

# READING WRITING IN THE DISCIPLINES

## Using Scientific Discourse Video Transcript

### **Mary Murphy:**

Okay, let's do our challenge problem. So let's see if you guys can answer this.

The idea behind the challenge question is, after reviewing the basics of transcription-translation is, okay, can we apply this to some unknown situation that we haven't seen before?

So here's our situation. The red is our gene, right? The blue transcription factor and the image to the right is inhibited, which means physically blocked, by the green poison -- that little gremlin dude that's sitting on the top. What are the effects on the regulation of this particular gene?

Who cares if you can name the steps of this or name the steps of that, but if I say to you, "There's this poison and this is the effect of this poison on this process," can you predict the consequences?

Talk at your tables and brainstorm.

Active engagement is what is going to make the reading more fun. Because they invest in the activity, they realize to communicate their understanding, they have to know the words. That goes hand in hand.

This poison happens to block, or inhibit, that transcription factor...

What effects do you guys think that might have?

I really, really try not to have extended lecture, especially in a sophomore class because attention span is just simply not there. And if they're not practicing what you're talking about, they're not taking it in. So I'll break a lot of things up like, "Talk to your group about this." I'll throw out a question and say, "I don't want hands right now, I want you do brainstorm at your table."

### **Student:**

Well, I guess depending on what... what the... purpose of the cell is.

**Murphy:**

In looking at protein synthesis, the big idea is, you've heard about this molecule called DNA, everybody tells you it's the code. Well, how does that work? What is it a code for? And so, in order to understand that bigger question, they have to break it down into these steps.

**Student:**

It's definitely on if the transcription factor is on it, right?

**Student:**

Yeah.

**Student:**

Does that make a tumor if the transcription factor can't, like, leave the gene?

**Student:**

Because you think it'll, like, build up, and, like...?

**Student:**

Well, like, actually because, like, if it stopped, it can't record RNA, so it probably doesn't make...

**Griffin:**

The transcript of the DNA or the RNA, that is created by the RNA polymerase.

I definitely do like group conversations just because you can help others to expand their knowledge, but they can also help you, and it definitely, like... it works as a conversation as opposed to limiting yourself to just trying to explain it using what only you know. If we're ever confused or stuck, we'll raise our hand or ask for Mary, and she'll come over, and she'll try and give us a hint. She won't fully explain it but she'll say, like, "Well, think about this or think about that."

**Murphy:**

And what do you think about the other two? How do you think they're made? How do you think every RNA is made?

Mostly, I'm observing when I'm walking around the classroom, and interjecting if I see a particular student struggling or if maybe they're headed down a path that's wrong and I know that it's going to derail them for the rest of the period.

Maybe just look at your diagram so that you're not looking at the written out steps?

Oftentimes I'll say, "Individually, I want you to write about this question. Then I want you to share it with someone at your table. Then we're going to go into the full group." So really emphasize that participation is more than raising your hand and answering.

**Griffin:**

For one, the first one was T-A-G, so then that can be created... or that can be translated into A-U-C.

**Murphy:**

My goal is, if they can teach it to each other, that means that they know it. And if in trying to explain something to someone, they get tripped up, then it's a good indicator to them that, "Oh, I've got to go review that." Something I really emphasize is, if you can explain it to somebody else, then you actually understand it. If you find yourself not being able to help that student, then call me over and then as a group we'll try to see where your explanation is breaking down.

**Murphy:**

The beginning is called the...

**Student:**

The promoter.

**Murphy:**

And the end is called the...

**Student:**

The terminator.

**Murphy:**

Say it like Arnold Schwarzenegger.

**Student:**

Terminator.

**Murphy:**

Yes.

We're very big on collaboration here. In a science classroom especially, we always work in groups. So, table groups. And it's something I emphasize with them when we talk one on one about their performance in the class. How are you working with your peers?

**Abbey:**

I like that we're forced to figure it out by ourselves first because it really tests your understanding of the vocabulary that you're learning.

When the RNA polymerase unwinds the DNA, does it have to unwind it through the transcription factors?

**Murphy:**

Great question. So, the transcription factor is going to really just stay at the promoter.

Sometimes, I'm just interested in how they're explaining it to each other because I can really learn from that. They may be using an example or metaphor, or something that I haven't thought of, and then I might throw that in when we come back together as a whole class.

All right, let's come back together. What are the effects on the regulation of this particular gene? Anybody want to venture a guess? Jordan?

**Jordan:**

Going back to our kind of light switch allegory, the RNA polymerase is not able to necessarily turn on the light switch...

**Murphy:**

Good, or use the gene, right? So whatever this gene, whatever this red guy is coding for, that protein's not going to be made.

Science is a group endeavor. Really, it's about collaboration and sharing data with other people. And you can learn more about what you're studying by knowing what somebody else is studying, so we try to mimic that process as much as possible. Part of being good at science is being able to work with a variety of people, and that's important.