



## 7.5 Kei and Xarielle Exploring Amplitude of the Sine Function Transcript



Ms. Fye is using the [Introduction to Sine Desmos Activity](#) in an in-person class.



Watch [Kei and Xarielle Exploring Amplitude of the Sine Function](#)

### Transcript:

**[Students start working on slide 6 of the activity with questions about amplitude and then go back to slide 5 which has sliders for the parameters  $a$ ,  $b$ , and  $k$  for a sine function  $y = a \sin(bx) + c$ .]**

Kei: Alright. Whoa. Whoa. Whoa.

Kei:  $k$  affects the amplitude because look,

**[Student starts dragging the slider for  $k$  greater than zero and then less than zero. The graph translates up and down depending on the movement and position of the slider.]**

Kei: it's changing up and down and like

Kei: it's going to have different amplitude.

Kei: I don't know  $a$ .  $a$  does not change it at all.

**[Student moves the cursor to the point on slider  $a$  but does not move the slider.]**

Teacher: So before we move on to the next argument

Teacher: I agree with moving up and down.

Xarielle: Okay, I see what I got wrong.

Xarielle: Okay. I can see that it's  $k$ .

Teacher: Hold on. I didn't say anything yet.

Teacher: I agree that our graph is going up and down.

Teacher: What's the amplitude right now?

Kei: Uh.

**[Student moves cursor to a maximum of the graph with coordinates  $(-150, 0.1)$ ]**

Teacher: It's easier to move it to  $a$ ....

Kei: She said no decimals.

Teacher: Not decimals (unclear words)

Kei: Go to one. There you go.

**[Student moves sliders to make parameter  $a$  into a whole number, negative 1 is where they stop.]**

Kei: You know you could just click it, right?

**[Student is moving parameter  $b$  to try to land on a whole number, they stop at positive 2.]**

Xarielle: And I can just do this too.

Kei: But it's easier if you just click-



Xarielle: Mines (unclear words)

Teacher: Alright, so what's the amplitude?

Xarielle: It is...

Kei: No, let me see.

**[Student selects a max and min on the graph and then goes to the parameter  $k$  slider to change it from a decimal.]**

Xarielle: Oh, I gotta put this to one.

Xarielle: Why'd you write negative one?

**[Student types in negative 1 as the parameter for  $k$  and then changes it to positive 1.]**

Kei: Because you just said one (unclear words)

Xarielle: But leave it to two!

Kei: Alright.

**[Student selects the maximum of the new function with coordinates  $(-45,2)$  and the minimum at  $(-135,0)$ .]**

Xarielle: Okay, the amplitude right now is one.

Teacher: Okay, now move slider  $k$  to somewhere else.

**[Student moves slider  $k$  first to a larger positive number and then to negative 1.1.]**

Kei: Go down.

Xarielle: Let's see.

Teacher: What's the amplitude?

Xarielle: Uh, do just negative one

**[Student backspaces the .1 in the  $k$  parameter to leave negative 1 as the value.]**

Kei: One, negative one?

Xarielle: Wait, we are supposed to do negative two plus

Kei: So it's the same,

Xarielle: No it's no-....yeah, it's the same.

Teacher: Okay, alright

**[Student starts moving the parameter slider for  $a$ .]**

Xarielle: And I say  $a$

Teacher: Why do you say  $a$ ?

Xarielle: Because, okay watch this, watch this,

Xarielle: watch this, watch this

**[Student drags slider  $a$  value back to negative 1.]**

Teacher: What's the amplitude right now?

Xarielle: Zero.....

Kei: Okay, zero....

Kei: It's the same.

Xarielle: It's the same.

Teacher: Okay, now move it.

Xarielle: It seems to be.

Xarielle: Is it still the same? It's still the same.

**[Student drags slider  $b$  to be positive and then negative.]**

Kei: Look let me see that



**[Student starts sliding the parameter slider for  $a$  but the switches to typing in values.]**

Xarielle: Try two.

Kei: Three

Xarielle: Try two!

Xarielle: Let me see.

**[Student types -2 for the value of parameter  $a$ . They select a maximum at  $(-30,1)$  and a minimum at  $(-90,-3)$ .]**

Kei: Got it. It's one and three.

Kei: So three....

Xarielle: Negative three, No it's three.

Xarielle: No, three plus one's....

Xarielle: No, negative three plus one, negative two,

Xarielle: divided by two,

Xarielle: Yeah it's absolute value so it's one.

Xarielle: Cause it's um

Kei: So it's  $a$  and  $k$ . Can it be two? Or one, just one.

Teacher: Is it one or two?

Kei: Uh I think it's one

Kei: I would say  $a$  though

**[Student starts dragging the slider for parameter  $k$ , the graph translates up and down accordingly. They stop at  $k=0$ . Parameter  $a$  stays at negative 2 and parameter  $b$  stays at 3. They select a maximum at  $(-150,2)$  and a minimum at  $(-210,-2)$ .]**

Xarielle: I say  $a$ , because

Kei: Not because you said it just because...

Teacher: But what's the amplitude of this one before we change it?

Kei: That's zero, no

Xarielle: Four

Kei: The distance....

Xarielle: It's two. It's two.

Xarielle: I don't know, this is hard.

Kei: I choose  $a$ , I choose  $a$

Teacher: Why do you choose  $a$ ?

Kei: Cause like, if you slide  $a$ ,

Kei: it depends on where

Kei: See look, you gotta slide it.

**[Student moves slider for parameter  $a$  from negative 2 to negative 5.]**

Kei: see, it stretches

Kei: and it has different.... Then if you stop, stop it real quick.

Kei: And then now, is it different?

**[Student drags the slider  $a$  to 0.6 and stops. Then the selected a maximum at  $(30,0.6)$  and a minimum at  $(-30,-0.6)$ .]**

Kei: So that's 0.6, and -0.6



Kei: So it had different

Kei: it changes the  $y$ -axis, the  $y$ -value

Kei: So it's different. So I think it's  $a$ .

Teacher: Okay. But I thought you said it didn't change

Kei: Wait because

**[Student drags slider for parameter  $k$  from 0 to 1.7. Then they select a maximum on the graph at  $(-90, 2.3)$  and a minimum at  $(-150, 1.1)$ .]**

Xarielle: Okay. The reason I say  $k$ , I mean  $a$

Xarielle: is because it moved the sine wave.

Xarielle: It moved the point. Even though  $k$  do, too.

Xarielle: But it doesn't matter

Xarielle: for every one you got a  $y$ -axis if you do

Xarielle: you start to do the  $y$  values

Xarielle: and  $a$  actually changes the amplitude of the

Teacher: How do you know it changes the amplitude?

Kei:  $k$  changes the amplitude

Xarielle: No. It's  $a$

**[Student moves the slider for parameter  $k$  to negative 1.6.]**

Xarielle: Because no, no  $k$  doesn't

Xarielle: Just because it just moves it.

Xarielle:  $a$  makes the sine either larger or smaller.

Xarielle: So it does end up changing.

Xarielle:  $k$  doesn't do

Kei:  $k$  just changes the position

Xarielle:  $k$  just, yeah

Xarielle: It just changes the position

Teacher: Ah, I like that.