DR. LEWICKI, PHD · EDUCATIONAL SONGS

You Only Get One Shot (Translate It Right)

Lyric Sheet · Grades 6–9 · Science (Life Science)

Translation: how a ribosome reads mRNA, three letters at a time, to build a protein. Line numbers make it easy to point to a line in class. Timestamps show where each section starts in the video.

INTRO 0:03

1 Listen...
2 One message
3 Three letters at a time
4 One chain
5 And every protein you've got was read off a message in threes
6 Will you translate it right?
7 Or lose the frame?

VERSE 1 0:32

8 Translation reads the mRNA and turns the message into a protein, link by link,
9 The reader is a ribosome — a small and a large subunit — rRNA and protein, no membrane, smaller than you'd think.
10 Some float free in the cytoplasm, making proteins that stay inside the cell,
11 Some sit on the rough ER, making proteins for the membrane or to ship out as well.
12 The small subunit grabs the message and slides along to the start codon — AUG,
13 That's methionine, the first amino acid — and the reading frame is set from that first three.
14 Every three bases is a codon — read in order, no gaps, no overlaps, down the line,
15 Sixty-four codons, twenty amino acids — so most amino acids have more than one sign.

PRE-CHORUS 1 1:26

16 tRNAs are the carriers — an anticodon on one end, an amino acid on the other,
17 The anticodon pairs with the codon — UAC matches AUG — then in slides another.
18 The ribosome links the amino acids with a peptide bond — and its own RNA makes that bond,
19 The empty tRNA lets go and leaves to reload — and the chain grows on and on.
20 At a stop codon — UAA, UAG or UGA — no tRNA fits, and a release factor frees the chain,
21 Message in, protein out — three letters at a time, again and again.

CHORUS 1 2:00

22 **You only get one shot — translate it right,**
23 Read the message in threes — every codon in the frame, keep it tight,
24 Start at AUG — methionine leads the way,
25 tRNAs bring the pieces — anticodons match what the codons say.
26 This is your moment — build the chain,
27 Peptide bonds link it up — link by link, again and again,
28 You only get one shot — till a stop codon calls the end,
29 Then the chain lets go and folds — a protein, ready to send.

VERSE 2 2:25

30 Worked example — read it in threes: AUG, UUU, GGC, UAA,
31 AUG's methionine, UUU's phenylalanine, GGC's glycine — then UAA says stop, no more today.
32 Three amino acids, two peptide bonds — short, but the rule's the same for the long ones too,
33 Insulin has fifty-one amino acids — titin, in your muscles, has over thirty thousand, too.
34 Shift the frame by one base, and every codon after it changes — the words come out wrong,
35 That's why the start codon matters — it sets where every three begins, all along.
36 Many ribosomes can read one message at once — a polysome, many readers on one thread,
37 Each one adds a few amino acids a second — many copies of the protein from one message read.
38 Almost every living thing uses the same codons — bacteria, plants and you,
39 So bacteria or yeast given the human insulin code can make real human insulin too.
40 Bacteria's ribosomes are smaller than ours — so some antibiotics jam theirs and mostly leave ours alone,
41 A different shape, a different target — that's how a drug can stop the germ and not your own.

PRE-CHORUS 2 3:35

Check the facts before you write — the anticodon's on the tRNA, the codon's on the mRNA,
Ribosomes have no membrane — and in a eukaryote, translation's out in the cytoplasm, not the nucleus — that's the way.
A stop codon doesn't code an amino acid — it ends the chain, nothing more,
The mRNA isn't changed by being read — another ribosome can read it, like the one before.
Message in threes, from the start to the stop — keep the frame, keep the order in your mind,
Translate it right — and you'll never leave a link behind.

CHORUS 2 4:05

Repeat the chorus (Chorus 1)

BRIDGE 4:33

Breathe. Find the start.
Small subunit on the message.
AUG. Methionine.
Codon. Anticodon. Match.
Peptide bond. Next three.
Stop codon. Let go.
The chain folds into a protein.
Now write it down — and translate it right.

CHORUS 3 4:51

Repeat the chorus (Chorus 1)

OUTRO 5:17

Ribosome...
Codon...
Anticodon...
tRNA...
Peptide...
Chain...
One shot...
Translated.

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You Only Get One Shot (Translate It Right)

Fill in the Blanks · Grades 6–9 · Science (Life Science)

Name _____ Date _____ Period _____

Listen to the song and fill in each blank. Use the word bank. Some words are used more than once.

WORD BANK

amino acids · anticodon · anticodons · AUG · codon · cytoplasm · folds · methionine · mRNA · peptide bond · release factor · reload · ribosome · rough ER · start codon · stop codon · subunit · tRNA · UAC

VERSE 1 0:32

Translation reads the (1) _____ and turns the message into a protein, link by link,
The reader is a (2) _____ — a small and a large subunit — rRNA and protein, no membrane, smaller than you'd think.
Some float free in the cytoplasm, making proteins that stay inside the cell,
Some sit on the (3) _____, making proteins for the membrane or to ship out as well.
The small subunit grabs the message and slides along to the (4) _____ — AUG,
That's (5) _____, the first amino acid — and the reading frame is set from that first three.
Every three bases is a (6) _____ — read in order, no gaps, no overlaps, down the line,
Sixty-four codons, twenty (7) _____ — so most amino acids have more than one sign.

PRE-CHORUS 1 1:26

tRNAs are the carriers — an (8) _____ on one end, an amino acid on the other,
The anticodon pairs with the codon — (9) _____ matches AUG — then in slides another.
The ribosome links the amino acids with a (10) _____ — and its own RNA makes that bond,
The empty tRNA lets go and leaves to (11) _____ — and the chain grows on and on.
At a stop codon — UAA, UAG or UGA — no tRNA fits, and a (12) _____ frees the chain,
Message in, protein out — three letters at a time, again and again.

CHORUS 1 2:00

You only get one shot — translate it right,
Read the message in threes — every codon in the frame, keep it tight,
Start at (13) _____ — methionine leads the way,
tRNAs bring the pieces — (14) _____ match what the codons say.
This is your moment — build the chain,
Peptide bonds link it up — link by link, again and again,
You only get one shot — till a (15) _____ calls the end,
Then the chain lets go and folds — a protein, ready to send.

PRE-CHORUS 2 3:35

Check the facts before you write — the anticodon's on the (16) _____, the codon's on the mRNA,
Ribosomes have no membrane — and in a eukaryote, translation's out in the (17) _____, not the nucleus — that's the way.

A stop codon doesn't code an amino acid — it ends the chain, nothing more,
The mRNA isn't changed by being read — another ribosome can read it, like the one before.
Message in threes, from the start to the stop — keep the frame, keep the order in your mind,
Translate it right — and you'll never leave a link behind.

BRIDGE 4:33

Breathe. Find the start.
Small **(18)** _____ on the message.
AUG. Methionine.
Codon. Anticodon. Match.
Peptide bond. Next three.
Stop codon. Let go.
The chain **(19)** _____ into a protein.
Now write it down — and translate it right.

ANSWER KEY

1. mRNA
2. ribosome
3. rough ER
4. start codon
5. methionine
6. codon
7. amino acids
8. anticodon
9. UAC
10. peptide bond
11. reload
12. release factor
13. AUG
14. anticodons
15. stop codon
16. tRNA
17. cytoplasm
18. subunit
19. folds

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You Only Get One Shot (Translate It Right)

Vocabulary · Grades 6–9 · Science (Life Science)

15 terms from the song, in the order they come up.

Term	What it means	Where it's in the song
Translation	Building a protein by reading the code in mRNA.	*“Translation reads the mRNA and turns the message into a protein”*
mRNA	Messenger RNA: a copy of one gene that carries the message from DNA to a ribosome.	*“Translation reads the mRNA”*
Ribosome	The cell's reader: it reads mRNA and links amino acids into a chain. It has no membrane.	*“The reader is a ribosome”*
Subunit	One of the ribosome's two parts, small and large, made of rRNA and protein.	*“a small and a large subunit”*
Start codon	AUG, the codon where translation begins.	*“slides along to the start codon — AUG”*
Methionine	The amino acid AUG codes for, so it's the first in every new chain.	*“That's methionine, the first amino acid”*
Reading frame	The way the bases are grouped into threes, set by the start codon.	*“the reading frame is set from that first three”*
Codon	Three bases on the mRNA that code for one amino acid or say stop.	*“Every three bases is a codon”*
Amino acid	One of the 20 building blocks that link into a protein.	*“Sixty-four codons, twenty amino acids”*
tRNA	Transfer RNA: carries one amino acid to the ribosome.	*“tRNAs are the carriers”*
Anticodon	Three bases on a tRNA that pair with a matching codon.	*“an anticodon on one end, an amino acid on the other”*
Peptide bond	The link between two amino acids in a chain, made by the ribosome's rRNA.	*“The ribosome links the amino acids with a peptide bond”*
Stop codon	UAA, UAG or UGA: no amino acid, it ends the chain.	*“At a stop codon — UAA, UAG or UGA”*
Release factor	A protein that fits a stop codon and frees the finished chain.	*“a release factor frees the chain”*
Polysome	Many ribosomes reading one mRNA at the same time.	*“a polysome, many readers on one thread”*

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You Only Get One Shot (Translate It Right)

Quiz · Grades 6–9 · Science (Life Science)

Name _____ Date _____ Period _____

Circle the best answer. For question 10, write your answer on the lines.

1. **What does a ribosome read during translation?**
   A. DNA, inside the nucleus
   B. mRNA
   C. Only tRNA
   D. The amino acids themselves

2. **Which codon starts translation, and what does it code for?**
   A. UAA, which says stop
   B. AUG, which codes for methionine
   C. UUU, which codes for phenylalanine
   D. GGC, which codes for glycine

3. **How many bases make up one codon?**
   A. One
   B. Two
   C. Three
   D. Four

4. **There are 64 codons but only 20 amino acids. What does that mean?**
   A. Each codon codes for two amino acids
   B. Most amino acids have more than one codon
   C. Each amino acid has exactly three codons
   D. Some amino acids are never used

5. **Where is the anticodon found?**
   A. On the mRNA
   B. On the tRNA
   C. On the ribosome's large subunit
   D. On the amino acid

6. **Which anticodon pairs with the codon AUG?**
   A. AUG
   B. UAC
   C. TAC
   D. UAA

7. **What makes the peptide bond between two amino acids?**
   A. The tRNA's anticodon
   B. The ribosome's own RNA (rRNA)
   C. A release factor
   D. The nucleus

8. **What happens at a stop codon?**
   A. A tRNA brings one last amino acid
   B. No tRNA fits, and a release factor frees the chain
   C. The ribosome jumps back to AUG
   D. The mRNA is destroyed right away

9. **Why can some antibiotics stop bacteria without stopping your own cells?**
   A. Bacteria have no ribosomes
   B. Bacterial ribosomes are smaller and shaped differently from ours
   C. Antibiotics only work inside the nucleus
   D. Your cells don't make proteins

10. **Short answer: Translate the mRNA AUG-UUU-GGC-UAA. Name each amino acid, say how many peptide bonds the chain has, and explain what UAA does.**

ANSWER KEY

1. B mRNA

2. B AUG, which codes for methionine

3. C Three

4. B Most amino acids have more than one codon

5. B On the tRNA

6. B UAC

7. B The ribosome's own RNA (rRNA)

8. B No tRNA fits, and a release factor frees the chain

9. B Bacterial ribosomes are smaller and shaped differently from ours

10. Methionine, phenylalanine, glycine (Met-Phe-Gly), joined by 2 peptide bonds. UAA is a stop codon: no tRNA fits it, so a release factor frees the chain, and it adds no amino acid.

EXIT TICKET **Translate It Right**

Name _____ Date _____

1. What is a codon, and how many bases does it have?

2. Put these in order: peptide bond · ribosome finds AUG · stop codon · tRNA brings an amino acid.

3. In one sentence: what's the difference between a codon and an anticodon?

✂️

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Name _____ Date _____

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3. In one sentence: what's the difference between a codon and an anticodon?

ANSWER KEY

1. Three bases on the mRNA that code for one amino acid (or say stop).
2. Ribosome finds AUG, tRNA brings an amino acid, peptide bond, stop codon.
3. A codon is three bases on the mRNA; an anticodon is the matching three bases on a tRNA.

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Lead Sheet · Grades 6–9 · Science (Life Science)

Key	B♭ major (estimated from the recording)
Tempo	About 152 beats per minute (estimated), 4/4
Length	6:00
Style	Alternative rock anthem: cinematic strings and a single piano note in the intro, driving live drums, overdriven guitars, male and female vocals trading verses, a spoken-word bridge over swelling strings
Hook	★ **“You only get one shot — translate it right”**

Chords and melody aren't written out yet. Full sheet music is planned.

FORM

Section	Starts	What it covers
Intro	0:03	Spoken setup: one message, three letters at a time, one chain
Verse 1	0:32	The ribosome, free vs. rough ER, the start codon AUG, codons and the reading frame, 64 codons for 20 amino acids
Pre-Chorus 1	1:26	tRNA and anticodons, peptide bonds, stop codons and the release factor
Chorus 1	2:00	★ The hook: read it in threes, from AUG to the stop codon
Verse 2	2:25	Worked example AUG-UUU-GGC-UAA, insulin vs. titin, frameshifts, polysomes, one code for nearly all life, antibiotics
Pre-Chorus 2	3:35	Check the facts: codon vs. anticodon, no membrane, the cytoplasm, stop codons, mRNA read again
Chorus 2	4:05	★ The hook: read it in threes, from AUG to the stop codon
Bridge	4:33	Spoken word: translation, step by step
Chorus 3	4:51	★ The hook: read it in threes, from AUG to the stop codon
Outro	5:17	The key terms, one word at a time

LYRICS BY SECTION

INTRO 0:03

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One chain
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So bacteria or yeast given the human insulin code can make real human insulin too.
Bacteria's ribosomes are smaller than ours — so some antibiotics jam theirs and mostly leave ours alone,
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CHORUS 2 4:05

★ *Repeat the chorus (Chorus 1)*

BRIDGE 4:33

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CHORUS 3 4:51

★ *Repeat the chorus (Chorus 1)*

OUTRO 5:17

Ribosome...
Codon...
Anticodon...
tRNA...
Peptide...
Chain...
One shot...
Translated.