

Focus: Problem Solving

Unit Length: lessons

AusVELS:

Students develop the ability to make choices, interpret, formulate, model and investigate problem situations, and communicate solutions effectively. Students formulate and solve problems when they use mathematics to represent unfamiliar or meaningful situations, when they design investigations and plan their approaches, when they apply their existing strategies to seek solutions, and when they verify that their answers are reasonable.

Vocabulary Development:

“Zone of Confusion”

Specific strategies to teach:

- Understanding the problem- read the problem a few times until they fully understand what is them problem asking them to do?
- BAR method

Strategies include:

Drawing a diagram, -draw a picture of a word problem using simple symbols or pictures enables students to see the situation more clearly

Drawing a Table- decide in the number of columns to fit the variables, leave gaps in tables and complete patterns mentally

Acting it out or Using Concrete Materials- act out the roles in the problem or use concrete materials such as counters or blocks

Guessing and Checking- students begin with an educated guess and check their guess against the conditions of the problem

Creating an Organised List- students need to follow a procedure or sequence to ensure all possibilities are listed and to prevent repetition.

Looking for a Pattern- when a pattern is established it is easy to find what comes next and can be extended or continued.

Other Resources:

Problem Solving Books-Peter Maher, Solve that Problem, Sharon Shapiro- Solve that problem- Middle Primary.

Teaching and Learning Sequence:

Session	Student Learning Activity (Including introduction)	Enabling Prompt	Extension Problem	Content link/Strategy Focus
1	<p>Draw A Diagram. Example 3 (Do this as a class together) Measurement: For her woodwork project Zoe has to hammer 5 nails into a piece of wood. The nails must be in a straight line and 0.75 centimetres apart. What is the distance from the first nail to the last? <i>Working in pairs/ small groups</i></p>	<p>Can you draw a diagram of the wood with the 5 nails?</p>	<p>A snail finds itself at the bottom of a deep well. The well is 1530 centimetres deep. Each day the snail struggles up 180cm and then stops to rest. While it is resting the snail slides down 30 centimetres. How long before it reaches the top of the well?</p>	
2	<p>Intro: Lucas and Chloe go shopping for shoes. Lucas chooses one pair for \$110 and another for \$100. Chloe chooses a pair that costs \$160. When they go to pay, the assistant says that there is a sale on and they get three pairs of shoes for the price of two pairs. How much should Lucas and Chloe pay each? Give two different options and explain which one you think is fairest.</p>	<p>Re-cap of understanding the problem. Ask yourself “what I am being asked to find out?” Introduce the idea of writing an “answer sentence” after reading the problem. E.g. ‘Lukas spent \$... in total on shoes.’ They can use this to refer back to as they go along to make sure they are not straying off-task.</p>	<p>Imagine Lucas is a really unfair person (obviously this is NOT true). Come up with an unfair solution to this problem and then write a persuasive argument to try and trick Chloe into accepting your unfair proposal.</p>	<p>Challenging Problem</p>
3	<p>Due to overcrowding, Jeff has decided to build a skyscraper at MPW, to allow for new classrooms without the kids losing any more yard space. The skyscraper is going to be built in a narrow space. Each floor will be square in shape. Jeff wants just one window on each side/wall of the skyscraper and he also wants a window on the roof (like a sunroof). How many windows will the school need to order if the skyscraper is going to be 10 stories high?</p>	<p>Could you make a model of a skyscraper that is 6 stories high? How many windows would Jeff need to order for this building?</p>	<p>Jeff has decided to make the skyscraper 20 stories high, so he can get rid of all the portables and free up even more yard space. How many windows will he need to order now? What if the building was 100 stories high? Or even 500 stories high?</p>	<p>Open ended problem</p>
4	<p>Draw a table Example 2 (Do this as a class together) <i>Jacob has 37 footy cards. Finn has 23 more cards than Jacob. How many cards does Finn have?</i> There are 18 animals on the farm. Some are chickens and others are sheep. If you can count 50 legs how many chickens and how many sheep are there?</p>	<p>Run a teaching group on the floor for those who are having difficulty.</p>	<p>A wild dog swallowed a total of 105 nuts in five days. Each day he managed to eat eight more than he had on the previous day. How many did he eat each day?</p>	<p>BAR method. Draw a table</p>

5	<p>The farmer has 3 different hen houses. One hen house contains red hens, the second black hens and the third white hens. Every day the red hens lay 5 eggs, the black hens lay 8 eggs and the white hens lay 3 eggs. How many days will it take for the hens to lay a total of 80 eggs?</p>	<p>Use coloured unifix to represent the different hen houses.</p> <p>Can you work out how many for each hen house?</p>	<p>On an alien planet. 6 out of 20 inhabitants are animal, 9 out of 20 are humans and the rest are robots. If there are 108 humans on the planet how many robots are there?</p>	<p>Draw a table</p>
6	<p>Acting it out or using concrete materials. Example 1 (Do this as a class together) Twenty-nine students were waiting in a line to play game. The teacher chose the first person in the line and then every fourth person in the line after that. How many were chosen?</p>		<p>Imagine that you bought a game for \$15, and then sold it for \$20 because you no longer played with it. Then you bought it back for \$25 because your sister wanted it. Finally, when your sister got bored with the game, you sold it for \$30. How much money did you make or lose?</p>	<p>BAR method</p>
7	<p>Guessing and Checking Example 3 (Do this as a class together) Jake is buying concert tickets for 8 friends. He has \$50. A reserve seats cost \$7 each, and B reserve seats are \$5. If he buys some of each kind, and spends exactly \$50, how many tickets does he buy?</p>		<p>Carolyn is twice as old as Jackie. Ben is five years older than Jackie. The sum of the three ages of the three children is 41. What are their ages?</p>	
8	<p>Creating an Organised List Example 2 (Do this as a class together) Luca, Olivia, Sian and Jay are lining up to go to the cinema. How many different ways can they line up?</p>		<p>I have four metal sculptures to display on the mantelpiece above the fireplace. The first one is a cellist, the second a violinist, the third a flautist and the fourth a saxophonist. How many different ways can I organise the musicians?</p>	
9	<p>Looking for a Pattern Example 2 (Do this as a class together)</p> <p>During the holidays, Selvi picked apples at the Granny Smith orchard. She was paid 10c for the first bucket of apples, 20c for the second, and 40c for the third and 80c for the fourth. How much was she paid for the eight bucket?</p>		<p>Gerald jogs five blocks on the first day of training. Each day he increases her distance by another three blocks. On the last day he jogged 35 blocks. For how many did did he jog?</p>	

Next term: