Learners and Learning

The object of this exercise is to put the teacher in the position of being a novice learner. In that way they gain deeper insights into understanding how their pupils might really see what it is they are trying to teach them.

The "lesson" here is about finding the formula for the area of a triangle (in square units!). Often described by teachers as finding the area of a triangle. I have observed this lesson countless times in my career, and I have had the opportunity to discuss with pupils what it is they see.

Typically, the lesson has come from earlier experiences of counting unit squares inside rectangles and compound shapes constituted from rectangles. Some will have counted half squares when the shape includes lines running through their diagonals. It is likely that they will have learnt that the area of a rectangle can be calculated by multiplying its length by its breadth.

Pupils approach the lesson about area of a triangle knowing that a formula for area refers to the lengths of visible sides.

Teaching the formula for area of a triangle is normally very good. It often involves cutting or folding rectangles to show that it is half of the rectangle area. At the end of this, the term "height" of the triangle is introduced to serve as the second dimension of the rectangle which is no longer visible when the triangle is singularly presented.

In short, when a child sees a rectangle, they see the sides whose lengths need multiplying to find its area. This is not the case in a triangle. They can see a base, but they need to mentally insert the height to proceed with its measurement and its consequent multiplication.

Mathematicians might call the height of a triangle an **auxiliary** measurement because it helps, in this case, with the calculation of area. For the sake of this discussion, I might call the three sides of the triangle the **evident** measurements.

It is my view that the teaching about the formula for the area of a triangle, though clear in its demonstration, introduces the auxiliary measurement only implicitly. This creates a conceptual gap with some children. Presenting children with triangles whose bases are not horizontal on the page can wobble children's confidence with locating an evident base and, even more so, an auxiliary height.

To many teachers the height, as the auxiliary measurement is evident, but this is not necessarily the case for the novice learner.

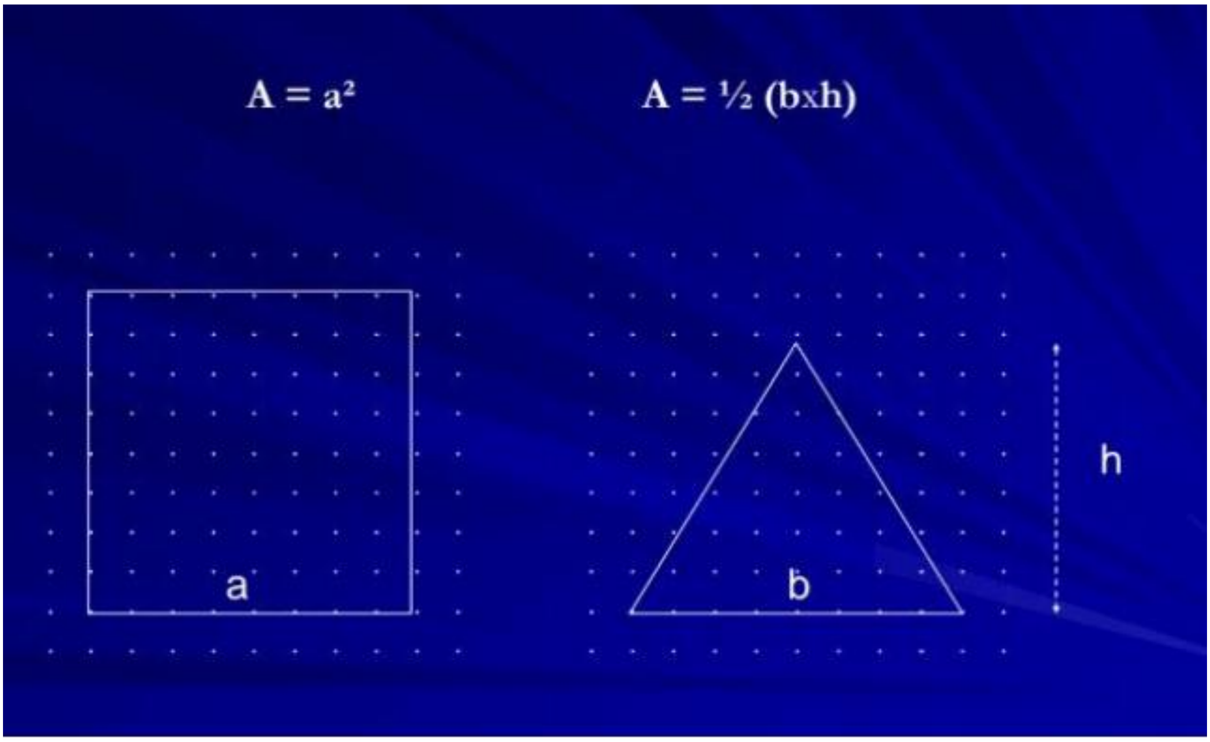
I will use the first slide to illustrate that very point. I'm not going to say all the earlier stuff. But I wanted you to know where I was coming from.

The second slide puts the teacher in novice learner mode. Using isometric paper the area of the equilateral triangle in triangular units is (base)^2. Check it out! So what is the area of the square in triangular units? <u>If they are fluent they will seek out the auxiliary measurement.</u>

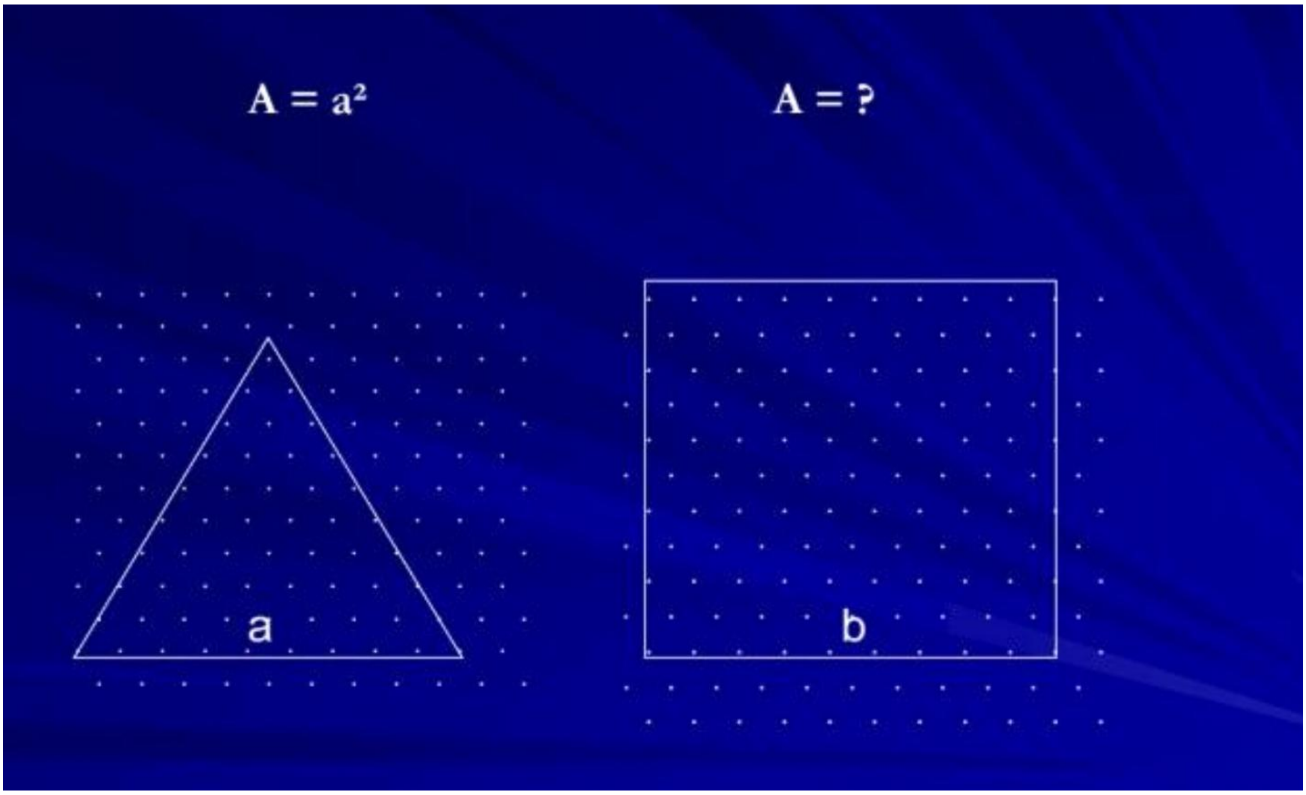
It will take only 10 minutes to present, and give time for teachers to work on the task and to discuss.

As ever, for the reflective teacher, there will be something to dwell on here.

Slide 1



Slide 2



Peter Lacey (from my ATM conference opening presentation 2004)