

# How can I use inquiry-based and creative activities in Mathematics and numeracy based lessons?

Bacon, K.A. (2010) 'A Smorgasbord of Assessment Options' *Teaching Children Mathematics* 16(8) pp.458-469

## At a glance:

Bacon is a 5<sup>th</sup> grade (10-11 year olds) in the United States. She investigated ways to make her mathematics lessons more inquiry based and creative using different planning and assessment techniques. She uses the following structure to plan her lessons and activities:

<p>Level 0: Visualisation</p> <p>Object of Activity:</p> <p>Shapes and what they 'look like'</p>	<p>Level 1: Analysis</p> <p>Object of Activity:</p> <p>Classes of Shapes</p>	<p>Level 2: Informal Deduction</p> <p>Object of Activity:</p> <p>Properties of Shapes</p>	<p>Level 3: Deduction</p> <p>Object of Activity:</p> <p>Relationship among properties of shapes</p>	<p>Level 4: Rigor</p> <p>Object of Activity:</p> <p>Deductive systems of geometry</p>
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Bacon's application of the Van Heile model of learning (Bacon 2010; 460)

Example of activity used in a primary classroom:

'Create a three-dimensional model of a theme park... you must include:

**Four** solid figures that are regular solids with six congruent square faces

**Two** three-dimensional figures with two circular bases that are parallel and congruent

**Three** three-dimensional figures with one curved surface; one flat, circular surface; one curved edge; one vertex

**At Least Two** three-dimensional figures with six rectangular faces

Upon completing your model, present it to the class. Act as a "tour guide", identifying each three-dimensional figure that you have used. Explain the form and function of each structure and your reasons for selecting them. Be sure to identify the faces, edges and verticals in each of your structures

(Bacon, 2010; 463)

## Ways that you can use this in your classroom today:

- 1) Plan your activities, not by what pupils are *doing*, but by what pupils should be *thinking* by the end. This will make sure that you are planning activities that are very closely linked to your intended learning
- 2) Scaffolding learning using the above 'step-by step' process. The five sections above could be different worksheets for pupils to choose from, different stages in the lesson (e.g. teacher led, study led starters, activities and plenaries)
- 3) Start at the end. Think of what you want pupils to be able to do at the end of your topic (see example of final assessment above) and work backwards from there.

## Key Information:

'A proposition' – a "single declarative sentence" that captures expected learning (Stiggins 2004) – can be turned into an assessment.

E.g. **Proposition:** The vertex of a polyhedron is the point of intersection of three or more edges or faces, or the tip of a cone can be changed into true for false statements (lower ability), short answer questions and multiple choice questions (middle ability) and essay investigation questions to demonstrate pupils depth of learning, for example.. 'You have just met an alien. This alien has no idea what solid figures are nor does he understand the concept of vertices. Explain how you would teach the alien to identify and count vertices in the following solids... Create illustrations to support your explanations (p.468)