

# Hearing Music, Seeing Waves

## Pre-Activity Questions:

1. For the sine function  $f(x) = 15 \sin(7x)$ , identify the amplitude, frequency, and period.
2. Choose a scale or calculator window to sketch three periods of the function  $f(x) = 15 \sin(7x)$ , in radian mode as well as degree mode.
3. If  $ar^n = 63$ ,  $a = 7$ , and  $r = 3$ , what are the terms before and after 63 in this geometric series?

## Summary Questions

1. Describe how the sine waves of notes that are octaves apart compare. Based on your answer, describe how the sine waves of four octaves of the same notes would compare.
2. In this activity, the geometric sequence was started with an A-note whose frequency is 220 Hz. Explain why we could have started with any note. For example, if we had started with C, what are the values of  $a$  and  $r$  in the geometric sequence,  $a, ar, ar^2, \dots$ ?
3. Explain how notes that are an octave apart form their own geometric sequence. What is the ratio,  $r$ , and how would you determine the starting value,  $a$ , of the sequence?