

Bloom's Revised Taxonomy



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Pupil Free Day

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***The mind is not a vessel
to be filled, but a fire to
be ignited.***

(Plutarch)

Overview

- Bloom's Taxonomy and higher-order thinking
- Take a walk down memory lane
- Investigate the Revised Taxonomy
 - New terms
 - New emphasis
- Explore each of the six levels
- See how questioning plays an important role within the framework (oral language)
- Use the taxonomy to plan a unit
- Look at an integrated approach
- Begin planning a unit with a *SMART Blooms* Planning Matrix



Productive Pedagogies

A guide to Productive Pedagogies: Classroom reflection manual lists three degrees of incorporation of Higher-order thinking skills in a “Continuum of practice”:

- Students are engaged only in lower-order thinking; i.e. they receive, or recite, or participate in routine practice. In no activities during the lesson do students go beyond simple reproduction of knowledge.
- Students are primarily engaged in routine lower-order thinking for a good share of the lesson. There is at least one significant question or activity in which some students perform some higher-order thinking.
- Almost all students, almost all of the time are engaged in higher-order thinking.

(Department of Education, Queensland, 2002, p. 1)

What is Higher-order thinking?

A guide to *Productive Pedagogies: Classroom reflection manual* states that:

Higher-order thinking by students involves the transformation of information and ideas. This transformation occurs when students combine facts and ideas and synthesise, generalise, explain, hypothesise or arrive at some conclusion or interpretation. Manipulating information and ideas through these processes allows students to solve problems, gain understanding and discover new meaning. When students engage in the construction of knowledge, an element of uncertainty is introduced into the instructional process and the outcomes are not always predictable; in other words, the teacher is not certain what the students will produce. In helping students become producers of knowledge, the teacher's main instructional task is to create activities or environments that allow them opportunities to engage in higher-order thinking.

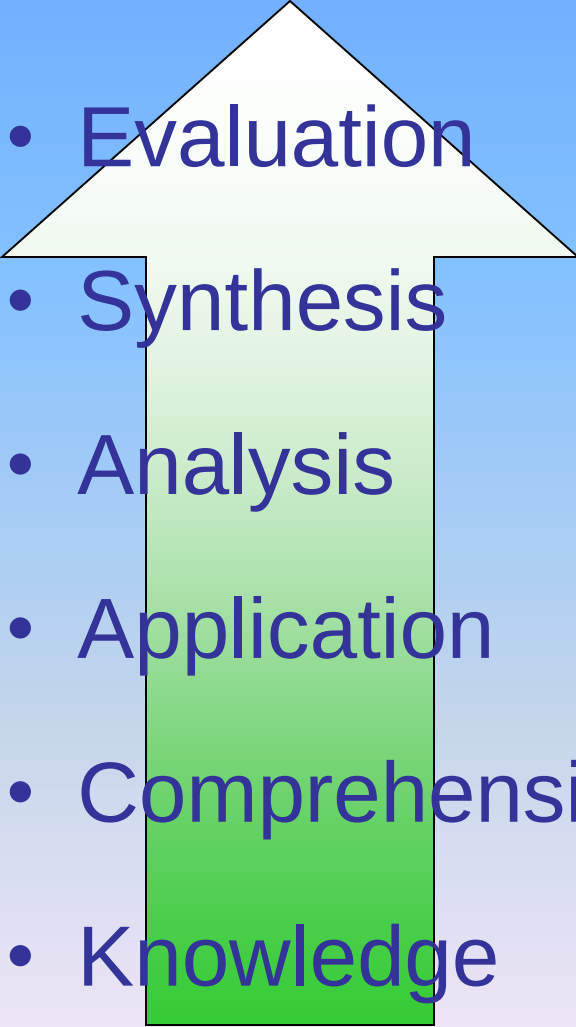
(Department of Education, Queensland, 2002, p. 1)

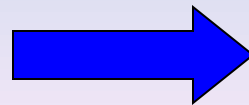
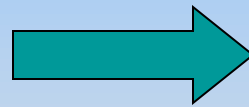
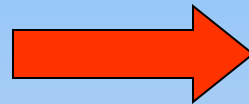
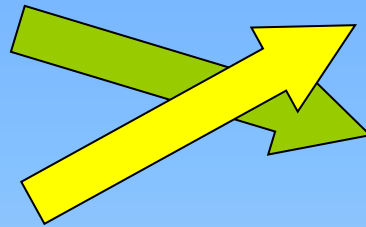
Bloom's Revised Taxonomy

- Taxonomy of Cognitive Objectives
- 1950s- developed by Benjamin Bloom
- Means of expressing qualitatively different kinds of thinking
- Adapted for classroom use as a planning tool
- Continues to be one of the most universally applied models
- Provides a way to organise thinking skills into six levels, from the most basic to the higher order levels of thinking
- 1990s- Lorin Anderson (former student of Bloom) revisited the taxonomy
- As a result, a number of changes were made

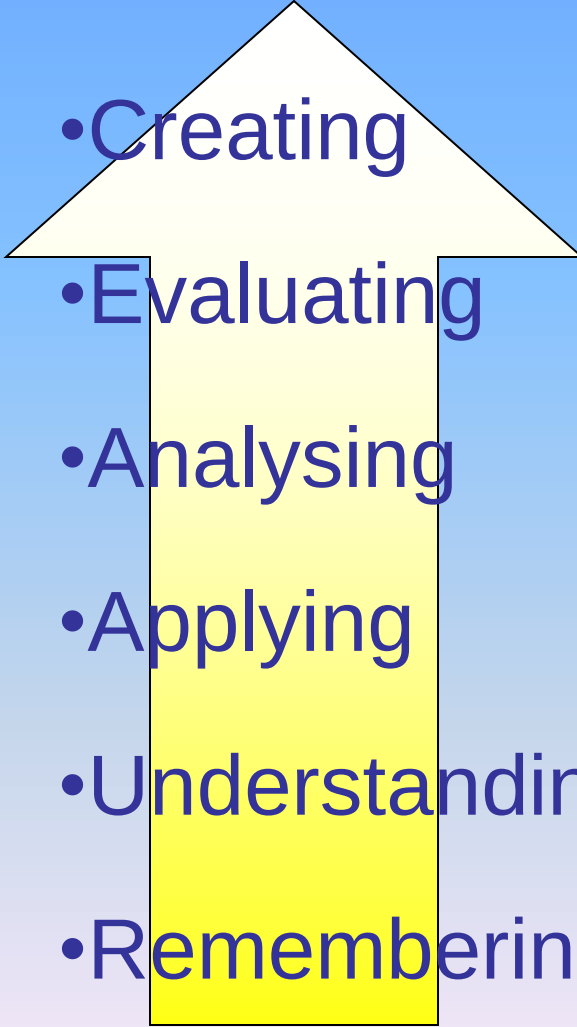
(Pohl, 2000, *Learning to Think, Thinking to Learn*, pp. 7-8)

Original Terms

- 
- Evaluation
 - Synthesis
 - Analysis
 - Application
 - Comprehension
 - Knowledge



New Terms

- 
- Creating
 - Evaluating
 - Analysing
 - Applying
 - Understanding
 - Remembering

Change in Terms

- The names of six major categories were changed from *noun* to *verb* forms.
- As the taxonomy reflects different forms of **thinking** and thinking is an *active* process verbs were more accurate.
- The subcategories of the six major categories were also replaced by verbs
- Some subcategories were reorganised.
- The knowledge category was renamed. Knowledge is a product of thinking and was inappropriate to describe a category of thinking and was replaced with the word *remembering* instead.
- Comprehension became *understanding* and synthesis was renamed *creating* in order to better reflect the nature of the thinking described by each category.

Change in Emphasis

- More authentic tool for curriculum planning, instructional delivery and assessment.
- Aimed at a broader audience.
- Easily applied to all levels of schooling.
- The revision emphasises explanation and description of subcategories.

(<http://rite.ed.qut.edu.au/oz-teachernet/training/bloom.html>) (accessed July 2003; Pohl, 2000, p. 10).

BLOOM'S REVISED TAXONOMY

Higher-order thinking

Creating

*Generating new ideas, products, or ways of viewing things
Designing, constructing, planning, producing, inventing.*

Evaluating

*Justifying a decision or course of action
Checking, hypothesising, critiquing, experimenting, judging*

Analysing

*Breaking information into parts to explore understandings and relationships
Comparing, organising, deconstructing, interrogating, finding*

Applying

*Using information in another familiar situation
Implementing, carrying out, using, executing*

Understanding

*Explaining ideas or concepts
Interpreting, summarising, paraphrasing, classifying, explaining*

Remembering

*Recalling information
Recognising, listing, describing, retrieving, naming, finding*

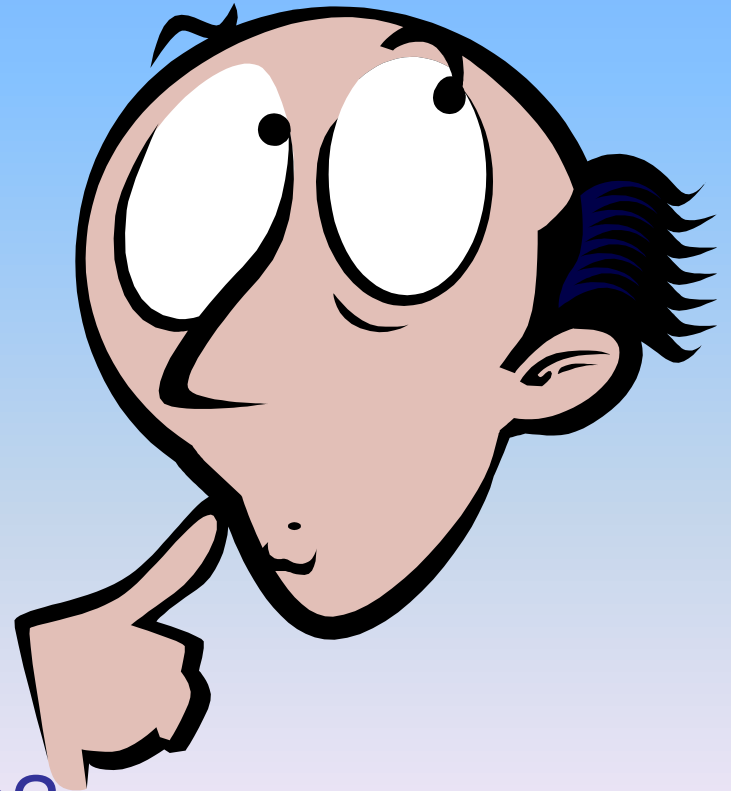
***A turtle makes progress
when it sticks its neck
out.***

(Anon)

Remembering

The learner is able to recall, restate and remember learned information.

- Recognising
- Listing
- Describing
- Identifying
- Retrieving
- Naming
- Locating
- Finding



Can you recall information?

Remembering cont'

- List
- Memorise
- Relate
- Show
- Locate
- Distinguish
- Give example
- Reproduce
- Quote
- Repeat
- Label
- Recall
- Know
- Group
- Read
- Write
- Outline

- Listen
- Group
- Choose
- Recite
- Review
- Quote
- Record
- Match
- Select
- Underline
- Cite
- Sort



Products include:

- | | |
|--------------|----------------|
| • Quiz | • Label |
| • Definition | • List |
| • Fact | • Workbook |
| • Worksheet | • Reproduction |
| • Test | • Vocabulary |

Classroom Roles for Remembering

Teacher roles

- Directs
- Tells
- Shows
- Examines
- Questions
- Evaluates

Student roles

- Responds
- Absorbs
- Remembers
- Recognises
- Memorises
- Defines
- Describes
- Retells
- Passive recipient

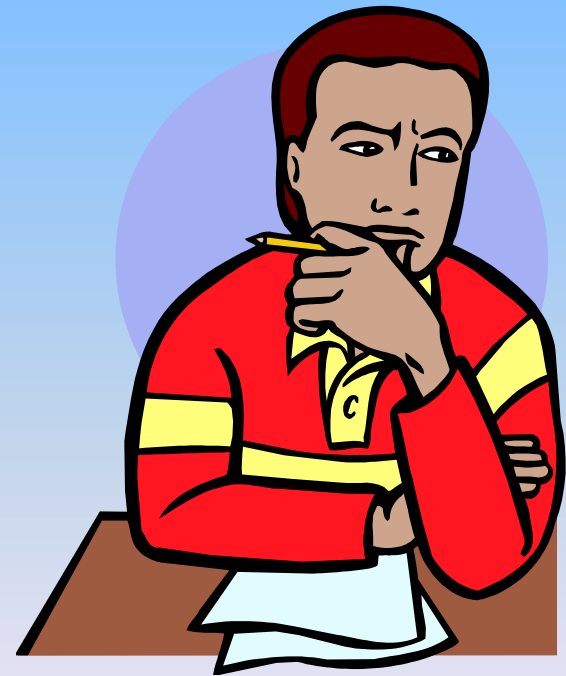
Remembering: Potential Activities and Products

- Make a story map showing the main events of the story.
- Make a time line of your typical day.
- Make a concept map of the topic.
- Write a list of keywords you know about....
- What characters were in the story?
- Make a chart showing...
- Make an acrostic poem about...
- Recite a poem you have learnt.

Understanding

The learner grasps the meaning of information by interpreting and translating what has been learned.

- Interpreting
- Exemplifying
- Summarising
- Inferring
- Paraphrasing
- Classifying
- Comparing
- Explaining



Can you explain ideas or concepts?

Understanding cont'

- Restate
- Identify
- Discuss
- Retell
- Research
- Annotate
- Translate
- Give examples of
- Paraphrase
- Reorganise
- Associate
- Describe
- Report
- Recognise
- Review
- Observe
- Outline
- Account for
- Interpret
- Give main idea
- Estimate
- Define



Products include:

- Recitation
- Summary
- Collection
- Explanation
- Show and tell
- Example
- Quiz
- List
- Label
- Outline

Classroom Roles for Understanding

Teacher roles

- Demonstrates
- Listens
- Questions
- Compares
- Contrasts
- Examines

Student roles

- Explains
- Describes
- Outlines
- Restates
- Translates
- Demonstrates
- Interprets
- Active participant

Understanding: Potential Activities and Products

- Write in your own words...
- Cut out, or draw pictures to illustrate a particular event in the story.
- Report to the class...
- Illustrate what you think the main idea may have been.
- Make a cartoon strip showing the sequence of events in the story.
- Write and perform a play based on the story.
- Write a brief outline to explain this story to someone else
- Explain why the character solved the problem in this particular way
- Write a summary report of the event.
- Prepare a flow chart to illustrate the sequence of events.
- Make a colouring book.
- Paraphrase this chapter in the book.
- Retell in your own words.
- Outline the main points.

Applying

The learner makes use of information in a context different from the one in which it was learned.

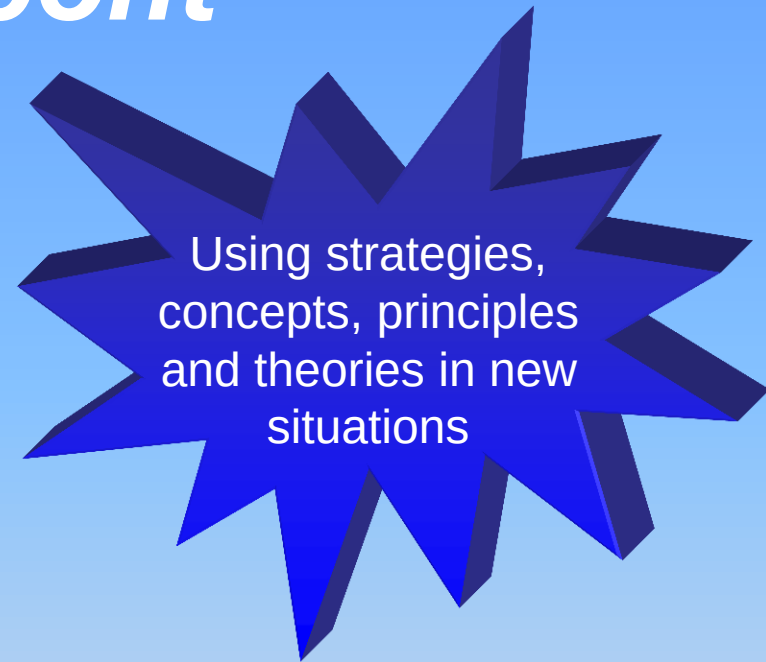
- Implementing
- Carrying out
- Using
- Executing



Can you use the information in another familiar situation?

Applying cont'

- Translate
- Manipulate
- Exhibit
- Illustrate
- Calculate
- Interpret
- Make
- Practice
- Apply
- Operate
- Interview
- Paint
- Change
- Compute
- Sequence
- Show
- Solve
- Collect
- Demonstrate
- Dramatise
- Construct
- Use
- Adapt
- Draw



Products include:

- Photograph
- Illustration
- Simulation
- Sculpture
- Demonstration
- Presentation
- Interview
- Performance
- Diary
- Journal

Classroom Roles for Applying

Teacher roles

- Shows
- Facilitates
- Observes
- Evaluates
- Organises
- Questions

Student roles

- Solves problems
- Demonstrates use of knowledge
- Calculates
- Compiles
- Completes
- Illustrates
- Constructs
- Active recipient

Applying: Potential Activities and Products

- Construct a model to demonstrate how it looks or works
- Practise a play and perform it for the class
- Make a diorama to illustrate an event
- Write a diary entry
- Make a scrapbook about the area of study.
- Prepare invitations for a character's birthday party
- Make a topographic map
- Take and display a collection of photographs on a particular topic.
- Make up a puzzle or a game about the topic.
- Write an explanation about this topic for others.
- Dress a doll in national costume.
- Make a clay model...
- Paint a mural using the same materials.
- Continue the story...

Analysing

The learner breaks learned information into its parts to best understand that information.

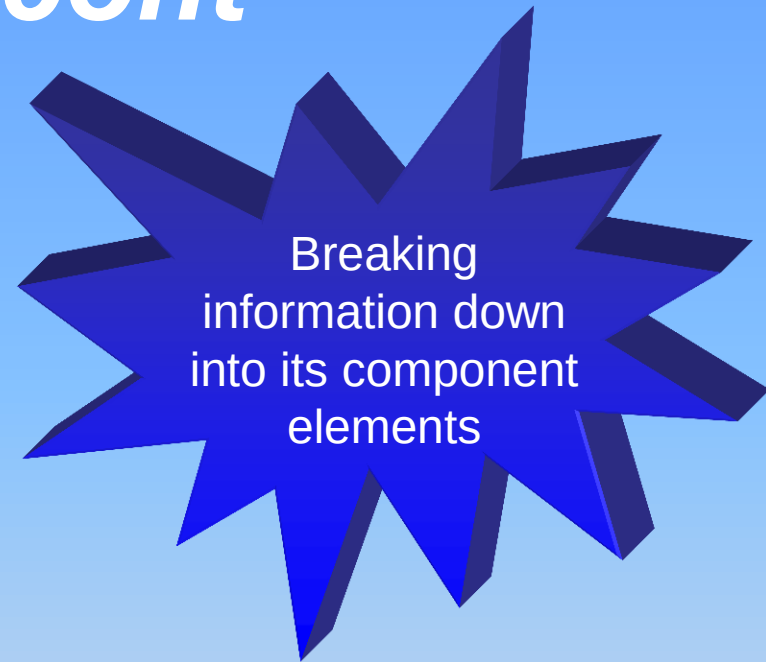
- Comparing
- Organising
- Deconstructing
- Attributing
- Outlining
- Finding
- Structuring
- Integrating



Can you break information into parts to explore understandings and relationships?

Analysing cont'

- Distinguish
- Question
- Appraise
- Experiment
- Inspect
- Examine
- Probe
- Separate
- Inquire
- Arrange
- Investigate
- Sift
- Research
- Calculate
- Criticize
- Compare
- Contrast
- Survey
- Detect
- Group
- Order
- Sequence
- Test
- Debate
- Analyse
- Diagram
- Relate
- Dissect
- Categorise
- Discriminate



Products include:

- Graph
- Spreadsheet
- Checklist
- Chart
- Outline
- Survey
- Database
- Mobile
- Abstract
- Report

Classroom Roles for Analysing

Teacher roles

- Probes
- Guides
- Observes
- Evaluates
- Acts as a resource
- Questions
- Organises
- Dissects

Student roles

- Discusses
- Uncovers
- Argues
- Debates
- Thinks deeply
- Tests
- Examines
- Questions
- Calculates
- Investigates
- Inquires
- Active participant

Analysing: Potential Activities and Products

- Use a Venn Diagram to show how two topics are the same and different
- Design a questionnaire to gather information.
- Survey classmates to find out what they think about a particular topic. Analyse the results.
- Make a flow chart to show the critical stages.
- Classify the actions of the characters in the book
- Create a sociogram from the narrative
- Construct a graph to illustrate selected information.
- Make a family tree showing relationships.
- Devise a roleplay about the study area.
- Write a biography of a person studied.
- Prepare a report about the area of study.
- Conduct an investigation to produce information to support a view.
- Review a work of art in terms of form, colour and texture.
- Draw a graph
- Complete a Decision Making Matrix to help you decide which breakfast cereal to purchase

Evaluating

The learner makes decisions based on in-depth reflection, criticism and assessment.

- Checking
- Hypothesising
- Critiquing
- Experimenting
- Judging
- Testing
- Detecting
- Monitoring



Can you justify a decision or course of action?

Evaluating cont'

- Judge
 - Rate
 - Validate
 - Predict
 - Assess
 - Score
 - Revise
 - Infer
 - Determine
 - Prioritise
 - Tell why
 - Compare
 - Evaluate
 - Defend
 - Select
 - Measure
- Choose
 - Conclude
 - Deduce
 - Debate
 - Justify
 - Recommend
 - Discriminate
 - Appraise
 - Value
 - Probe
 - Argue
 - Decide
 - Criticise
 - Rank
 - Reject



Judging the value of ideas, materials and methods by developing and applying standards and criteria.

Products include:

- Debate
- Panel
- Report
- Evaluation
- Investigation
- Verdict
- Conclusion
- Persuasive speech

Classroom Roles for Evaluating

Teacher roles

- **Clarifies**
- **Accepts**
- **Guides**

Student roles

- **Judges**
- **Disputes**
- **Compares**
- **Critiques**
- **Questions**
- **Argues**
- **Assesses**
- **Decides**
- **Selects**
- **Justifies**
- **Active participant**

Evaluating: Potential Activities and Products

- Write a letter to the editor
- Prepare and conduct a debate
- Prepare a list of criteria to judge...
- Write a persuasive speech arguing for/against...
- Make a booklet about five rules you see as important. Convince others.
- Form a panel to discuss viewpoints on....
- Write a letter to. ..advising on changes needed.
- Write a half-yearly report.
- Prepare a case to present your view about...
- Complete a PMI on...
- Evaluate the character's actions in the story

Creating

The learner creates new ideas and information using what has been previously learned.

- Designing
- Constructing
- Planning
- Producing
- Inventing
- Devising
- Making



Can you generate new products, ideas, or ways of viewing things?

Creating cont'

- Compose
- Assemble
- Organise
- Invent
- Compile
- Forecast
- Devise
- Propose
- Construct
- Plan
- Prepare
- Develop
- Originate
- Imagine
- Generate
- Formulate
- Improve
- Act
- Predict
- Produce
- Blend
- Set up
- Devise
- Concoct
- Compile



Products include:

- Film
- Story
- Project
- Plan
- New game
- Song
- Newspaper
- Media product
- Advertisement
- Painting

Classroom Roles for Creating

Teacher roles

- **Facilitates**
- **Extends**
- **Reflects**
- **Analyses**
- **Evaluates**

Student roles

- **Designs**
- **Formulates**
- **Plans**
- **Takes risks**
- **Modifies**
- **Creates**
- **Proposes**
- **Active participant**

Creating: Potential Activities and Products

- Use the SCAMPER strategy to invent a new type of sports shoe
- Invent a machine to do a specific task.
- Design a robot to do your homework.
- Create a new product. Give it a name and plan a marketing campaign.
- Write about your feelings in relation to...
- Write a TV show play, puppet show, role play, song **or** pantomime about..
- Design a new monetary system
- Develop a menu for a new restaurant using a variety of healthy foods
- Design a record, book or magazine cover for...
- Sell an idea
- Devise a way to...
- Make up a new language and use it in an example
- Write a jingle to advertise a new product.

Practical Bloom's

- Suitable for use with the entire class
- Emphasis on certain levels for different children
- Extend children's thinking skills through emphasis on higher levels of the taxonomy (analysis, evaluation, creation)
- Possible approaches with a class could be:
 - All children work through the remembering and understanding stages and then select at least one activity from each other level
 - All children work through first two levels and then select activities from any other level
 - Some children work at lower level while others work at higher levels
 - All children select activities from any level
 - Some activities are tagged “essential” while others are “optional”
 - A thinking process singled out for particular attention eg. Comparing, (done with all children, small group or individual)
 - Some children work through the lower levels and then design their own activities at the higher levels
 - All children write their own activities from the taxonomy

(Black, 1988, p. 23).



Sample Unit : Space



Remembering	Cut out “space” pictures from a magazine. Make a display or a collage. List space words (Alphabet Key). List the names of the planets in our universe. List all the things an astronaut would need for a space journey.
Understanding	Make your desk into a spaceship, Make an astronaut for a puppet play. Use it to tell what an astronaut does. Make a model of the planets in our solar system.
Applying	Keep a diary of your space adventure (5 days). What sort of instruments would you need to make space music? Make a list of questions you would like to ask an astronaut.
Analysing	Make an application form for a person applying for the job of an astronaut. Compare Galileo’s telescope to a modern telescope. Distinguish between the Russian and American space programs.
Evaluating	Compare the benefits of living on Earth and the moon. You can take three people with you to the moon. Choose and give reasons. Choose a planet you would like to live on- explain why.
Creating	Write a newspaper report for the following headline: “Spaceship out of control”. Use the SCAMPER strategy to design a new space suit. Create a game called “Space Snap”. Prepare a menu for your spaceship crew. Design an advertising program for trips to the moon.



Sample Unit : Travel



Remembering	How many ways can you travel from one place to another? List and draw all the ways you know. Describe one of the vehicles from your list, draw a diagram and label the parts. Collect “transport” pictures from magazines- make a poster with info.
Understanding	How do you get from school to home? Explain the method of travel and draw a map. Write a play about a form of modern transport. Explain how you felt the first time you rode a bicycle. Make your desk into a form of transport.
Applying	Explain why some vehicles are large and others small. Write a story about the uses of both. Read a story about “The Little Red Engine” and make up a play about it. Survey 10 other children to see what bikes they ride. Display on a chart or graph.
Analysing	Make a jigsaw puzzle of children using bikes safely. What problems are there with modern forms of transport and their uses- write a report. Use a Venn Diagram to compare boats to planes, or helicopters to bicycles.
Evaluating	What changes would you recommend to road rules to prevent traffic accidents? Debate whether we should be able to buy fuel at a cheaper rate. Rate transport from slow to fast etc..
Creating	Invent a vehicle. Draw or construct it after careful planning. What sort of transport will there be in twenty years time? Discuss, write about it and report to the class. Write a song about traveling in different forms of transport

***A good teacher makes
you think even when
you don't want to.***

(Fisher, 1998, ***Teaching Thinking***)

Blooming Questions

- Questioning should be used purposefully to achieve well-defined goals.
- Bloom's Taxonomy is a classification of thinking organised by level of complexity. It gives teachers and students an opportunity to learn and practice a range of thinking and provides a simple structure for many different kinds of questions and thinking.
- The taxonomy involves all categories of questions.
- Typically a teacher would vary the level of questions within a single lesson.

Lower and Higher Order Questions

- Lower level questions are those at the remembering, understanding and lower level application levels of the taxonomy.
- Usually questions at the lower levels are appropriate for:
 - Evaluating students' preparation and comprehension
 - Diagnosing students' strengths and weaknesses
 - Reviewing and/or summarising content

www.oir.uiuc.edu/Did/docs/QUESTION/quest1.htm

Lower and Higher Order Questions

- Higher level questions are those requiring complex application, analysis, evaluation or creation skills.
- Questions at higher levels of the taxonomy are usually most appropriate for:
 - Encouraging students to think more deeply and critically
 - Problem solving
 - Encouraging discussions
 - Stimulating students to seek information on their own

Questions for Remembering

- What happened after...?
- How many...?
- What is...?
- Who was it that...?
- Can you name ...?
- Find the definition of...
- Describe what happened after...
- Who spoke to...?
- Which is true or false...?

Questions for Understanding

- Can you explain why...?
- Can you write in your own words?
- How would you explain...?
- Can you write a brief outline...?
- What do you think could have happened next...?
- Who do you think...?
- What was the main idea...?
- Can you clarify...?
- Can you illustrate...?
- Does everyone act in the way that does?

(Pohl, *Learning to Think, Thinking to Learn*, p. 12)

Questions for Applying

- Do you know of another instance where...?
- Can you group by characteristics such as...?
- Which factors would you change if...?
- What questions would you ask of...?
- From the information given, can you develop a set of instructions about...?

Question for Analysing

- Which events could not have happened?
- If. ..happened, what might the ending have been?
- How is...similar to...?
- What do you see as other possible outcomes?
- Why did...changes occur?
- Can you explain what must have happened when...?
- What are some or the problems of...?
- Can you distinguish between...?
- What were some of the motives behind..?
- What was the turning point?
- What was the problem with...?

(Pohl, *Learning to Think, Thinking to Learn*, p. 13)

Questions for Evaluating

- Is there a better solution to...?
- Judge the value of... What do you think about...?
- Can you defend your position about...?
- Do you think...is a good or bad thing?
- How would you have handled...?
- What changes to.. would you recommend?
- Do you believe...? How would you feel if. ..?
- How effective are. ..?
- What are the consequences..?
- What influence will....have on our lives?
- What are the pros and cons of....?
- Why is of value?
- What are the alternatives?
- Who will gain & who will loose?

(Pohl, ***Learning to Think, Thinking to Learn***, p. 14)

Questions for Creating

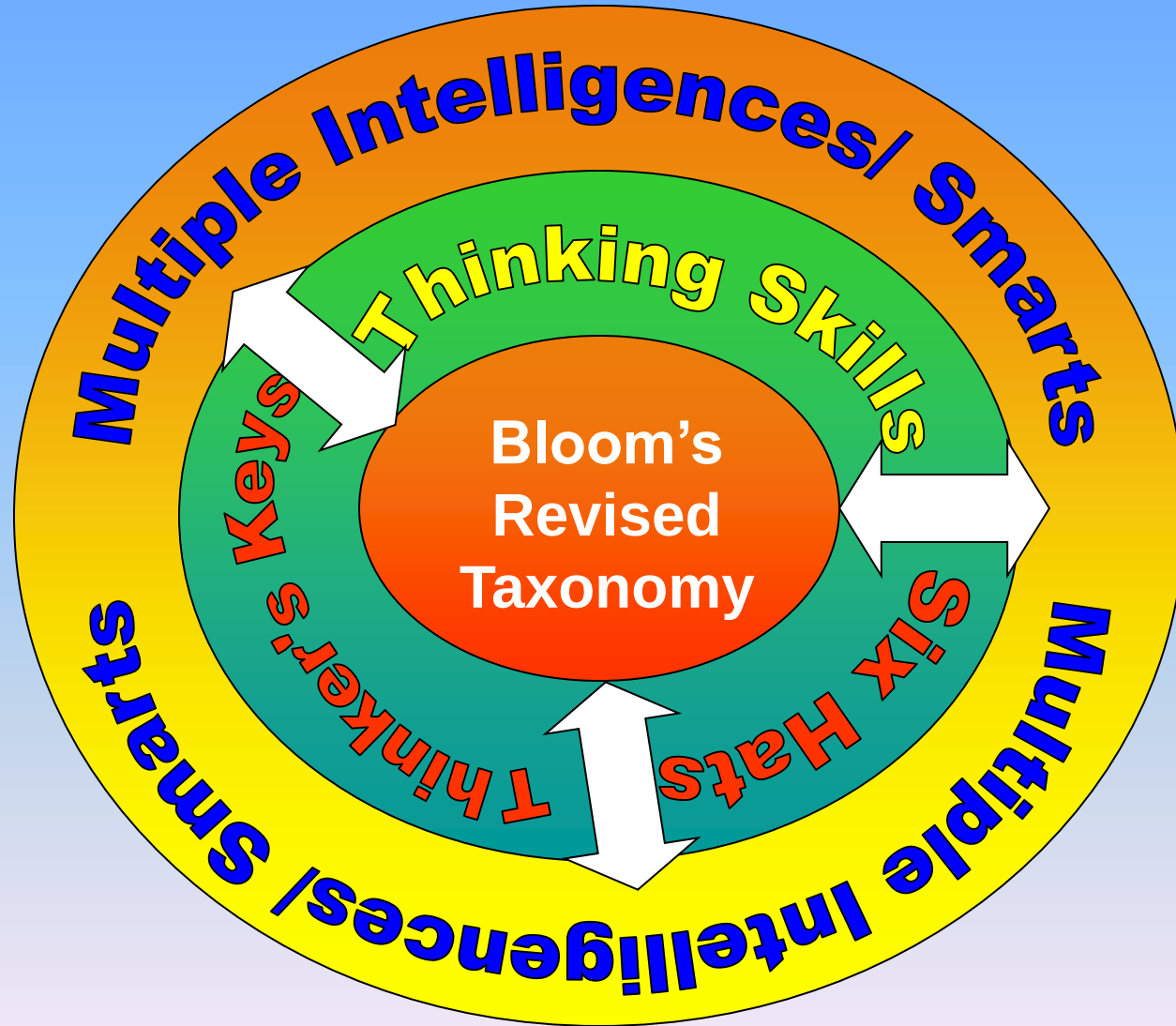
- Can you design a...to...?
- Can you see a possible solution to...?
- If you had access to all resources, how would you deal with...?
- Why don't you devise your own way to...?
- What would happen if ...?
- How many ways can you...?
- Can you create new and unusual uses for...?
- Can you develop a proposal which would...?

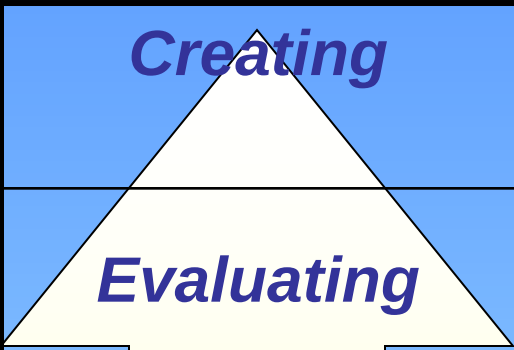
Now it's your turn...

- Use the Bloom's Matrix and these notes to plan a number of activities or questions for each level of the taxonomy.
- You may choose to use this term's context or unit, or focus on next term's.
- Work with your teaching partner.
- I will copy these for our Thinking Skills Folder so everyone can share our BRILLIANT ideas.

HAVE FUN!

How does it all fit together?



 <i>Creating</i>	Green Hat, Construction Key, SCAMPER, Ridiculous Key, Combination Key, Invention Key
 <i>Evaluating</i>	Brick Wall Key, Decision Making Matrix, PMI, Prioritising.
 <i>Analysing</i>	Yellow Hat, Black Hat, Venn Diagram, Commonality Key, Picture Key, Y Chart, Combination Key.
 <i>Applying</i>	Blue Hat, Brainstorming, Different uses Key, Reverse Listing Key, Flow Chart.
 <i>Understanding</i>	Graphic Organisers, Variations Key, Reverse Listing, PMI, Webs (Inspiration).
 <i>Remembering</i>	White Hat, Alphabet Key, Graphic Organisers, Acrostic, Listing, Brainstorming, Question Key.

An integrated approach: Blooms and SMARTS

- Planning across six levels of thinking (Bloom) and eight different ways of knowing and understanding the world (Gardner's SMARTS).
- Assist in achieving a balanced program of activities that cater for all students' abilities and interests.
- Comprehensive planning.
- Every space on the matrix doesn't have to be filled.

NOW IT'S YOUR TURN!

***This world is but a canvas
for our imaginations.***

(Henry David Thoreau)

Bloom on the Internet

- ***Bloom's(1956) Revised Taxonomy***

<http://rite.ed.qut.edu.au/oz-teachernet/training/bloom.html>

An excellent introduction and explanation of the revised Taxonomy by Michael Pole on the oz-TeacherNet site written for the QSITE Higher order Thinking Skills Online Course 2000. Pohl explains the terms and provides a comprehensive overview of the sub-categories, along with some suggested question starters that aim to evoke thinking specific to each level of the taxonomy. Suggested potential activities and student products are also listed.

- ***Bloom's Revised Taxonomy***

<http://coe.sdsu.edu/eet/articles/bloomrev/index.htm>

Another useful site for teachers with useful explanations and examples of questions from the College of Education at San Diego State University.

- ***Taxonomy of Technology Integration***

<http://education.ed.pacificu.edu/aacu/workshop/reconcept2B.html>

This site compiled by the Berglund Center for Internet Studies at Pacific University, makes a valiant effort towards linking ICT (information and communication technologies) to learning via Bloom's Revised Taxonomy of Educational Objectives (Anderson, et. al., 2001). The taxonomy presented on this site is designed to represent the varying cognitive processes that can be facilitated by the integration of ICT into the teaching and learning process.

- ***Critical and Creative Thinking - Bloom's Taxonomy***

<http://eduscapes.com/tap/topic69.htm>

Part of Eduscape.com, this site includes a definitive overview of critical and creative thinking as well as how Bloom's domains of learning can be reflected in technology-rich projects. Many other links to Internet resources to support Bloom's Taxonomy, as well as research and papers on Thinking Skills. Well worth a look.

Bloom on the Internet

- <http://www.tedi.uq.edu.au/Assess/Assessment/bloomtax.html>
-
- <http://www.acps.k12.va.us/hammond/readstrat/BloomsTaxonomy2.html>
-
- <http://www.teachers.ash.org.au/researchskills/dalton.htm>
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- <http://www.officeport.com/edu/blooms.htm>
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- <http://www.quia.com/fc/90134.html>
-
- <http://www.utexas.edu/student/utlc/handouts/1414.html> Model questions and keywords
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- <http://schools.sd68.bc.ca/webquests/blooms.htm>
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- <http://www.coun.uvic.ca/learn/program/hndouts/bloom.html>
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- http://caribou.cc.trincoll.edu/depts_educ/Resources/Bloom.htm
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- http://www.kent.wednet.edu/KSD/MA/resources/blooms/teachers_blooms.html
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- <http://www.hcc.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/questype.htm>
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- <http://www.nexus.edu.au/teachstud/gat/painter.htm> Questioning Techniques that includes reference to Bloom's Taxonomy.
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***He who learns but does
not think is lost***

(Chinese Proverb)