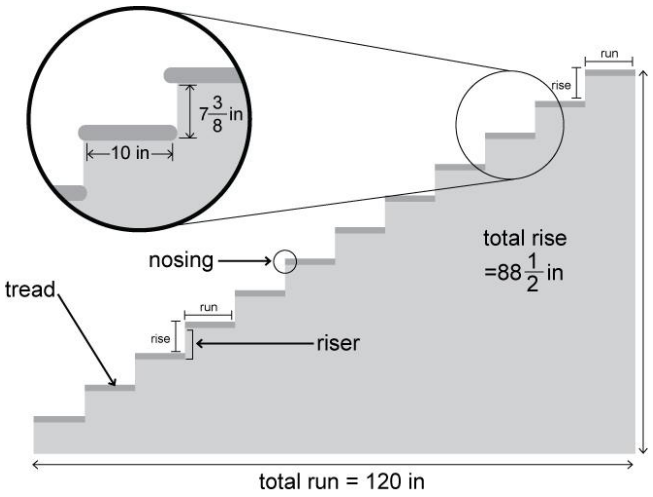
Module 4 Lesson 4:
Math Lab: Slope of a Staircase

The following diagram is a profile of a staircase with the run of each stair (tread width) equal to 10 in and rise of each stair equal to $7\frac{3}{8}$ in. You will use this diagram to answer questions 1, 2, and 3.



Remember the following terms:

- Rise: the height of a step's riser
- run: the depth of the step's tread (not including the nosing)

Procedure

1. Study the diagram above. State the rise and run of a step.

2. Divide the rise by the run of a step. Record this as the "steepness of one step."

3. Divide the total rise by the total run. Record this value as the "steepness of staircase."

4. Look at the following diagrams. The relationship between the rise and the run determines the steepness of the staircase.

Staircase A

Staircase B

   a. Which staircase has a steeper slope?

   b. Which has a gentler slope?

   c. How can you tell?

5. Find a staircase in your school or your home that you can measure.

   a. Measure the run. If the tread has a nosing, don't include it in your measurement. Record your calculation.

   b. Measure the rise. Record your calculation.

   c. Calculate the steepness of the stairs by dividing the rise by the run.

Analysis

6. How does the rise and run of a single step compare with the rise and run of the entire staircase?

7. How do you think the rise and run calculation for several consecutive steps compares with the rise and run of a single step? Show the calculation of the steepness of several steps (choose two or more) to check your hypothesis.

8. a. How do the stairs that you measured compare with the stairs in the diagram?

   b. How can you tell which set of stairs is steeper?

Note: You will refer to this Math Lab again later in the lesson.