left hand side and select practice.

[Article](#)