Differentiation & Raising Challenge in the Classroom

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Definition

- **Process by which curriculum objectives, teaching methods, assessment methods, resources and learning activities are planned to cater for the needs of individual pupils.**
  National Curriculum Council
- **OFSTED concerned with the impact of schools on pupils to develop independence of thought, collaboration , ability to exercise choice of approach and measurable progress through appropriate challenge**

Implications:

- **Method of organising learning = pedagogy & teaching**
- **Match of what is offered to what is needed = AfL – APP**
- **Consider stage of learning for pupils = range of objectives linked to outcomes**
- **Pupils to evaluate their own learning = independence, choice and creativity**

Main Factors affecting Learning ASK 1

- **A = Attitudes related to metacognition and motivation;**

  developing the learning attitudes of the students which is a function of Emotional Intelligence

  - **Claxton develops this in his learning power ideas:**
    - **Resilience; - able to resist distractions**
    - **Resourceful; - able to learn in different ways**
    - **Reflective; - be strategic in the use of different learning approaches**
    - **Reciprocity; - prepared to face challenges , work alone and in groups)**
  - **Dweck evidence relates to one's self esteem and which viewpoint the individual has:**
    - **'I can't learn any more I have filled up my brain' – fixed Entity**

  Or

    - **'I want to learn more – challenge me' - Untapped**

Main Factors affecting Learning ASK 2

- **S = Skills related to cognition, literacy to learn how to learn:**

  - **Ability to deal with language especially Academic Literacy, Subject Specific Literacy linked to conceptual understanding and General Functional Literacy**
  - **This relates directly to access and independence of thought**

  - **Ability to use higher order thinking to identify, plan and develop solutions and arguments which can be affected by self esteem**
  - **This relates to success and creativity in the solution**

  - **Ability to deal with questions especially open questions that promote thinking**
  - **This relates to cognition, reasoning and choice of action**

  Hattie's work on Learning

Example of the difficulty of Academic Literacy

- **Heard recently as two students were exiting a Biology A level examination:**
- **"I found that question difficult I mean what does it mean by 'Explain the nature of enzymes ..."**

- **But it is not only in academic speak that language poses problems e.g. Two students on a London Bus:**

  Bus Conductor: "Aldwych. Alight here for the London School of Economics."

  Students: "What does he mean alight?"

Academic Word List (AWL) identifies 2000 words necessary for success in academic tests and examinations.

Main Factors affecting Learning ASK 3

- **<u>K = Knowledge of concepts</u> and how concepts relate to each other to enable us to explain:**
  - **Adey argues that if you face children with intellectual challenges , help them talk through the problems towards a solution, you almost literally stretch their minds. They become cleverer, not only in the particular topic but across the curriculum**
  - **Cognitive Acceleration requires challenge, thinking, skilful questioning and discussion**
  - **Alexander's Dialogic teaching to encourage interactive talk**
  - **Hymer argues that to encourage students' intrinsic learning motivation we need to:**
  - **Praise the behaviour not the child**
  - **Praise the process not the product**
  - **Praise the learning not the performance**

Research on Effective learning

Hattie (2009) Larger effect size (d) the more effective the method:

- **Hattie shows Peer Teaching (student learns concepts then teaches it to others under observation of a teacher) very effective (effect size d = 0.74) but Mentoring (where a student is matched with a teacher) is not (effect size d = 0.15)**
- **Problem solving teaching with worked / partially worked examples (effect size d = 0.57) more effective than problem solving with no examples (effect size d = 0.15)**
- **Direct instruction with modelling, Socratic questioning more effective (effect size d = 0.59) than Web based learning (effect size d = 0.18); but Computer-cooperative paired learning (where 2 students work together to discuss, question and complete a computer based learning task) very effective (effect size d = 0.96)**
- **Frequent testing not so effective (effect size d = 0.34)**
- **Cognitive Acceleration (e.g. CASE) style learning very effective (effect size d = 1.28) Method: Activation (set the scene), Concrete examples, Cognitive conflict – solve a problem, apply to a novel problem and bridge ideas to real examples.**

Challenge - Brain warm up

Intellectual Verbal Tennis

A lesson starter or revision activity.

An informal assessment for learning or a creative exchange.

Warm up and attention focusing activity.

- **Face a colleague with another acting as referee and scorer**
- **Take the subject of 'Thinking and Learning' or a subject of your choice**
- **In turn give examples of things connected with 'Thinking and Learning'**
- **You only have 3 seconds each; they must be accurate and no repeats**
- **The score is as in tennis**
- **Change places when one wins; the loser becomes the scorer**

Brain and Tennis

Switches the brain on

Develops lateral and creative thinking through concept association using different parts of the brain

•Cognitive enrichment : - aim to put the brain under and elevate the level of stress. This presents the challenge

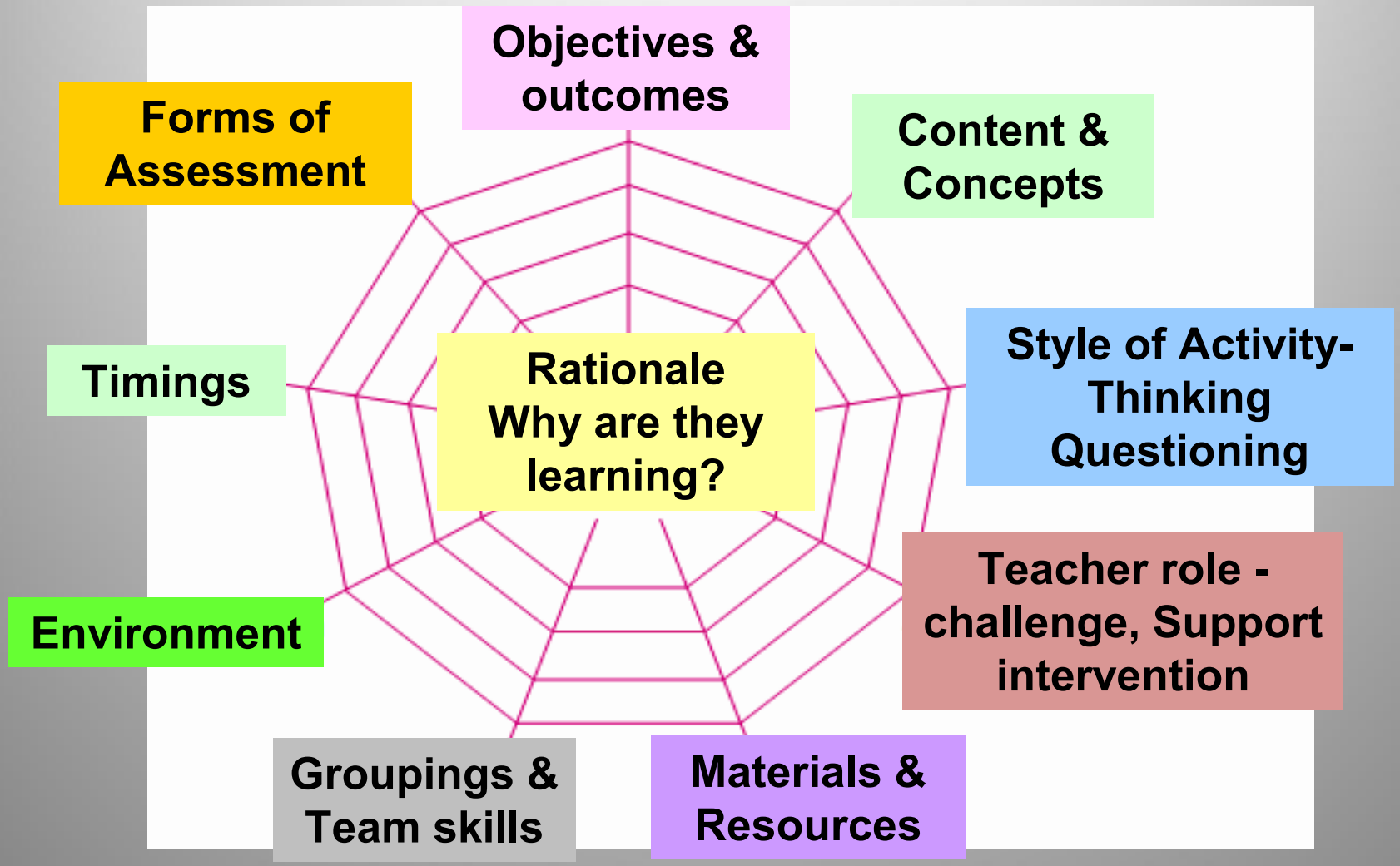
•Level of stress put upon learner by time & lack of word association encourages development of, declarative or explicit memory. Declarative memory relates to recall of words and facts (semantic memory) and is part of our working memory

•Declarative memory is dealt with by hippocampus and cerebrum through a connective zone, the corpus callosum rich in blood, but first area from which blood is withdrawn if threatened

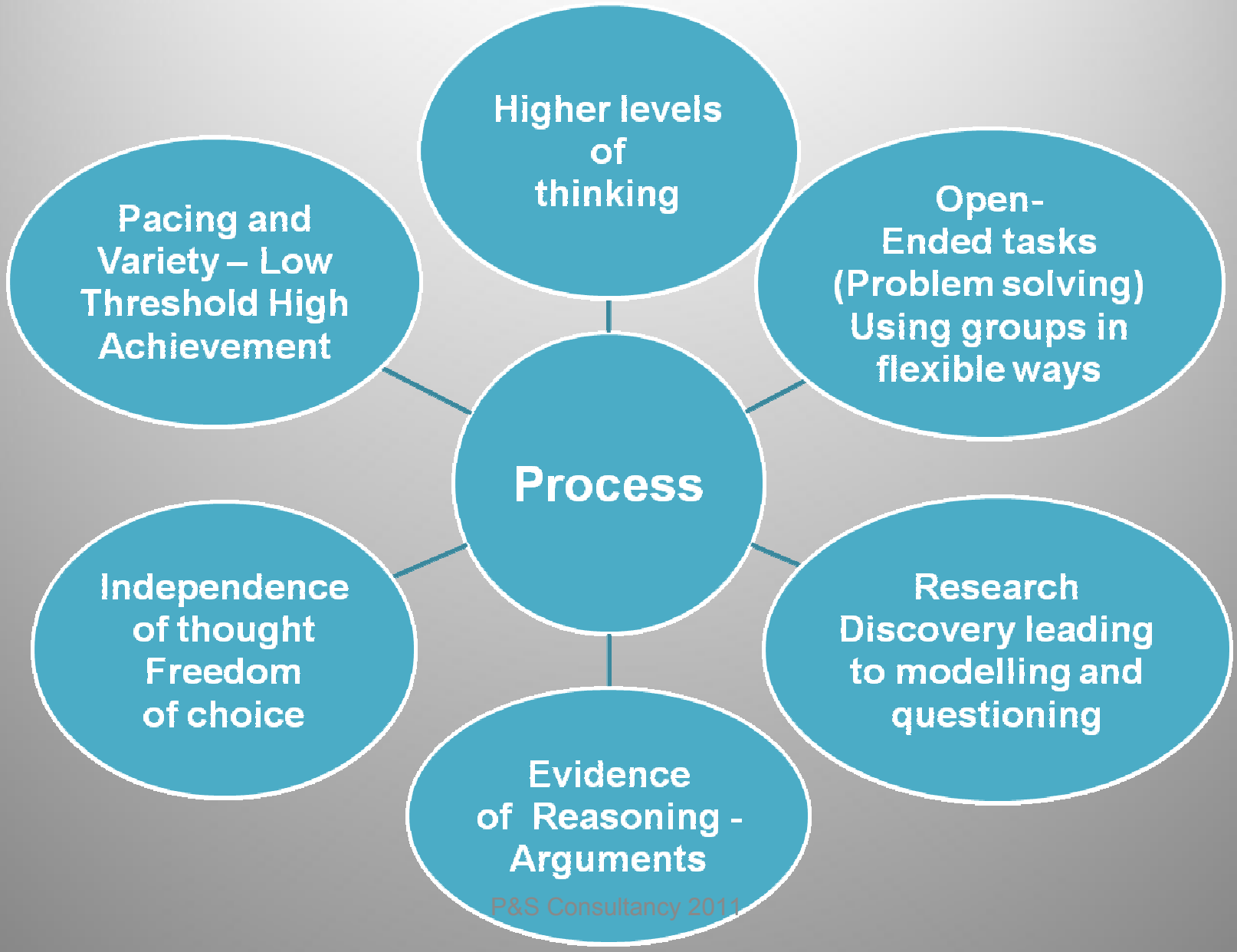
Alternative: Less Able and More Able

- A low attaining pupil is the pupil who finds it difficult to translate between or access the different activities of learning
- Learning efficiency is affected by strengths or weaknesses in the cognitive development and attitude this affects the learning skills of pupil due to poor ability to access the learning
- More able learners show high confidence and ability to take risks in the learning situation. Hence differentiation is about access and challenge

Altering any of the following factors leads to differentiation



Varying the Process By:



Differentiation by process

Choice and creativity can be approached by using:

- **Different styles of presentation**
- **Different demands of language**
- **Writing for different audiences**
- **Using dialogic activities**
- **Using group work such as cooperative and jig-sawing**
- **Range of different styles of activities**
- **Using planned 'Rich Questions'**
- **Using a range of teaching methods**
- **Using a range of resources**
- **Using a range of different thinking processes**

Challenge: Thinking-Tricky Tracks

Tricky Tracks Tricky Tracks

- Look at picture 1 and individually determine what you think the story might be and how it might end
- Form up into groups of 3 and discuss your stories
- Now try to form a single composite story from the group
- Now look at picture 3 and as a group of 3 discuss what you think has happened and how it compares with your story
- Share the stories with the whole group

- In groups of 3 Variety life.doc this time the translation analysis is verbal text to visual. Is this just as easy or more difficult? Does it depend upon your cognitive makeup.

- Answer

Sternberg & Learning - HOTS

What the activity illustrates are some of the important aspects of learning for the able

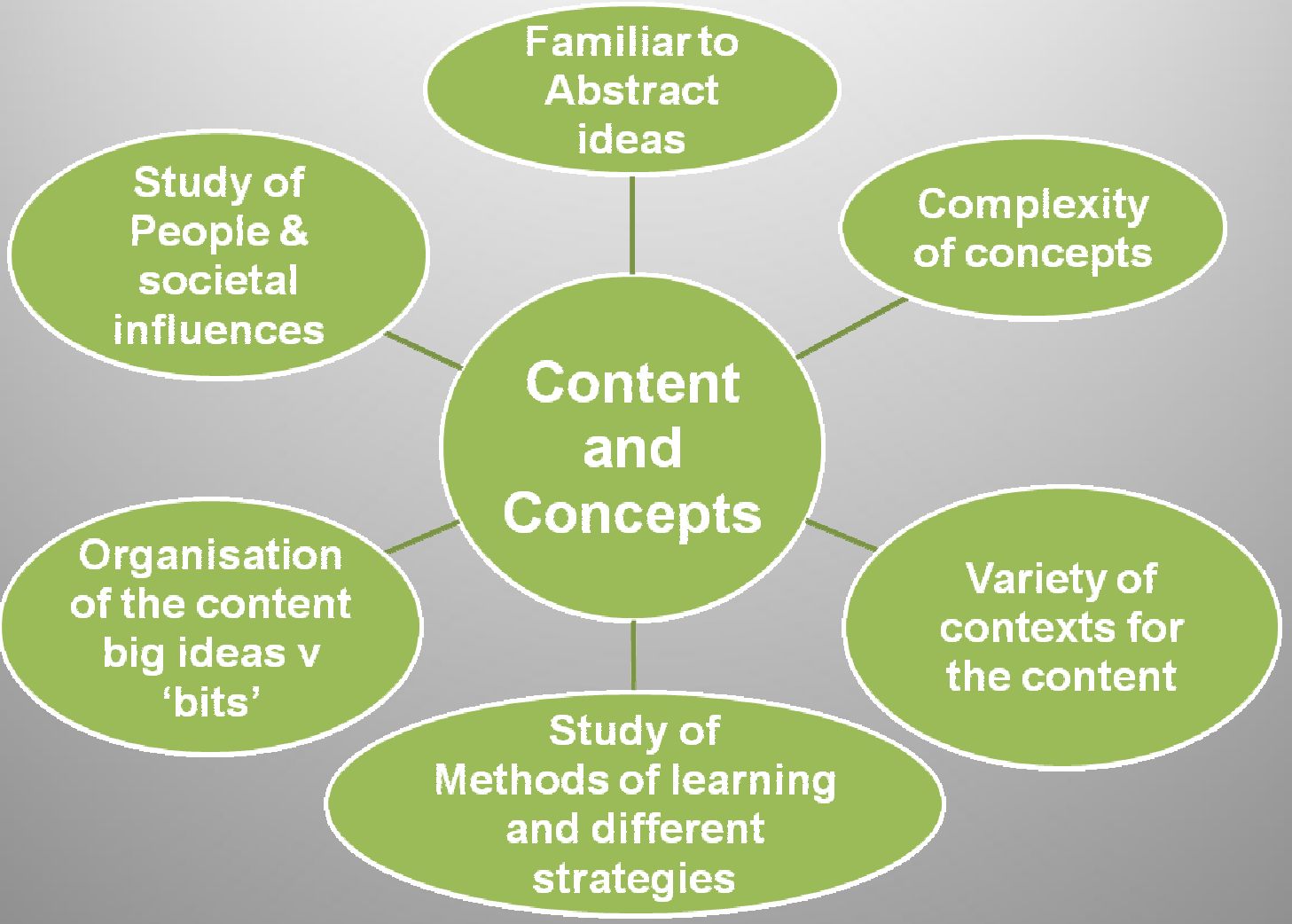
Sternberg identifies three aspects of high order ability that develops an individual's intellect

Although all are present they are present in varying degrees reflecting differences in any group of individuals

The gifted or able are those who display high levels of:

- **Analytical ability – analyse, define the nature of the problem, evaluate options and determine a strategy to solve the problem**
- **Planning or Creative ability – able to generate solutions to problems**
- **Implementation or Practical ability – able to implement the options for solving the problem and make them work**

Content and Concepts in Differentiation



Challenge: Photo Story

- Link
- You are to act in the role of geologists and geographers
- Look at the set of photos and in groups of three discuss what you see.
- Try to deduce a sequence and tell the story of that sequence
- Write the story and discuss your story with another group
- Question each other about each other stories and make adjustments or defend your story as a result of the discussion

- Think about the range of concepts you have used to accomplish this challenge

Creativity

There are three main mental resources that enable creativity:

- **Memory: - absorption and embedding of experiences and information which our brains map into some terrain of reality - It is a set of strategies to help make sense of the world, rather than crude recall. This creates a trajectory of learning we build our models, they are not created whole**

- **Imagination; the ability to laterally move and link ideas from various maps and create a new mental impression which might lead to a new idea.**

- **Thinking Strategies: to use the thinking skills of Analysing, Observing and Inferring, Comparing and Contrasting, Recognising cause and effect, Defining operations and methods, Developing Models to make lateral connections and leaps in thinking.**

Lateral or Creative Thinking

An old Italian lives alone in New Jersey. He wanted to plant his annual tomato garden, but it was very difficult work as the ground is very hard.

He writes to his only son who is in prison:

Dear Vincent,

I am very sad because this year I cannot plant my tomatoes. I am getting too old to dig. I know that, if you were here, you would do it for me just like in the old days.

Love Pops

He gets a letter from his son:

Dear Dad,
Don't dig up that garden that's where the bodies are buried.
Love Vinnie

4a.m. Next morning FBI and local police agents arrive and dig the entire area but find no bodies. They leave apologising to the old man.

Vincent writes to his dad:

Dear Pop,

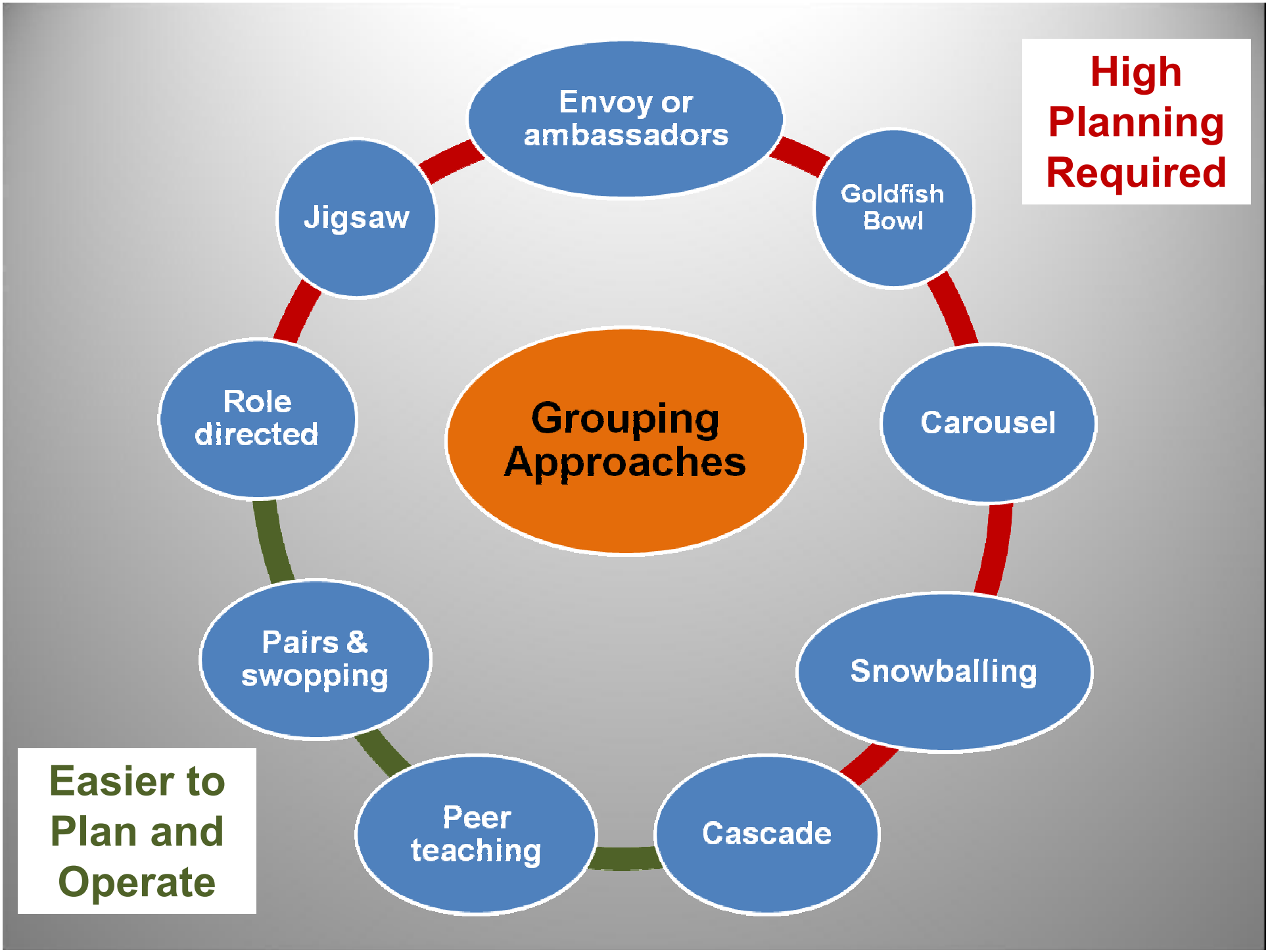
Go ahead and plant the tomatoes. That's the best I could do under the circumstances.

Love Vinnie

Memory, imagination and thinking strategies certainly played their part!

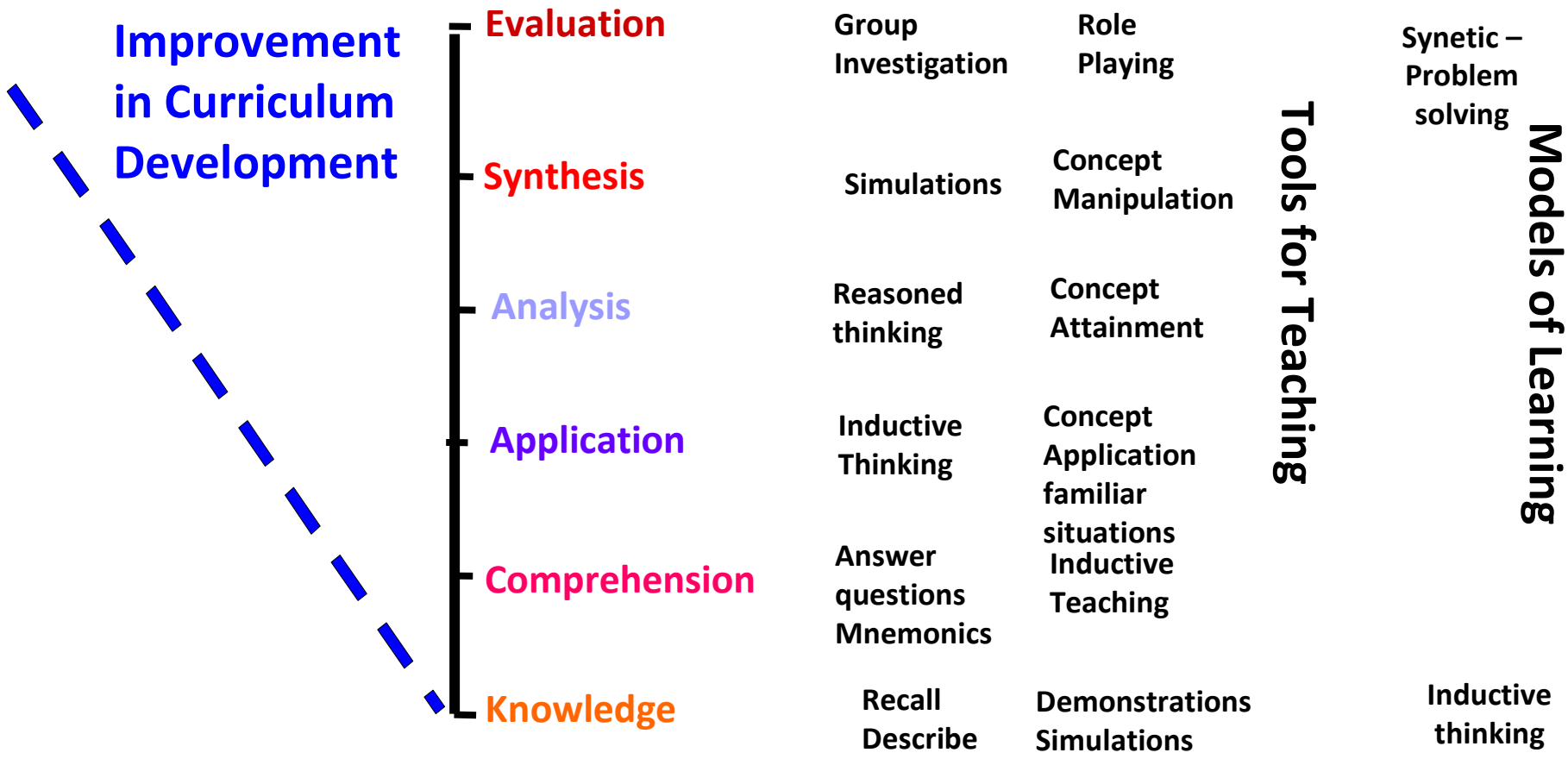
Differentiation by Grouping into

- Able and mixed ability groups
- Single gender and mixed gender groups
- Friendship groups
- Team skills groups
- Social skills grouping
- Expert knowledge and skills groups
- Same age and vertical groupings
- Collaborative and co-operative work groups


High Planning Required
Envoy or ambassadors
Goldfish Bowl
Carousel
Snowballing
Cascade
Peer teaching
Pairs & swopping
Role directed
Jigsaw
Grouping Approaches
Easier to Plan and Operate

Curriculum, Learning & Teaching – Bloom Reinterpreted

Depth of concept + context add another dimension to the hierarchy of Bloom



After David Hopkins - HSBC Chair in International Leadership Presentation London Challenge Project 2008

Bloom & Differentiation

Bloom's Taxonomy is a hierarchy of task difficulty going from easy tasks such as

- **recalling knowledge**
- **to harder tasks such as planning and evaluating an argument.**

'Tasks' include everything students are asked to do including work inside and outside the classroom or group.

Petty's Model 1:

Using Bloom as the structure there should be a mix of

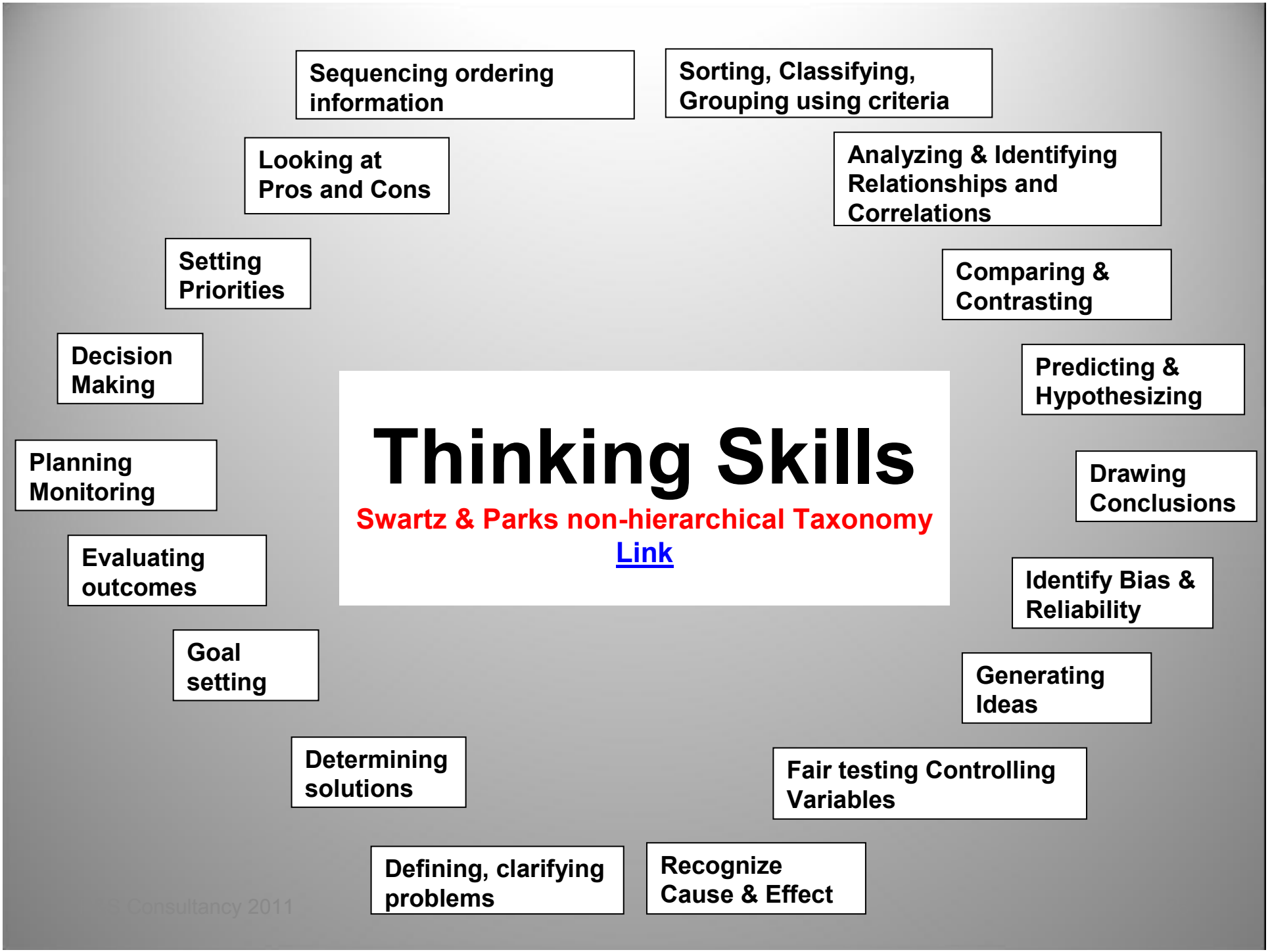
- **Mastery Tasks**
  - **Can be mastered by all learners in a short period regardless of their prior learning**
  - **Allows weaker learners to succeed. Without this success they will probably give up**
  - **These will frequently need scaffolds or support to allow intervention for weaker or frustrated students**
  - **Mastery tasks help to prepare student's for developmental tasks but for able students their ability to use learning approaches to unravel a developmental task is a good strategy**

Petty 2: There should be a mix of:

- **Developmental Tasks**
  - **Stretch the more able and develop the skills required for academic success, and for the world of work**
  - **These tasks develop the skills required for progression to the next educational level**
  - **They create deep learning, that is, real understanding**
  - **It is important to consider that all students must have access to developmental tasks**
  - **The context chosen for the learning is often the differentiating component**
  - **For least able students difficult developmental tasks can be broken down into introductory mastery tasks, followed by a simpler developmental task supported by constructive case studies with scaffolds or frameworks**

Difficulties with Bloom

- The linear nature of Bloom can lead to misinterpretation
- The result can be least able learners end up with a lot of low level thinking in an attempt to develop knowledge
- More able learners actually get the full range but with a bias to more low level thinking than high level thinking which reduces their independence, choice and creativity.
- One alternative approach to developing high order thinking is the Swartz and Parks model


Sequencing ordering information
Sorting, Classifying, Grouping using criteria
Looking at Pros and Cons
Analyzing & Identifying Relationships and Correlations
Setting Priorities
Comparing & Contrasting
Decision Making
Predicting & Hypothesizing
Thinking Skills
Swartz & Parks non-hierarchical Taxonomy
Link
Planning Monitoring
Drawing Conclusions
Evaluating outcomes
Identify Bias & Reliability
Goal setting
Generating Ideas
Determining solutions
Fair testing Controlling Variables
Defining, clarifying problems
Recognize Cause & Effect
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Challenge:
Swartz & Parks linked to an Activity.

Look at the fruit and Vegetable activity
Link

Think about the groups of questions from Swartz and Parks.
Which sets would be useful to direct pupils to use while carrying out an activity such as this?
How could you differentiate by using different sets of questions from Swartz and Parks


E.K. Schaffhauser
www.pbase.com/thepaleblueeyegallery

Activity 07: Asking Questions

- **What types of questions do you ask when confronted by a photograph such as:**

Skinny questions:
Check pupils' knowledge
Often one word answers
Seeking facts

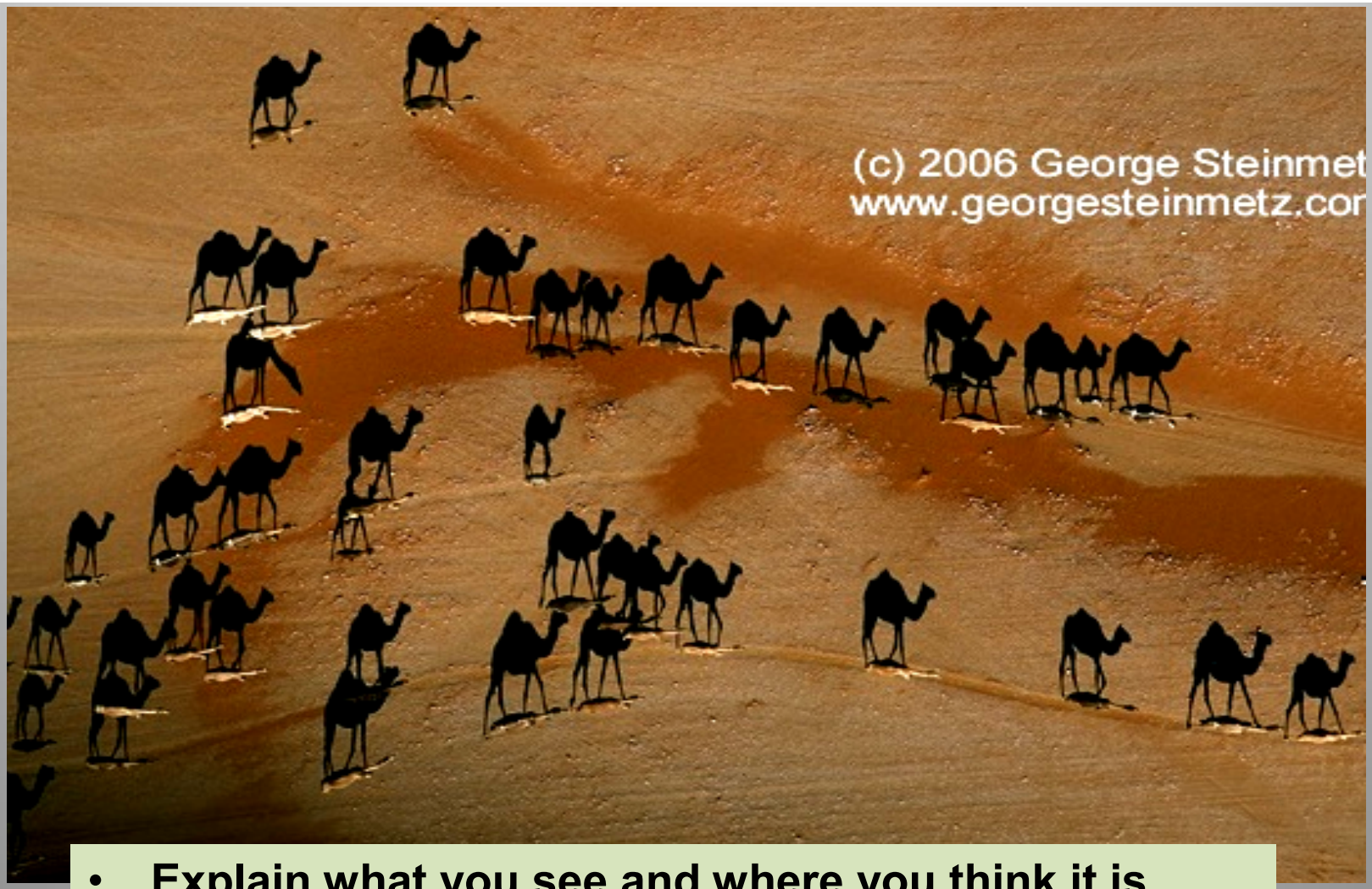
Rich questions:

- **Open ended**
- **Needs time to think – can't usually answer immediately**
- **Answers generally require one or more sentences**
- **Sometimes pupils need to ask other questions to work towards main question**
- **Tend to prompt further questions**
- **Need to make links, apply ideas, give reasons**

Inside the Black Box

Black & Wiliam, nferNelson

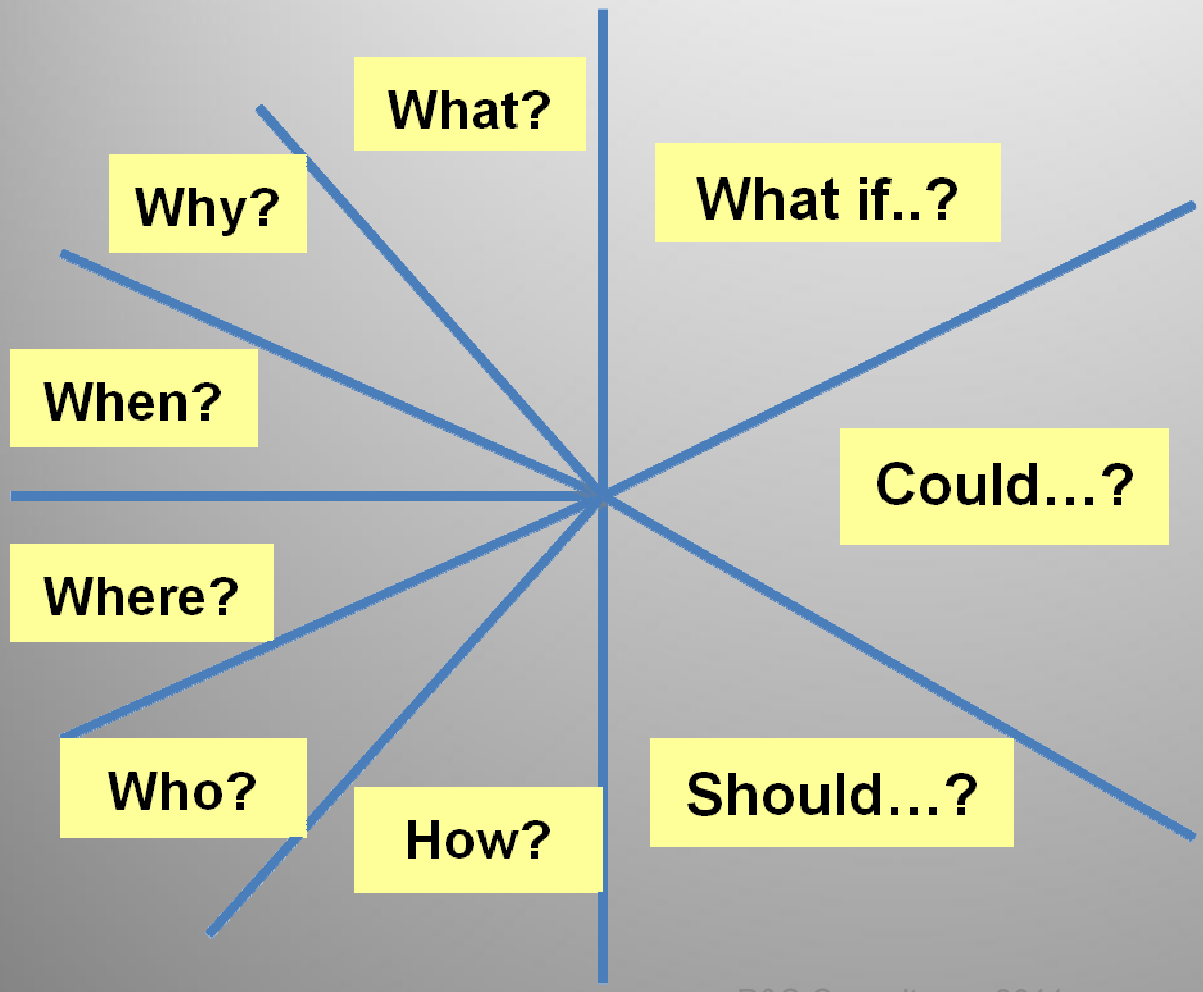
Challenge: Flash Card Socratic Questions



- Explain what you see and where you think it is
- How do you know that what is the evidence?
- What time of day is it and how do you know that?
- Explain how the photo could have been taken

Stretching questions

Questions that require thinking about



The *5Ws and an H* formula may not be enough

To make it more challenging it might need more speculative or predictive question styles

Discuss how they might fit with Swartz and Parks or Bloom

How might they enhance thinking and how would they contribute to differentiation?

Challenge:
Mystery
An example of decision making leading to high order thinking

Link

Socratic Discussions

- Socratic dialogue involves asking specific types of questions
- not just about being open-ended
- Most pupils will need support and practice to become confident users of the approach
- With practice pupils will begin to see how Socratic discussion differs from other forms of classroom talk
- takes time to develop the skills to able to engage in the dialogue.

Challenge: Socratic Discussion

Link

- **People who are convicted of drinking and driving should be charged with a deadly weapon and not drink driving.**
- **The vehicle can be considered a weapon being used to threaten or cause fear; and an offence committed in dangerous circumstances**

Example of use of Socratic Discussion: Reading for Purpose – PQR^{3}S

Preview - Look at titles /subtitles /diagrams /photos. List them and predict nature of text - gives general idea of text

Questions - Form ask simple/difficult questions based upon titles and illustrations. Teacher adds questions to class list, share the questions

Read - Read passage to try and answer questions. Bullet point answers for reflection. Ask more questions about the reading

Reflect - Have we answered all our questions? If not research more and read some more perhaps use the internet

Retell - Bullet point answers to the questions turned into prose: "The main idea in the text?" "How it relates to me?" "How I feel about it?" "What does it mean?"

Share – Class discuss the various products by using carousel or paired reading

ADDITIONAL HIDDEN SLIDES FOR INFORMATION

Golden rules for group sessions

- Teacher should take the time to introduce objectives/task thoroughly.
- Pupils should be fully aware of the expected outcome.
- Assign roles & responsibilities.
- Seating arrangements and groups are planned in advance.
- Time limit is given and kept short.
- Tell the group how long they have for the task.
- Teachers should answer most questions with leading questions.
- Teacher should remain sitting when supporting group talk. Don't loom over the group as it will stifle conversation.
- Pupils need to experience group work and group talk regularly in order to learn the skills required.

Tips for Question Sessions

- Allow more time for thinking
- Use challenging questions – compare/contrast, classification with justification, exceptions to rules, prediction, etc.
- Use open questions
- Avoid hands up and be wide in your selection of student
- Accept the value of all sensible answers and use these to create a chain of reasoning
- Start with the big or 'rich' question (one that cannot be answered immediately) and then structure the learning around this
- Use probing questions to open the thinking

Meanings and Word Walls

- Brainstorm the keywords for a topic
- Develop some ideas for helping pupils realise some of the means of the words pupils will meet in science
  - Try some graphic humour
  - Try some Pictionary ideas
  - Think of the pictorial approaches such as ‘big book’ or poster approach to retell an event
  - Try a concept mapping exercise
  - Colouring text and sequential diagrams so linking visual with text

Examples of Work that Help Develop Literacy

- Word walls/Concept walls
- Concrete models
- Word Prisms
- Pictionary
- Jigsaws and mazes
- Word Searches/Crossword construction
- Puzzles
- True False
- Colouring with label fixing
- Cartoons
- Graphic outlines/Text Grids
- Mapping and flow charts

- Question forming
- Creative writing
  - prose
  - poems
  - articles
  - newspaper reports
- Poster making
- Presentations
- DARTs
  - sequencing
  - cloze/Underlining
  - bullet pointing
  - collecting/sorting info

Models for Challenging Lessons

- IRE = Initiate – Respond – Evaluate (Most lessons tend to this)
  - Initiate – Define Problem, Possible Routes, Limitations, Research arguments
  - Respond – Discuss Arguments, Hypothese & Trial, Form Theories
  - Evaluate – Outcomes, Probabilities, Conclude

- Vignettes = Case Studies (These involve big pictures being reduced)
  - Become familiar with ideas and materials –
  - Chart and sequence events –
  - Flow/Time – Identify influences, factors, events
  - 'What if' Trials - Research
  - Evaluate outcomes – Identify alternatives – Compare/Contrast
  - Conclude

- Pupils as Researchers (Often start with parts leading to big picture)
  - Approaches, Possible routes, identify constraints + possible success
  - Research, Trial hypotheses, Look for patterns/trends in data
  - Where does this lead?
  - Evaluate and Conclude