

# The Escalator, Assessment Variation

Alignment: MAFS.6.RP.1.1 and MAFS.6.RP.1.2

## Task

Ty took the escalator to the second floor. The escalator is 12 meters long, and he rode the escalator for 30 seconds. Which statements are true? Select all that apply.

- a. He traveled 2 meters every 5 seconds.
- b. Every 10 seconds he traveled 4 meters.
- c. He traveled 2.5 meters per second.
- d. He traveled 0.4 meters per second.
- e. Every 25 seconds, he traveled 7 meters.



## Commentary

This task is part of a joint project between [Student Achievement Partners](#) and Illustrative Mathematics to develop prototype machine-scorable assessment items that test a range of mathematical knowledge and skills described in the Florida Standards and begin to signal the focus and coherence of the standards.

## Task Purpose

This task is part of a set of three assessment tasks that address various aspects of 6.RP domain and help distinguish between 6th and 7th grade expectations.

While simply constructed, [The Escalator](#) addresses aspects of both MAFS.6.RP.1.1 "Understand the concept of a ratio" and 6.RP.2 "Understand the concept of a unit rate  $a/b$  associated with a ratio  $a:b$  with  $b \neq 0$ , and use rate language in the context of a ratio relationship." The simple extension of a traditional multiple choice item to a "choose all that apply" allows us to ask questions about the same context from the different perspectives afforded by the different RP standards in 6th grade.

[Running at a Constant Speed](#) addresses aspects of MAFS.6.RP.1.2 "Understand the concept of a unit rate  $a/b$  associated with a ratio  $a:b$ " and MAFS.6.RP.1.3 "Use ratio and rate reasoning to solve real-world and mathematical problems." The numbers are chosen so that it would be easy to implement this task as a fill-in-the-blank item.

On the other hand, [Molly's Run](#) is meant to contrast directly with "Running at a Constant Speed" as it is the natural extension of the work that students do related to MAFS.6.RP.1.2. In sixth grade, the standards are clear that ratios need to have whole numbers for  $a$  and  $b$ . With the introduction of rational number arithmetic in 7.NS, the standards place an emphasis on ratios that have fractions within a given ratio; MAFS.7.RP.1.1 requires students to "compute unit rates associated with ratios of fractions."

## Cognitive Complexity

### Mathematical Content

The mathematics in "The Escalator" is more complex than it appears. The distractors are placed in a particular order. Students might choose (c) after (correctly) choosing (a) because they look similar. The three correct answers are purposefully interrupted by an incorrect choice, and (e) is included for students who subtract rather than divide.

"Running at a Constant Speed" requires students to attend to both ratios (20:150) and (150:20) and both associated unit rates  $20/150$  and  $150/20$  that are implicit in the given context. Thus, this task is complex for 6th grade.

"Molly's Run" is a straight-forward extension of the work that students do in 6th grade. The only difference is that students now work with ratios defined by fractions rather than just whole



numbers. Thus, this task is not mathematically complex except for students who are still struggling with fractions.

### **Mathematical Practice**

Especially in 6th grade, the cognitive load associated with making sense of units in proportional relationships is heavy; the first two tasks in this set engage MAFS.K12.MP.6.1, Attend to precision.

The third task does not engage any of the Mathematical Practices any more than they are present in the day-to-day mathematical work of students.

### **Linguistic Demand**

The linguistic demand for all three tasks is low.

### **Stimulus Material**

The stimulus material for all three tasks is not complex.

### **Response Mode**

The response mode for all three tasks is not complex.

### **Solution**

This is a one-point item.

(a), (b) and (d) are all correct.

