PROFESSOR: Because there was a point when you could start to read. Behind that point, you couldn't read it anymore, and in front of that point you could. So when you were at a large distance-- when the text was at a large distance from your eyes, what do the text look like? I saw a couple of different explanations. So what did the text look like when you were a large distance away? What did it look like?

Black lines. Anyone else have another description they want to use? Black lines. Blurry. I like that. What did you say? Chinese characters? It looked like a different language. You couldn't read it.

You could tell that there was some difference between them, right? Like, you could tell that there was maybe a vertical line or something, but you couldn't recognize it. You couldn't decide what it was. OK, I like that. So maybe it looked like a different alphabet. Different alphabet, nice. I like that. That's good.

What about when you were a small distance away, what did it look like? Actual words, real writing, you could read it. You can see details about those letters, and we're going to call that-- we're going to say that you can see details, but I really like Juan's different alphabet there. Because you can see that it's not a Chinese character, or a Cyrillic character, or a different alphabet that you're not used to. But you could read the characters.

Now just because you are standing farther back, does that mean the letters weren't actually there like they changed into some other mysterious language? No, they're still there. You just can't read the characters. You can't see detail. You could read the characters. You can see details. Here, you cannot see details.

How would you say the angular size of that text would compare when you are a large distance away versus when you're a small distance away? In your camera-- when you have these two cameras here, you take an image, and that gets transferred back to your brain. When you're far from the text, what is the angular size of that text? It's what?

It's smaller, right? So let's do this. We have small angular size. What about when you're close? It gets large. You get a large angular size.

And you can get closer, and closer, and closer, and closer until each of those letters actually looks pretty big, so the angular size of those letters is big, and you can easily see the details. So there was some point in between where you could first, as you got closer, start to see details. You could first start to read the characters. You could first tell that they were words in writing.

And we call that the smallest angular size, you or your detector-- your detector-- can resolve. So when astronomers talk about resolving things, that means they're talking about seeing details. So for each of your eyes, there is a smallest angular size that your detector can resolve, and for people, that size-- we're actually going to calculate this, but we're running out of time a little bit today. So for a person, your smallest angular size-- I'm just going to write this down over here-- for a person, the smallest angular size is equal to about 3 times 10 to the minus 4 radians. All right, that doesn't mean a whole lot.

What that means is when you're about a meter or so away, you can read text that's a couple of millimeters tall. For different telescopes, they can actually resolve details that are much smaller than that in terms of angular size. For the micro observatory telescopes, we've got an angular size of about 7 times 10 to the minus 5 radians. And for the Chandra X-ray telescope, the one that we're going to use, we are going to see that it's resolution, or the smallest angle that it can see details, is 5 times 10 to the minus 6 radians.

Which one of these detectors has the smallest angle that it can see? Which one of these numbers is the smallest? OK. Because remember this is 0.0003 radians, so 3 times 10 to the minus 4. We move the decimal point over one, two, three, four places, and we get 0.0003. This one is 0.00007, so smaller, and this one is 5-- or I'm sorry. 0.000005 radians, so this number is smaller.

So if you guys can only see this, that means that other telescopes could be farther away, and they could still see details. Or they can see smaller details than we can see.