

Questioning

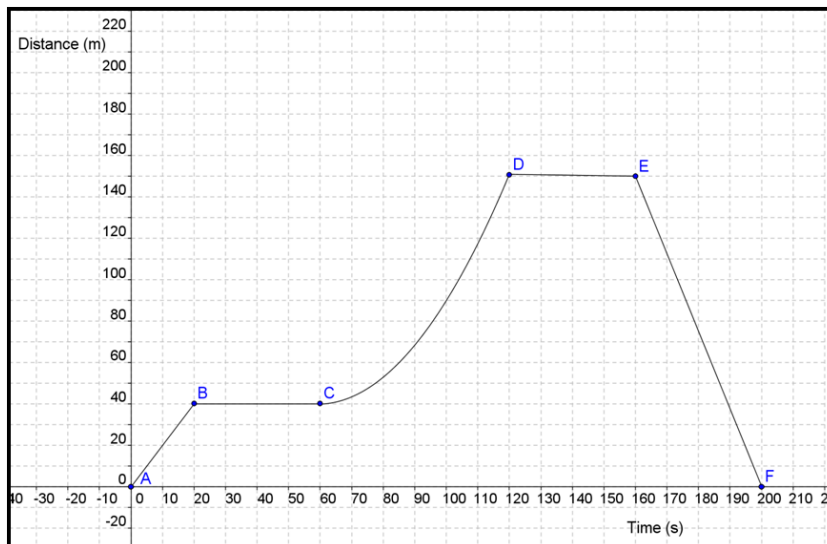
Initiation Questions – Relations

With a partner I want you to look at the 3 cards you have in front of you and talk about how the two variables of distance and time could be related.



- How is the relationship between distance and time the same?
- How is the relationship between distance and time different?
- How might we represent the information in each card such that we could compare it more easily?
- What is the dependent and independent variable?
- What might this look like if we graphed it?
- Do all distance-time graphs look the same?

Come up with a plausible storyline for the following d-t graph:



- Which areas on this graph represent a similar type of relationship? Which are different?
What line segments can be said to be 'proportional'? (As one variable goes up, the other goes up)
What line segments can be said to be 'inversely proportional'? (As one variable goes up, the other goes down)
- What makes the A-B segment of the graph different to the C-D segment?

- What would happen if the final E-F segment continued below the x-axis? What does the x-intercept of this graph represent? What does the y-axis of the graph represent?

As I fold a piece of paper in successive halves:

- What happens to the surface area?
- What happens to the perimeter?
- Are these relationships the same?
- What would they look like graphically?

Students are assigned the task of identifying a quadratic relation and bringing in an artifact (picture, video, equation, etc.)

Probing questions relating to the student artifacts

- How challenging did you find it to locate a quadratic relation in everyday life?
- Do you think linear relationships would have been easier? Why or why not?
- How could we categorize the relations that the class identified? Should we use a table, a Venn diagram, something else?
- What characteristics are we using to classify the artifacts?
- Can we further subdivide the categories? Is this necessary?
- How would it be possible to compare the artifacts mathematically?
- What more could be revealed by a mathematical comparison?
- What would we have to do to make this possible?
- What mathematical form would we use?

Students work in pairs to develop a mathematical way of comparing their artifacts.

Questions relating to mathematical model

- What more is revealed to us by using a mathematical tool to compare?
- How might we change our initial categories and their characteristics? Is this necessary?
- Did anyone discover that they may not have had a quadratic relationship after all? Why might this happen?
- How many of the mathematical models have a real-life application? What might this be?
- What generalization, if any, can be made about your artifact based on the model?