Planning for extension - a process for designing from within the Australian Curriculum

John Munro

Session 1: Recognising gifted learning in the classroom: A first step in planning for extension

Our pathway: Session 1

What gifted learning look like in the classroom: Some anecdotes

The characteristics of gifted learning

An example of gifted learning: Tom

High ability interpretations : some anecdotes

Learning about insects: Grade 3

Regular learners learn what I teach: insects have three pairs of legs. They move fast.

Insects

How many toes does a slater have ?

They can move so fast when they are so small. They must be able to push off with their feet really well.

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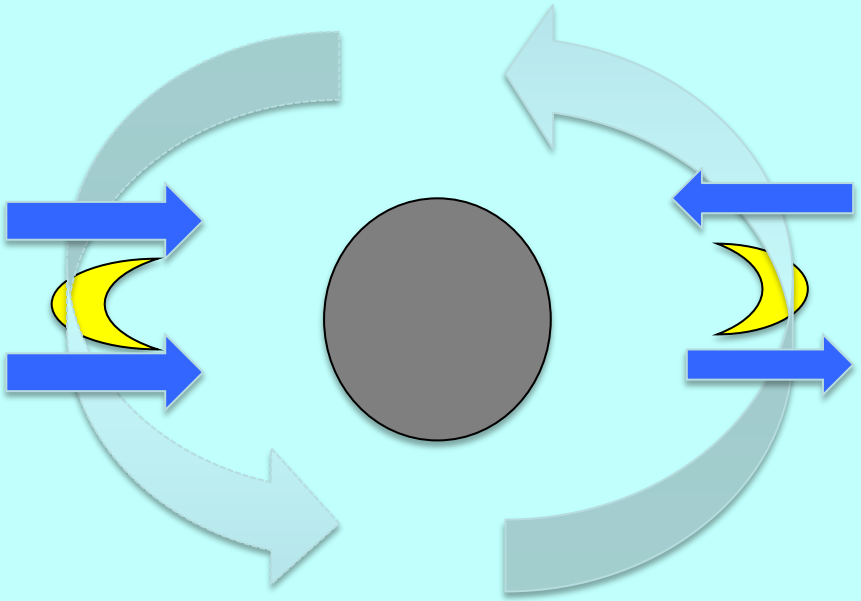
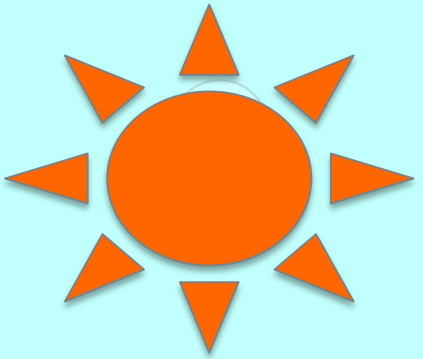
Anecdote : Grade 4 student learning about the Solar System

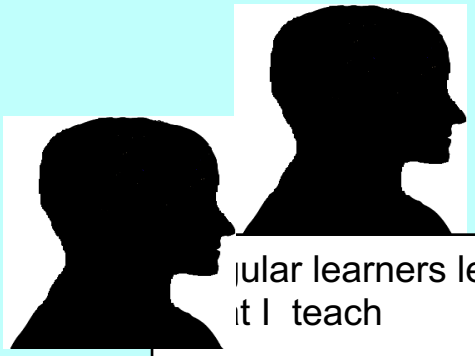




The Moon is moving closer to the Earth

High ability interpretations of teaching

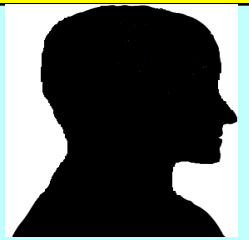
How do the glands in the stomach know how much hydrochloric acid and enzymes to squirt out ? How do they know how much protein there is in the mouthful ?

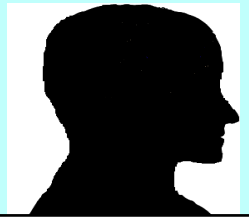


ular learners learn
t I teach

How the human body digests food

If a person changed food they ate over three days, would the amount of hydrochloric acid build up and damage the lining of the stomach



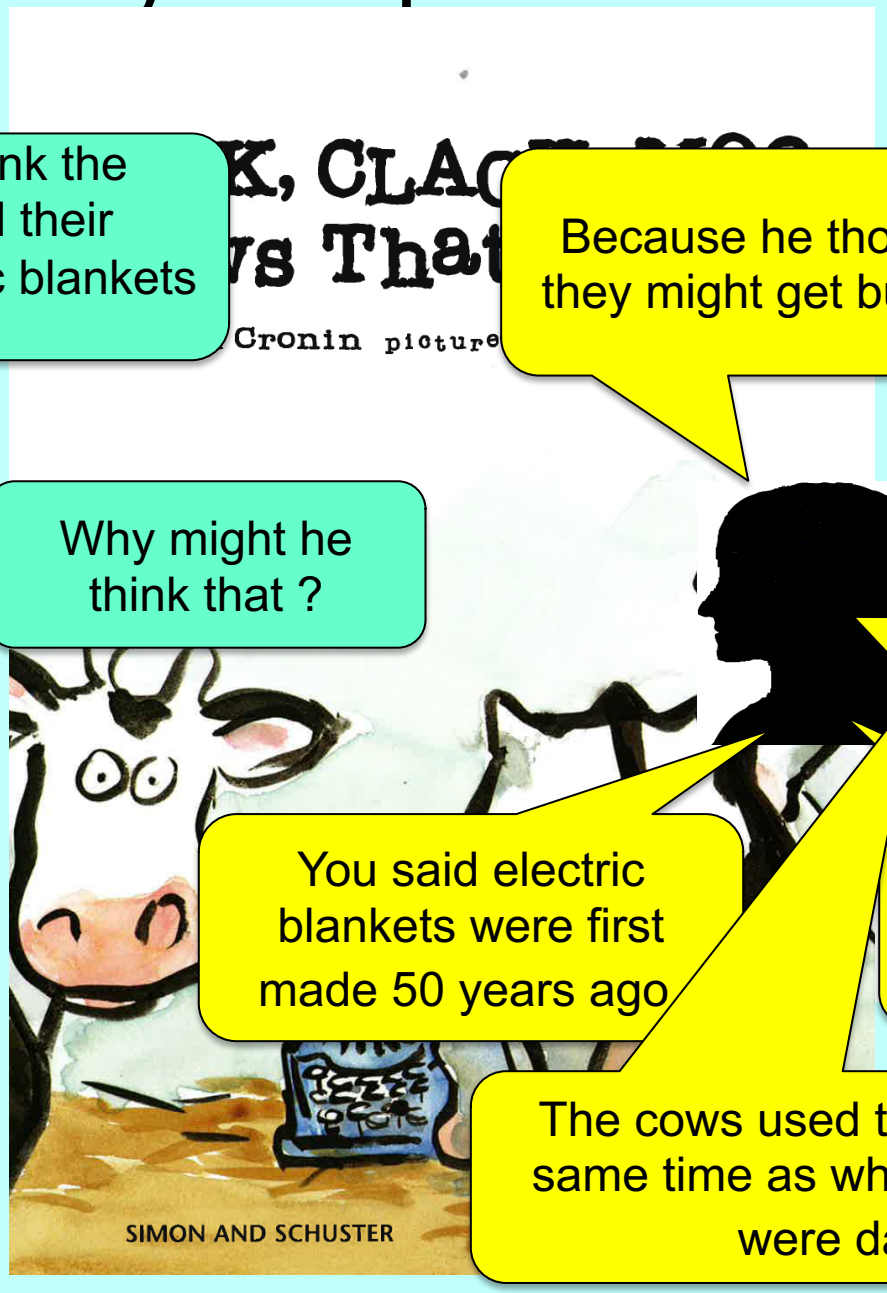


A second student learns these ideas very rapidly, must faster than their peers and organises the ideas in the appropriate hierarchy

High ability interpretations : Grade 2

Why do you think the farmer refused their request for electric blankets ?

Why might he think that ?



Because he thought they might get burnt ?

Because you said that when electric blankets were first made some houses were burnt.

You said electric blankets were first made 50 years ago

You said typewriters stopped being used about 40 years ago.

The cows used the typewriter at the same time as when electric blankets were dangerous.

How does a light beam affect the table top.

Imagine you were the table top ? How might the beam of light affect you ?

It might make you heavier

Why might it make you heavier ?

If you are sprayed by a hose, your clothes get heavier. The beam of light could be like a beam of water from a hose. It could make the table heavier

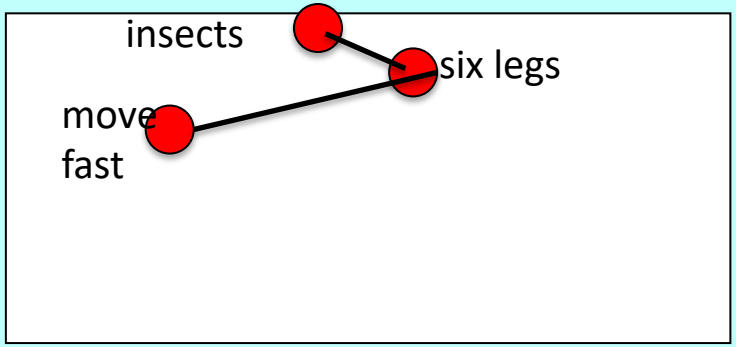
Your turn 1: Analysis of the content

Padlet 1 Activity - https://padlet.com/markeoliver/nzmt2ndaph63htb4

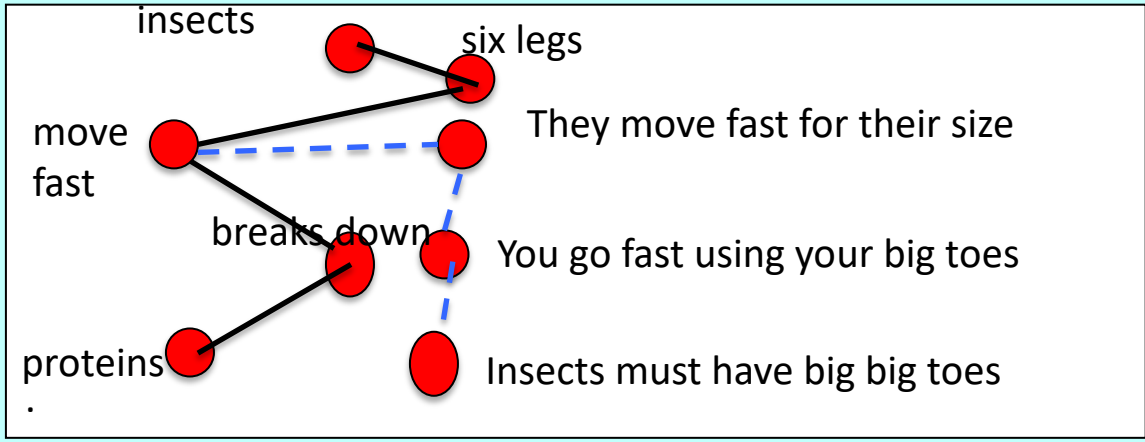
- How would you describe how the gifted students are learning?
- What does their learning activity 'look like'?
- What similar instances of gifted learning have you witnessed in your teaching?

Describe change in understanding of insects

Regular learners are programmed by teaching.



Gifted learner extends the knowledge from the teaching



They form an essentially literal understanding of the teaching information.

They may infer and extend spontaneously what they have learnt beyond the teaching but their inferences are usually low level.

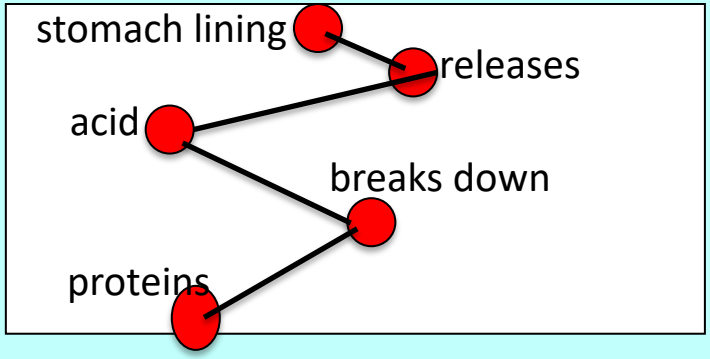
Gifted learner infer an intuitive theory by making richer links.

Gifted responses comprise both links from the information and links made by the student. They

- analyse and extend the teaching information. Their responses show evidence of two or more inferences; they infer patterns that extend their knowledge
- synthesize the inferences into a big idea. They form a 'personal intuitive theory' about the information.

Describe change in understanding of digestion

Regular learners are programmed by teaching.



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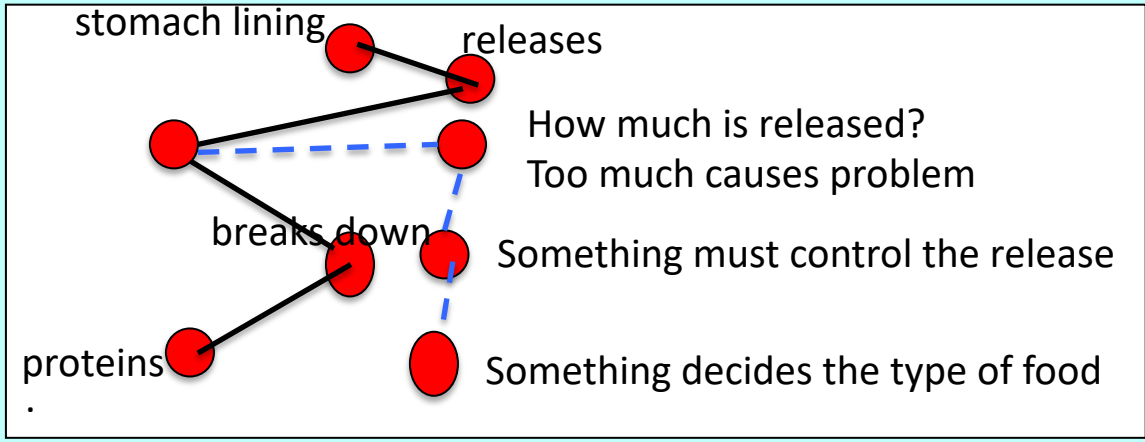

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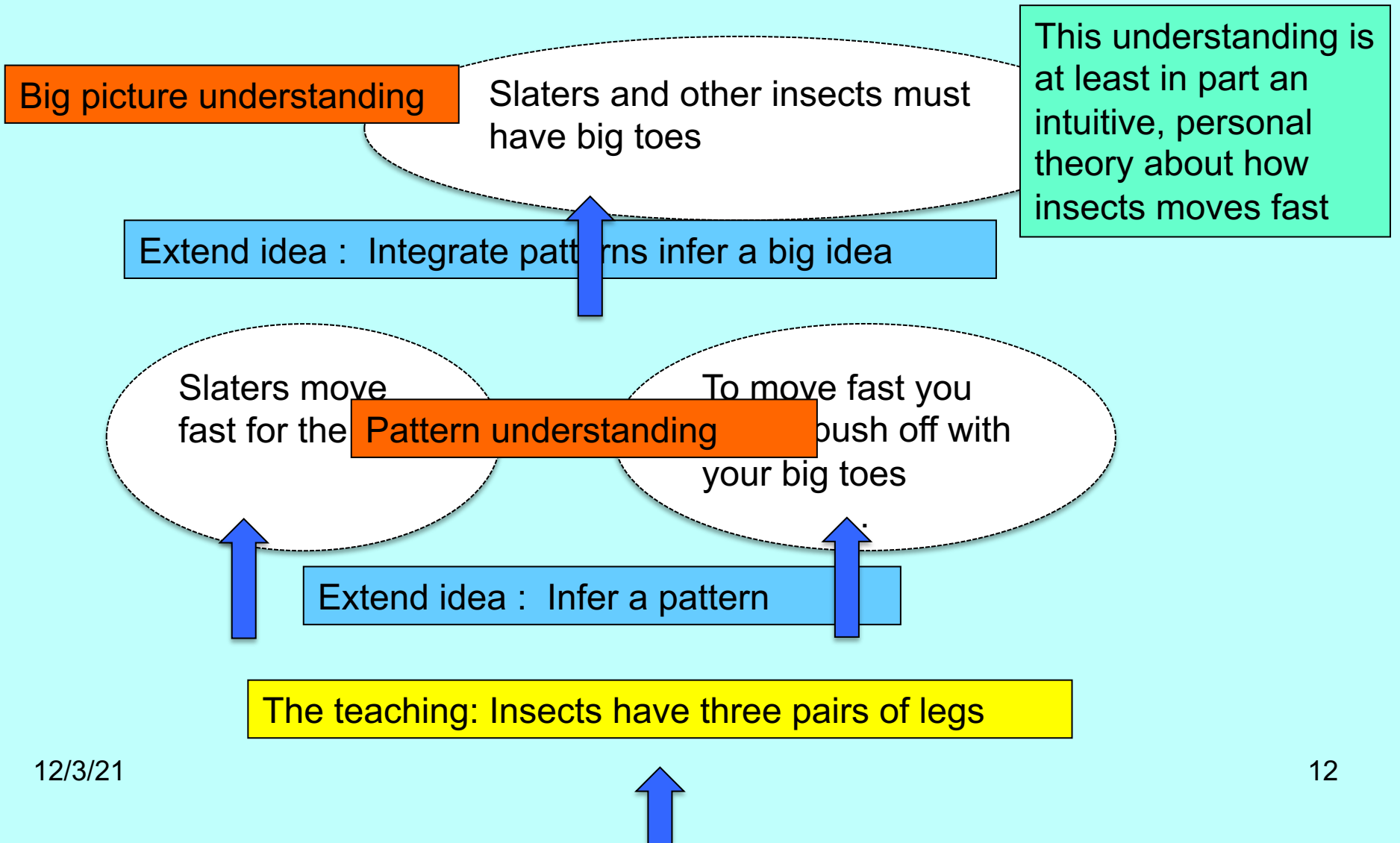
The characteristics of the gifted understanding



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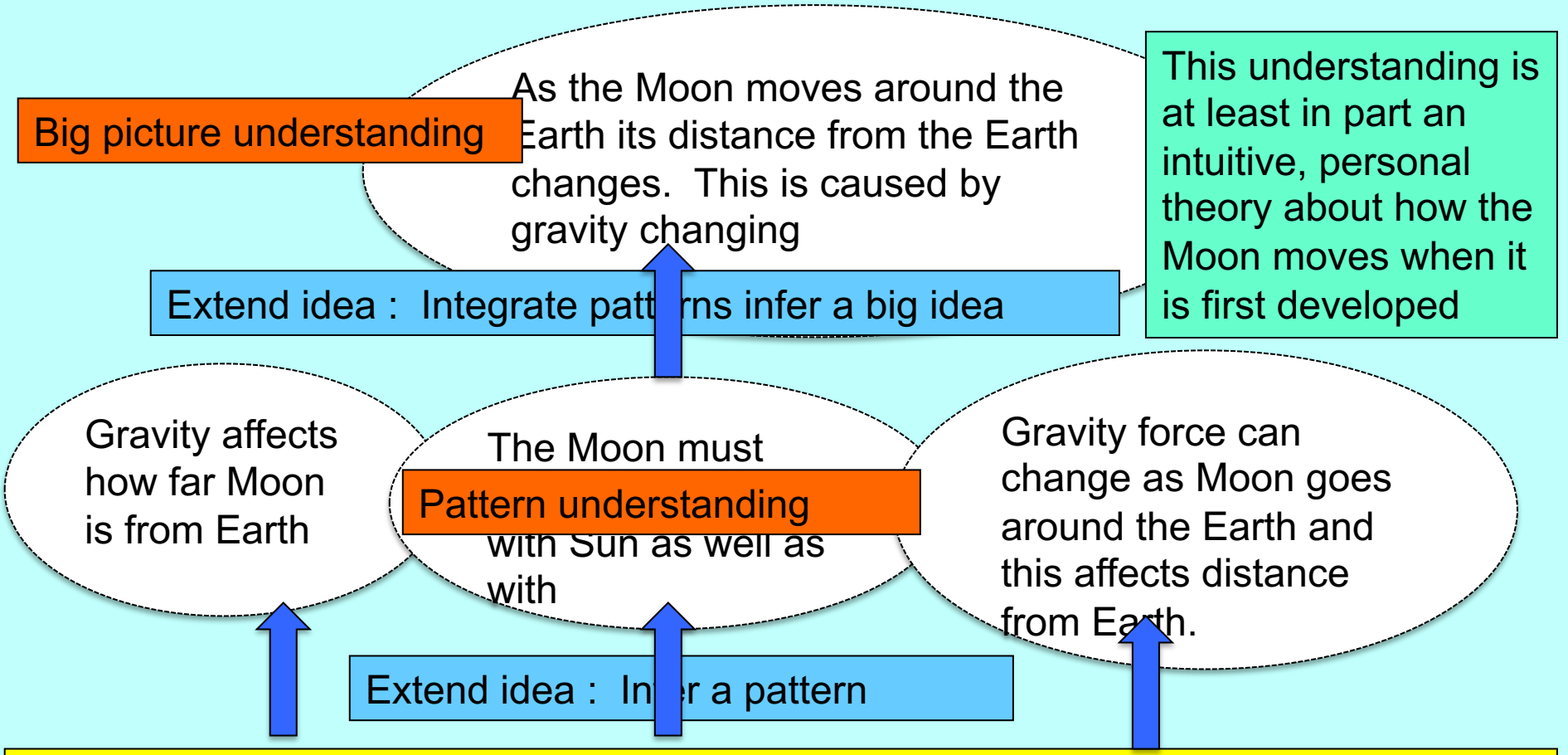

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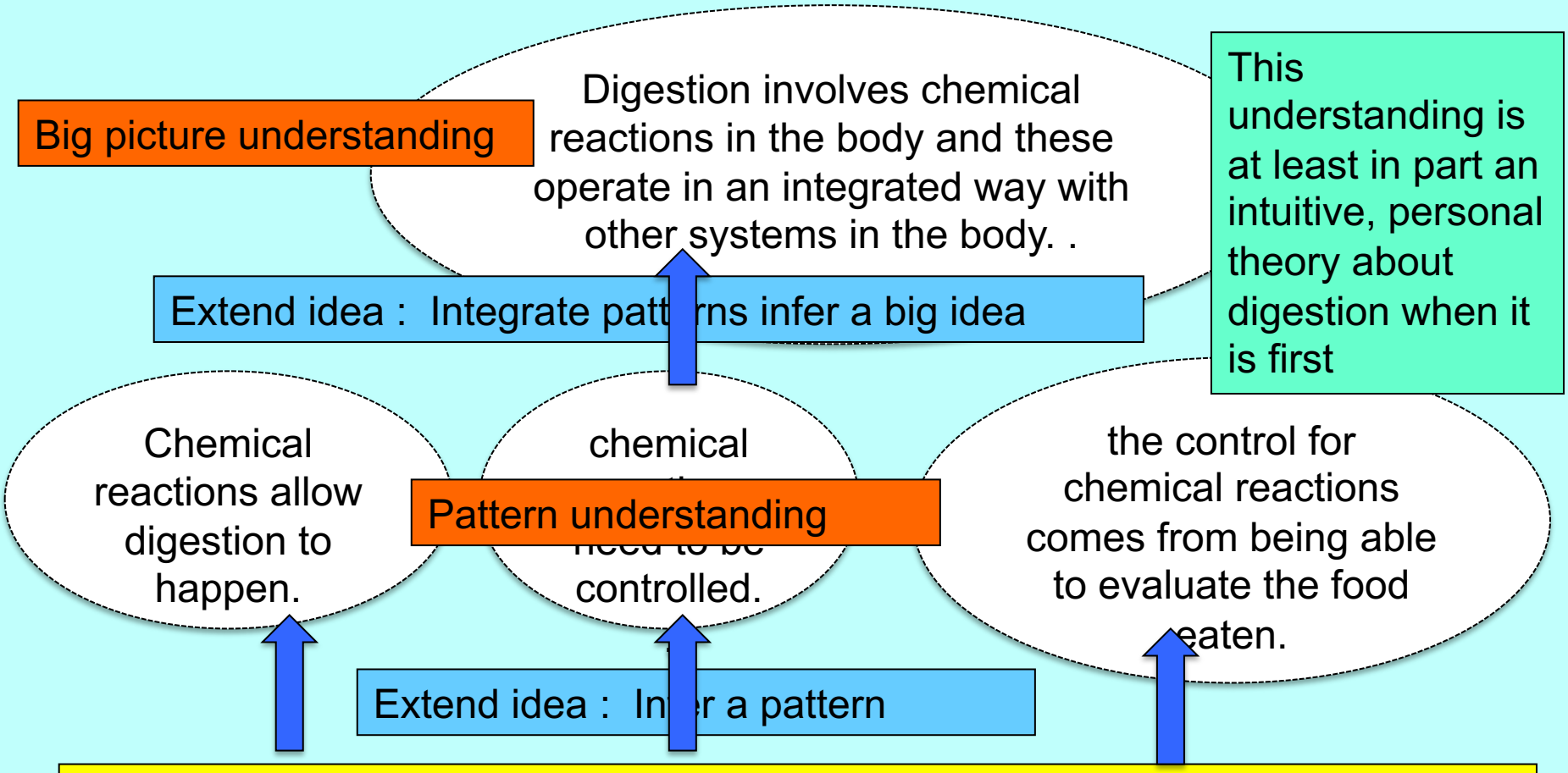


Characteristics of gifted interpretations of the teaching information

- They have more inferred concepts, often gained through fluid analogistic reasoning
- The concepts are organized into more semantically complex propositions.
- The propositions are organized around one or more inferred main or big ideas. The students are more likely to impose hierarchies or to hierarchicize subjectivity.
- The interpretations have the properties of an intuitive theory that can be tested by the learner. They may include propositions that are logically inaccurate.
- they are subjectively 'problem-solution' directed; the student is motivated intrinsically to 'know more' and to reduce uncertainty about the issue.
- an intuitive theory at any time is speculative; gifted thinkers are motivated intrinsically to test, evaluate and modify it.
- The interpretations can be analyzed in their complexity using semantic analysis procedures that compare and categorize the propositions and match them with the teaching information.

We need to look for these in our teaching.

Your turn 2 : Analysis of the content

Mentimeter Slide 1 (Open-ended)

- How does this way of looking at gifted learning match and differ from what you had previously thought about gifted learning?

Mentimeter Slide 2 (Open-ended)

- How does this model of gifted learning help you to recognise instances of gifted learning as part of your teaching?

What does the trend in forming a gifted understanding of a topic look like ?

Regular understanding

- internalise the teaching information, use new ideas literally in the contexts in w
  specific details and main ideas,
- rely on the teaching to link ideas and to 'fit' them together, understand them i
  teaching guides students to transfer

Use this to differentiate the teaching

inferential understanding, infer patterns

- identify patterns and relationships in the ideas, use new ideas in more general, abstract, patterned, rule oriented and abstract ways,
- link two or more patterns in possible causal or consequential trends. *How / why did the trend / pattern change?*
- question the patterns, generate unknown new ideas and possibilities; *How did the patterns effect…?*

'Big ideas' understanding

- infer and use 'big ideas' for the topic, use them fluently and automatically to solve problems and make decisions; *What are the big ideas in the information* ?

- think about two or more patterns, rules or general propositions at once, form and understand rules and link moral/ ethical issues with them, build principles in the topics.

- manage and use their knowledge efficiently, monitor how they use it and change direction or question it
- use their big ideas understanding to solve problems fluently and automatically. They show they can think in multiple patterns at once and see possible options: *"If this happens, then.., but because of .. I would….*

- plan how they will use their new knowledge in creative, novel ways

Students who bring advanced knowledge and interpretations to the classroom

Tom is 6-9, a Year 1 student.

He started his current school at the beginning of this term.

- He has a reading comprehension age of 15.
- his class teacher thinks his maths is at a similar level; he taught himself long division.
- his previous school (didn't focus on academic learning.

He spoke quite early but not exceptionally so and his speech was always quite clear and his vocabulary extensive.

When he was three and a half, he he decided to learn to read. He moved through five levels of a set of phonics books based on fairy tales within a week. Since then he has read everything and preferred non-fiction and has started to read some chapter books to himself.

He didn't go to kinder. His learning approach was obvious early:

he soaks up facts and had an early interest in science (the periodic table fascinated him).
he read the same text repeatedly and remembered it word for word and comprehended and transferred the ideas he read. He likes the New Scientist.

One parent is a teacher and was at home with him most of the time and responded to his questions and explanations. His family nurtures learning and reading.

Tom's inferences about inches

We talked about measuring the height of students in Tom's class We began to discuss centimetres. Tom mentioned incidentally measuring in inches as well……

I know millimetres and centimetres are used to measure things. Could inches be used to

measure?

Centimeters (cm)	Inches (") (decimal)
10 **cm**	3.9370 in
20 **cm**	7.8740 in
30 **cm**	11.8110 in
40 **cm**	15.7840 in

He interpreted information from a ruler in terms of its possibilities.

He explicated the possibility and researched it.

He observed his possibility worked. It became part of his abstract conceptual knowledge.

His curiosity and capacity to question

how much knowledge he could retain and manipulate in his working memory at once

his intrinsic ability to engage over a prolonged period.

Ways of thinking shown by high ability learners

Gifted students

- use the thinking strategies spontaneously and independently. They direct or 'self-regulate' their thinking and learning spontaneously and efficiently. They set goals, plan, self-check, focus, persist.

- use higher level more complex thinking strategies such as problem-solving strategies more flexibly and shift from between strategy more easily.

- think in 'larger chunks' , retain more knowledge about a topic in their thinking spaces.

- scan and interpret the teaching more quickly and efficiently, search what they know more rapidly and re easily ar

The teaching in the classroom needs to facilitate and foster this

- infer and synthesize at a higher level, form subjective patterns and personal rules for the information and 'big ideas' way.

- make analogies between topics that seem unrelated to others, 'see' similarities between topics that may seem superficially different, cross 'topic boundaries', make 'far transfer' between topics and link them in unexpected, lateral, novel ways and use what they know about one topic to comprehend a second topic.
-
- differ in how they are programmed by the teaching. Some are easily programmed and need fewer learning experiences to acquire an idea. Others, particularly those who engage in analogical thinking, are more 'self programming'.

- organize and re-organize the ideas that comprise their new understanding in more complex ways. They recognize and infer the main idea/s in information more rapidly than their peers.

Ways of thinking shown by high ability learners

Gifted students differ in how they interact socially in the classroom culture:

- Some share what they know successfully with peers. They can 'read' well what others know, think and how they feel and align with it. They show high leadership awareness.
- Some have difficulty sharing what they know. They seek 'like thinking' peers (older students and adults) who accept their knowledge, their intense interest and commitment.
- Some hide their higher understanding. They haven't developed ways of sharing it and aren't sure of how the culture/s will respond to them. These are the *gifted hidden ability students*.
- Some are dis-engaged or alienated from particular cultures, such as the classroom. These are the *gifted emotionally disengaged students* described later.

Your turn 3 : Infer from the content

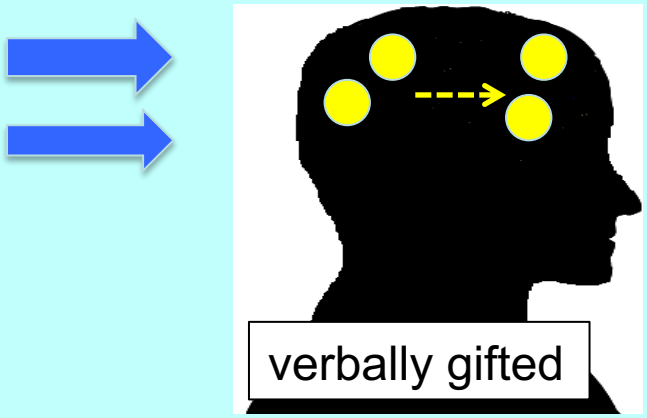
Padlet Activity - https://padlet.com/markeoliver/ibofht9af44a2gwz

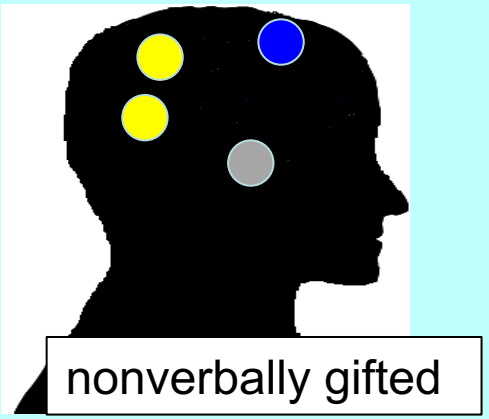
- How might this content influence your teaching in the future?
- What sources of evidence can you use to recognise possible instances of gifted learning in the classroom?
- How might your teaching invite gifted students to tell you 'all that they know' about a topic?
- How often do we invite students to share and unpack their interpretations of the teaching?
- How often do we provide a window of opportunity for this?

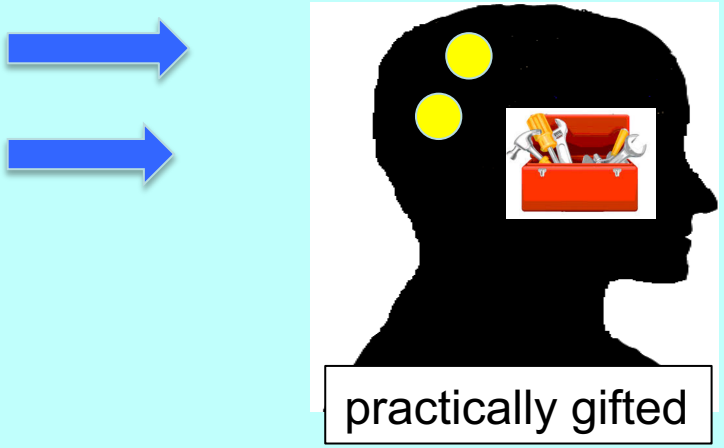
Mentimeter Slide 3 (open-ended)

- How does this model of gifted knowing and learning explain high IQ?

Multiple ways of being gifted by inferring and synthesizing







Multiple ways of being gifted: Convergent or verbal gifted

Verbally gifted knowing: gifted in text comprehension.

Form intuitive theories that have the properties of text : high level text comprehension, production and use.

Examples of a text: a film, a written text, a football game, a drama or play or plumbing routine. Each text

- has a topic and a genre, details and discourse or section meanings
- uses abstract meanings and symbols.
- was designed for a purpose
- has rules and conventions for linking the ideas. These come from the culture/s.

In the classroom verbally gifted students learn faster. They

- form the intended understanding faster than their peers. Their more elaborated and differentiated concept networks allow them to learn in larger chunks and deal with more information at a time.

- use high level text- type thinking. They infer spontaneously the topic, details, section meanings and the intended purposes. This allows them to 'jump ahead'. They make link with other texts they know. They add ideas that were not mentioned in the text. They form more elaborated and extensive interpretations.

- analyse spontaneously aspects of a text at a high level, evaluate, contrast themes in two or more texts, compare evidence to find a common element in an argument, compare texts within and across genres, interpret characterization in imaginative text, make within- and between text links.

- want to be self-programming and to manage their own learning. They learn the rules and conventions for a text rapidly. They use them to organize the ideas in the intended ways.

Multiple ways of being gifted: Convergent or verbal gifted

Verbally gifted knowing: gifted in text comprehension.

- in a given time can form more knowledge and are ready to explore it sooner than peers. They form a network of concepts that is programmed more rapidly by the information. They don't wait to be programmed in a 'bit by bit' way.
- structure and fit together the ideas in their own ways and check their interpretations against the information. Prior to the checking, their initial interpretations are likely to be intuitive.

Verbal gifted' = inferring and synthesizing rapidly in any of these contexts

Texts use a range of symbolic systems such as mathematics ($V=pr^2h$, $x^2-5x+6=0$), music and in gestures. 'Different symbolic systems are handled by different parts of the brain. A person may show 'verbal gifted ability' for maths or music symbolism but not for oral language.

Verbal gifted' = inferring and synthesizing rapidly in any of these contexts.

This matches

- Renzulli's school-house giftedness,
- Tannenbaum's 'consumers of knowledge', (2005) and
- Sternberg's 'analytical intelligence'.

A

Multiple ways of being gifted: Nonverbal or divergent gifted knowing

Nonverbal or Divergent gifted knowing

Nonverbal giftedness. Nonverbal thinking is in time and space, noting the outcomes, inferring patterns, possible 'big ideas' and then 'intuitive theories' about what is possible in time and space. You can imagine ideas changing in

- their attributes or properties; they imagine items in a context changing in what they look/sound like, what they do, the effect they have, their size or shape
- where they are (they transfer them to other contexts),
-
- how, why and when and where the ideas move, alternative actions they could take,
- the contents of the context; they imagine what would happen if the contents changed, for example, new entities entered the context, entities were removed,
- the sequence or order in which events in the context occur.

Visual –spatial gifted

Creative intellectual gifted

Multiple ways of being gifted: Nonverbal or divergent gifted knowing

Nonverbal or Divergent gifted knowing

In the classroom these gifted students form outcomes that are different, lateral or creative. They

- think about the ideas in time and space contexts at a high level, infer patterns by linking with other sets of images and time and space contexts they have. 'Fluid analogies or 'far transfer' allows them to see shared features or possibilities that others don't see; 'insight'. They don't use only what they've been taught; they ideas not mentioned in the teaching.

Nonverbally gifted = inferring in time and space imagery across contexts and synthesizing

- synthesize the inferred patterns into 'big ideas' and form intuitive theories that are based on dynamic time-space thinking. Their outcomes and understanding are creative and novel, often unexpected or unusual, because time-place thinking is unique to an individual. Their theories are about what might be possible.

- engage in 'possibilistic thinking'. Their theories are about what is possible. Their understanding at this time is an intuitive theory about the topic and has not yet been validated. Parts may be inaccurate or illogical, because the student has not yet tested it. Given the opportunity, they can test their theories and see the extent to which they are supported. They link questions with the various aspects that they can investigate.

- may have difficulty sharing their unusual ideas in words and 'show' them in drawings, act them out or make models. Examples are the Feynmann diagrams in modern physics.

Rather than using what they've been taught by their cultures, these individuals are using their experiential or episodic knowledge. This is unique to them.

This matches Renzulli's (2012) creative productive giftedness', Tannenbaum's 'producers of knowledge' and Sternberg's 'creative int

Creative intellectual gifted

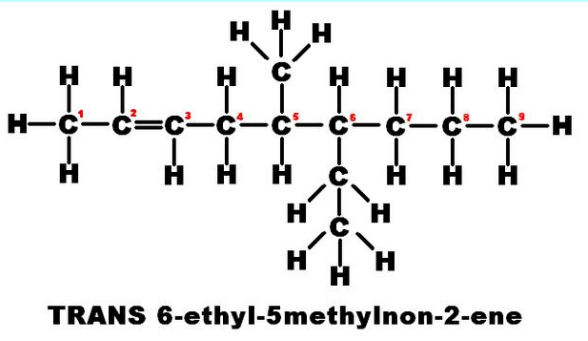
Visual –spatial gifted

Kekule : the father of aromatic organic chemistry

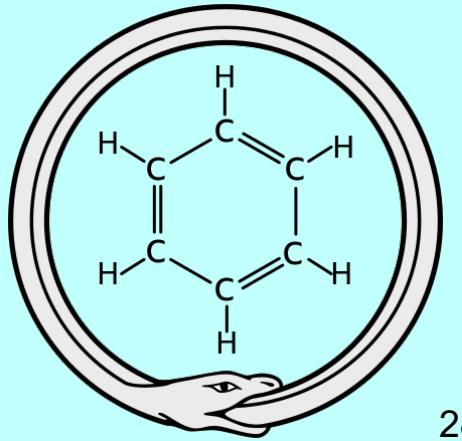
What was known in the 1860s

Carbon atoms linked in chains to make organic compounds

Benzene, the basic organic chemical, had the formula C_6H_6 and that didn't fit a chain format



Kekule imagined a chain becoming a circle : a snake biting its tail. He discovered the structure of benzene.



Multiple ways of being gifted: Procedural or action giftednesss.

Some individuals learn new motor sequences very easily and rapidly automatize these. These students show practical and innovative giftedness that is associated with applying and implementing what they know in novel ways, usually through action sequences.

Any action sequence comprises a set of component actions that achieves a particular outcome or production. You can get a different outcome by

- doing the components in a different sequence or by doing components simultaneously,
- combining actions from different sequences,
- changing the duration for each components.

The action sequence can be used to produce a new musical improvisation, a new art style, a new way of cutting grass, solving a maths task, a set of gestures to communicate 'being a schemer', a set of actions for growing vegetables using less water or actions for kicking goals in football.

In the classroom these gifted students form outcomes that are different, lateral, original or creative productions or ways of solving problems. They use action thinking in novel ways. They are the 'problem-solving innovators'. They include the students who are gifted in information technology and its applications. They

infer in actions to form new action sequences that may lead to products that are creative.

can see how to act in creative innovative ways They learn to make far transfer between sets of perceptual-motor action sequences.

Creative intellectual gifted

Visual –spatial gifted

integrate action sequences to form 'big idea' action sequences

Multiple ways of being gifted: Procedural or action giftednesss.

In the classroom these gifted students form outcomes that are different, lateral, original or creative productions or ways of solving problems. They use action thinking in novel ways. They are the 'problem-solving innovators'. They include the students who are gifted in information technology and its applications. They

- infer in actions to form new action sequences that may lead to products that are creative.
- Practically gifted = inferring in time and space imagery across contexts and synthesizing motor action sequences.
- integrate action sequences to form 'big idea' action sequences
- modify their action sequences rapidly to match new or changed contexts.

The advanced problem solving ability is often in practical, everyday contexts and matches Sternberg's practical aspect of intelligence. These students understand their world in unique ways and use their knowledge in culturally 'street wise' ways, to adapt to, shape and construct their environment and solve real life problems in everyday contexts by using their experiential knowing.

Creative actions in producing music → talented music outcomes, skilled in learning music action sequences, automatize these to produce new or novel action sequences.

This matches Sternberg's 'practical' or 'street wise intelligence'.

The multiple ways of learning in gifted ways.

Convergent, verbally gifted: gifted in text comprehension.

Students form the intended message in information much faster than their peers. Their inferencing and synthesizing allows them to 'jump ahead' in direction of the teaching.

Renzulli's school-house giftedness, Tannenbaum's 'consumers of knowledge', 'analytical intelligence', academic giftedness.

Practical giftedness, problem solving giftedness.

Thinking through actions. Some students create new motor sequences through far transfer. They

- Infer new action sequences that may solve problems and lead to creative outcomes
- see how to act in creative innovative ways
- combine action sequences to form 'big idea' action sequences
- show gifted knowing by producing, demonstrating.

Innovators, successful giftedness

Divergent, creative, nonverbal, visuo-spatial, creative intellectual giftedness

Knowing, thinking about the ideas in time and space imagery, infer patterns and then 'intuitive theories' about the ideas. Imagine ideas changing in

- in time and place contexts and the effect they have
- where they are (they transfer them to other contexts),
- how, why and when and where the ideas move.

Fluctuating high achievement in the classroom –twice exceptional.

- gifted underachievers; 'dual' exceptionalities of giftedness and learning difficulties, due to a specific analytic sequential processing difficulty
- gifted students who have actively disengaged from from formal education academic learning, and
- gifted students who have psychological issues such as Asperger's syndrome, ADHD, affective disorders, such as depression or bipolar
- gifted hidden ability students
- gifted students from minority cultures

Fluctuating high achievement in the classroom –twice exceptional

Show high achievement intermittently

gifted students who also have learning difficulties often due to a specific analytic sequential processing difficulty associated with using phonological and symbolic information and organizing ideas

gifted students from 'minority' cultures

gifted students with psychological issues

gifted disengaged students who are disengaged from the social context of the regular classroom and show an on-going negative emotional disposition to school because their knowledge is not valued or acknowledged and their lack of positive identity in it.

gifted hidden ability students who have low self or social identity and who seek to avoid appearing to be different from their peers.

What can make gifted learning difficult to identify in the classroom?

A range of factors can affect how well we can identify instances of gifted learning in the classroom.

The risk of not recognising these instances means that some gifted students will not have their knowledge and understanding valued and validated in the classroom and that they will not receive the appropriate teaching. We need to be aware of the types of factors that can mask gifted learning, so that we reduce the likelihood that they will restrict/prevent gifted students from being noticed in the classroom.

The factors may include the following

1. Teachers may not be sure about what to look for. We often focus on the middle 70 to 80% of students. How often

- do we look for examples of intuitive theories in the responses of our students?
- do we look for the students who are thinking ahead of us as we teach?
- when we are planning to teach a topic or an activity do we think about what gifted interpretations of the topic or activity might 'look like'?
- do we build inferential tasks into our teaching, note the students who respond at a high level to these do we encourage demonstrate valuing of having students and encourage them to do this?

The lateral, unexpected, quirky responses of many nonverbally gifted students to the teaching are often dismissed as irrelevant. How often do we probe their unusual interpretations and ask them to unpack their thinking or look for the intuitive theories that underpinned their responses in our classrooms?

2. How often do our assessment tasks invite students explicitly to tell us all that they now know and

What can make gifted learning difficult to identify in the classroom?

A range of factors can affect how well we can identify instances of gifted learning in the classroom.

2. How often do our assessment tasks invite students explicitly to tell us all that they now know and believe about a topic they've been learning? Many assessment tasks assess how well the students have mastered the content we taught.

3. We don't have formative and summitted assessment tools that allow us to unpack what they know. If a teacher doesn't know how to analyse, evaluate, unpack the interpretations of the students to see what they do know, they won't recognize the student's advanced understanding. The interpretations of these students can be confusing and challenging for teachers who are looking for the ''right answer'' or an answer to the question: 'How well has my teaching worked?'

4. Our teaching may not provide a window of opportunity for the students to share what they know. How often does our teaching welcome students to share their intuitive theories, possibilities about ideas? How often do we give students like Tom the opportunity to take us on a journey through what they've learnt about a topic and to tell us all that they know or believe about it?

5. We don't know how to modify or differentiate our teaching to respond to how the students learn and what they know. When we aren't sure of how to respond to a challenge we tend to ignore it.

What can make gifted learning difficult to identify in the classroom?

A range of factors can affect how well we can identify instances of gifted learning in the classroom.

7. Other gifted students may also have learning profiles that mean they have difficulty learning literacy and or numeracy skills. Restricted reading and spelling skills limit a student's ability to engage effectively in the classroom teaching and to share and display their knowledge. Teachers can focus on the student's poor spelling or word reading and not 'see' the higher level understanding

8. Some gifted students may also have difficulty actually sharing their advanced understanding with their teachers. Some nonverbally and procedurally gifted students may lack the words necessary for talking about their imagery or action understanding. If the teacher doesn't ask the student: "Just tell me what you see in your mind", "Draw a picture to show me what you're thinking" or "Act out what you are thinking", the student may simply not bother communicating their understanding.

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Participant activity: What can your school do to recognise gifted learning?

- What sources of evidence can teachers in your school use to recognise possible instances of gifted learning in the classroom?
- How is this information shared and tracked in your school?
- How can schools enhance the level of teacher curiosity about potentially gifted learners?
- What new or tweaked strategies will you now try back at your school to identify potential gifted learners?

Roles
- Recorder
- Reporter
- Time keeper
- Director

Very best wishes with your important work in this area in the future