Scrambled fraction tours
Boise Math Teachers' Circle
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Ooh la la! Your family's Paris vacation is finally here. And now it is your first day in Paris! *Magnifique!* But who could have guessed that your feet would be allergic to croissants? *Quel dommage!* That's French for bummer!!

Your family gets up early to walk from the hotel to the Louvre to see the Mona Lisa. You slowly get dressed and start after them. When you are just halfway there, your *mobile* (that's French for cell phone) rings: they are going to go to the Arc de Triomphe. So you start walking toward the Arc. Your poor feet! They are hurting more and more. You only make it one third of the way there before you hear that ring again—they are now going to the Palace at Versailles. You stop where you are and rest for a while. Then, time to start trudging to Versailles. It is so far, and your feet hurt so much! When you are just one quarter of the way there, surprise, your family calls to tell you that they are going to the Eiffel Tower. So you turn around one more time and start walking that way. When you are one fifth of the way there, they call again. Now they are on top of the tower, looking down. And they are going to take a picture! You need to wave, so they can see you in the picture. Say *frommage!* That's French for cheese!

The next day they visit all the same places again, in a different order. What a wonderful vacation!

For this activity you will need:
- Some markers for destinations, such as post-it notes, water bottles, or chairs,
- an open area of floor (10–15 feet across),
- a marker, such as some masking tape or post-it notes,
- some labels marked 1–5,
- a measuring tape or yardstick,
- a calculator.

Arrange 5 destinations "randomly" in the open area. Give each one a label, 1 through 5.
(1) Start at destination 1.
(2) Go 1/2 of the way toward destination 2.
(3) Turn and go 1/3 of the way toward destination 3.
(4) Turn and go 1/4 of the way toward destination 4.
(5) Turn and go 1/5 of the way toward destination 5.

Where did you end up? Mark that spot on the floor with masking tape or a post-it note.
- Use a measuring tape or yardstick to measure the distance to the next destination, and a calculator to divide by 2, 3, 4, or 5, so that you know how far to walk.

Now, scramble the labels on the destinations **without moving the destinations**. Once again start at 1 (whichever destination has that label now) and repeat the same procedure. You will follow a different path.

1. Where did you end up? Did this surprise you?

2. Try scrambling the labels again. What happens?

3. Now move the destinations to new positions. Walk through the steps, mark the spot, and try again with scrambled labels. Does it still work?

4. Why does it work?