

Inclusive Science Pedagogies through Universal Design for Learning

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York St John University

#ASETDConf26

Intended Learning Outcomes

By the end of the session, participants will:

- Understand the 3 core UDL principles in a science context
- Identify barriers to participation in science learning
- Apply UDL to adapt an existing science activity
- Leave with ready-to-use inclusive strategies

Signposting

Time	Activity
5m	Introduction/provocation & poll
5-15	UDL principles in science
15-40	Choice block: learning station or challenge cards (primary/secondary options)
40-50	feedback from groups, debrief difference between tasks
50-60	Reflection & next steps

Who is excluded?

Primary: investigate how the surface area of a parachute affects its drop time

Secondary: outline the data handling for the Specific Heat Capacity required practical

Who might struggle here?

Is this is science problem or a task design problem?

In UDL, we design flexible learning environments, not 'fix' learners

UDL principles applied to science 1

1. Multiple Means of Representation (the *what*)

How content is presented

- Diagrams + models + simulations
- Practical demos + videos + annotated images
- Word banks, symbols, dual coding

Example:

Instead of only text on electrical circuits → use circuit kits, simulations, labelled visuals

UDL principles applied to science 2

2. Multiple Means of Action & Expression (the *how*)

How students show understanding

- Written explanations *or* verbal *or* diagrams *or* models
- Poster, presentation, practical demonstration
- Scaffolded templates for reports

Example:

- Students explain particle theory by:
 - Drawing
 - Building with objects
 - Recording a short explanation

UDL principles applied to science 3

3. Multiple Means of Engagement (the *why*)

Motivation and relevance

- Choice of context (sports, environment, space)
- Enquiry-based questions
- ‘Real-world’ problems

Example:

Climate change data vs local pollution vs biodiversity investigation

A 'typical' task

Complete the worksheet about food chains

Identify barriers under:

- Representation
- Expression
- Engagement

Principle: What could you add/change?

Representation, e.g.,
images, models, video

Action/Expression, e.g.,
draw, build, explain
verbally

Engagement, e.g., choice,
real-life link

Example transformation

Original:

Complete worksheet

UDL version:

- Watch short clip + food chain cards
- Build a food web physically
- Explain using diagram or voice recording
- Choose your context (ocean / woodland / local park)

Encourage:

- Low-prep adaptations
- Small achievable changes (not full rewrites)

Choose your path - breakouts

A. Learning station – Primary

B. Challenge Cards – Primary

C. Learning station – Secondary

D. Challenge Cards – Secondary

Learning stations = choice + movement + exploration

Challenge cards = constraint + focus + depth

Chatterfall [what is this?]

1. Engagement (The Why of Learning)




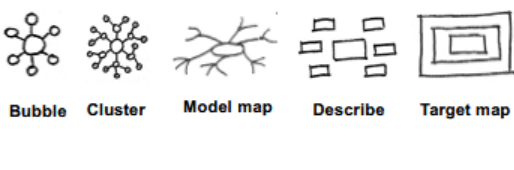
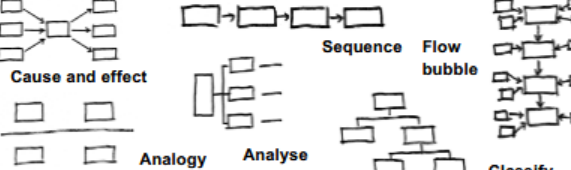
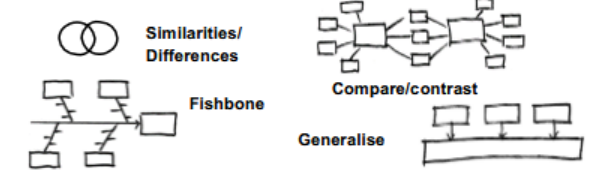



- What is one new way you can offer your learners more choice or autonomy based on the challenge cards?
- How can you make your learning topics more personally relevant and authentic to your specific students?
- What is a specific strategy you can use to minimize threats and distractions in your redesign?

2. Representation (The What of Learning)

- What flexible ways can you present your content so it is not reliant on just one medium or format (e.g., text only)?
- Which accessibility tools or customisable materials did you find most useful at the learning stations

3. Action & Expression (The How of Learning)

- How can you provide students with options to show what they know in a way that aligns with their unique strengths?
- What executive function supports (like graphic organizers or planning templates) can you embed into your redesign?

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How does.....occur?																																																																																																																																						
How would you evaluate/ adapt/improve...?	What data supports the conclusion and why...?																																																																																																																																					
How would you determine...?	How would you adapt to create a different...?																																																																																																																																					
Assess the value/importance of...?	What could be done to minimise (or maximise)...?																																																																																																																																					
What is your opinion of...?	How would you create/design a new ...? What ideas can you add to ...?																																																																																																																																					
Do you support the outcomes/ actions of...? What would you recommend...?	What would you predict/infer from ...? What changes would you make to solve ...?																																																																																																																																					
What would you select/how would you justify...?	Can you propose an alternative...?																																																																																																																																					
How would you prove/disprove...?	Can you formulate a theory for/ hypothesise why...?																																																																																																																																					
Why did they (person/character) choose...?	What solutions would you suggest for ...?																																																																																																																																					
How would you rank/prioritise the...?																																																																																																																																						
Which is the best answer/model ...?																																																																																																																																						
What might happen if you combined ...? What would happen if...?																																																																																																																																						
SOLO Taxonomy Pedagogy Planning Toolkit    Dr Katy Bloom York St John University @bloom_growhow																																																																																																																																						

Reflection and take-home

What is the biggest barrier in your current curriculum that this UDL redesign activity will help you remove?

In one word or a short phrase, what is your key takeaway from the learning stations today?