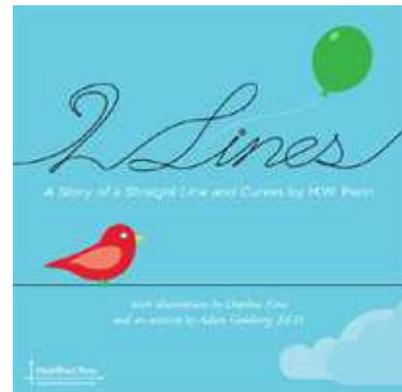


Teacher's Notes

What is a line?

Macmillan's Dictionary for Children gives no less than 15 definitions, beginning with a long thin mark or stroke and ending with 'to cover the inside of a garment', i.e. to line your jacket. Many math dictionaries, such as Barron's Dictionary of Mathematics Terms, define a line as a straight set of points that extend to infinity in two directions.



The term line is one of the basic undefined terms of Euclidian geometry, so it is not possible to give a rigorous definition. The Oxford Concise Dictionary of Mathematics defines a straight line segment but ignores a definition for line.

So what do you teach a child?

When they connect two points using a straight edge, we tell them this is a straight line segment. Of course the mark bears the width of the pencil point, so it is and it isn't. A line has no width, only length.

When we construct a closed curve such as a circle, children differentiate between the points inside and those outside the circle. The points on the circle? Children will see them as a line. Macmillan will, too, because they form a 'limit or boundary', an edge.

Barron's suggests we think of a curve as the path traced out by a point if it is allowed to move around freely in space. A point that moves? Surely the moment you conceive of a point that moves you have a problem. If a point could move it would move to a different place and, by definition, be a different point. Macmillan claims a curve has no straight parts or angles while Barron's suggests a straight line is one type of curve.

The brilliance of Oxford is that it ignores defining a curve completely, though it does define a closed curve. How can you define the latter without defining the former?

We can define curves with equations. A helix, a spiral, an ellipse, a circle, etc. have defining equations. So does a straight line.

Confused?

So what do you teach a child? That lines exist, that they are interesting and, wow, that they might even be fun to explore. When we set a child on a path of exploration, we've created an inquiring mind. Isn't that our goal?