

School of Education

Thinking frameworks supporting communication of thinking

Whole school approach to making thinking visible.

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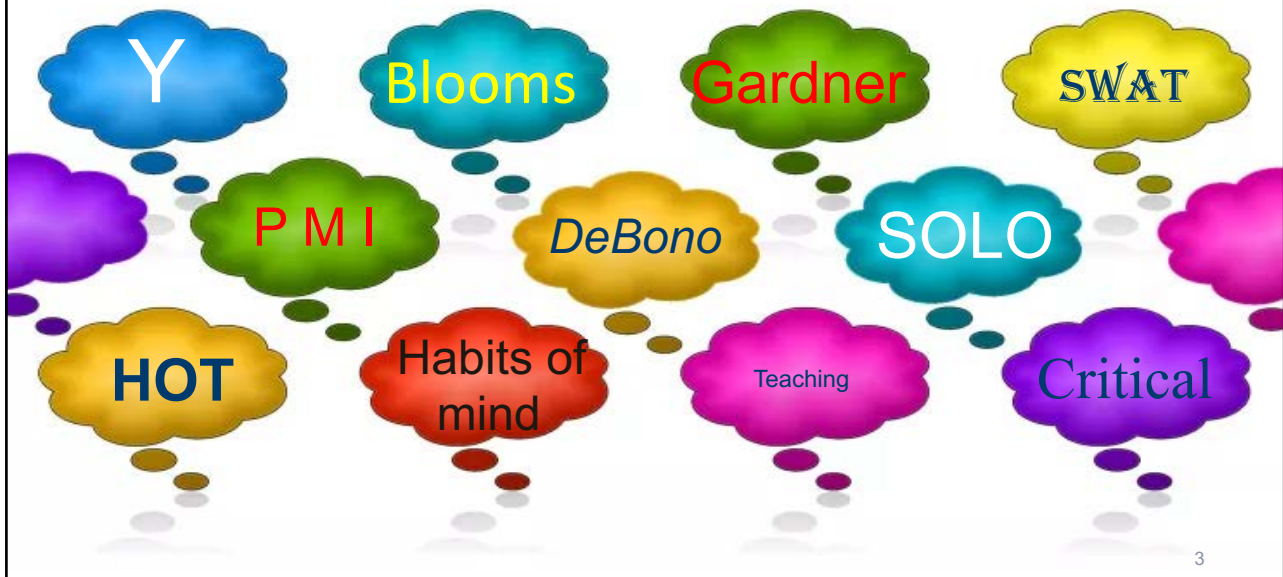
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Thinking frameworks supporting communication of thinking

Common framework and language are desirable concepts for supporting thinking in educational settings. Higher order thinking is more likely to be supported if students, teachers and parents all use a common language and have a shared understanding of what is involved. In this presentation, two Victorian F-12 schools are explored as case studies that highlight how a consistent whole school approach can be used to promote thinking. The frameworks of Bloom's and SOLO (Structure of Observed Learning Outcome) are described and compared with examples from several content areas across all year levels. The popular Bloom's taxonomy is excellent for designing learning tasks for differing thinking skills, while the SOLO framework can be used to classify students' work according to the levels of thinking within individual tasks. Consistent use of a well-publicised framework across a school community can improve the learning and thinking of both students and teachers. Participants in this session will be challenged to think about how these frameworks can be used in their own settings.

We would like our students to be thinking,



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A tale of two schools,

Bloom's and SOLO

A whole school approach

"We don't teach standalone lessons on critical thinking. We introduce it at the beginning of the year, but then it just becomes part of the shared language. The teachers use it over and over again in the context of the lessons they teach."

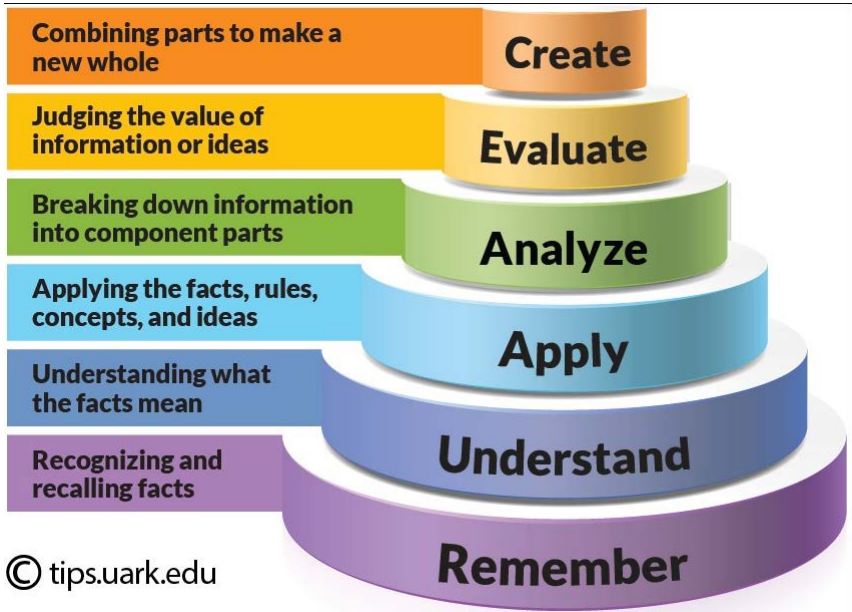
Principal

Bloom's Taxonomy

(Revised)

is used for teachers when they assign tasks.

They can use verbs to categorise tasks.



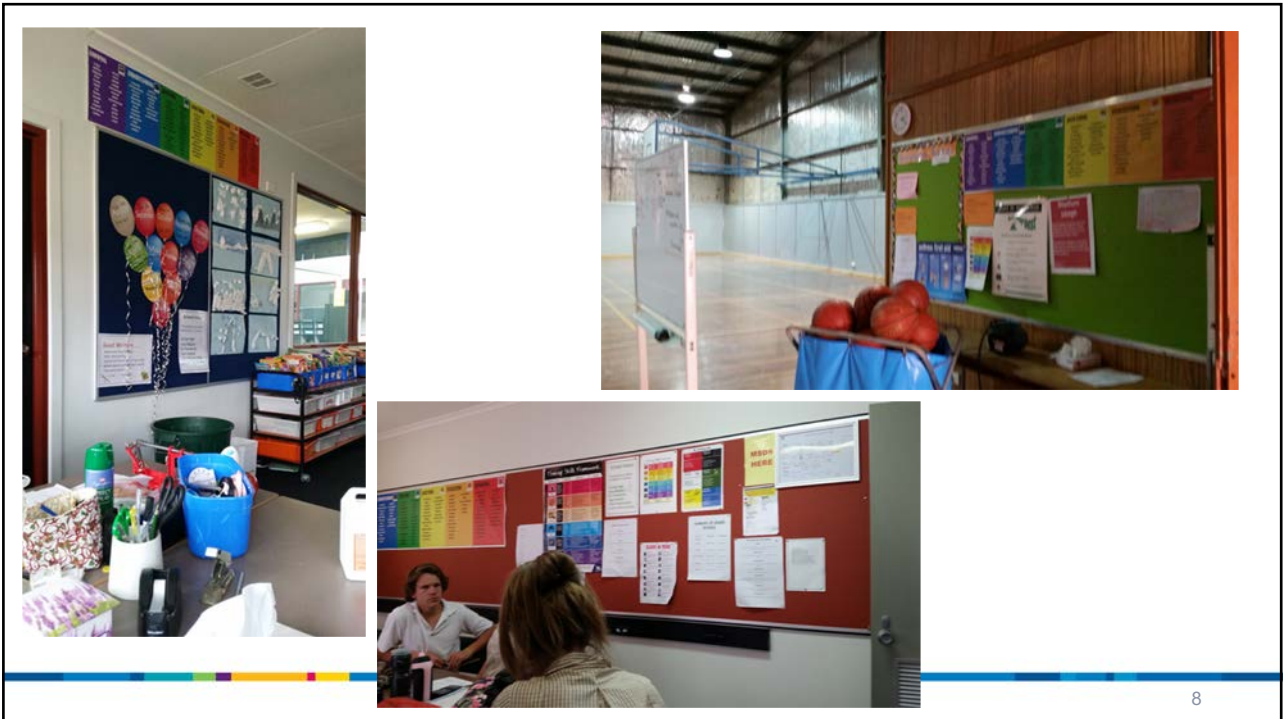
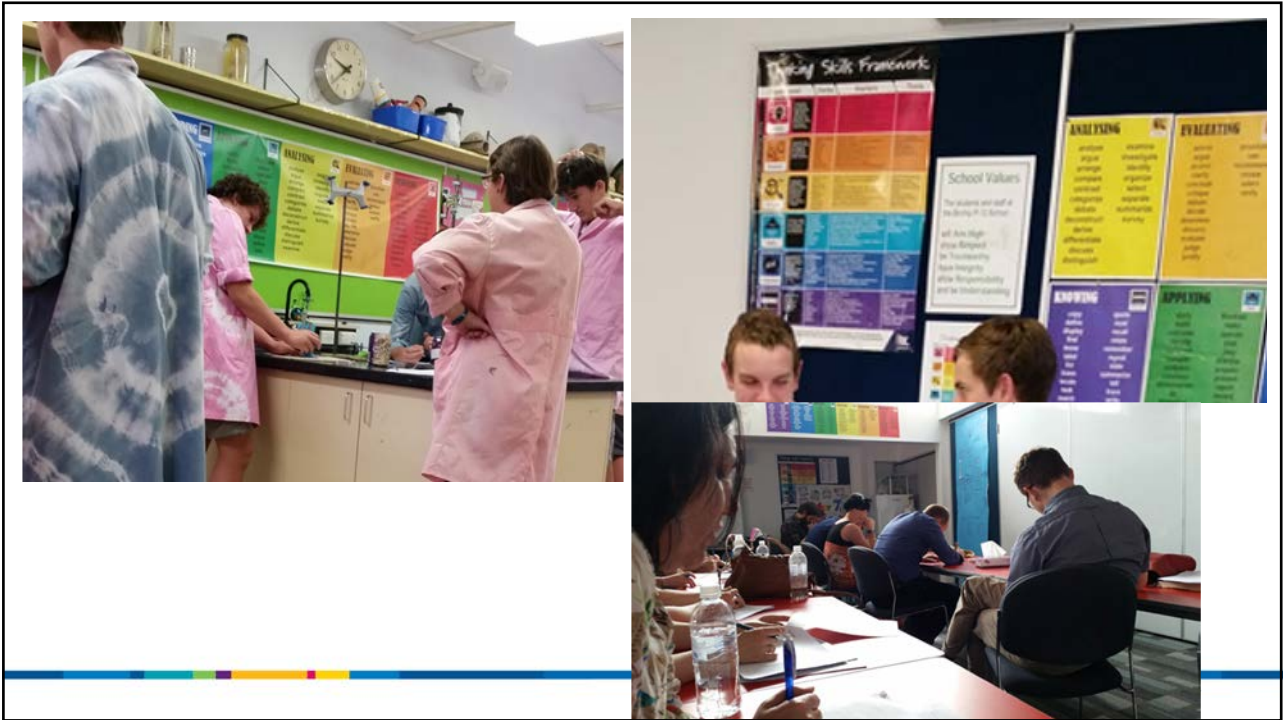
(Anderson & Krathwohl, 2001).

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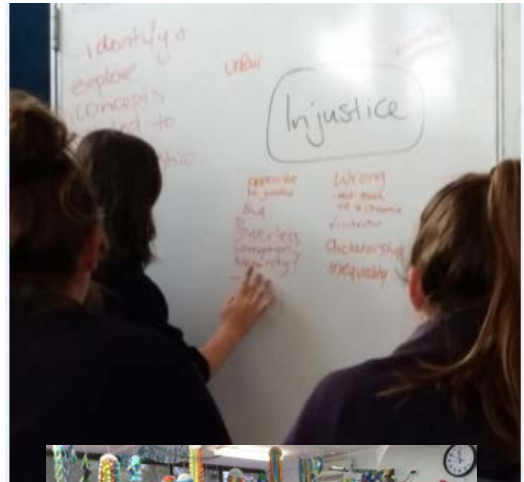
<https://federation.edu.au/staff/learning-and-teaching/teaching-practice/learning/levels-of-learning>

Western Victorian small rural F- 12 school

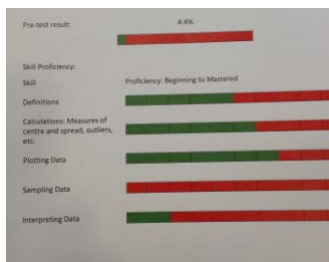




Students ran classes



Children's work and checklist every where

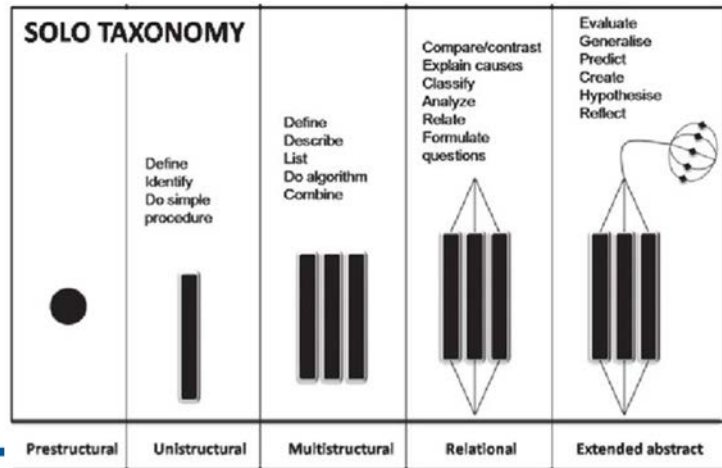


GRADE 4/5
ATTENDANCE
LAST WEEK
98%

TASK	ELISE	TAHJA	SEAMUS	OLIVIA	JAMES	NAKITA
...
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SOLO - Structure of Observed Learning Outcomes; used to classify student responses to tasks.



SOLO taxonomy explained using Lego



SOLO taxonomy

These three types of understanding- surface, deep, and constructed or conceptual understanding- are built on the Biggs and Collis (1982) SOLO model of student learning that has proven most valuable both in developing models of teaching and learning and also our understanding of assessment

(Hattie, 2009, p29)

Hattie, J. (2009). *Visible learning for teachers: Maximizing impact on learning*. Routledge.

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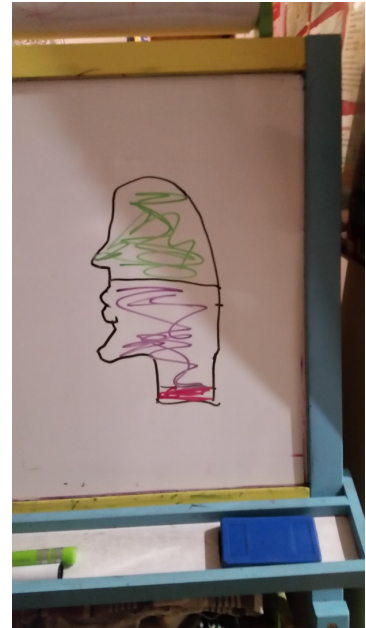
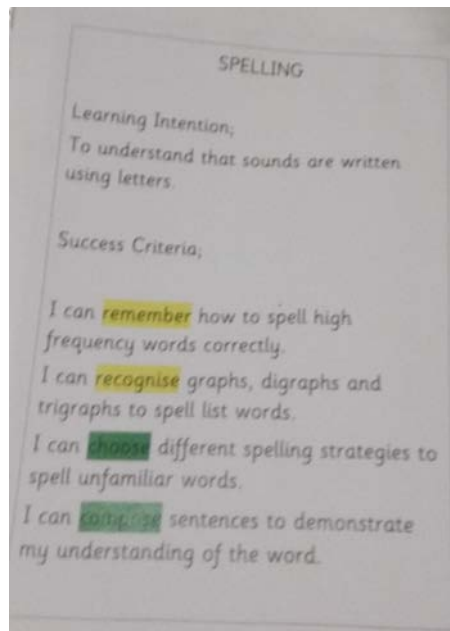
Large Grammar school, multi-campus, F-12

This is from the school website
and handbook

Visible Learning

- Teachers to develop success criteria using SOLO verbs, which will be documented in courses and units in VOS and as part of classroom displays
- Students to be able to articulate what the learning intention is and a display an understanding of the success criteria. This will be evident through the use of the SOLO verbs appropriate to the student's needs
- Teachers and students to engage in mediated learning through effective feedback

SOLO



How was whole school thinking implemented – BOTH SCHOOLS

- Self and Peer observation with focused classroom checklists (many)
- Curriculum documentation checklists
- Explicit list of teacher expectations
- Whole school PD
- The PD I attended at the SOLO school, was on The Differentiated Classroom (Tomlinson, 2014).

Professional Learning: Assessment for Learning Checklist

This checklist can be used to audit your present classroom practice. Which practices do you engage in on a regular basis?

In my classroom:

- I tell my students what they are going to learn, rather than what they are going to do.
- I explain to students what I'll be looking for to help me decide whether or not they have learned.
- I use the learning intention and the success criteria as the basis for feedback to students.
- I try to avoid grade-only feedback and tick-only feedback.
- I include in my feedback to students recognition of what they have achieved and advice about how to improve.
- I make use of 'wait time' or 'thinking time'.
- I make a point of asking open questions rather than closed questions.
- I make use of the information I derive from questioning to shape my teaching and learning program.
- I encourage peer feedback, based on the learning intention and success criteria, and



Counting Australian Coins (A)

What is the value of each set of coins?

<p>1.</p> <p style="text-align: right;">\$</p>	<p>2.</p> <p style="text-align: right;">\$</p>
<p>3.</p> <p style="text-align: right;">\$</p>	<p>4.</p> <p style="text-align: right;">\$</p>
<p>5.</p> <p style="text-align: right;">\$</p>	<p>6.</p> <p style="text-align: right;">\$</p>

Permission to use Australian currency coin designs was obtained from the Royal Australian Mint
Math-Drills.com

Examples of tasks,
lower order thinking
and
higher order thinking



Download from Dreamstime.com



PISA

MATHEMATICS UNIT 28: COINS

You are asked to design a new set of coins. All coins will be circular and coloured silver, but of different diameters.



Researchers have found out that an ideal coin system meets the following requirements:

- diameters of coins should not be smaller than 15 mm and not be larger than 45 mm.
- given a coin, the diameter of the next coin must be at least 30% larger.
- the minting machinery can only produce coins with diameters of a whole number of millimetres (e.g. 17 mm is allowed, 17.3 mm is not).

QUESTION 28.1

You are asked to design a set of coins that satisfy the above requirements.

You should start with a 15 mm coin and your set should contain as many coins as possible. What would be the diameters of the coins in your set?

.....

.....

Examples of tasks,
lower order thinking
and
higher order thinking



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<https://www.oecd.org/pisa/pisaproducts/Take%20the%20test%20e%20book.pdf> p.126

Why does it get dark at night?

The one question can be answered many ways.

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Question: Why does it get dark at night?

Why does it get dark at night?

Unistructural. Because the sun goes to the other side of the world.

Multistructural. Because the earth is spinning and the sun is going round the earth.

Relational. It gets dark at night because the sun goes around the earth once for 12 hours and for the other 12 hours it is day as the sun is around the opposite side of the earth.

Extended abstract. The earth is spherical in shape and rotates about its north-south axis. As it rotates, at any one time the half of the Earth's sphere facing the sun will be in light while the opposite half will be in shadow. As the earth is rotating continuously, a point on the earth's surface will pass alternately through the lighted half and the shaded half.

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SOLO : Cooperating in a team sport

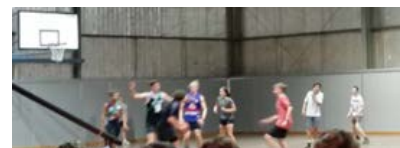
Prestructural – I need help to interact with others

Unistructural – I can participate in a team

Multistructural – I can participate in a team and take responsibility

Relational – I can interact in a team, adapting different roles to meet differing demands

Extended abstract – I can interact confidently with others in team situations, and make individual compromises based on identifying ways to improve outcomes



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SOLO Category	Structured Questions
Prestructural (A)	Describe the clinical appearance of the lesion.
Unistructural (B)	What is your pre-diagnosis? Explain.
Multistructural (C)	Write the etiology of the lesion. Which laboratory tests do you want? (Select the proper ones from the list.) What are your selection reasons?
Relational (D)	Write your opinion about the results of the tests you selected. What is your decision according to the biopsy report and precise diagnosis? Please outline your treatment plan.
Extended abstract (E)	Write a synthesis about the relationship among systemic diseases. Evaluate the medication the patient used related to your diagnosis. Predict the prognosis, and evaluate a consultation necessity.



Ilgüy, M., Ilgüy, D., Fişekçioğlu, E., & Oktay, I. (2014). Comparison of case-based and lecture-based learning in dental education using the SOLO taxonomy. *Journal of dental education*, 78(11), 1521-1527.

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Thinking prompts

- How can you use these ideas in your setting?
- Whole school approach, or variety of approaches?
- Do students need to master lower order thinking before they attempt higher order thinking?

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References

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My own teaching of PSTs

Think/Pair/Write/Share
Mini whiteboards

