CORNERSTONE MATHS

Linear functions: What is a linear function?

The National Curriculum for mathematics at key stage 3 requires students to:

• *recognise, sketch and produce graphs of linear functions of one variable using equations in x and y and the Cartesian plane;*

• *calculate and interpret gradients and intercepts of linear functions numerically, graphically and algebraically, using y = mx + c;*
and

• *begin to model simple contextual and subject-based problems algebraically.*

What is a linear function?

Answer as if you are describing this to another maths teacher.

How confident are you with your previous response?

Please tick one response only

☐ Not at all confident

☐ Quite confident

☐ Confident

☐ Very confident

Share your description with colleagues....
Listen for...
❯ mathematical language?
❯ references to different mathematical representations?
❯ references to different mathematical notation?
❯ mathematical rigour?
❯ completeness?

Try to arrive at some common understandings...

Cornerstone Maths Project   www.ucl.ac.uk/cornerstone-maths

CORNERSTONE MATHS

Linear functions: Hands-on with the software

❯ *Open the linear functions software https://www.lgfl.net/learning-resources/summary-page/cornerstone-maths*
❯ *Open Investigation 3, Activity 3.3*

The scenario is a race between the blue car and the green car.
Focus on the Animation and Graph only to begin with….

A.   **Edit the graph** so that the cars start at the same position, travel the same distance and the green car wins.   **Check by playing the simulation.**

Record what you did
STEP 1
STEP 2
STEP …

B.   Now edit the graph so that the blue car wins.
        Check by playing the simulation.

Record what you did
STEP 1
STEP 2
STEP …

Cornerstone Maths Project   www.ucl.ac.uk/cornerstone-maths

Linear functions: Hands-on with the software

Reveal the **Data Table** and **Equation**.

There are <u>three</u> ways of controlling a race by editing the <u>graph</u>, the <u>equation</u>, and the <u>simulation</u>.
Explore how to do this…
What aspects of the race can you control and how does it affect the other representations?

	Record what you did	Record what effect this had on each of the other representations
1 Graph		
2 Equation		
3 Simulation		

You cannot edit the table. Why not?

Discuss the three "hotspots" that control the graph…

Establish the mathematical rationale for each hotspot – what does each one control?
How is speed represented in each of the representations?

CORNERSTONE MATHS

PD Task 3

Linear functions: Interpreting multiple representations

Look at the screenshot of a race between the green car and the blue car.
Use the information to work out the distance travelled by the blue car after 5 hours.
There are several ways to solve this problem – Find as many as you can
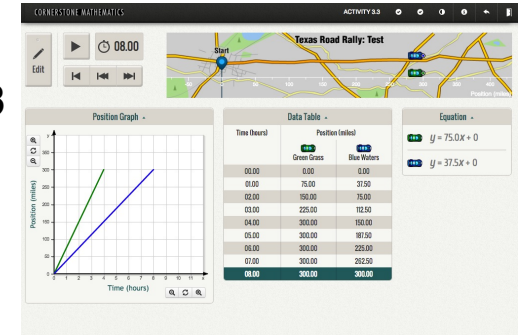
Representation used	What you did… record your working out/explanation/solution	Underlying mathematical idea(s)