



## The Tale of the Twins' Scooters



The Jones twins, Anna and Bob, have been begging their parents for electric scooters. Anna and Bob continually make the point that with electric scooters they could “drive” themselves to school everyday instead of being dropped off by their father. (After all, Anna and Bob get embarrassed by having to hug and kiss their father everyday in front of all of their friends.)

Anna, the daredevil, has asked for the Tank scooter which has a maximum speed of 37.5 miles per hour ( $\frac{\text{miles}}{\text{hour}}$ ). Bob, the safety conscious one, has asked for the Transporter which has a maximum speed of 15 miles per hour ( $\frac{\text{miles}}{\text{hour}}$ ). Their parents decide that with some strict safety guidelines scooters may not be a bad idea, and purchase the scooters that Anna and Bob requested.

Anna and Bob try out their new scooters and quickly realize that the two scooters move very differently. Bob’s scooter almost instantly goes from being at rest, to its maximum speed of 15 miles per hour ( $\frac{\text{miles}}{\text{hour}}$ ) and remains at this speed until it stops; he cannot slow down or speed up during the trip. Anna gets very frustrated because Bob leaves her in the dust...Anna’s scooter starts out very slowly and accelerates constantly at  $\frac{1}{16}$  mile per minute each minute ( $\frac{\text{mile}}{\text{min}^2}$ ).

- Generate several strategies that could be used to determine the distance that each scooter travels as a function of time.
- Include some strategies that you think are flawed.

*We will display and critique strategies on the overhead.*

*Be ready to provide evidence of why you think each strategy will or will not work.*





## Solving and Graphing the Scooter Problem

At 8:00 AM the next morning Anna and Bob hop on their scooters and head off to school which is 1 mile from their house.

- *Who arrives at school first?*
- *What is the approximate difference in the twins' arrival times?*

That afternoon Anna and Bob convince their parents to let them ride the scooters to the park which is 3 miles from their house.

- *Who arrives at the park first, Anna or Bob?*
- *To the nearest minute, how long does it take each one to arrive?*
- *How fast is each one going when they arrive?*
- *To the nearest minute, how long would it take Anna to reach the maximum speed of her scooter?*

**Represent your thinking in as many ways as possible.**

**Use a variety of ways to verify and communicate your work.**



## Graphing the Scooter Problem

*Individual think time:*

Quickly sketch predictions of graphs for the following pairs of variables for Anna's scooter and for Bob's scooter:

- Distance vs. time
- Velocity vs. time
- Acceleration vs. time

*With your partner:*

- Create graphs for each of these sets of variables.
- Note any observations or surprises.
- Discuss the following:

*The focus of this course is on proportional reasoning.*

*For each case (Anna's and Bob's) find at least one example of quantities that have a proportional relationship, and at least one example of quantities that do not have a proportional relationship.*

