Lesson 2: Meet the Scientists

UNIT: Investigating Asteroids

TRANSCRIPT

HOOK 1

Hi, it's Anne. As a writer, I've written about lots of different things. One time, I wrote about this game—Connect 4. People play Connect 4 in all sorts of ways, like basketball Connect 4, or soccer Connect 4. But no matter how you play, you need four in a row to win.

Before I wrote about this game, I did some research about different strategies for how to play it. I interviewed a Connect 4 expert, James D Allen. He was the first person to invent a strategy that lets a player win every time.

He even wrote this book about it. I knew some things about playing Connect 4. But before I talked to him, I had no idea how complicated this strategy really is. Writers do this all the time—they talk to experts on the topic and include what the expert said in their writing.

Imagine you could talk to an expert about any topic and learn all about it. Maybe you'd want to talk to one of these soccer players who are experts at trick shots. Or maybe you'd want to talk to this expert baker who can make cakes that look like everyday objects.

What topic would you want to learn more about?

DISCUSSION 1

Discuss: What's a topic you'd want to talk to an expert about?

HOOK 2

I don't know what you said, but talking to experts can be really interesting and really useful for writers. Writers can't be expected to already know everything about a topic. Instead, they research to learn more and listen to experts.

In the last lesson, you helped Kristi research all about asteroids after a rumor went around your school that a huge asteroid was about to hit Earth. She's trying to inform her classmates that the Earth is protected from asteroids.

You've already used two Sources to research and take notes.

Kristi has found more sources that she thinks will help your research interviews with actual NASA scientists. By watching them, you can not only learn more but also show your reader that the information is accurate because it came from an expert.

Check out this interview with NASA Planetary Defense Expert, Dr. Kelly Fast. She's answering the question: What if an asteroid were going to hit Earth?

As you listen to her talk, think about what information you might want to include in your writing.

What if an asteroid were going to hit Earth?

> *"Well, it's important to find asteroids before they find us. In case we need to get them before they get us.*
>
> *An asteroid impact is the only natural disaster that could be prevented.*

NASA's Planetary Defense Coordination Office supports projects to discover asteroids and to calculate their orbits far into the future."

That video had a lot in it. To help Kristi remember all the parts, she got a transcript of this video.

These are the exact words that Dr. Kelly Fast said in the video you just watched.

DISCUSSION 2

Read the transcript, then discuss: What information from this video would you want to include in your writing?

HOOK 3

There was a lot of great information in this video. For Kristi, there was one sentence that really stood out: An asteroid impact is the only natural disaster that could be prevented. She really likes it because it could let her reader know that NASA is working hard to prevent large asteroid impacts. The sentence is also really powerful because the person who said it works for the NASA Planetary Defense Coordination Office, so she would be the one to know.

Kristi knows that she can't just copy the sentence into her notes because she wasn't the one who said it. Doctor Kelly Fast did. But Kristi could write it as an expert quote.

She wrote this sentence in her notes like this, with quotation marks around it. Then she recorded who said it, and their role. This way, when she adds this quote to her writing later on, she can include who said it and what their role is at NASA.

Kristi has found two more interviews that she thinks might be helpful for your research. You'll watch both of them and then pick quotes to add to your notes. I'll get you started, step by step.

STEP 1

Get your supplies. You'll need two new worksheets and your research packet from the last lesson.

STEP 2

In today's lesson, you'll need someone to share ideas with. This could be a partner or someone you sit near. When everyone knows who their top partner is, move on to the next step.

STEP 3

To get started, let's watch a video made by NASA.

This is an interview with NASA Asteroid Expert, Marina Brozovic. She's answering the question when was the last time an asteroid hit Earth? She talks about how asteroids hit the Earth all the time. But they burn up in the atmosphere and don't make it to the ground.

She'll even tell you about an asteroid the size of a building that hit the atmosphere in twenty thirteen. Even that one wasn't big enough and burned up before it hit the ground.

This video has a lot in it. So for now, just watch and listen. When you're ready to watch our interview, move on to the next step.

STEP 4

“When was the last time an asteroid hit Earth?

Well, the answer depends on whether you're asking about small or large impacts because Earth gets hit all the time. But luckily for us, the vast majority of these impactors are small, and they just burn in the atmosphere.

The most significant fireball event in over 100 years occurred over Russia, in 2013. We actually got hit by an asteroid that was the size of a small building, and that one disintegrated about 20 kilometers above the city of Chelyabinsk and deposited a fair number of meteorites on the ground. And I happen to have a piece of the Chelyabinsk impactor right here in my hand.

But what about big impacts? The ones that leave craters tens of kilometers wide and cause huge amounts of devastation. We have to go far back in time for such an event, and those old craters are not easy to spot because by now they're heavily eroded, they're filled with sediment, or they can be at the bottom of the ocean.

But to keep the long story short, small events—they happen all the time, especially given that 15,000 tons of space dust hit Earth every year. And large impacts are rare, and we are talking millions of years rare.

So, when was the last time an asteroid hit Earth? Probably today, but the odds are it was very small and just burned in the atmosphere."

If you'd like to watch our interview again, replay this step. Otherwise, move on to the next step.

STEP 5

Get your Source 3 worksheet.

This is a transcript of what Marina said in the video. We'll take each Source one piece at a time. Take a look at just the first paragraph. Silently read it to yourself.

When you're done, show a thumbs up.

STEP 6

Discuss with your partner: Which of these three sentences best teaches someone that the Earth's atmosphere protects us from asteroids?

STEP 7

Here's what Kristi noticed:

- The first sentence doesn't really give any specific information.

- And the second sentence might worry her readers.

- The third sentence really explains how most things that hit the atmosphere aren't harmful—this sentence could be used as a quote in your writing.

Underline this sentence in your Source 3.

STEP 8

Take a look at the next paragraph. Reread it silently. Look for sentences that would teach someone how Earth's atmosphere protects us from asteroids.

When you're done, give a thumbs up.

STEP 9

Discuss with your partner: Which sentence teaches someone that the Earth's atmosphere protects us from asteroids?

When you've decided, underline it.

STEP 10

This is what Kristi underlined. It's okay if you underlined something different. She picked this sentence because it could show her reader that even an asteroid the size of a building is still no match for the power of the atmosphere.

Now you can continue to look for quotes to use in your writing on your own.

Silently read the rest of the transcript and underline sentences you want to use as an expert quote. Not every paragraph will have a sentence you want to include, and that's okay.

STEP 11

Your Source 3 worksheet now has options for expert quotes that you could add to your notes. This is what Kristi underlined, but it's okay if you picked something different.

It's now decision time. As a writer, you get to decide which two quotes you think best teach a reader that the Earth is protected from asteroids.

Reread the sentences you underlined and put a check mark next to the two you want to include in your writing.

STEP 12

Copy the two sentences you chose into the two quote boxes on your worksheet. Since it's a quote, make sure you copy the words exactly.

STEP 13

So you don't forget, be sure to write the name of the person who set the quote and their role. You can find that information in the title box.

The scientist's name is Marina Brozovic. Her role is a NASA Asteroid Expert.

Copy this information in the blanks below each of your quotes.

STEP 14

Nice job writers! You gathered some expert quotes in your notes. Kristi found one more interview made by NASA for you to watch. This is an interview with a NASA Planetary Expert, Nancy Chabot. She's answering the question: Is NASA really crashing a spacecraft into an asteroid?

Nancy was one of the lead scientists on the DART Mission, which you read about in the last lesson. She'll tell you more about the Mission and how it works.

This video has a lot in it, so just watch and listen for now. When you're ready to hear the interview, move on to the next step.

STEP 15

> *"Is NASA really crashing a spacecraft into an asteroid?*
>
> *Yes. NASA really is crashing a spacecraft into an asteroid. That spacecraft is DART—the Double Asteroid Redirection Test. Now, asteroids hit the Earth all of the time. Luckily, the ones that are big enough to cause widespread damage are pretty rare, and none are expected in the near future.*
>
> *NASA and others are actively tracking asteroids, but also, we haven't found all of them yet. So, it makes sense to do this first test to demonstrate if we needed to protect the Earth, what might we do? And we should do this test before we need it.*

That's where DART comes in. DART is a spacecraft that's about the size of a vending machine, and it has really long solar arrays that stick out.

And it's going to be traveling really fast—about 15,000 miles per hour—and it's going to slam into this target asteroid. That's about the size of the Great Pyramid.

So, slamming the smaller spacecraft into this larger asteroid isn't going to destroy it, but it will deflect it—it's going to give it a small little nudge, and that will ever so slightly change that asteroid's future path.

If you wanted to do this, you would want to do it years in advance so that the asteroid and the Earth weren't on a collision course in the future.

So, is NASA crashing a spacecraft into an asteroid? Yes. NASA really is in the name of planetary defense in order to be ready in case we need it."

If you'd like to watch her interview again, replay this step. Otherwise, move on to the next step.

STEP 16

Get your Source 4 worksheet.

This is a transcript of the video you just watched.

You can put your Source 3 worksheet to the side for now.

STEP 17

Silently reread the Source looking for any sentences that would teach a reader how NASA protects the Earth from asteroids. Underline sentences you want to use as an expert quote. Not every paragraph will have a sentence that you want to include, and that's okay.

STEP 18

It's decision time. Pick the two sentences that you want to include in your writing.

Put a check next to the sentences you chose.

STEP 19

Share with your partner the sentences you picked and why you picked those sentences. It's okay if you underlined different things.

STEP 20

Copy the quotes you want to use into the quote boxes at the bottom of your worksheet.

Then write the name of the speaker and her role. You can find that information in the title box.

STEP 21

Well done, writers! You're almost done with your research for today.

Before we put these Sources away, you'll need to record them in your Bibliography. You'll need to find the author—in this case, the speaker—the date published, the title of the video, and the organization that published it.

Get your Bibliography worksheet on top of your research packet. Record Sources 3 and 4 that you used today into numbers 3 and 4 on your Bibliography worksheet.

STEP 22

Put your Bibliography worksheet next to your partners. Compare the information you both found for numbers 3 and 4. If they don't match, check the Source worksheets to find the missing information.

STEP 23

Add Sources 3 and 4 to your research packet by stacking them on the back of the packet and adding one more staple.

Then your research packet will be complete!

WRAP UP

Well done, writers! You listened to two experts on asteroids and picked quotes that you could use in your writing.

You'll be able to write all about how asteroids burn up in the atmosphere, and NASA's DART Mission.

In the next lesson, you'll sort your information to make a writing plan.

Make sure you keep the V.I.P.s in your research packet somewhere safe. And I'll see you next time!