



# Mathematics lesson 3 – Student worksheet

## Lesson 3 – Student worksheet

### Learning aim:

To recognise and interpret graphs and rates of change.

### Scenario

A gym instructor runs five spin (cycling) classes per week with 6 members per class. The instructor is always keen to look for ways to better support clients during these classes. As well as asking clients for their direct feedback, she also collects data from the five spin classes, including:

- Time spent at rest.
- Total distance cycled.
- Average speed on the bikes.

She collects the average data from the classes and names them: Group A, Group B, Group C, Group D and Group E.

### Career spotlight:

Gym instructors organise exercise programmes to improve people's health and fitness. Their responsibilities include creating personal exercise programmes, leading group exercise classes, and giving advice on healthy eating and lifestyle. Gym instructors have a desire to help people and have an ability to teach and motivate. They are creative, patient and understanding.

### Activity 1

How far have they travelled?

The gym instructor wants to make graphs to compare the performance of each class.

1. Use the five tables below to draw a distance time graph for each class on graph paper.
2. Discuss in pairs/groups. What do you notice from each class? Does anything surprise you?

#### Group A

Time (mins)	Distance (kilometre)
0	0
15	10
30	10
45	15
55	15
60	16

#### Group B

Time (mins)	Distance (kilometre)
0	0
30	12
45	12
60	18

## Group C

Time (mins)	Distance (kilometre)
0	0
25	12
35	12
45	18
55	18
60	22

## Group D

Time (mins)	Distance (kilometre)
0	0
30	12
60	24

## Group E

Time (mins)	Distance (kilometre)
0	0
20	10
40	10
60	16

## Activity 2

How fast did they travel?

1. Calculate the average speed for each group in km/hr, for each part of their journey. Don't include the parts when they are at rest.
2. Discuss the following:
  - What could be affecting the different rates in the classes?
  - Which class do you think has the best/most successful 'shape' and why?
3. Mindmap all the ways that the instructor could change the following:
  - Format (for example how long the session lasts for)
  - Instruction (for example, how the instructor demonstrates what will happen in class)
  - Environment (for example, add up-tempo music at the moments when clients tend to slow)
4. For each of the classes, write a summary of what you have learnt from the data and some personalised recommendations for each class. The recommendations for each group should be unique and be based on the data collected.

Class	Summary (data including average speed/distance travelled etc.)	Recommendations
A	<p>The data from Group A shows that...</p> <p>The average distance travelled was...</p> <p>From this data we can conclude that...</p>	<p>For example, group A are using two breaks but are going at a slower rate as the session goes on. This may be due to the long first session. Perhaps shorter sessions and more breaks may help them later on in the session.</p>

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B

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C

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D

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E

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### Extension Activity

How do you know the recommendations worked?

The instructor wants to know more about how the clients feel about the classes, after making some of the changes you've suggested.

Design a survey that clients will complete on their phones after the class.

The survey must include:

- 5-10 questions.
- Questions to better help understand personal motivations for coming to class.
- Ways of gathering information about the format, instruction and environment of the classes.
- Questions that find out the reactions to the changes for the class.

