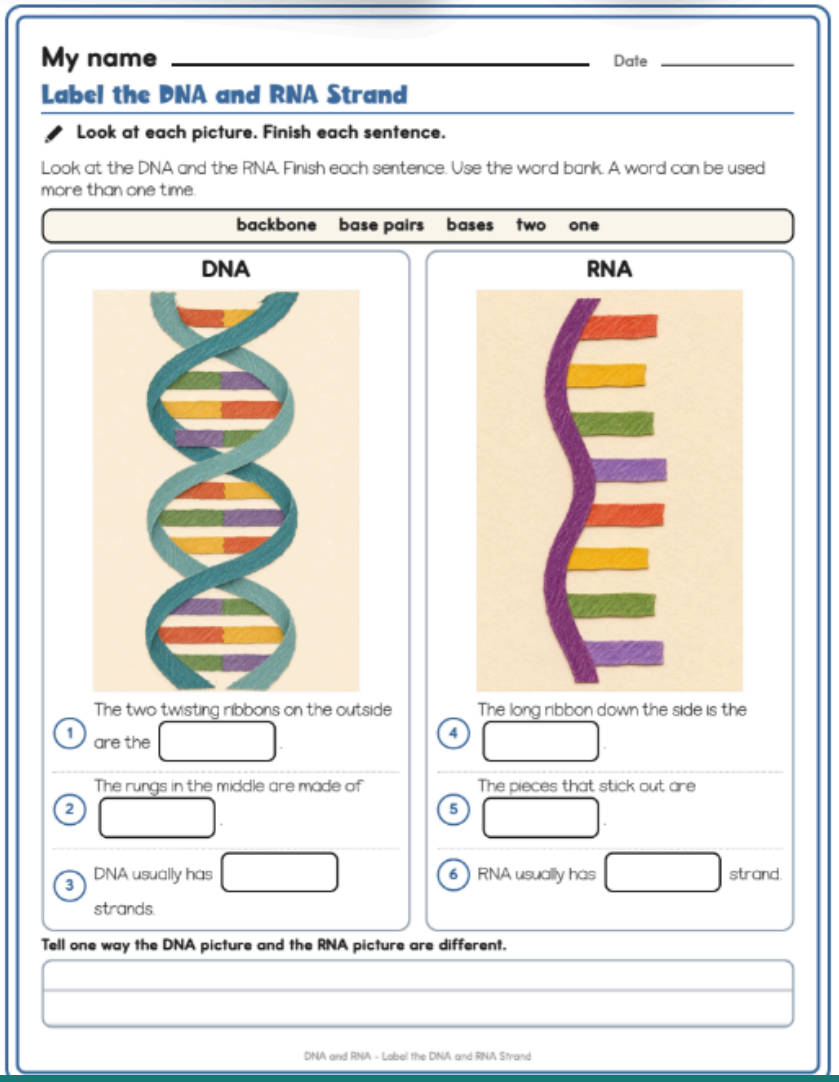
DNA AND RNA

WORKSHEETS GRADES 8-10



26 STUDENT PAGES

KEYS INCLUDED



My name _____ Date _____

Label the DNA and RNA Strand

Look at each picture. Finish each sentence.

Look at the DNA and the RNA. Finish each sentence. Use the word bank. A word can be used more than one time.

backbone	base pairs	bases	two	one

DNA

1. The two twisting ribbons on the outside are the _____.
2. The rungs in the middle are made of _____.
3. DNA usually has _____ strands.

RNA

4. The long ribbon down the side is the _____.
5. The pieces that stick out are _____.
6. RNA usually has _____ strand.

Tell one way the DNA picture and the RNA picture are different.

DNA and RNA - Label the DNA and RNA Strand

Bright Path Sped

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This is a fillable PDF

- Open it in a PDF reader (Adobe Acrobat Reader, Preview, or your browser), click into a line or a box, type, and Save As.
- The name line, every answer box, every ruled work box and every check box on the student pages are type-in fields, and so are the tracker, class grid, team note and family page. You can also print any page and write by hand.
- It works offline. No account, no subscription, no internet connection needed after you download it.

Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart. Every student page is black and white inside a colored border, so it still reads when copied in black and white.

Student work

A filled-in tracker, class grid or team note carries a real student's name. Keep it in the data folder, and use a first name only on any page that leaves your hands.

Need help?

If a field will not behave or a page will not print the way you expect, use Ask a Question on the product page before leaving a review. Every question is read, and a fix to the file ships as a free update: re-download it any time from My Purchases.

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PREVIEW

How To Read a Page

The parts of a student page, then the kinds of sheet in the order they come.

The parts of a page

- **The answer box.** A bordered box for a letter, a number or a word. Click it to type, or print and write in it.
- **The ruled work box.** Lines 0.34 inch apart for sentences. Write one idea to a line.
- **The check box.** True or false, right or mistake, yes or not yet: click or mark.
- **The word bank.** A box of words to use. Some words are used once, some not at all.
- **The cut line.** Nine pieces in a short grid, edge to edge: a few straight cuts across and down.

Kind of sheet	How many	What the student does
Readings and cards	4 sheets	Read, answer, and keep the cards to look things up.
Words and matching	3 sheets, 14 items	Match words; try a worked example.
Compare	2 sheets, 21 items	Fill in a chart of DNA and RNA, then a Venn diagram.
Kinds of RNA	1 sheet, 9 items	Name mRNA, tRNA or rRNA from a clue.
Transcribe	2 sheets, 26 items	Write the mRNA for 18 bases, then check 8 copies.
Order and sentences	2 sheets, 12 items	Put six steps in order, then fill in the sentences with the bank.
True or false and mistakes	3 sheets, 16 items	Check sentences, fix false ones, find Dev's mistakes.
Writing	2 sheets, 6 questions	Short answers with four ruled lines each.
Quizzes, exit tickets, cut and paste	12 items, 3 tickets, 18 pieces	Two quizzes, one exit sheet, two cut-and-paste pages.

Untimed, unscored on the page

No student page has a timer or a score on it. The keys and the tracker are for you. The answer keys are on pages 31 to 37.

Short answers

Their key (page 36) says what to look for, not one right sentence. Accept any answer that uses a fact from the readings or the cards.

Printing and the type-in fields

Every page prints clean in black and white. The name line, every answer box, every ruled box and every check box are type-in fields in any PDF reader: click one, type, then save. This is a fillable PDF, not a slideshow or a word-processor file.

Room to work

Short-answer boxes hold four lines. If a student needs more room, hand over one page a day, or let students write on scrap paper and copy their best sentences into the box.

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Label the DNA and RNA Strand

Look at each picture. Finish each sentence.

Look at the DNA and the RNA. Finish each sentence. Use the word bank. A word can be used more than one time.

backbone **base pairs** **bases** **two** **one**

DNA



1. The two twisting ribbons on the outside are the _____.
2. The rungs in the middle are made of _____.
3. DNA usually has _____ strands.

RNA



4. The long ribbon down the side is the _____.
5. The pieces that stick out are _____.
6. RNA usually has _____ strand.

Tell one way the DNA picture and the RNA picture are different.

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Reading 2: Three Kinds of RNA

Read about the three kinds of RNA. Then answer.

Making mRNA, and the three jobs of RNA

Cells make three main kinds of RNA. First, the cell makes **mRNA** in a step called **transcription**. In the nucleus, a part of one DNA strand, the **template**, is read, and each DNA base is matched with an RNA base: A with U, T with A, G with C and C with G. **Messenger RNA (mRNA)** carries the message to a ribosome. **Ribosomal RNA (rRNA)** is part of the ribosome, where proteins are built. **Transfer RNA (tRNA)** brings amino acids to the ribosome. The ribosome reads the mRNA and joins the amino acids into a protein.

Main idea: What is this reading mostly about?

Check what you read. Write the letter in the box.

1. Where does transcription happen in the cell?
   - **A** On the ribosome
   - **B** Outside the cell
   - **C** In the nucleus

2. Which RNA carries the message to a ribosome?
   - **A** Messenger RNA (mRNA)
   - **B** Transfer RNA (tRNA)
   - **C** Ribosomal RNA (rRNA)

3. What does tRNA bring to the ribosome?
   - **A** DNA
   - **B** Amino acids
   - **C** Sugars

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Cell Words

Match each word to what it means.

Write the letter of the meaning in the box. Use the readings to help you.

1	**nucleus**		A	One building block of a protein.
2	**cytoplasm**		B	The part of the cell that holds the DNA.
3	**ribosome**		C	A tiny cell part where proteins are built.
4	**protein**		D	One building block of DNA or RNA.
5	**amino acid**		E	The jelly-like part of the cell outside the nucleus.
6	**nucleotide**		F	A molecule built from amino acids that does jobs in the cell.

Use two of the words in one sentence about DNA.

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Match the DNA and RNA Words

Match each word to what it means.

Write the letter of the meaning in the box. Use the cards to help you.

1	**DNA**		**A**	Making an RNA copy of part of a DNA strand.
2	**RNA**		**B**	The sugar in DNA.
3	**Ribose**		**C**	The molecule that stores the instructions, usually in two strands.
4	**Deoxyribose**		**D**	The base in DNA that pairs with adenine.
5	**Uracil**		**E**	The DNA strand that is read to make the RNA.
6	**Thymine**		**F**	A molecule that helps use the instructions, usually in one strand.
7	**Transcription**		**G**	The base in RNA that is matched with adenine.
8	**Template**		**H**	The sugar in RNA.

Pick one pair. Tell how the two things are connected.

PREVIEW

My name _____ Date _____

Which RNA?

Which RNA is it? Write its name.

Each kind of RNA fits three clues. Write mRNA, tRNA or rRNA for each clue.

mRNA tRNA rRNA

1. It carries a copy of the message from the nucleus to a ribosome. ☐
2. It is part of the ribosome. ☐
3. It brings amino acids to the ribosome. ☐
4. Together with proteins, it makes up a ribosome. ☐
5. The ribosome reads its message three bases at a time. ☐
6. It carries one amino acid at a time. ☐
7. Its name means transfer RNA. ☐
8. Its name means messenger RNA. ☐
9. Its name means ribosomal RNA. ☐

Pick one clue. Tell how the card helped you.

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Check the mRNA Copy

Is the mRNA right? Check one.

The top strand is the DNA template. Check right if the mRNA under it is correct. Check mistake if it is not.

1	DNA	T A C G T	☐ right	☐ mistake
	mRNA	A U G C A		
2	DNA	G G C T A	☐ right	☐ mistake
	mRNA	C C G T A		
3	DNA	C G A T T	☐ right	☐ mistake
	mRNA	G C U A A		
4	DNA	A T G C A	☐ right	☐ mistake
	mRNA	U A C G U		
5	DNA	C A T G G	☐ right	☐ mistake
	mRNA	G U U C C		
6	DNA	T T A G C	☐ right	☐ mistake
	mRNA	A A U C G		
7	DNA	A C C T G	☐ right	☐ mistake
	mRNA	U G G A C		
8	DNA	G C A T A	☐ right	☐ mistake
	mRNA	C G U A T		

Pick one mistake. Write the right mRNA for that DNA.

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Fill In the Story

Fill in each blank. Use the word bank.

Read the sentences. Fill each blank with a word from the bank. Two words are not used.

ribose	**uracil**	**transcription**	**messenger**
adenine	**ribosome**	**thymine**	**deoxyribose**

1. The sugar in DNA is deoxyribose. The sugar in RNA is _____.

2. DNA has the base thymine. RNA has the base _____ instead.

3. Making an RNA copy of part of a DNA strand is called _____.

4. The RNA that carries the message is called _____ RNA.

5. In transcription, the DNA base T is matched with _____.

6. The mRNA goes from the nucleus to a _____.

Pick one sentence. Tell whether it is about DNA or RNA.

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Short Answers 1

Answer each question in sentences.

Use facts from the readings and the cards. Write in sentences.

1. Name two ways RNA is different from DNA.

2. What is the main job of DNA? What is the job of RNA?

3. Name the three bases that DNA and RNA share. Which base is different?

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Find the Mistake

Find the mistake. Then fix it.

Dev is made up for practice. Each sentence has one mistake.

1 **Dev wrote:**

"RNA has the base thymine."

What is wrong?

Write it the right way.

2 **Dev wrote:**

"DNA is usually one strand, and RNA is usually two."

What is wrong?

Write it the right way.

3 **Dev wrote:**

"The DNA template reads T-A-C, so the mRNA reads A-T-G."

What is wrong?

Write it the right way.

4 **Dev wrote:**

"tRNA is part of the ribosome."

What is wrong?

Write it the right way.

PREVIEW

My name _____ Date _____

Exit Tickets

Answer each ticket before you go.

Each ticket takes about two minutes. Your teacher may collect them at the door.

1. Name two differences between DNA and RNA.

2. A DNA template reads G-A-T. Write the mRNA.

3. What is one question about RNA that you still have?

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Cut and Paste: Make the mRNA

Cut out the nine pieces. Paste the mRNA base next to each DNA base.

Each DNA base in the top box needs its mRNA partner. Find the right piece and paste it in the empty box.

1 **T** DNA	2 **A** DNA	3 **C** DNA
4 **G** DNA	5 **G** DNA	6 **A** DNA
7 **T** DNA	8 **C** DNA	9 **A** DNA

Cut on the dashed lines: nine pieces, two cuts across and two cuts down.

U uracil	G guanine	A adenine
U uracil	C cytosine	C cytosine
U uracil	G guanine	A adenine

Check one pair. Tell the rule you used.

PREVIEW

Answer Key: Readings, Words, Matching

Every letter is the position of the right option in the printed list.

Readings pages 6, 7

Item	Letter	Answer
6.1	A	Ribose
6.2	B	Two
6.3	C	Uracil
7.1	C	In the nucleus
7.2	A	Messenger RNA (mRNA)
7.3	B	Amino acids

Cell Words page 10

Word	Letter	Meaning
1. nucleus	B	the part of the cell that holds the DNA
2. cytoplasm	E	the jelly-like part of the cell outside the nucleus
3. ribosome	C	a tiny cell part where proteins are built
4. protein	F	a molecule built from amino acids that does jobs in the cell
5. amino acid	A	one building block of a protein
6. nucleotide	D	one building block of DNA or RNA

Match the Words page 12

Word	Letter	Meaning
1. DNA	C	The molecule that stores the instructions, usually in two strands
2. RNA	F	A molecule that helps use the instructions, usually in one strand
3. Ribose	H	The sugar in RNA
4. Deoxyribose	B	The sugar in DNA
5. Uracil	G	The base in RNA that is matched with adenine
6. Thymine	D	The base in DNA that pairs with adenine
7. Transcription	A	Making an RNA copy of part of a DNA strand
8. Template	E	The DNA strand that is read to make the RNA

Which RNA? page 15

Clue	RNA
1. It carries a copy of the message from the nucleus to a ribosome.	mRNA
2. It is part of the ribosome.	rRNA
3. It brings amino acids to the ribosome.	tRNA
4. Together with proteins, it makes up a ribosome.	rRNA
5. The ribosome reads its message three bases at a time.	mRNA
6. It carries one amino acid at a time.	tRNA
7. Its name means transfer RNA.	tRNA
8. Its name means messenger RNA.	mRNA
9. Its name means ribosomal RNA.	rRNA

PREVIEW

Answer Key: True or False, Mistakes

The student in Find the Mistake is invented. Accept any wording that fixes a false sentence or a mistake.

True or False pages 20, 21

Item	Answer	The fix
20.1	True	-
20.2	False	DNA has thymine. Uracil is a base of RNA.
20.3	True	-
20.4	True	-
20.5	False	In RNA, adenine is matched with uracil.
20.6	True	-
21.1	True	-
21.2	False	T is matched with A. A is matched with U.
21.3	True	-
21.4	True	-
21.5	False	tRNA brings amino acids to the ribosome.
21.6	False	The DNA stays in the nucleus. Only the mRNA copy leaves.

Find the Mistake page 24

Item	What went wrong	Right sentence
24.1	One base is wrong.	RNA has uracil in place of thymine.
24.2	The two are swapped.	DNA is usually two strands, and RNA is usually one.
24.3	The mRNA has a T in it.	The mRNA reads A-U-G. RNA has U, not T.
24.4	The wrong kind of RNA.	rRNA is part of the ribosome. tRNA brings amino acids.

PREVIEW

Answer Key: Short Answers

These pages have no single right sentence. Accept any answer that uses a fact from the readings or the cards.

Short answers: what to look for pages 22, 23

Item	Look for
22.1	Any two of: RNA has ribose and DNA has deoxyribose; RNA has uracil where DNA has thymine; RNA usually has one strand and DNA usually has two.
22.2	DNA stores the instructions for the cell. RNA helps use the instructions to build proteins.
22.3	Adenine, guanine and cytosine are in both. DNA has thymine and RNA has uracil.
23.1	A-U-G-C. Each DNA base is matched with its RNA partner: T gets A, A gets U, C gets G and G gets C.
23.2	mRNA carries the message to a ribosome. rRNA is part of the ribosome. tRNA brings amino acids to the ribosome.
23.3	A part of the DNA opens and one strand is read. RNA bases are matched to the template and joined to make mRNA. The mRNA comes off and leaves the nucleus. Accept any answer with the matching and the mRNA strand.

Reading a short answer

- Look first for the fact: the sugar, the base, the strand count, the matching rule or the kind of RNA.
- Then look for a complete sentence that uses a word from the readings or the cards.
- A partly right answer is a prompt to reread the matching card together, not a mark against the student.

PREVIEW

DNA and RNA Tracker

One student, every scored sheet. Filled example: page 42.

Student _____ Teacher _____ Month _____

Page	Page type and set	Items	Right	Date	Notes
5	Label the DNA and RNA Strand	6			
6	Reading 1: DNA and RNA Side by Side	3			
7	Reading 2: Three Kinds of RNA	3			
10	Cell Words	6			
12	Match the DNA and RNA Words	8			
13	Compare DNA and RNA: Fill In the Chart	12			
14	DNA and RNA Venn Diagram	9			
15	Which RNA?	9			
16	Transcribe: Write the mRNA	18			
17	Check the mRNA Copy	8			
18	Put the Steps in Order	6			
19	Fill In the Story	6			
20	True or False 1	6			
21	True or False 2	6			
24	Find the Mistake	4			
25	Quiz A	6			
26	Quiz B	6			
29	Cut and Paste: Make the mRNA	9			
30	Cut and Sort: Three Kinds of RNA	9			

How to fill this in

Write how many items the student got right with no prompt, and the date. A blank means not tried yet, never wrong. There are 140 items on the 19 scored sheets. Answer keys: pages 31 to 37. Filled example: page 42.

This unit we are working on (your own standard or wording)

PREVIEW

Team Note

Use this page between team meetings or when a student moves classes, to hand off what changed without writing a note from scratch. Everything below is observable, with a blank for the number or the wording your team already uses.

Student _____ Team member _____ Date _____

Kind of sheet	Covered since last note (Y/N)	Items right	Still blank
Readings and words			
Matching and compare			
Which RNA			
Transcribe			
Order and sentences			
True or false			
Quizzes			
Cut and paste			

What I saw (observable, not a conclusion)

- Filled in ___ of 12 boxes of the comparison chart (page 13).
- Placed ___ of 9 facts in the right part of the Venn diagram (page 14).
- Wrote ___ of 18 mRNA bases correctly (page 16).
- Got ___ of 12 true or false sentences right (pages 20, 21).
- Explained what mRNA, tRNA and rRNA each do in a complete sentence: yes / no / with a reminder.

Next step

- Next page or set: ___, because ___ (what you saw).
- What to try in another class or at home: ___.
- What to keep doing because it is working: ___.
- Anything for the team meeting to decide: ___ (this page records what happened, never a label or a plan).

Summary, in one or two sentences, for whoever reads this next

A filled-in line, for reference

"Got 5 of 6 true or false sentences right on 10/17. Next step: reread Reading 2 and ask which RNA carries the message to the ribosome." That is the level of detail this page is built for. It matches the filled example on page 42.

PREVIEW

Riley's Tracker (Invented Student)

Riley M. is invented; nothing on this page describes a real student. The blank tracker is on page 38.

Student: Riley M. (an invented student)

Teacher: Ms. Patel (invented)

Month: October

Page	Page type and set	Items	Right	Date	Notes
5	Label the DNA and RNA Strand	6	4	10/5	Mixed up bases and base pairs
6	Reading 1: DNA and RNA Side by Side	3	3	10/6	-
7	Reading 2: Three Kinds of RNA	3	2	10/7	Chose tRNA for the message
10	Cell Words	6	5	10/8	Mixed up nucleus and cytoplasm
12	Match the DNA and RNA Words	8	6	10/9	Swapped ribose and deoxyribose
13	Compare DNA and RNA: Fill In the Chart	12	9	10/10	Wrote T as an RNA base
14	DNA and RNA Venn Diagram	9	7	10/13	Put thymine in the middle
15	Which RNA?	9	7	10/13	Mixed up tRNA and rRNA
16	Transcribe: Write the mRNA	18	14	10/14	Wrote T instead of U
17	Check the mRNA Copy	8	8	10/15	-
18	Put the Steps in Order	6	5	10/16	Put the ribosome step too early
19	Fill In the Story	6	6	10/16	-
20	True or False 1	6	6	10/17	-
21	True or False 2	6	5	10/17	Thought the DNA is used up
24	Find the Mistake	4	3	10/20	Missed the tRNA sentence
25	Quiz A	6	6	10/21	-
26	Quiz B	6	5	10/21	Missed which RNA is in the ribosome
29	Cut and Paste: Make the mRNA	9	7	10/22	Pasted two C pieces where G goes
30	Cut and Sort: Three Kinds of RNA	9	-	-	-

How to read it

Riley M. has done **18 of 19** scored sheets and got **108 of 131** items right with no prompt. **5** sheets were all right and **13** carry a note. Every number comes from the table.

What the table points to

The lowest sheet is Label the DNA and RNA Strand (4 of 6) and Reading 2: Three Kinds of RNA (2 of 3). That is where the next practice goes. The 1 sheet left blank is not tried yet, never wrong.

PREVIEW