Edward Peake Church of England Middle School		
Topic: Working in the cartisan plane	**Year: 8**	**NC Strand: Algebra**

What should I already know?
• How to describe and continue a sequence given diagrammatically • How to predict and check the next term(s) of a sequence • How to represent sequences in tables and graphs • How to recognise the difference between a linear and non-linear sequence

What will I know by the end of the unit?
• How to work with coordinates in all four quadrants • How to identify and draw lines that are parallel to the axis • How to recognise and use the line y=x • How to recognise and use lines of the form y=kx • How to link y = kx to direct proportion • How to explain the effect of changing the value of k to the gradient of the line y=kx • How to recognise and use lines of the form y = x + a • How to recognise and explain if a graph will have a negative gradient from it's equation • How to explain the connection between graphs and linear sequences • How to recognise non linear graphs • How to explain how to find the midpoint of a line

Vocabulary			
Quadrants	Equation	Table	Steepness
Coordinates	Graph	Slope	Difference
Horizontal	Diagonal	Axes	Gradient
Vertical	Scale	Linear	Input
Axis	Multiple	Proportion	Output
Origin	Steep	Unitary	Intercept
Parallel	Linear	Multiplier	Straight line
Straight line	Substitute	Direct	Negative
Ratio	Slope	Sequence	Incline
Descending	Ascending	Integer	Substitution
Table of values	Curve	Non-linear	Symmetrical
Midpoint	Equidistant	Segment	Mean

Investigate/Homework tasks
• Homework will be set by your teacher using google classroom • You should complete at least 30 minutes of maths tasks using the website and log in provided by your teacher. Please attend help sessions if you do not have access to the internet at home • Additional work you could complete: ○ Find out more about the meaning of the vocabulary list using http://www.amathsdictionaryforkids.com/ • To challenge yourself: Answer the key questions to deepen your knowledge
Key Information/Diagrams

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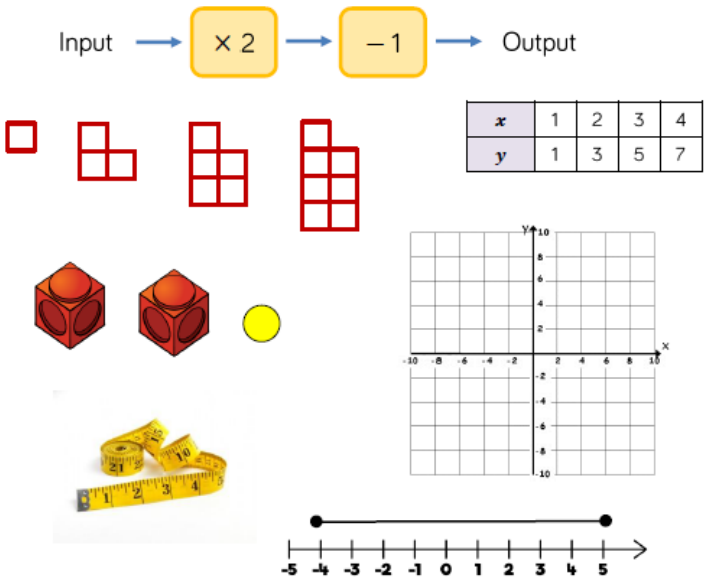
Key Representations



Key Questions

What is the same and what is different about the points with coordinates $(a, 0)$ and $(-a, 0)$?
Why are coordinates $(a, 0)$ and $(0, a)$ different?
Why do the order of the numbers in a coordinate matter?
Describe how you read and plot a coordinate.
Where is the origin?

Give an example of an equation of a line that is parallel to the x-axis/y-axis.
Is the line $3 = x$ the same as the line $x = 3$? What about the line $x - 3 = 0$?
Why is the line $x = 0$ different from the x-axis?
Will the lines $x = \cdots$ and $y = \cdots$ ever meet? Why or why not?

How can you recognise a line of the form $y = kx$?
What's the same and what is different about the lines $y = kx$ and $y = x$?
What effect does increasing or decreasing the value of k have on lines with equations in the form $y = kx$?
Do all lines with equations in the form $y = kx$ form a straight line and go through the origin? Why or why not?

Is the graph $y = x$ the same as the graph $x = y$?

How many points lie on the line $y = x$? Why?

Why are the scales of the axes important when plotting graphs?

What's the same and what's different about the straight lines represented by the equations $y = kx$ and $y = -kx$?
How can you identify whether a straight line, plotted on a graph, has a negative or positive gradient?
How can you identify the type of gradient (positive or negative) of a line by just looking at the equation of the line?

What does the gradient of a line represent?
How do we know if one line is steeper than another?
Does it matter which right-angled triangle we choose on the straight line when we are calculating the gradient?
What does a gradient of zero mean?
How can working out the gradient of a line help in direct proportion calculations?

Describe the differences between a linear and a non-linear graph.
How can you use the equation of the graph to determine whether it is linear?
How do we work out the scale for our axes?

What is the same and what is different about the line $y = x$ and the line $y = x - a$?
What is the gradient of the line $y = a + x$?
What about $y = x + a$?
Is $a - x = y$ the same line as $x + y = a$? Explain.
Explain how you could check that you have plotted the line $y = x + a$ correctly. What could you look for?

How would you know if a straight line or a table of values represents direct proportion? What are the key features?
What is a conversion graph and how can information be obtained from it to answer questions?
Why do direct proportion graphs always start at $(0, 0)$?

What's the same and what's different about linear graphs and linear sequences? How could we label the axis on a the graph to show the position of a term in the sequence?
Will the gradient of the straight line representing a descending linear sequence be positive or negative? Explain your answer.

Why is it a good idea to use three coordinates when plotting a straight line graph?
Can you use non-integer x values in your table to generate your set of coordinates?
Can you extend your straight line outside of the range of values in your table? Explain your answer.

What does the word equidistant mean?
How can you work out a midpoint? Is there more than one way?
If given the coordinates of the midpoint, and of the starting point of the line, how can you work out the coordinates of the endpoint of the line?