

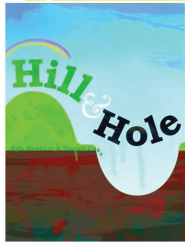
Take This Book

Read:

Hill and Hole

By Kyle Mewburn

Kynan's Positive and Negative Adventures
Connected 3, 2006



Years 7-8

GEOMETRY AND MEASUREMENT

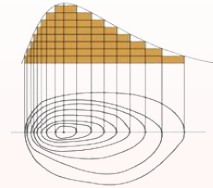
Have students give or interpret location, distance and grid references on a *topographic* map, make and draw objects from their top and side views.

Make available a topographic map of the local area. Have students use the key and the scale, grid reference to make factual statements about the location of a local landmark or point of interest. Draw their attention to *contour lines*, research these and discuss elevations above (and below) sea level (0), and the unit of measure used (m).

- Investigate contour lines by making available to students thick cardboard, scissors and glue. Have them work in pairs to 'build a hill' with layers (elevations) of cardboard of decreasing size. Before each layer is glued, in place have students draw round this to create the contour lines of their hill.

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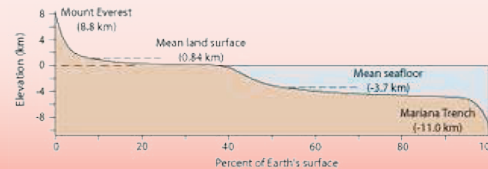
- Have students create a top view and profile view of their hill.



In making their model, students develop understanding that contour lines are drawn on maps to connect points of equal elevation from sea level, the 0 contour line.

On a topographic map, locate a hill (elevated area). Have students interpret the contour lines, noticing that where they are closer together the hill is steeper. Have them read the elevation and scale, and with support, create a profile view of the hill.

Research and locate places of interest in the world, with positive and negative elevation, understanding that the shoreline is the 0 (zero) contour line. eg. *Google height above sea level*.



STATISTICAL INVESTIGATIONS AND LITERACY

Have students work in pairs to investigate a question or an assertion, using the statistical enquiry cycle. For example, assert and investigate the views of senior students/staff, using a scale, *strongly agree, agree, neutral, disagree, strongly disagree*:

- *The level of student debt (negative bank balance) is good for NZ.*
- *We should put the same effort into protecting the environment below sea level (our oceans) as we do above it (the land).*

NUMBER AND ALGEBRA

As part of ongoing numeracy learning:

Read *Hill and Hole*. Discuss the messages of friendship and of contentment, then explore integers (...-2, -1, 0, 1, 2...)

Together recognise that the *amount* of the earth that makes the hill and the *amount* of earth absent from the hole must be equal. Have students use equations to express this. Accept ideas such as $+H + -H = 0$. Have student substitute values for H, and record examples, eg, $+100 + -100 = 0$.

Explore scenarios such as: What if the hole was bigger than the hill when the wind blew? eg. $+100 + -120 = -20$ (there'd still be a bit of a hole) What if the hill was bigger than the hole when the wind blew? eg. $+120 + -100 = +20$ (there'd still be a bit of a hill). Recognise that adding a positive integer, is a rise and adding a negative integer is a drop.

Together list occasions in our lives when we encounter positive and negative integers, eg. owing money and being in credit, celsius temperatures that fluctuate above and below freezing, elevations above and below sea level.

Using these contexts *as appropriate*, together explore scenarios, model and record equations that express situations that involve the addition and subtraction of negative and positive integers.

Have student work in pairs to write their own contextual scenarios (as above) and record equations to express these. Share these as a class, and have students explain their reasoning for the equation they have used to express the problem.