Introducing SOLO through systems thinking and SOLO hexagons

Using SOLO hexagons[1] provides insight into the cognitive understanding different students have before, during and after activities for learning (prior knowledge, formative and summative assessment for learning). You can then use this insight when you are designing further learning activities to both support and challenge students. The hexagon activity itself can prompt students to think more deeply about concepts and big ideas and to undertake systems thinking about complex issues. It is also widely used as a revision strategy.

In this strategy for generating and connecting ideas, the students work individually or in collaborative groups.

Teachers and/or students can prepare the content on the hexagons before the session or generate it during the session. You may use:

- a wide range of content, such as text, quotes, symbols, images, photographs, graphs, tables, equations, geometric shapes and political cartoons
- different-coloured hexagons to represent different categories of content.

1 SOLO hexagons are based on an idea from Hodgson (1992).

Process for student-generated content

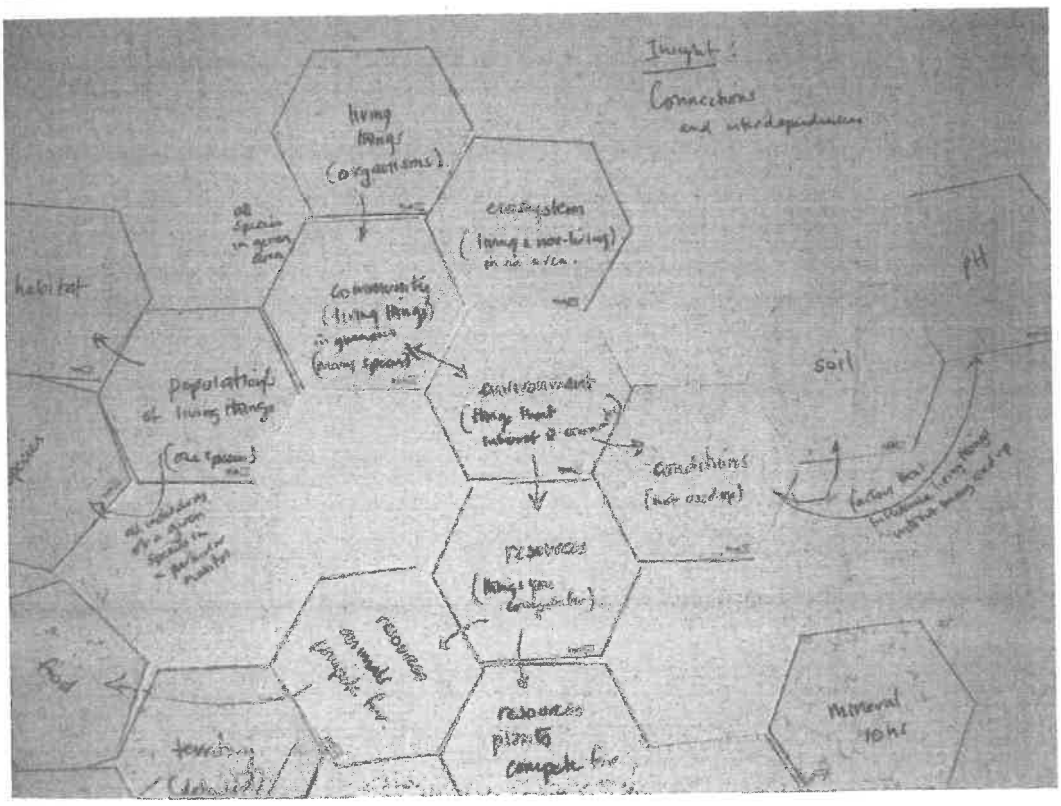
Where students are generating the hexagon content, ask them to:

- **brainstorm** everything they know about a given topic (presented as a focus question)
- **record** each idea or thought on a separate blank hexagon by writing text or drawing images
- **make links between** the hexagons by tessellating them
- **annotate with the reasons** for linking the hexagons
- **make a generalisation** about the tessellation.

As Figure 3.7 indicates, you can curate the tessellation in a digital photo, which you can then use as a scaffold for oral discussion or a future written text.

To extend student thinking, once they have completed the initial activity, introduce extra hexagons with prompts for students to think in new ways.

Figure 3.7: A digital record of a SOLO hexagon tessellation can scaffold further learning

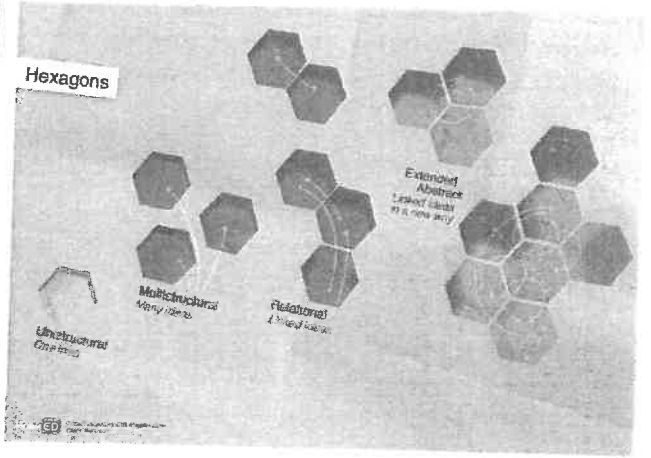


Outcomes of SOLO hexagon activity

The outcome differs according to the SOLO level (Figure 3.8):

- In a **multistructural** outcome, students can describe the content on the individual hexagons.
- In a **relational** outcome, students can make straight-edge connections between simple hexagon sequences and clusters. They can tessellate the hexagons (making connections) and explain why they have linked the ideas together in this way (talk or annotate).
- In an **extended abstract** outcome, students can explore the node where three hexagons share a corner (or simply look at a cluster of hexagons). They can step away from all the linked ideas and make a generalisation about the nature of the relationship between the ideas. This step involves extending what is known in a new way.

Figure 3.8: HookED SOLO hexagons rubric



HookED SOLO hexagons rubric

	... and I can make a generalisation about the linked ideas.
	... and I can make connections between the ideas and explain why ...
	I have several relevant ideas.
	I have one relevant idea.
	I need help to start.

My learning outcome is _____ because _____

My next step is to _____

Reasons for starting to use SOLO hexagons

You may start using hexagons for any of the following reasons:

1. **Introduce SOLO as a model.** SOLO hexagons are a great way to introduce students of all ages to SOLO as a model of learning outcomes.

2. **Determine prior knowledge.** You can use SOLO hexagons to determine a student's depth of prior knowledge and understanding before starting to learn. The approach is similar to a brainstorming activity except with SOLO hexagons you spend time looking for connections between the ideas and then step back and make a generalisation or "big picture" claim. The content of the hexagons may be student-generated, identified by the teacher as relevant to the topic, or a mix of both. Where students are generating the content, ask them to:
   - draw or write everything they know about the topic on to separate hexagons (an indicator of multistructural understanding)
   - work in pairs or small groups to find links or connections between the loose ideas (an indicator of relational understanding)
   - step back from the various tessellations and make a "big picture" call about the essence or significance of the topic (an indicator of extended abstract understanding).

You can test this understanding further by offering students hexagons you have prepared with prompts to consider the political, social, economic, environmental or cultural implications of the topic. Alternatively you could give them prepared hexagons and ask them to describe each one and to make and annotate connections between them as above.

3. **Scaffold student writing.** Students can use their annotated tessellations as prompts for their writing. Sometimes the students write from the tessellation itself; more commonly they write from a digital photo of the tessellation (as in Figure 3.7 on the previous page).

4. **Conduct formative assessment.** Students can add to, revise and reorganise tessellations they created at the beginning of a topic. Using different-coloured hexagons and annotations helps differentiate new thinking.

5. **Revise and/or extend student thinking.** Prepare hexagons before the lesson to extend your students' thinking beyond the initial connections made. Effective strategies are to: print hexagons on different-coloured paper; ask students to add quotes or elaborations on the back of hexagons (turning them into flip cards); or ask them to guess the content on a flipped or blank hexagon.

Tip: So much and no more

When learning to use SOLO hexagons for systems thinking with students, do not assume it will automatically lead to extended abstract learning outcomes. Students who start with very little relevant content knowledge will struggle to make relevant connections etc. Just as it is possible to "over-SOLO-map" and "over-rubric" students, it is possible to over-use SOLO hexagons. It is only one of many pedagogical approaches available to classroom teachers.

SOLO hexagon resources

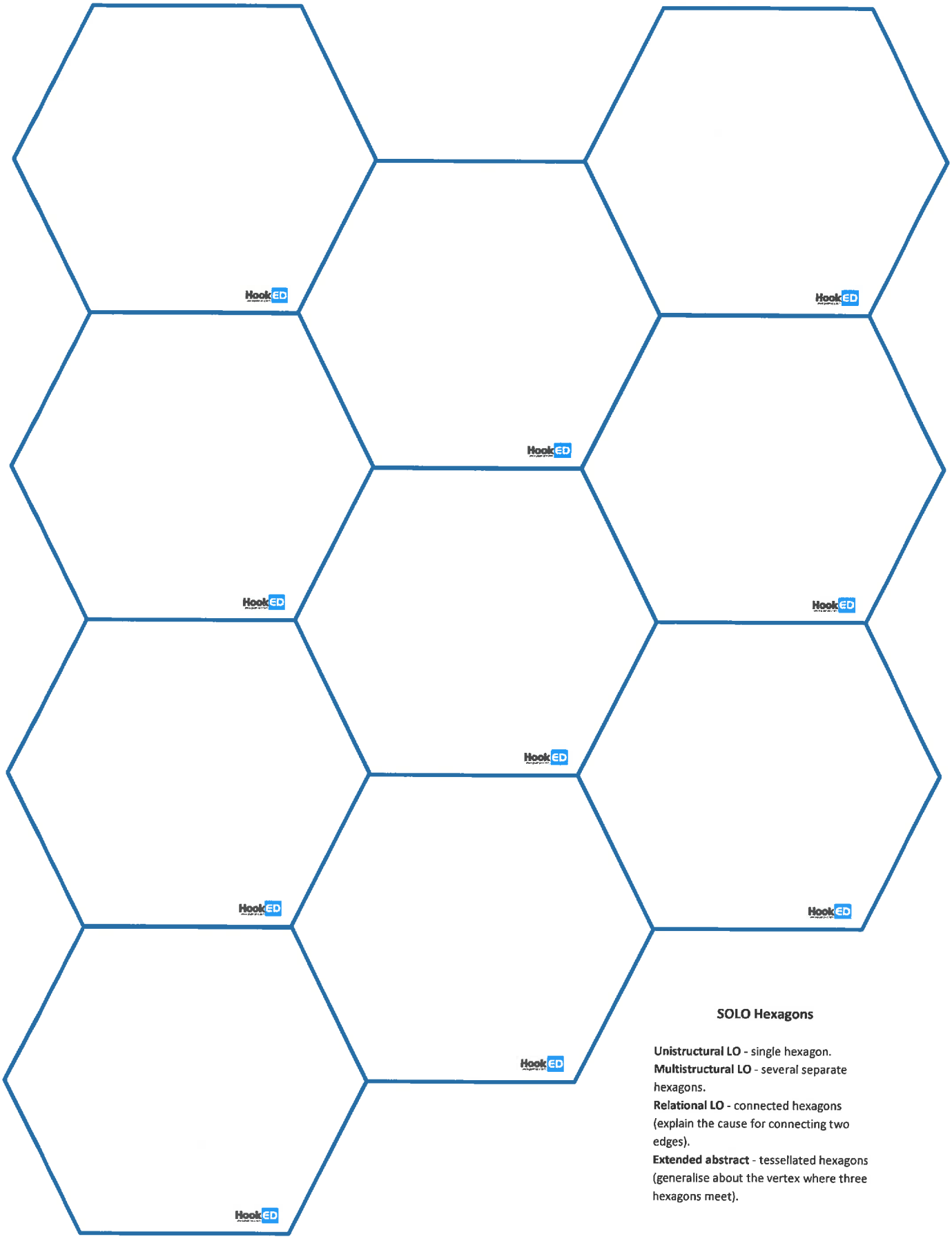
Resources available for your SOLO hexagon activities are:

- the online HookED SOLO Hexagon Generator (**http://pamhook.com/solo-apps/hexagon-generator**), which you can use to add content to hexagons. Once this tool has generated the Word document, it is possible to add images, photographs, colour, different fonts etc
- SOLO hexagon templates (**http://pamhook.com/wiki/SOLO_Hexagons**), including a larger template for younger students
- SOLO hexagon template and examples from early years settings (Hook and Cassé 2013, pp 13–14)
- SOLO hexagon concept mapping (McNeill and Hook 2012, p 7)
- SOLO reverse hexagons (Hook et al 2014, p 40).

Tip: Develop your ideas about SOLO hexagons with colleagues

When starting out with SOLO hexagons, bring samples of your students' learning outcomes to a staff meeting and share the strengths and weaknesses of this pedagogical approach with colleagues. Teachers in New Zealand and the United Kingdom have found many ways to further develop the strategy in this way.

HookED SOLO Hexagons Template Small



SOLO Hexagons

Unistructural LO - single hexagon.
Multistructural LO - several separate hexagons.
Relational LO - connected hexagons (explain the cause for connecting two edges).
Extended abstract - tessellated hexagons (generalise about the vertex where three hexagons meet).

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