Inclusive education in the digital technologies curriculum

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Overview

- What is the Australian Digital Technologies curriculum

- How to adjust it for students with special needs,

- How to personalise your lessons using Universal Design for Learning (UDL) to meet individual needs

- How to plan for whole-group learning

- Assessment and ongoing adjustment

Introducing Clark

My background:

is a teacher at Ashwood School and a PhD candidate at the University of Melbourne

- has worked with the Victorian Government in the area of Digital Technologies
- former lecturer and tutor at The University of Melbourne, RMIT, and Federation University
- is also a committee member of the Australian Association of Special Education Victorian Chapter
- is contactable at http://www.clarkburt.com and you can follow him via twitter @clarkburt

Webinar registrations: by location

padlet

Martin Richards • 2m

Inclusive education

Select the + and type in your response

DIGITAL TECHNOLOGIES HUB

What are some of the challenges your students face with their learning?

What strategies have you used to adjust your students learning?

What guidance would be helpful to you to enable you to make better adjustments to your students learning?

ADD COLUMN

Digital Technologies

- Twenty-first century thinking
- Teamwork
- Project management skills
- Coding
- Problem solving and Creating Solutions

DIGITAL TECHNOLOGIES HUB

Australian CURRICULUM

⬇ Download content

F-10 Curriculum ⌄   Senior secondary curriculum ⌄   Parent information   Student diversity ⌄   Resources/publications ⌄

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Home › F-10 curriculum › Technologies › Digital Technologies

❯ Digital Technologies

Year Levels	Strands	General Capabilities	Cross Curriculum Priorities	Additional Information

Please select at least one year level to view the content

☐ Select All   ☐ Foundation to Year 2   ☐ Years 3 and 4   ☐ Years 5 and 6

☑ Years 7 and 8   ☐ Years 9 and 10

Submit   Reset

Understand how Digital Technologies works   ⊕

Level Description   Content Descriptions   Achievement Standards   Work Samples   Expand all

Years 7 and 8

Years 7 and 8 Band Description

[Years 7-8](#)

Adjustments

- An 'adjustment' is a measure or action taken to assist a student with disability to participate in education and training on the same basis as other students.

- Takes into account the student's learning needs and balancing the interests of all parties affected, including the student with disability, the school, staff and other students.

Source: https://www.australiancurriculum.edu.au/resources/student-diversity/students-with-disability/

Select curriculum

Adjust instruction

For example:
- use explicit, systematic and scaffolded instruction
- use cross-curricular and naturally occurring learning opportunities
- use augmentative and alternative communication systems
- provide opportunities for generalisation (transfer) and maintenance of learning
- undertake frequent cumulative reviews.

Starting point
- use the Australian Curriculum learning area content at the student's age-equivalent level
- consider student's current level of learning, strengths, goals and interests

Select or adjust
- select the curriculum content from a year level that the student is able to access **and/or**
- select elements of the general capabilities or cross-curriculum priorities appropriate to the student's learning needs **and/or**
- adjust the instruction **and/or**
- adjust the environment

Progress
- monitor and assess the student's progress in relation to the:
  - relevant F–10 achievement standard
  - individual learning goals
  - school requirements

Adjust environment

For example:
- provide physical access to the teaching and learning environment
- provide peer assistance
- provide access to alternative equipment and furnishings
- use support personnel
- adjust scheduling.

Queensland Curriculum and Assessment Authority (2014, July)

Adjusting the Curriculum to meet the needs of the learner

You are legally expect to teach students topics from their **year** level.

But what and how you teach can be based on their **developmental** level and be more focused on general capabilities and cross curriculum priorities.

> ## Digital Technologies

Year Levels	Strands	**General Capabilities**	Cross Curriculum Priorities	formation
☑ Select All	☑ 🗎 Literacy	☑ ▦ Numeracy	☑ Information and Communication Technology (ICT) Capability	
☑ Ⓒ Critical and Creative Thinking	☑ 👥 Personal and Social Capability	☑ Ethical Understanding	☑ Intercultural Understanding	

Submit   Reset

Understand how Digital Technologies works ⊖

Rationale

This rationale complements and extends the rationale for the Technologies learning area.
In a world that is increasingly digitised and automated, it is critical to the wellbeing and sustainability of the economy, the environment and society, that the benefits of information systems are exploited ethically.

Structure

The Australian Curriculum: Digital Technologies (F–10) comprises two related strands:

Digital Technologies knowledge and understanding – the information system components of data, and digital systems (hardware, software and networks)

MODIFYING THE CURRICULUM EXAMPLE:

Start at their age level to understand what you are expected to teach.

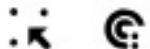**Years 9 and 10 Content Descriptions**

Digital Technologies Knowledge and Understanding ⊖

Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems (ACTDIK034 - Scootle ↗)

📄 🗨 ⣪   Elaborations +

Analyse simple compression of data and how content data are separated from presentation (ACTDIK035 - Scootle ↗)

⣪ 🗨   Elaborations +

Next look at the curriculum at their developmental level.

Foundation to Year 2 Content Descriptions

Digital Technologies Knowledge and Understanding ⊖

Recognise and explore digital systems (hardware and software components) for a purpose (ACTDIK001 - Scootle ↗)

Elaborations +

Recognise and explore patterns in data and represent data as pictures, symbols and diagrams (ACTDIK002 - Scootle ↗)

Elaborations +

Now try to come up with a lesson based on the student's age and developmental curriculum. You can include topics in the general capabilities and cross curriculum priorities curriculum if needed.

Year 9 Digital Systems
Investigate the role of hardware and software in managing, controlling and securing the movement of and access to data in networked digital systems

Foundation Content Descriptions
Recognise and explore digital systems (hardware and software components) for a purpose.

My lesson: Discuss "How do we secure our school computers?" "How do we 'log in' to them?" "Why we have passwords", "What is a strong password?". Have students practice physically securing devices and creating their own passwords and passphrases.

The Abilities Based Learning and Education Support (ABLES) program is a package of assessment tools, curricula, teaching strategies and resources that can help schools to better understand and meet the learning needs of all students, including students with a disability

ABLES - Abilities Based Learning and Education Support

Learning and Teaching Resources > Learning Diversity Resources > Students with Disabilities > ABLES - Abilities Based Learning and Education Support

Learning and Teaching Resources

→ Discipline-based Learning

→ Interdisciplinary Learning

→ Physical, Personal and Social Learning

↓ **Learning Diversity Resources**

→ Autism Resources

→ English as an Additional Language

→ Gifted and Talented Education

→ Koorie Learning Resources

→ Learning the law

→ **Programs for Students with Disabilities**

→ Assessment Service

→ Handbook and Guidelines

The Abilities Based Learning and Education Support (ABLES) program supports the teaching and learning of students with disabilities and additional needs. It provides a suite of curriculum, pedagogy, assessment and reporting resources that assist teachers in recognising and responding to the diverse learning needs of all students, and in assessing and reporting student learning, monitoring student progress and providing accurate intervention advice.

Features

ABLES provides an approach to effectively assess, monitor and respond to a student's abilities by:

1. Accurately identifying and setting learning goals for students with disabilities and additional learning needs.

2. Tracking a student's progress against their individual learning plan over time, and providing new information to parents on their child's learning and development.

3. Identifying the optimal resources that are known to improve learning, which can be adjusted as the learning needs of students change over time.
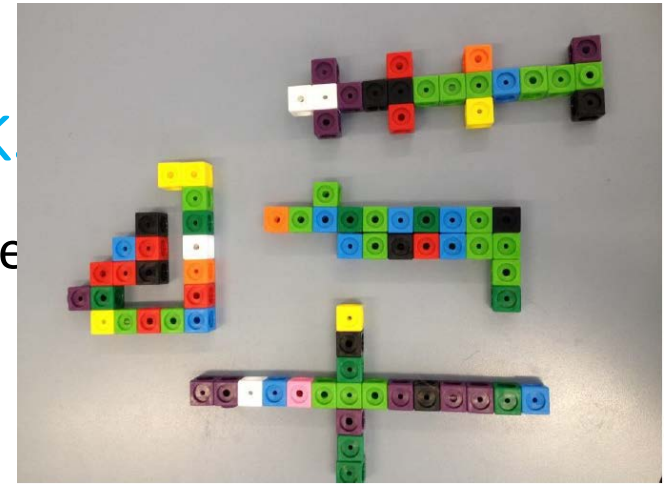
http://acd.org.au/resources-support-planning-assessment-adjustments-curriculum/

Victorian Curriculum Levels A – D (Working towards foundation)

Level A	Level B	Level C	Level D
Pre-intentional (Reaction) Students need high levels of **coactive support** and focused attention from the teacher.	**Cause and effect activities** Students become more reliant on **verbal prompts** and gestures to facilitate their learning.	**First signs of independence** Students respond more consistently to prompts and **simple clear directions**.	**Cooperate in a group** They indicate the beginning of understanding **social rules and expectations** and are beginning to **reflect** on their own behaviour.
Choice making usually from a field of two	Choice making from a field of three	Choice making from four	Considering outcomes of different choices
Intrinsic motivation	Matching real objects	Participate with others	Resilient in 'losing' in group activities
Gaze, touch hit, pat, smile	Matching, scan, manipulate	Use, identify, sequence	Collect, sort, represent

http://victoriancurriculum.vcaa.vic.edu.au/overview/diversity-of-learners
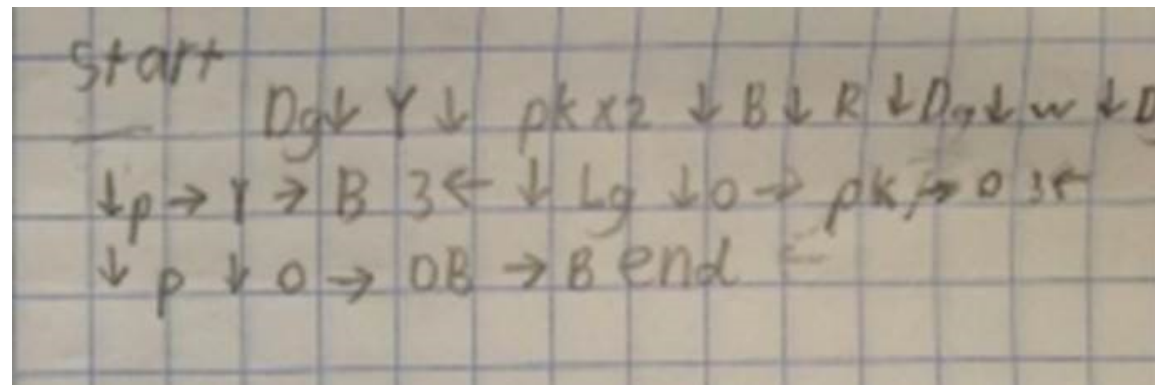
Example: Year 2 Coding with Unifix block

Students create a model using Unifix blocks, 1 block high and create a code so someone else can build an identical model.

Example colour key:

Example code:


```
key
R = red
W = white
B = black
Y = yellow
Dg = Dark green
Lg = Light green
p = purple
pk = pink
O = orange
DB = Dark blue
```

```
Start
       Dg↓ Y↓  pk x2 ↓ B ↓ R ↓ Dg ↓ w ↓ Dg
↓ p → Y → B 3← ↓ Lg ↓ o → pk → o ↓←
↓ p ↓ o → DB → B end ←
```

This task requires an understanding of:

Symbols/coding: students need to understand the concept that symbols or letters can represent other ideas such as colours or words.

Sequencing: students need to comprehend that some activities require steps and that some steps are repeated.

Offer different ways the student can start the task:

Write out the code for the image below (B for Blue, G for Green, R for Red, P for Purple, Y for Yellow).

or

Show a printed example or a row of Unifix blocks like the picture below:

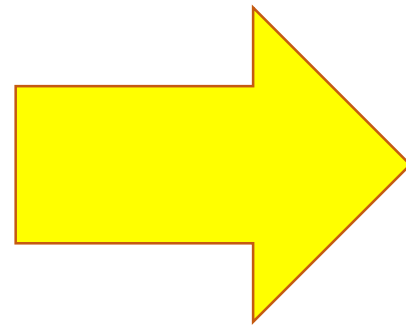**Ask the student to copy write letters to code each colour. G for Green, R for Red, and P for**

| G | | | | | | | |

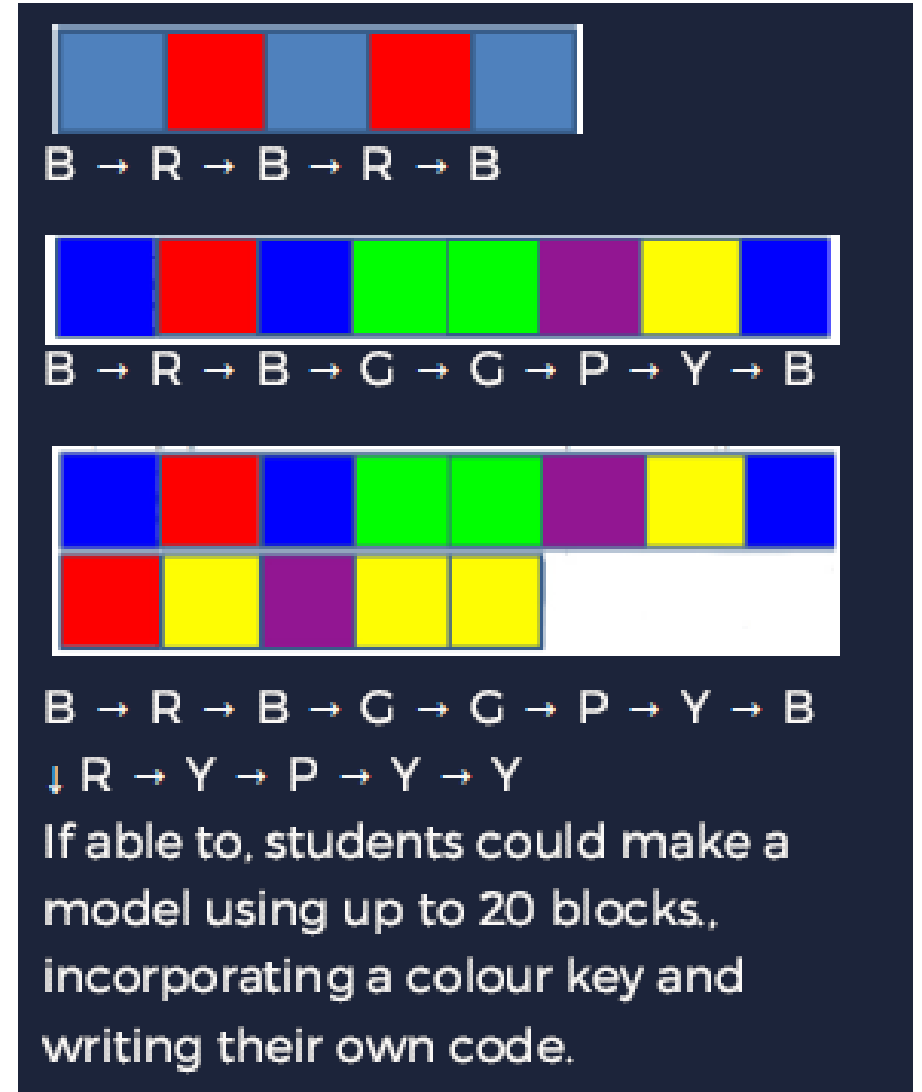# Give students choice and an appropriate level of challenge:

Students could create a code with a limited number of blocks and colours.

Have students copy the picture by colouring the same pattern onto grid paper, 1 grid box representing one Unifix block.

And, if needed, a shorter example with only two colours can be used:

Then progress to larger numbers and more colours.

B → R → B → R → B

B → R → B → G → G → P → Y → B

B → R → B → G → G → P → Y → B
↓ R → Y → P → Y → Y

If able to, students could make a model using up to 20 blocks., incorporating a colour key and writing their own code.

Adjustments: Nature of adjustments

- Level of difficulty
- Size of the task
- Timing
- Level of support
- What the student outputs
- Setting

Universal Design

Universal Design for Learning

UNIVERSAL DESIGN FOR LEARNING

When creating lesson plans using universal design
for learning, consider the following three principles:

1. MULTIPLE MEANS OF REPRESENTATION

The 'what' of learning

Provide information in a variety
of forms and media.

2. MULTIPLE MEANS OF EXPRESSION

The 'how' of learning

Offer different ways of
demonstrating knowledge.

3. MULTIPLE MEANS OF ENGAGEMENT

The 'why' of learning

Give students choice and an
appropriate level of challenge.

The Universal Design for Learning Guidelines

CAST | Until learning has no limits

Provide multiple means of **Engagement**	Provide multiple means of **Representation**	Provide multiple means of **Action & Expression**
Affective Networks — The "WHY" of Learning	Recognition Networks — The "WHAT" of Learning	Strategic Networks — The "HOW" of Learning

Access

Provide options for **Recruiting Interest** (7)	Provide options for **Perception** (1)	Provide options for **Physical Action** (4)
• Optimize individual choice and autonomy (7.1) • Optimize relevance, value, and authenticity (7.2) • Minimize threats and distractions (7.3)	• Offer ways of customizing the display of information (1.1) • Offer alternatives for auditory information (1.2) • Offer alternatives for visual information (1.3)	• Vary the methods for response and navigation (4.1) • Optimize access to tools and assistive technologies (4.2)

Build

Provide options for **Sustaining Effort & Persistence** (8)	Provide options for **Language & Symbols** (2)	Provide options for **Expression & Communication** (5)
• Heighten salience of goals and objectives (8.1) • Vary demands and resources to optimize challenge (8.2) • Foster collaboration and community (8.3) • Increase mastery-oriented feedback (8.4)	• Clarify vocabulary and symbols (2.1) • Clarify syntax and structure (2.2) • Support decoding of text, mathematical notation, and symbols (2.3) • Promote understanding across languages (2.4) • Illustrate through multiple media (2.5)	• Use multiple media for communication (5.1) • Use multiple tools for construction and composition (5.2) • Build fluencies with graduated levels of support for practice and performance (5.3)

Internalize

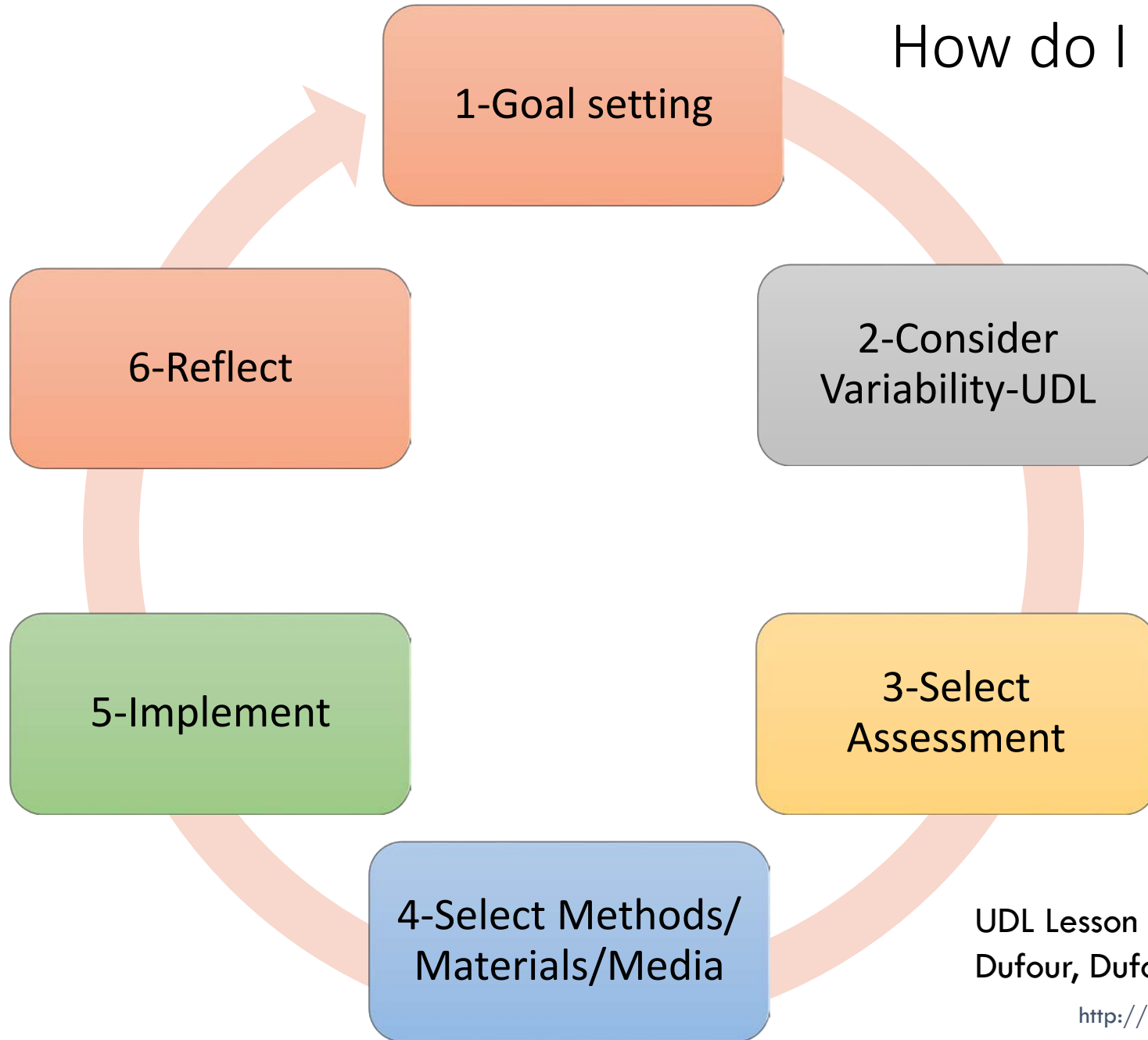| Provide options for **Self Regulation** (9)	Provide options for **Comprehension** (3)	Provide options for **Executive Functions** (6)
• Promote expectations and beliefs that optimize motivation (9.1) • Facilitate personal coping skills and strategies (9.2) • Develop self-assessment and reflection (9.3)	• Activate or supply background knowledge (3.1) • Highlight patterns, critical features, big ideas, and relationships (3.2) • Guide information processing and visualization (3.3) • Maximize transfer and generalization (3.4)	• Guide appropriate goal-setting (6.1) • Support planning and strategy development (6.2) • Facilitate managing information and resources (6.3) • Enhance capacity for monitoring progress (6.4)

Goal

Expert learners who are...

Purposeful & Motivated	**Resourceful & Knowledgeable**	**Strategic & Goal-Directed**

https://www.youtube.com/watch?v=pGLTJw0GSxk

Example: Data transmission & Networks

In this typical Year 7 task, students develop their understanding of networks and ways in which data is transmitted and validated.

Sydney Trains Network

1. MULTIPLE MEANS OF REPRESENTATION

The 'what' of learning

Provide information in a variety of forms and media.

What is a network? Use the analogy of a transport system to learn about a computer networks.

In both networks there are multiple ways to get from one station to the other. Just as train networks move people, computer networks move data.

2. MULTIPLE MEANS OF EXPRESSION

The 'how' of learning

Offer different ways of demonstrating knowledge.

Use maps and diagrams to represent network connections and routes.

Relate computer networking components to familiar objects.

© 2017 Transport for NSW

3. MULTIPLE MEANS OF ENGAGEMENT

The 'why' of learning

Give students choice and an appropriate level of challenge.

Instead of the transportation map, use a simpler and more familiar example, such as a school map. Choose two locations and look for alternative routes to them.

Instead of using a transportation network map to represent a computer network, simplify the task and use a school-based example. Role-play sending a message to the office.

For example, if a student brings a note (data) to the principal, they first look at the school map (DNS) to choose a route to the school office, where the receptionist (router), redirects the student to the principal's office.
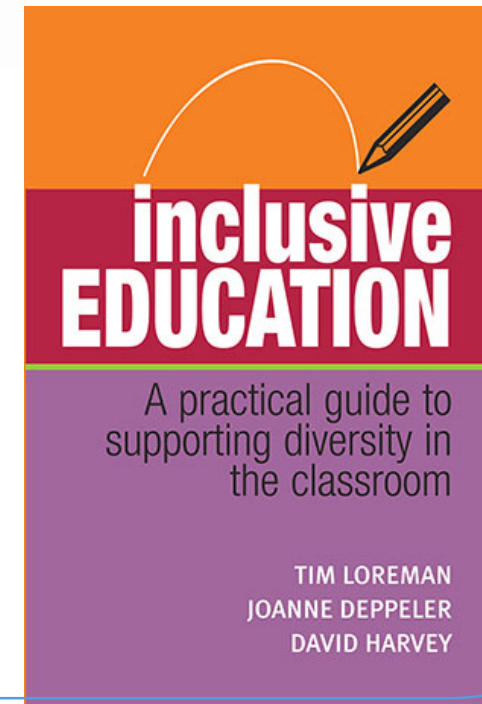
The principal responds to the note and sends a new message or document (data) back. This mimics an internet request.

Teacher-Centered Whole-Group Instruction

...... suggests that there are three types of knowledge:

1. 'must know' knowledge, which is prerequisite or essential
2. 'should know' knowledge, which is important but not essential
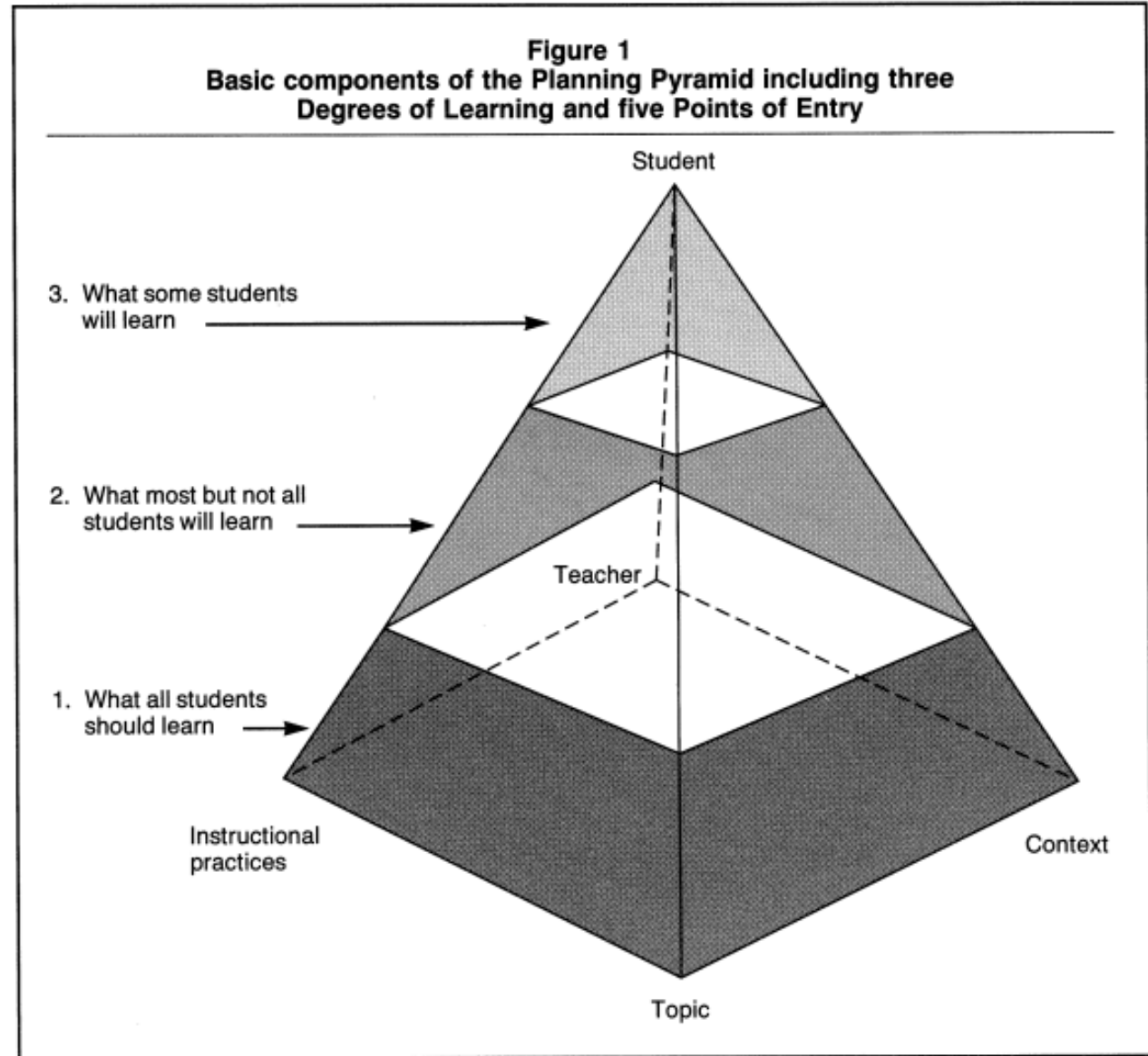3. 'could know' knowledge, which is neither essential nor particularly important.

Loreman, T., Deppeler, J., & Harvey, D. (2005). *Inclusive education: A practical guide to supporting diversity in the classroom*. Psychology Press.

inclusive
EDUCATION

A practical guide to
supporting diversity in
the classroom

TIM LOREMAN
JOANNE DEPPELER
DAVID HARVEY

The Planning Pyramid
(Schumm, Vaughn & Leavell, 1994)

- You the teacher need to decide what is important in a lesson

- Definitions, examples, and broad concepts can be put at the bottom for all learners

- Then extension activities in the top two tiers

Figure 1
Basic components of the Planning Pyramid including three Degrees of Learning and five Points of Entry

Student

3. What some students will learn

2. What most but not all students will learn

Teacher

1. What all students should learn

Instructional practices

Context

Topic

Taking the Planning Pyramid further…

- The Planning Pyramid is a great way to plan lessons to make sure all students understand the main points. It also allows you to plan for extension activities for students who finish early.

- But… it isn't ideal when the lowest tier is too easy and boring for higher ability students… especially if they already know the content!

- Thus, another approach is to separate your lesson into "Levels" where start at a point that they are comfortable with that they can do (mostly) independently. The more knowledgeable students may start at higher levels.

Example: Fairytale Fun

In this Foundation to Year 2, task, students sequence pictures using PowerPoint's slide sorter to tell a story.

To accommodate for different abilities, this lesson can be implemented by using the "Levels" approach (like Levels of difficulty in a video game).

Suggested steps

1. Students read or listen to a fairytale, eg Goldilocks and the Three Bears, and participate in a classroom discussion to consider plot development.

2. Support students to become familiar with the significant events within the fairytale, such as beginning (orientation), problem (complication) and solution (resolution).

3. Children work collaboratively to create a timeline of the significant events within the story, using pictures, words or simple sentences. Challenge students to decide which details within the story are not important, eg the colour of Goldilocks's dress; the type of porridge; the size of the bears; the colour of the chairs.

4. Depending on your learners, you could do one of the following:
   a. Provide students with a series of slides (PowerPoint or Keynote) depicting both significant events and details of no significance within the fairytale. Slides may include pictures, words, simple sentences or a combination of these.
   b. ask students to create their own set of slides to include the most significant events and discard unnecessary details.

5. Students choose which details/events are significant and use the slide-sorter function to arrange these events in order, to retell the story. Support the students to understand the importance of correctly sequencing the events and identifying the most important details.

Level One

Level Two

Level Three

Assessment and adjustment

- Further adjustments can be made using UDL principles:
  - non-ICT materials
  - drawings or printed pictures
  - models/figures including lego
  - partner with a more knowledgeable peer

- These adjustments can be done as the lesson is happening

- Think of each Level and each adjustment as an assessment

- Students open a PowerPoint file containing seven slides with t the slides are from Goldilocks and the Three Bears but are out and a sentence of text related to a scene in the story. They nee the top of the screen. The "View" ribbon menu displays and stu Sorter button.

Fine Motor Skills:
- This task could then be extended where the student c sequence (glue to a large piece of paper or tape to a v further cut out each sentence and put each in their co

Limited Mobility :
- Alternatively, if the student is struggling and/or they a keyboard controls, you could print out slides two thru students sequence the pieces of paper.

Visual Impairment:
- For those who are blind or visually impaired, you coul create each scene.
- Once students have chosen an order for the slides, th that do not contain information essential to the plot. are to delete as many pictures/slides as they can while sense.

Partner Activity:
- Have a partner look at your slides and read them to cl plot still is logical and ordered.

Summary

- Know your students and know their abilities
- Know the curriculum and how to adjust it to meet individual and group needs
- Consider individual, group, learner and teacher perspectives when lesson planning.
- Always be adjusting lesson plans based on the abilities and what the student is achieving

The End
Questions?