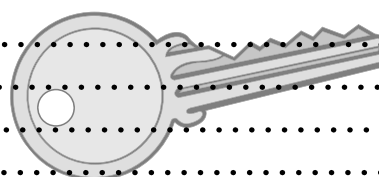
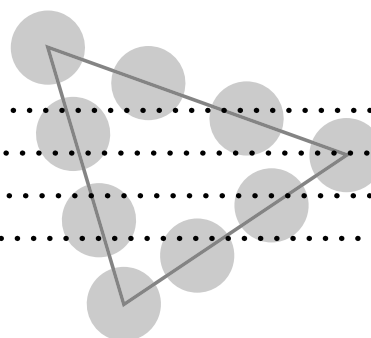
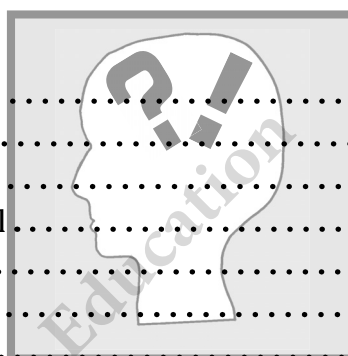


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Introduction

There is today a strong requirement for teachers at all levels of schooling to reflect upon how they design teaching and learning activities for their students. A previous publication by this author, *Teaching Thinking in the Primary Years* (Pohl, 1997), suggested that there is an expectation that learning experiences for students need to be structured in such a way as to:

- ⇒ **engage** students in a wide range of analytical, critical and creative thinking tasks
- ⇒ **create** on-going opportunities for students to
 - learn and expand their use of the language of thinking
 - develop, practise and refine their skills of thinking
 - share their thinking in many ways and at all times
- ⇒ **provide** students with the tools to better:
 - manage
 - organise
 - record and ...
 - recall
 - ... their thinking
- ⇒ **promote** productive thinking, for example, taking students beyond memorisation and simple recall into the higher order thinking skills of analytical, critical, creative and caring thinking
- ⇒ **assist** in the transfer of skills as tools for life-long learning
- ⇒ **encourage** transfer beyond the classroom. We wish to see students applying good thinking techniques not just in the classroom, but in the playground and beyond the school gate. We wish to embed these as tools for life-long learning as we provide students with opportunities to apply the thinking tools and strategies in everyday situations in real life (or at least, true to life) problem solving problem situations.

In *Learning to Think/Thinking to Learn* (Pohl, 2000) the author indicated that teachers currently have an extensive range of models, strategies and tools available to assist them in infusing thinking into

We wish to see students applying good thinking techniques not just in the classroom, but in the playground and beyond the school gate.

the curriculum. Some of these have gained wide acceptance and are used extensively. It was suggested there, for example, that there is any number of excellent resources for teachers that provide examples of how frameworks such as Bloom's Taxonomy of Cognitive Objectives or Gardner's Multiple Intelligences may be applied in the planning of learning activities for students. Due in part to the enduring popularity of these approaches, more examples of the application of both models at all levels of schooling are provided within this book.

It is important to note that such frameworks are popular because of the balance they provide. Bloom's may balance thinking well, as it will see students thinking in six qualitatively different ways about content. Applying Multiple Intelligence frameworks will allow students to express the way they best know, and understand content via their intelligence strengths.

However, no one framework should be seen as a panacea – no one structure will do everything. Bloom's may balance thinking but what if we require affective responses from students? Bloom's is a Taxonomy of Cognitive Objectives – a list of thinking things, not feeling things. So if we believe that thinking, feeling and learning are inextricably linked, then planning just using this taxonomy alone will only satisfy one half of the thinking–feeling equation.

However, while acknowledging the value of such frameworks, teachers will need to look 'beyond Bloom's' as they infuse thinking into content at all levels of schooling. Employing some different instructional approaches in planning learning activities can be a refreshing and rewarding challenge for teachers who have relied on a narrow range of planning structures in the past.

In addition, employing a range of frameworks in the planning of teaching and learning activities will assist teachers in maintaining student motivation and interest.

As Bloom's Taxonomy remains a popular and appropriate planning tool for teachers, this publication devotes much space to exploring its use in a variety of different contexts at different levels of schooling. Many curriculum-specific and general topics are covered within work units for students, and using the structure as an assessment and reporting tool is demonstrated.

Following this, we look beyond Bloom's as we link this structure to other structures (such as Multiple Intelligences) and explore other frameworks such as the recently Revised Thinkers Keys of Tony Ryan.



Planning Teaching and Learning Activities with a Thinking Skills Focus Using Bloom's Taxonomy

Science – Levers and More (Target Group – Primary Years of Schooling)

Instructions: You must complete six activities all together – one activity in each of the six categories below. You may choose three activities to research and complete by yourself and the other three may be completed with a partner.

Bloom's Taxonomy	Activities
Remembering (Recall factual information)	<ul style="list-style-type: none"> ❖ Create an A–Z of different types of machines found around the home. ❖ Make a list of both simple and complex machines that you know.
Understanding (Explaining information)	<ul style="list-style-type: none"> ❖ The answer is LEVER. What are five possible questions with this answer? ❖ Brainstorm a list of 20 things under each of the following headings: Levers, Inclined Planes, Wheels.
Applying (Using information in a different way)	<ul style="list-style-type: none"> ❖ Elevators are used to get to the top of tall buildings. Think about the type of buildings we might have in the future and predict the type of lift that may be used. ❖ How many different types of simple machines might be used in constructing a bridge? Make a list of each type and explain how they would be used.
Analysing (Breaking down information in some way)	<ul style="list-style-type: none"> ❖ Use diagrams to show the difference between effort, load and pivot. ❖ What are some disadvantages of the third class lever? ❖ What are the similarities and differences between complex machines and simple machines?
Evaluating (Justifying decisions)	<ul style="list-style-type: none"> ❖ Suggest four alternatives to transporting something using wheels. Suggest some consequences of using each alternative. ❖ Give three possible explanations for how the pyramids were constructed. ❖ Consider three alternatives to using an inclined plane for moving objects uphill. Rank your suggestions in priority order.
Creating (Combining information in new ways)	<ul style="list-style-type: none"> ❖ List the attributes of wheels and wedges and then combine them to make a better product. ❖ Design a simple machine to lift your toys from a shelf. ❖ Use BAR (Bigger? Add? Replace?) to improve on the design of a popular household machine.



**Planning Teaching and Learning Activities with a Thinking Skills Focus
Using Bloom's Taxonomy**

Maths – Statistics
(Target Group – Middle Years of Schooling)

Remembering and Understanding	<p>List important terms you know that are associated with statistical analysis (e.g. Mean, Median, Mode).</p> <p>Provide a dictionary definition for each term in your list.</p> <p>How would you explain each term in your own words to a friend who is having difficulty understanding them?</p>
Applying and Analysing	<p>Demonstrate to a friend that you know how information such as Mean, Median and Mode might be used by explaining how the Bureau of Statistics make use of such information generated from Census data.</p> <p>Complete the following: Mean, Median and Mode are similar in that they all, but differ from each other in that</p>
Evaluating and Creating	<p>Make a list of at least six things things that you like to do for recreation.</p> <p>Create a matrix so that you can rate each item on your list with a 1, 2, 3 or 4, using this rating scale: 4 = do this very regularly; 3 = do this most of the time; 2 = do this sometimes; 1 = rarely do this.</p> <p>Find the mean of the ratings of the items on your list. Find the median by placing the numbers in order from largest rating to smallest rating.</p> <p>What is the mode?</p> <p>Can we determine a median for such data? Explain.</p> <p>Create a pie chart for the eight-hour period from arriving at school until a couple of hours after school, showing how you spent your time.</p> <p>Now create another one showing your ideal school day!</p>



Planning Teaching and Learning Activities with a Thinking Skills Focus Using Bloom's Taxonomy

Maths – Algebra (Target Group – Middle Years of Schooling)

Instructions: You must complete six activities in all – one activity must come from each of the six categories below.

Remembering (Factual answers, recall and recognition)	Brainstorm all the algebraic terms you know.	Complete an A–Z list of occupations that may use algebra in some way.
Understanding (Translating, interpreting, showing understanding)	Write a definition for each term in your own words.	Describe a real life problem which requires the use of algebra.
Applying (Using information gained in different, familiar situations)	Use your brainstorm list (from above) to generate a word find based on algebraic terms.	Design a board game that would assist others to remember terms associated with algebra.
Analysing (Break into parts to examine more closely)	What is easy about algebra and what is difficult? Give reasons to support your ideas.	Compare algebra to another area of mathematics. Which is easier for you? More relevant for you? More relevant in general? Give reasons to support your ideas.
Evaluating (Judge, use criteria, rank, substantiate)	Do a PMI (Plus Minus Interesting) on the relevance of algebra for today's classrooms. Justify your personal stance on the issue.	What groups of people would argue that everyone needs a solid understanding of algebra and what evidence would they give to support their views?
Creating (Combining information to new situations to create new products, ideas, etc.)	Write a newspaper article titled: 'Algebra for Dummies! – A guide to a better understanding'.	Create a comic book which demonstrates the practical application of algebra in solving a real life problem.



Planning Teaching and Learning Activities with a Thinking Skills Focus
 Using Bloom's and Multiple Intelligences

Planning Proforma *Topic* _____

The Reverse	The What If?	The Disadvantages	The Combination	The Alphabet
The Bar	The Variations	The Picture	The Prediction	The Different Uses
The Ridiculous	The Commonality	The Question	The Brainstorming	The Inventions
The Interpretation	The Brick Wall	The Construction	The Forced Relationship	The Alternative