7.5 Noticing Student Thinking about Amplitude

Context

Ms. Fye is using the Introduction to Sine Desmos Activity in an in-person class.

This is an introduction activity focused on reasoning about the relationship between the equation of a sine function and characteristics of the sine graph. Ms. Fye designed the activity knowing that her students had explored the relationship between function structure and their graphs by varying the parameters for many different function families. With that in mind she had the following learning goals:

- Students will recognize the connection between the structure of a sine function equation (i.e., $y = a\sin(bx) + k$) and its related graph with respect to amplitude, midline, and period. Specifically,
    - Amplitude is $|a|$
    - Midline is $y = k$
    - Period is $\frac{360}{|b|}$

Specific performance goals include:

- Given a sine function equation, students will be able to determine the amplitude, period, and midline without graphing.
- Given the amplitude, midline, and period, students will be able to determine the function equation.
- Given the graph of a sine function, students will be able to determine the amplitude, period, and midline.
- Given the graph of a sine function, students will be able to determine the function equation.

Xarielle and Kei are discussing page 6 of the Desmos activity. Specifically, they are working to determine which parameter affects the amplitude of a sine graph. The students each provide justification for why they think a certain parameter affects the amplitude. Watch the clip and answer the questions below.

Xarielle and Kei Exploring Amplitude of the Sine Function

Q1. Attend to (describe in detail) how the students make sense of which parameter affects the amplitude.

Q2. In what way did Xarielle and Kei's prior knowledge of functions help or hinder their investigation of the relationship between the parameters and amplitude?

Q3. How does the students' thinking about which parameter affects the amplitude change during the video clip? Why does it change? Provide evidence from the video clip.

Q4. Ms. Fye's learning goal was "Students will recognize the connection between the structure of a sine function equation (i.e., $y = a\sin(bx) + k$) and its related graph with respect to amplitude". Do you feel like Xarielle and Kei have met that learning goal? Explain why or why not by providing evidence from the video clip.