Paul Swan

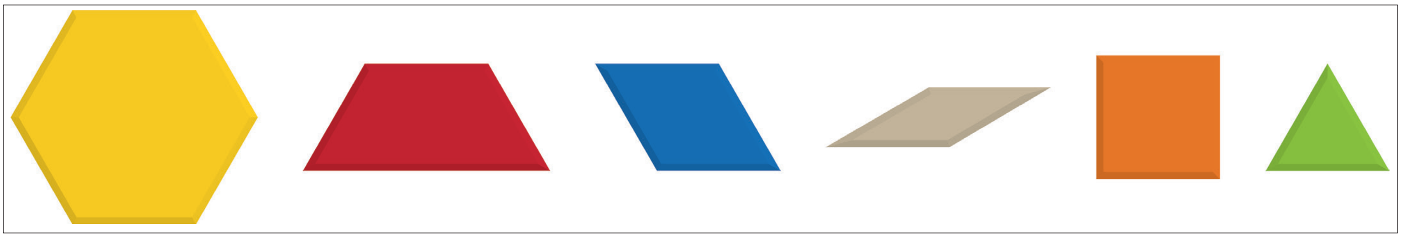

Figure 1.

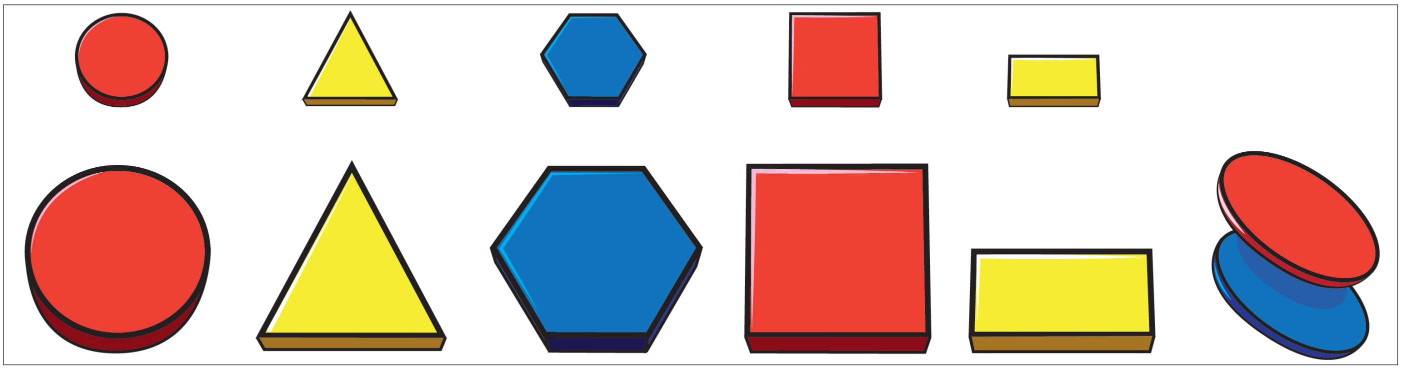

Figure 2.

Attribute Blocks are often confused with Pattern Blocks and I frequently find them mixed together in school maths storerooms. Pattern Blocks come in 10 mm thick wood or 5 mm plastic pieces (which are often mistaken for Attribute Blocks). Pattern Blocks come in five pieces: Yellow Hexagon, Red Trapezium, Blue and Tan Rhombus, Green Triangle and Orange Square (see Figure 1).

Attribute Blocks are plastic shapes that come in:

- Two sizes: large or small
- Two thicknesses: thick or thin
- Three colours: red, blue or yellow
- Five shapes: triangle, square, rectangle, hexagon and circle (see Figure 2)

The fact that there is a yellow hexagon in the Pattern Block set and the Attribute Block set causes part of the confusion.

The size, thickness, colour and shape represent the **blocks' attributes**, hence the name Attribute Blocks.

Figure 3.

With just four words, you can describe a single block. A large thick red triangle would look like this:

Note 60 individual pieces make up a set of Attribute Blocks (2 x 2 x 3 x 5). Each block is different, so I suggest the original packaging is kept and the pieces packed away at the end of each session (see Figure 3). Also, I would buy an extra set, so you have spares available to top up any lost bits.

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PICK A PIECE

The blocks are placed on the table. If you don't like the noise of plastic on the desk, place a white tea towel on the desk. It muffles the noise, reduces the 'bump factor' and makes a great background if the blocks are photographed.

One person chooses a block and the other person must describe it using just four words. Consider how the block's attributes are connected by the word 'and'; that is the block must meet all four criteria or attributes.

SPIN AND FIND

Use an Attribute Spinner or attribute dice to spin up a piece (see Figure 4).

Pick up a piece and code it onto the spinner. Students may simplify the above activities by using one section of the spinner, two sections etc. A virtual Attribute Block Spinner may be found at drpaulswan.com.au/wp-content/uploads/interactive/attributespinner/index.html

NOT SPINNER

Introduce the word **not**, a very powerful three-letter word in mathematics. Say the word **not** before each word that comes up on the spinner. For example, the piece is **not** large, **not** thick, **not** yellow and **not** a circle. This means there will be many possible answers. The pieces could be small, thin, red or blue, triangle, square, rectangle, hexagon. Once again, not all spinner sections need to be flicked and the word 'not' does not have to be used in front of each part on the spinner.

PLAY SHERLOCKS' BLOCKS

This is a game for four players. The blocks are placed out on the table and mixed around.

No talking version
Three players close their eyes and the remaining player 'steals a piece'. The three detectives must work cooperatively to find the stolen piece without talking.

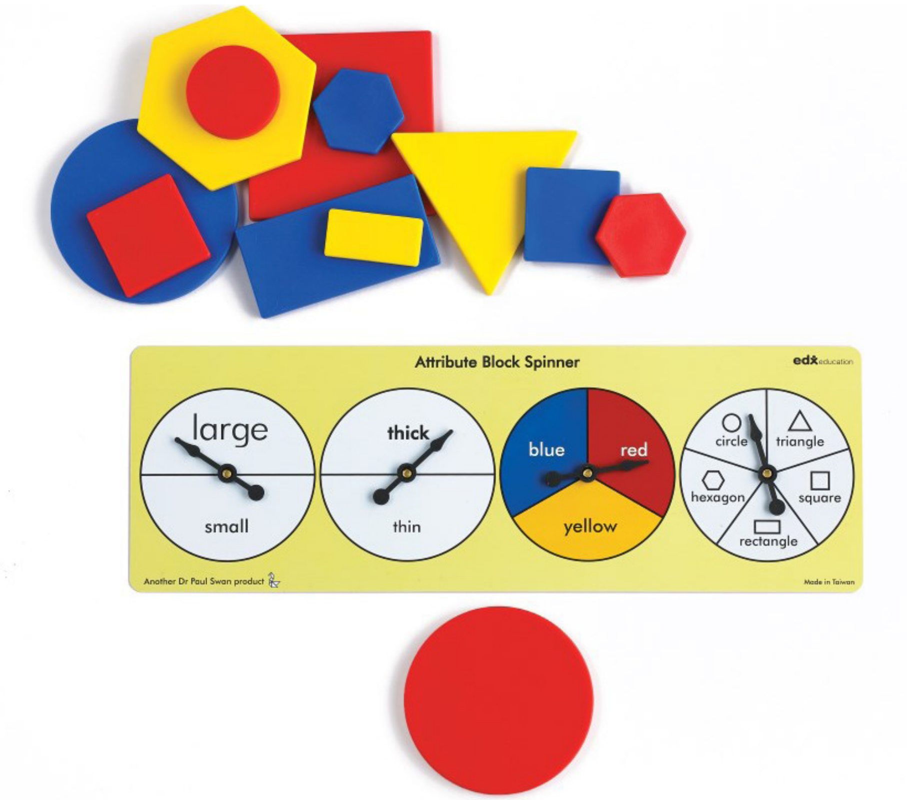

Figure 4.

The students are allowed to move and sort pieces. When they believe they have found the missing piece, they can only say four words. The thief will then say yes or no (guilty or not guilty).

Talking version
Players may interrogate the thief by asking questions to which the answer is only 'yes' or 'no'. Allowing students to use the spinner to keep track provides visual support to enable students who get 'lost' to stay in the game.

LANGUAGE AND LOGIC

Students may use sorting circles to form Venn Diagrams. Venn Diagrams are named after John Venn (1834 – 1923), a mathematician and logician.

Blocks placed in the intersection of two circles must meet two criteria or attributes, that is red and triangle. Adding a third triangle means that the intersection of all three circles means that three criteria will need to be met (see Figure 5). The link between language and logic becomes clear.

Consider how databases work – how internet search engines work.

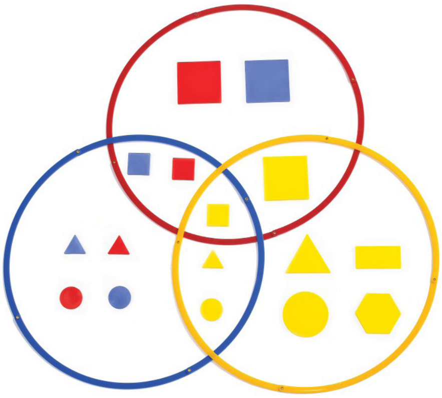

Figure 5.

SYMBOLS AND LANGUAGE

Students may use different coding systems to describe the relationship between pieces. See Figure 6.

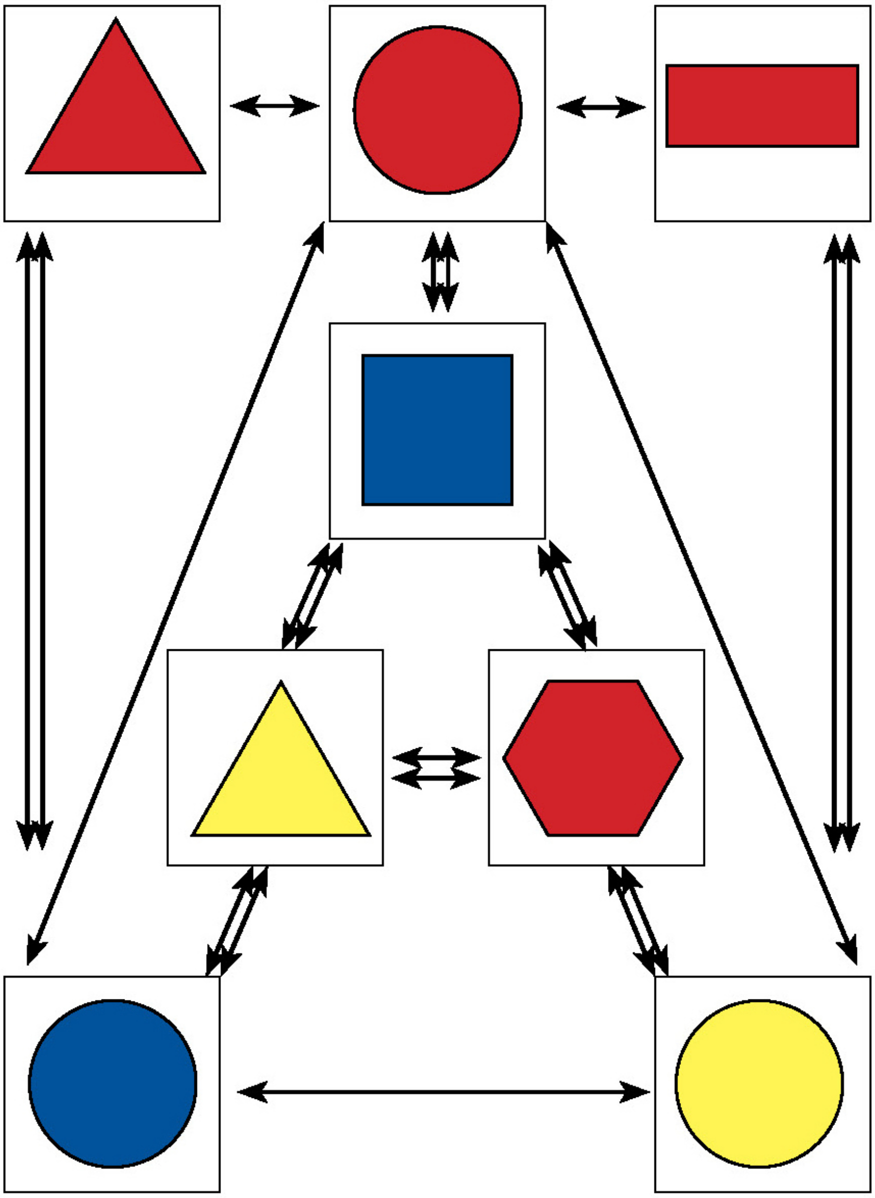

Figure 6.

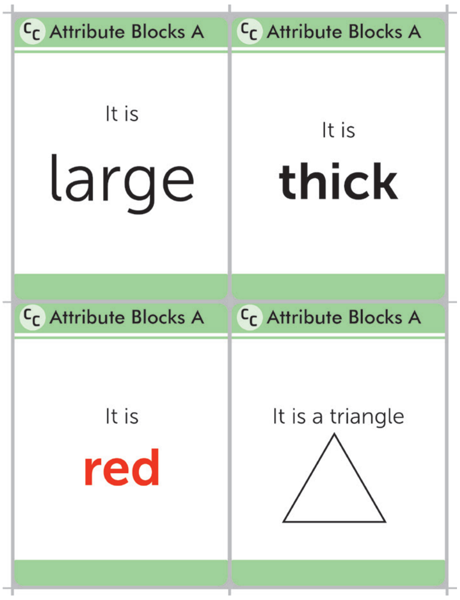

Figure 7.

A single arrow represents exactly one difference and a double arrow exactly two differences. Once students understand how these puzzles work, they can design their own. Various coding systems might be applied to Attribute Blocks. See Swan. 2014. p. 38 for an example.

COLLABORATIVE LEARNING

The *Check the Clues* problem solving series revolves around four students working together to solve a problem. Each student is given a card to read to the group.

After all clues have been read, the group decides on a course of action to solve the problem. Once they have arrived at an answer, students read again to check the solution meets all the criteria. Four cards from Check the Clues A are reproduced below. Once again, students may be encouraged to write their own clue cards to go with Attribute Blocks.

LOGIC LANGUAGE AND REASONING

This final challenge highlights the link between language and the ability to reason. A chain is formed between the Attribute Block Pieces. The linking rule is that there must be **exactly** two differences between each piece in the chain. Try using all sixty blocks and joining back to the start of the chain. To simplify the task, remove all the large piece or all the thin pieces.

Dunstan, D., & Swan, P. (2017). *Check the Clues A*. Perth: A-Z Type

Swan, P. (2014) *Attribute Blocks*. Perth: A-Z Type

Paul Swan has worked at primary, secondary and tertiary levels and is keen to share good ideas for Teaching (G.I.F.T.S), via his website (www.drpaulswan.com.au), videos, publications, games and presentations.