Subject	Year	Month	
Mathematics	9	March	Balcarras — From strength to strength

Topic:

STRAIGHT LINES AND QUADRATIC GRAPHS

8 LESSONS

Content (Intent)

Prior Learning

Y8 May
- Plot **straight-line** graphs
- Interpret **gradients** and **intercepts** of linear functions
- Recognise, sketch and interpret linear graphs

Plot and interpret graphs involving distance and speed

Future Learning

KS4 Higher Tier
- Linear Graphs and Coordinate Geometry
- Simultaneous equations
- Inequalities

KS4 Foundation Tier
- Equations
- Inequalities
- Straight Line Graphs
- Simultaneous Equations

Objectives

Use the form of y=mx+c
- Identify and interpret gradients of linear functions algebraically
  - ✓ HIGHER: gradients of parallel and perpendicular lines
- Identify and interpret intercepts of linear functions algebraically
- Find the equation of a line through one point with a given gradient
- Find the equation of a line through two given points

Quadratic graphs
- Recognise and interpret quadratic graphs
- Understand quadratic graphs
  - ✓ Intercept
  - ✓ Symmetry
  - ✓ Positive or negative coefficient a
  - ✓ HIGHER→ roots as a follow up from factorising quadratics learnt earlier in October

For teaching purposes

Possible Questions
- Convince me the lines $y = 3 + 2x$, $y - 2x = 7$, $2x + 6 = y$ and $8 + y - 2x = 0$ are parallel to each other.
- What is the same and what is different: $y = x$, $y = x^2$, $y = x^3$ and $y=1/x$?
- Show me a sketch of a quadratic graph. And another. And another …
- Sketch a distance/time graph of your journey to school. What is the same and what is different with the graph of a classmate?

Misconceptions
- Some students do not rearrange the equation of a straight line to find the gradient of a straight line. E.g. they think that $y - 2x = 6$ has a gradient of -2.
- may think that gradient = (change in x) / (change in y) when trying to equation of a line through two given points.
- may incorrectly square negative values of x when plotting graphs of quadratic functions.
- think that the horizontal section of a distance time graph means an object is travelling at constant speed.
- think that a section of a distance time graph with negative gradient means an object is travelling backwards or downhill.

Pedagogical notes (implementation)

'Monter' and 'commencer' are shared as the reason for 'm' and 'c' in y = mx + c and links to y = ax + b.

How will understanding be assessed & recorded (Impact)

BAM task 9 Gradient
BAM task 6 Quadratic Functions
Exams in May

How can parents help at home?

MathsWatch clips (Qualification GCSE)
96, 159a, 159b, 98

Further reading/discussion

KM: Screenshot challenge

KM: Stick on the Maths: Quadratic and cubic functions

KM: Stick on the Maths: Algebraic Graphs

KM: Stick on the Maths: Quadratic and cubic functions

NRICH: Diamond Collector

NRICH: Fill me up

NRICH: What's that graph?

NRICH: Speed-time at the Olympics

NRICH: Exploring Quadratic Mappings

NRICH: Minus One Two Three

Literacy
Function, equation
Quadratic, cubic, reciprocal
Gradient, y-intercept, x-intercept, root
Sketch, plot
Acceleration, deceleration
Linear, non-linear
Parabola, Asymptote
Rate of change

Numeracy Links

Careers Links
Medicine – identify links
Economist
Meteorologists
Actuaries graph risks