Y6 Learning at home activity sheet #5

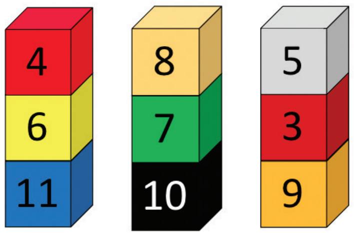
Problem 1:

Deena goes to Niue for a holiday.
Postcards cost $1.35 each.
Keyrings cost $2.25 each.
Deena spends $27.00 on postcards and keyrings for her friends back home.

How many postcards and keyrings might Deena have bought?

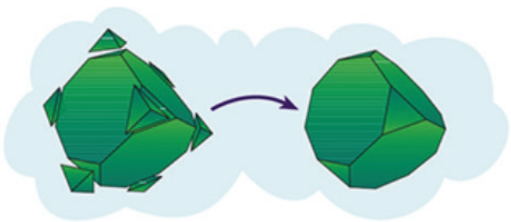
Problem 2:

Which blocks need to swap places so that the numbers in each stack have equal totals?



Problem 3:

If you cut the vertices (corners) off a cube like this you get a solid called a truncated cube.



What shaped faces make up a truncated cube?

How many of each shape are there?

How many edges and vertices does a truncated cube have?

Grid magic:

Two squares are shaded in this multiplication grid.

8 x 4 = 32 is shaded because the answer, 32, has the digit 2 in the ones place.

3 x 6 = 18 is shaded because the answer, 18, has the digit 8 in the ones place.

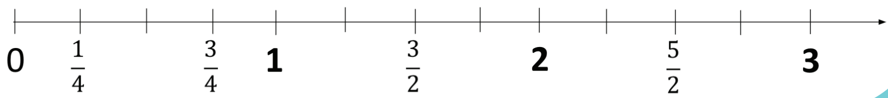
Shade any square in the grid where the product has either 2 or 8 in the ones place.

x	1	2	3	4	5	6	7	8	9	10
1										
2										
3										
4								32		
5										
6			18							
7										
8										
9										
10										

What did you notice?

Placing numbers:

Write the missing numbers on this number line.



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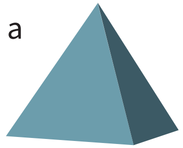
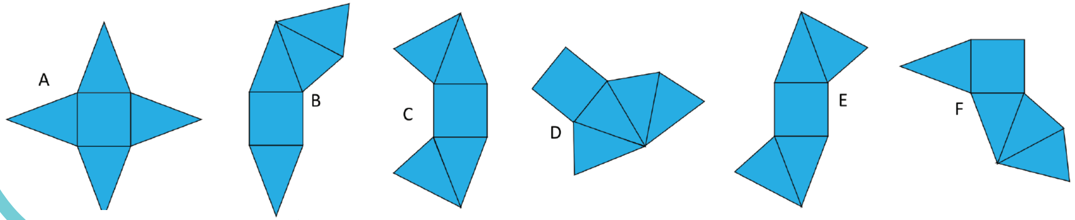
Nets for a square based pyramid:

Here are some flat patterns (nets) that might fold up to make a square based pyramid.

Some will work and some won't. Predict which nets work and make them to check.





Driving Fiji:

Use the scale to work out the distance of the road around Viti Levu.

Milk:

This large bottle of milk holds 3 litres.

How many glasses could you fill from a full 3 litre bottle?

You might have an empty 2 litre or 1 litre bottle that you could use to help you.

Show how you worked out your answer.

Pattern finding:

Here is a pattern of equations:

$$1 + 5 = 2 \times 3$$

$$2 + 6 = 2 \times 4$$

$$3 + 7 = 2 \times 5$$

$$4 + 8 = 2 \times 6$$

Write the equation that comes next.

Write an equation in the pattern that is a long way down.

Make up a rule for all equations in this pattern.

Make up your own pattern of equations for someone in your household to work out.

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Learning at home: Notes for whānau

When your child finishes each activity, ask them to add a mouth to the face to show how they felt about that activity.

Problem 1:

This problem can be solved with ‘trial and error’ but that can be inefficient. Once your child tries a few possible combinations you might ask:

- Could Deena only buy postcards and spend all $27.00? How many postcards could she get? (27 ÷ 1.35 = 20)
- If she only bought keyrings, how many could she buy? (27 ÷ 2.25 = 12)

Organising the information in a table supports your child to see a pattern in the possible combinations.

Number of postcards	Number of keyrings	Total cost
20	0	20 x 1.35 = 27
0	12	12 x 2.25 = 27

Swapping a postcard for a keyring, or vice versa, does not keep the total at $27.00. For example, 19 postcards and 1 keyring costs $27.90.

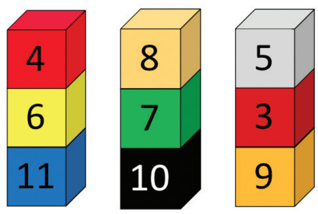
How many postcards need to be traded for how many keyrings to keep the total at $27.00?

In general, five postcards are exchanged for three keyrings to keep the total at $27.00. That leads to the other solutions of; 15 postcards and 3 keyrings, 10 postcards and 6 keyrings, 5 postcards and 9 keyrings.

Problem 2:

This is another problem that might be attempted by trial and error. For example, your child might exchange 4 for 5 to see what happens. You can encourage a more systematic approach with questions like:

- What are the tower totals without any exchange? (21, 25, 17)
- Which towers need to exchange to ‘balance’ the totals?
- How much extra does tower with total of 17 need to get from tower with total of 25? (4)



Exchanging block 7 for block 3 will remove four from the total of 25 and give it to 17.

This is a one block exchange solution. There is another possibility if you exchange two blocks. Exchanging 8 and 10 for 5 and 9 has the same effect.

Problem 3:

Imaging the corners of the cube being cut off to form triangular faces requires your child to structure the cube.

- How many faces does a cube have? What shape are they? (Six squares)
- How many vertices (corners) does a cube have? (Eight: Four on top and four on the bottom)
- How many edges does a cube have? (12)

Your child might make a cube from plasticine, clay, or an old potato, and cut the corners off. Predicting that eight triangular faces will be made because there are eight original corners is an important insight.

- What shape do the squares become when the vertices are cut off? (Octagons)
- How many octagons will three be? (Six since there were six squares)
- How many faces is that now? (6 + 8 = 14)
- How many edges are there? (8 x 3 = 24 around the triangles plus the 12 original edges makes 36 edges in total)

Grid magic:

This task is aimed at supporting your child to learn and connect the multiplication facts using the symmetry of the pattern.

Does your child look for symmetry to identify squares that should be shaded?

Do they use the knowledge that the ones digit of the fact must be 2 or 8 to work out the fact?

x	1	2	3	4	5	6	7	8	9	10
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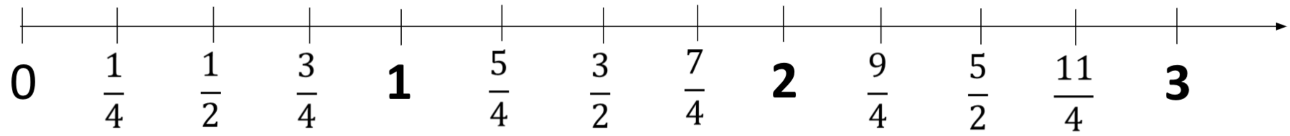
Placing numbers:



Your child should notice that the numbers many of the fractions are equivalents to numbers of quarters. For example, 1 equals $\frac{4}{4}$, and $\frac{3}{2} = \frac{6}{4}$.

Nets for a square based pyramid:

A square pyramid has a square as the base and four triangles that make the sides (lateral faces) and connect at the apex (top corner).

Encourage your child to predict whether, or not, each net will fold to form a square based pyramid. Ask your child to explain their prediction. Expect them to imagine the act of folding the nets.

They could make the nets from paper and fold the pattern into a pyramid.

The nets that work are A, D, E, and F. B and C do not work.

Driving Fiji:

Discuss what a scale on a map is and where to find it. Your child needs to know that the length on the scale is a 'reduced' amount of the length in real life. The scale shows that 40km in real life is represented by a length about the width of their thumb.

How many times does your thumb width fit along the road around Viti Levu? (11 or 12 times)

If each thumb width represents 40 kilometres, how long is the real road? (440km or 480km. Actual distance is about 500km)

Blocks:

If you have a plastic milk bottle, a glass or plastic cup, and a measuring jug at home, let your child use the items to solve the problem. The bottle is most likely to hold 2 litres (2L). That is good because your child will need to scale up the result for a 2 litre bottle by 1.5 to get the answer for a 3 litre bottle. It is tempting to let your child fill the plastic bottle and pour glasses until the contents are gone.
Move to predicting the result before acting it out.

Measure one glass to see how much milk that holds. A glass usually holds 200 or 250 millilitres though some can hold more, or less.

- How many millilitres are in a 2 litre bottle? Since "milli" means one thousandth, there are 2 x 1000 = 2000 millilitres in 2 litres.
- If a 2 litre bottle holds 2000 millilitres (2000mL), what operation tells us how many glasses can be filled? (2000 ÷ 200 = 10 or 2000 ÷ 250 = 8)
- So a 2 litre bottle fills 8 or 10 glasses. How many glasses will a 3 litre bottle fill? How do you work that out? (1.5 x 10 = 15 or 1.5 x 8 = 12)

Pattern finding:

Does your child notice patterns running across the equations as well as patterns running down? For example:

Patterns down

- The first numbers go up by one, so do the second numbers, and the fourth numbers.
- The third number is always 2.
- There is always addition on the left and multiplication on the right.

Patterns across

- The left and right sides always work out to the same total (are equal).
- The second number is always four more than the first number.
- The fourth number is always two more that the first number.

These patterns are important in answering the questions:

The next equation is $5 + 9 = 2 \times 7$

There are an infinite number of 'long way down' equations, like $10 + 14 = 2 \times 12$.

The rule for all equations can be expressed as $\Delta + (\Delta + 4) = 2 \times (\Delta + 2)$ if Δ represents the first number. Algebraically that can be written as $n + (n + 4) = 2(n+ 2)$.