

## Gamma Mathematics (3rd Edition) Student Data Survey

### Teacher Notes:

Most of the questions have features that make good discussion points. Some features are open to interpretation - that is deliberate, because we expect students to be able to identify variables, and manage variation etc. This is the real world of statistics - dirty data, which is often incomplete, muddled and with measurement and calculation errors.

- 1 Only whole months are counted. Years only would not have enough variation, days too complicated to calculate at this level. Assumes the survey is taken at about the same time by all participants - unlikely to be the case at different schools.
- 2 Centimetres are chosen because mm too difficult to measure accurately. One method is to draw a scale on a wall and then read off height using a level ruler. Specify feet flat on floor.
- 3 Either use a tape-measure or use scissors to cut out a paper band, mark it off where relevant and then measure with a ruler.
- 4 Use a stop-watch and speak out the time while students do the task. Some students may not have shoes, or they may not be lace-ups. That is deliberate - there will be questions on why not all data values are present.
- 5 Define the foot length as distance from end of big toe to end of heel. Students could first trace the outline of their foot on a piece of A4 paper in most cases (introduces measurement error), but it would be more accurate to place the tip of the shoe against a wall or other boundary, and then mark the end of the heel and read it off a scale. Suggest students take the barefoot measurement at home!
- 6 Hand span is the distance from the tip of the thumb to the tip of the little finger. Take the 'tips' as being the points that maximise this distance rather than the tip as defined with the thumb and little finger in normal positions. The best way to take this measurement is to place the hand flat on a piece of paper. To avoid parallax error make sure the pencil/pen is vertical when marking the two points.
- 7 Make the line AB exactly 55 cm long, and horizontal, if possible. Too short means students could visualize this against the typical 30 cm ruler, and much longer than this makes drawing the line too cumbersome. It would probably be a good idea to have the line on the board *before* the students arrive to class. The reason for horizontal is to keep the results consistent across the survey. There is some evidence that people tend to see vertical lines as longer than horizontal ones that are actually the same length - reference: [The Wundt illusion](#). Make sure students have filled in their answers before they do Question 8. Students should not discuss their results.
- 8 In the data an estimate the same as the actual length will be recorded as a difference of zero. Over-estimates will be positive and under-estimates will be negative. This provides an easy way to track the relative proportions of over- and under-estimates.

- 9 Remove the line AB on the board. Make the line CD 85 cm long, and again, horizontal.
- 11 Make the silence exactly two minutes, then afterwards you can tell the students they have observed two minute's silence. Don't tell them first, of course. Make sure there are no visual clues for the passage of time - so, put watches away, etc. The reason for parts a and b is partly for potentially looking at whether students can convert from minutes and seconds to seconds only.
- 15 This foot choice is completely instinctive. Starting a role play or theatre-sports type simulation will give them the answer!
- 16 The way people cross their arms is completely instinctive too. Doing it the 'other way' feels very awkward. You could instruct all the class to cross their arms and then move up and down the rows telling each student where they are 'left' or 'right'.
- 17 The last two choices are to allow for any new networks (it will need to be named) or for students who don't have access to a mobile phone. The reason for the wording 'use most often' is to allow for students who have more than one mobile phone. The wording of 'your' mobile phone is to avoid getting into who owns the mobile phone.
- 18 Researching this may need to be done at home if students don't have cell-phones at home. One week should be interpreted exactly - so as at the time they check the Inbox and Outbox.