

Diversity and Inclusion in Science Education

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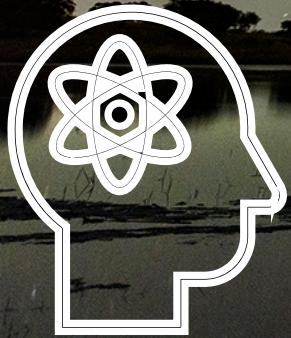
International InSTEAM teacher's
conference

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Science-literate citizens are the key to a sustainable future



SCIENCE CAPITAL

Science is Universal

One language

Collaboration

Sharing

Supporting

Foster key skills

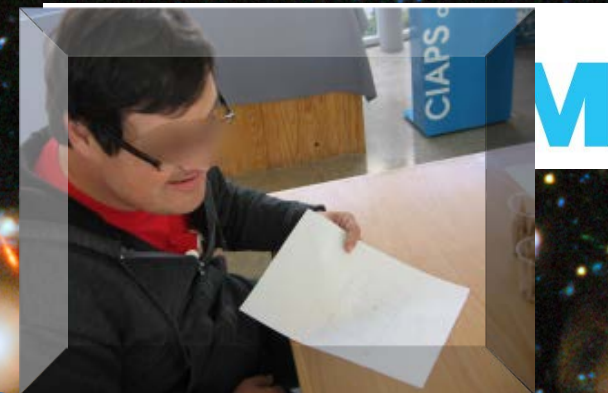
Empower free thinkers

But not all students
feel connected to the
art and magic of
Science



Nah!!!
Science is
not really
for me

Where
does
life
come
from?



I do have some very smart students
that might thrive in the world of
Science!!



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It is not Rocket Science, but girls are not really into that !!!

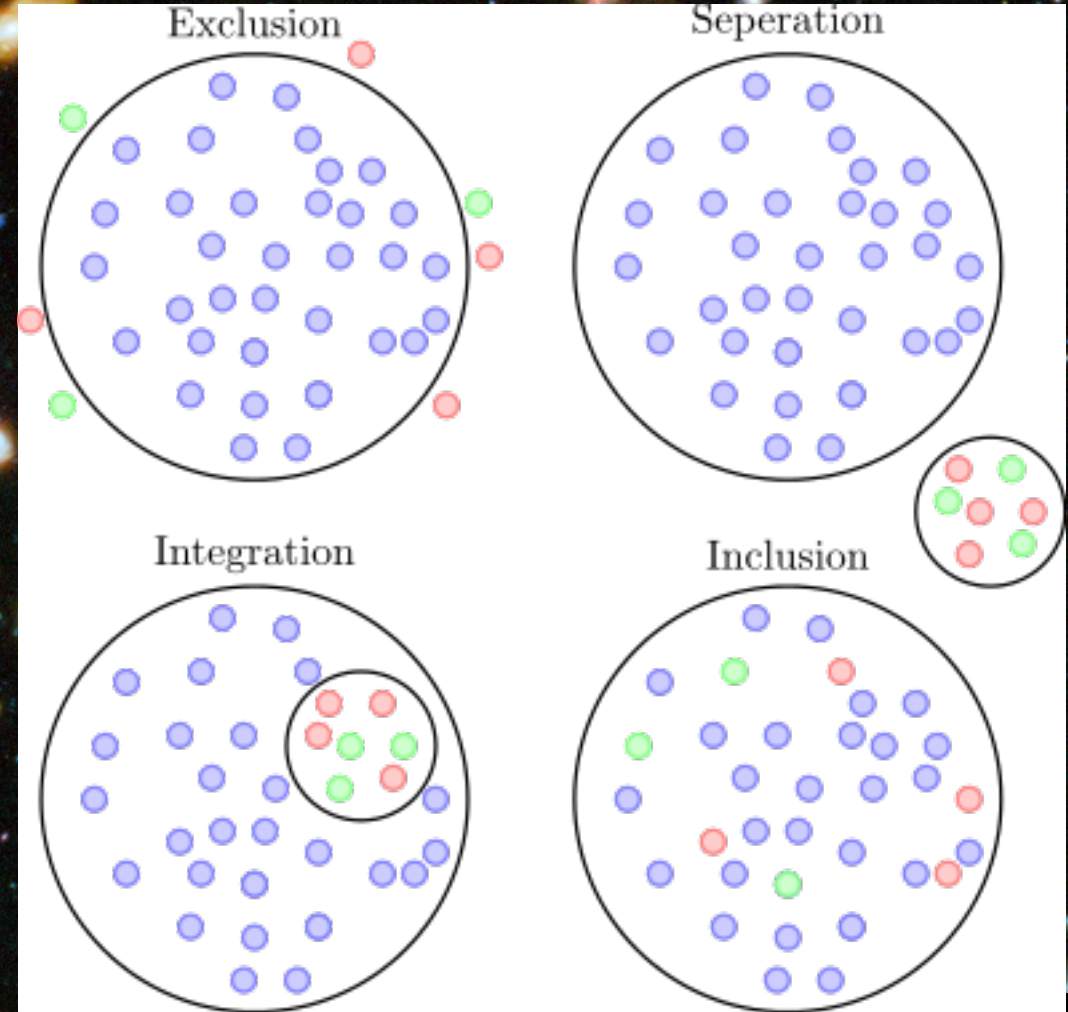
INCLUSION

Inclusion is

→ **an attitude**

→ **a belief**

→ **a mindset**



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WE ARE ALL
HUMANS !!

AHHH ... SO WE ARE ALL THE
SAME !!!

NOT AT
ALL



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WE ALL HAVE DIFFERENT



DNA



FINGERPRINTS

LIFE EXPERIENCES



EYE PATTERNS



Genrih Gigel

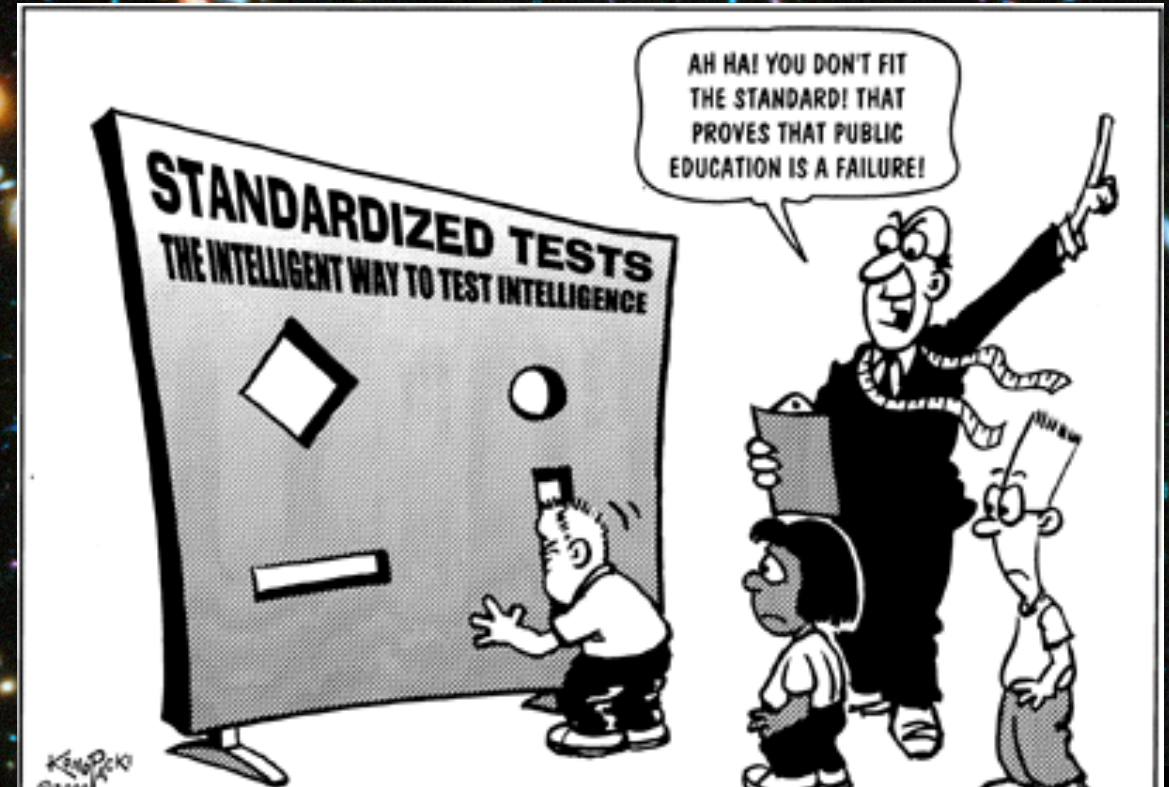


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Personal Qualities Not Measured by Tests



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Enthusiasm: Students

With your hands in scientific research

Working with Scientists





Empowerment: Educators



Astronomy Adventure for Teachers
@ Jose F. Arozema 2015
<http://vaya-usted-a-saber.blogspot.com.es/>



Equality / Equity / Accessibility



Igualdade



Equidade



Acessibilidade



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UNIVERSAL DESIGN FOR LEARNING



3. **THE WHY:** Multiple Means of **Engagement**
(Keep students interest)

1. **THE WHAT:** Multiple Means of **REPRESENTATION** (show information in different ways)

2. **THE HOW:** Multiple Means of Action and **Expression** (Freedom to approach tasks and demonstrate learning in different ways)

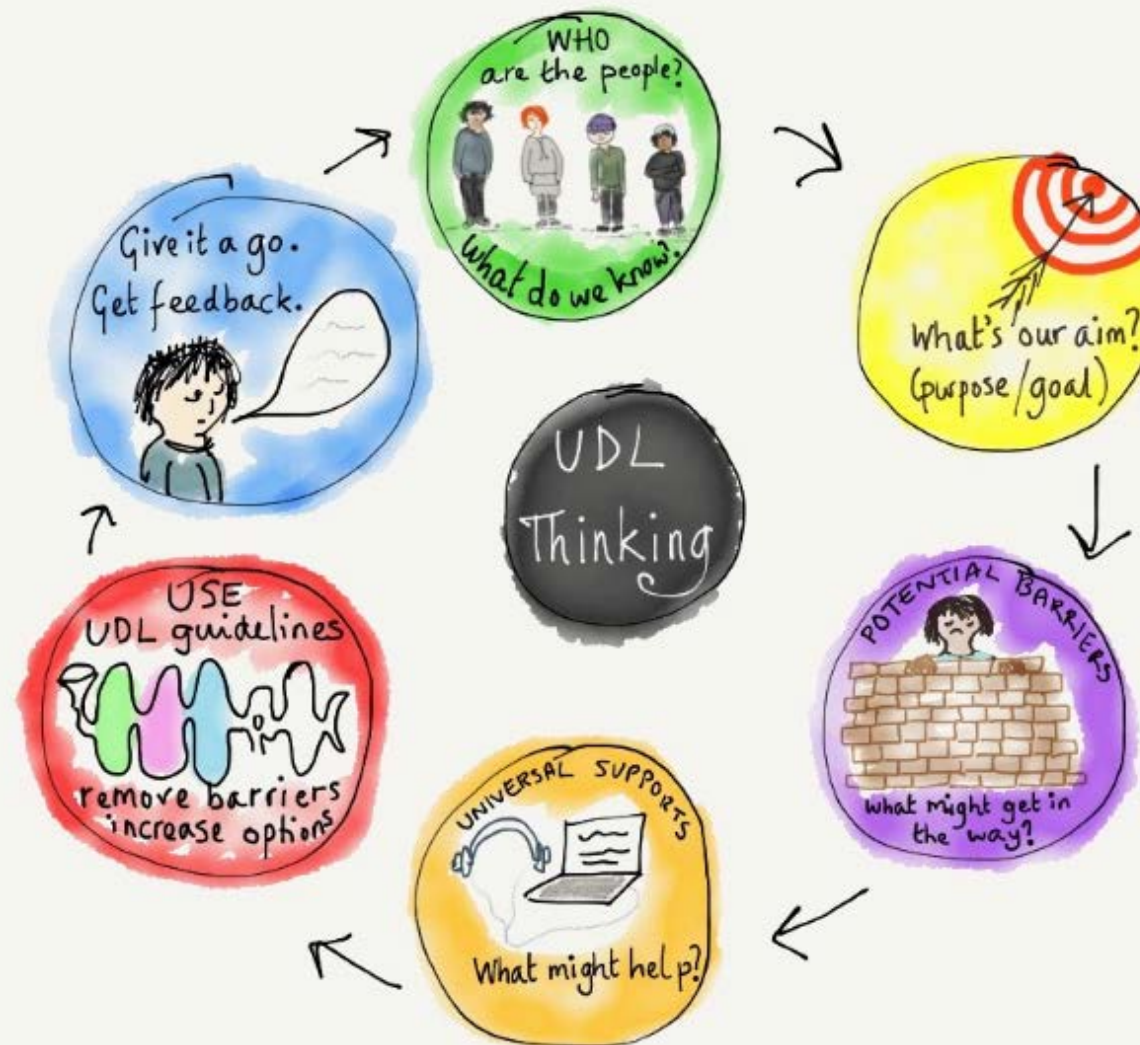


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How do we
please
everyone?!



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One buffet
to please
them all 😊



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We created something to get you started ..



[The edges and the Univers...](#)

[The Universal Design for L...](#)

[But Why?](#)

[This or That?](#)

[How can I do this?](#)

[The full picture](#)

[Meet the Team](#)

[It is not rocket science!!](#)

[Let's check this out](#)

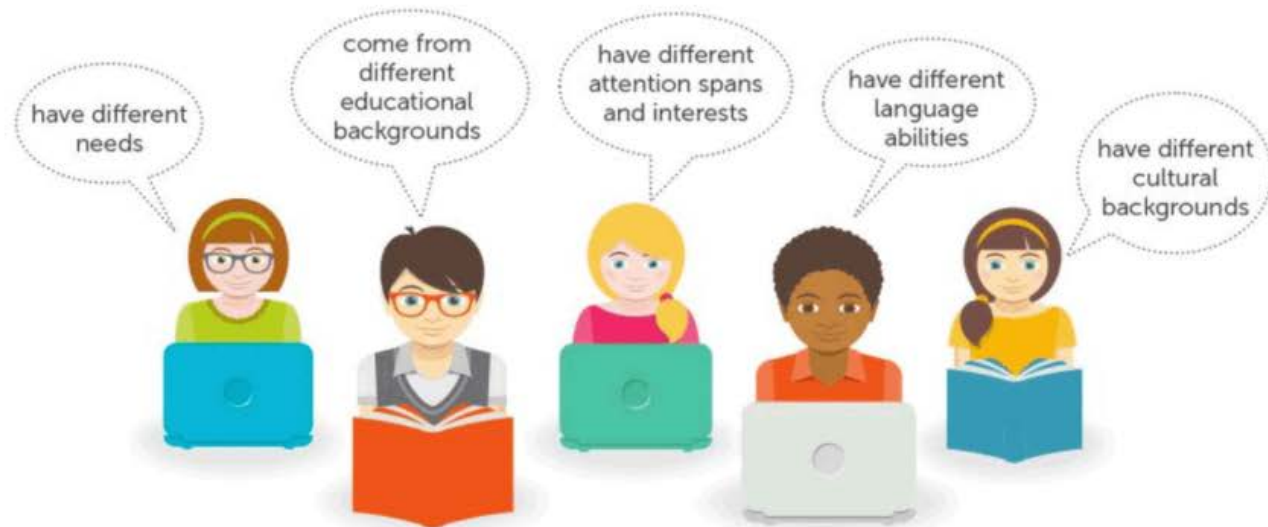
[Facing the Wall](#)

[I am Human](#)

Something very useful is what we call the Universal Design for Learning (UDL), a methodology created to help you improve the way you facilitate learning by providing the necessary opportunity for every student to succeed. But why do we all need it?

WHY UNIVERSAL DESIGN FOR LEARNING?

Classrooms are filled with students who:



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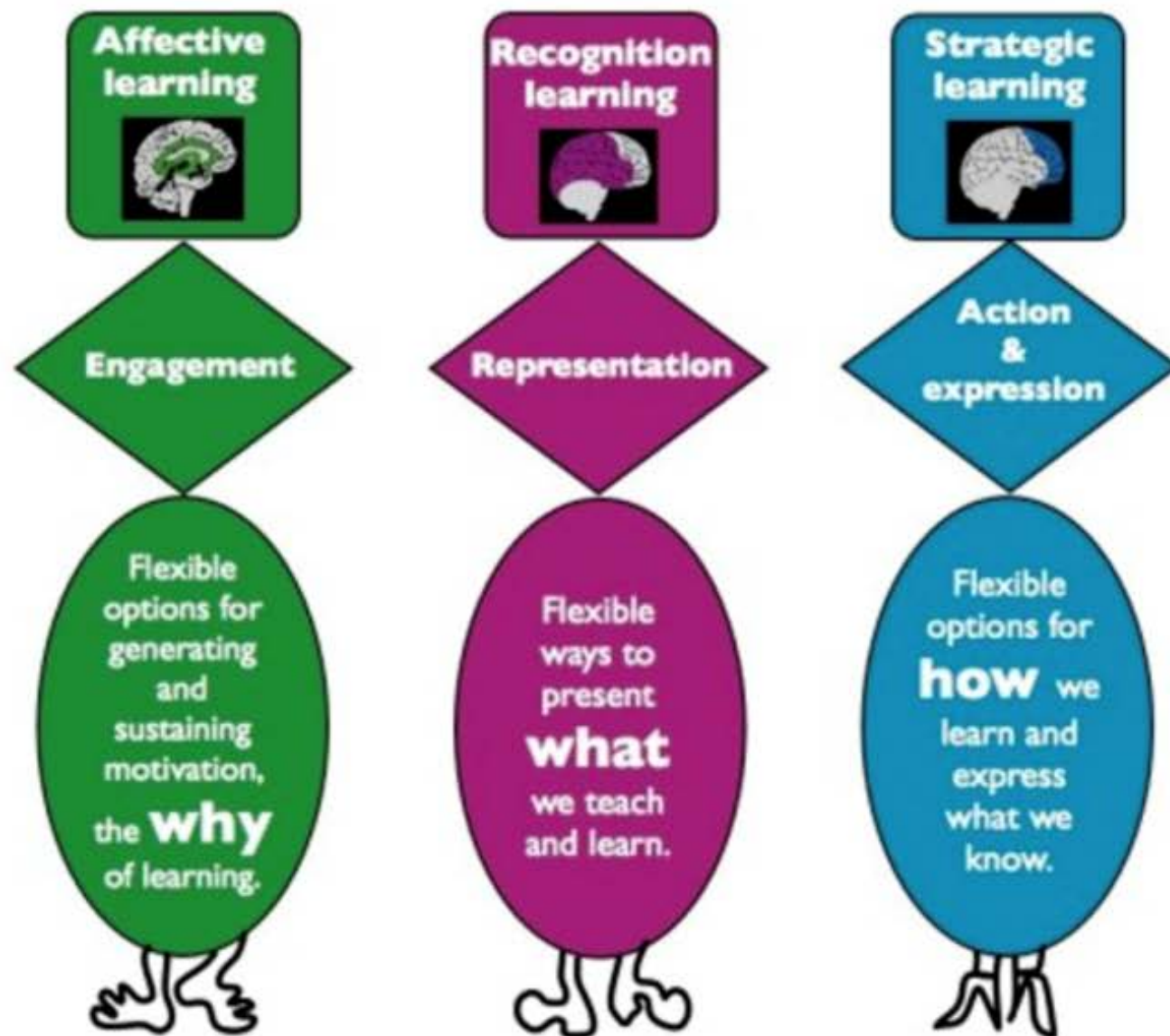
I am Human

3 primary
networks

3 principles of
UDL

3 sets of UDL
guidelines

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Now we need to make sense of all of it and understand how in real school settings this can be achieved. Well, this is not so hard

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Provide Choices for Engagement



Enable Teamwork



Provide real-life examples



Support community projects



Invite student to set personal goals

3. THE WHY: Multiple Means of Engagement
(Keep students interest)

1. **THE WHAT:** Multiple Means of
REPRESENTATION (show information in different
ways)

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ALLOW MULTIPLE MEANS OF
REPRESENTATION (SOUND, MUSIC,
AUDIO, VIDEO, ETC.)



USE DIVERSE MODELS FOR
PRESENTING CONCEPTS AND
INSTRUCTIONS (GRAPHS, DIAGRAMS,
TEXT, ILLUSTRATIONS, ETC.)



DIVERSIFY THE SOURCES OF
INFORMATION: BOOKS, VIDEOS,
BLOGS, PODCASTS, ETC.

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MEANS OF EXPRESSION - Learners should have the freedom to embrace each task according to their power and preferences and in multiple ways. Use the motto: "Everyone can create, learn, share and succeed".

Give plenty of room for your students to use their creativity and personal preferences when materialising the results of their learning journeys.



Allow students to present their work in various ways:



Drawing



Writing



Acting



Playing



Posters and other arts and crafts



Recording



etc

2. **THE HOW: Multiple Means of Action and Expression** (Freedom to approach tasks and demonstrate learning in different ways)



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Provide multiple means of Engagement ➔

Affective Networks
The "WHY" of learning



Provide multiple means of Representation ➔

Recognition Networks
The "WHAT" of learning



Provide multiple means of Action & Expression ➔

Strategic Networks
The "HOW" of learning



Access

Provide options for Recruiting Interest (7) ➔

- Optimize individual choice and autonomy (7.1) ➔
- Optimize relevance, value, and authenticity (7.2) ➔
- Minimize threats and distractions (7.3) ➔

Provide options for Perception (1) ➔

- Offer ways of customizing the display of information (1.1) ➔
- Offer alternatives for auditory information (1.2) ➔
- Offer alternatives for visual information (1.3) ➔

Provide options for Physical Action (4) ➔

- 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) ➔

- 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) ➔

Provide options for Language & Symbols (2) ➔

- 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) ➔

Provide options for Expression & Communication (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) ➔

- Promote expectations and beliefs that optimize motivation (9.1) ➔
- Facilitate personal coping skills and strategies (9.2) ➔
- Develop self-assessment and reflection (9.3) ➔

Provide options for Comprehension (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) ➔

Provide options for Executive Functions (6) ➔

- 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) ➔

AVOID UNNECESSARY STEREOTYPES



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Let's check this out

Facing the Wall

I am Human

Cultural and Social Background



Ethnicity, Beliefs and Cultural Traditions, Native Language



Values



Special Needs



Attitudes and Prejudices



Customs and Traditions



Self Perception, self regulation and self esteem















Behaviors



Family and Community



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Personal Characteristics and Skills		
 Creativity, Curiosity and Imagination	 Language (Listening, Speaking, Reading and Writing)	 Hope and Optimism
 Critical Thinking and Problem Solving	 Numeracy	 Resilience
 Collaboration and Cooperation	 Science Literacy	 Tolerance and Solidarity
 Communication	 Vision for the future	 Initiative and Entrepreneurism

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Differentiating Instruction: It's Not as Hard as You Think


 Watch later
  Share
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MORE VIDEOS



0:20 / 4:28


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WHERE DO WE
START !?!?



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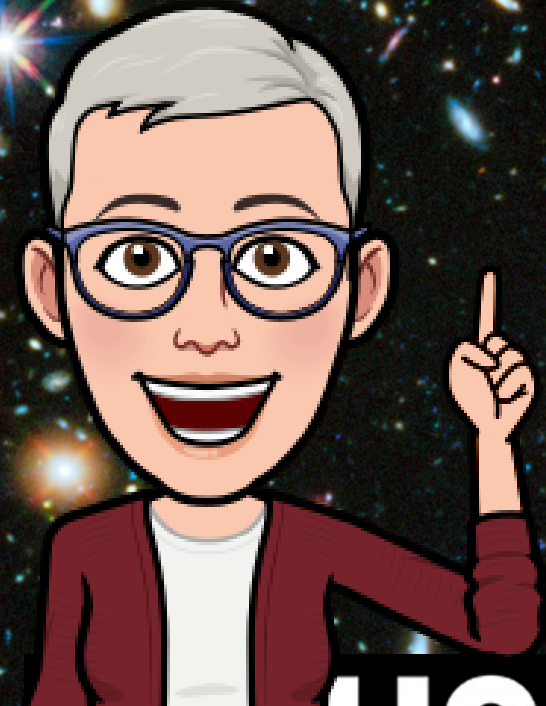
Inclusive Lessons

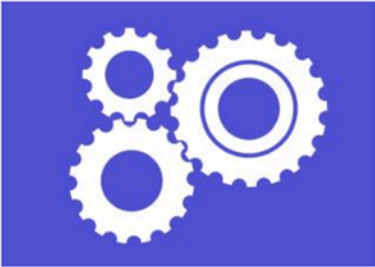


Inclusive Approach



Implementation guidelines





Creator	Golabz Master
Age Range	Before 7, 7-8, 9-10, 11-12, 13-14, 15-16, Above 16
Subject Domains	Astronomy, Biology, Chemistry, Environmental Education, Engineering, Physics, Geography And Earth Science, Mathematics, Technology
Language	English
Average Learning Time	45 Minutes
License	Creative Commons Attribution-Noncommercial (CC BY-NC) - default
Works Offline	No

Preview

Duplicate Space

Description

The Universal Design for Learning (UDL) is an approach that allows educators to create learning equity to a diverse classroom by acknowledging and accommodating each learner. The UDL incorporates a set of principles, which offers each student an equal opportunity to learn. The UDL idea that each person has a unique individual learning style.

Teachers can incorporate Universal Design for Learning into their STEAM curricula. UDL principles are assimilated in Basic inquiry learning scenario using its five major phases:

- 1. Orientation,
- 2. Conceptualisation,
- 3. Investigation,
- 4. Conclusion,
- 5. Discussion

Each above-mentioned phase includes a set of recommendations of the UDL principles and results.

Although this lesson plan provides a holistic picture of implementation of the UDL for a single lesson or activity and apply a few UDL guidelines that are relevant to the learning scenario.

Before... Read and Complete...

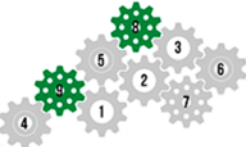
Before... Employ in Each Phase...

0. Learning goals

- 1. Orientation
- 2. Conceptualisation
- 2.a. [Optional] The lab
- 3. Investigation
- 4. Conclusion
- 5. Discussion

After Lesson Planning

Show About



ENGAGEMENT | SUSTAINING EFFORT & PERSISTENCE, SELF REGULATION

The What, Why & How

What:	You will be able to... [Fill in (S.M.A.R.T.) learning objective(s) that include the level of knowledge and skills you expect your students to gain by the end of the lesson.]
Why:	[Explain in 1-2 sentences, why it is important to learn this concept or skill. Try to connect it with the real life of your students.]
How:	[Give a brief overview of- - The students' task ahead: the structure of the ILS, the phases students will go through, and their functions. - (Technical) requirements (if any) for running the ILS, for example, if a software plug-in is required. - Offline arrangements (if any), for example: seating arrangements, group work, international communication, offline tools that may be required such as hands-on experiment, textbooks etc.]



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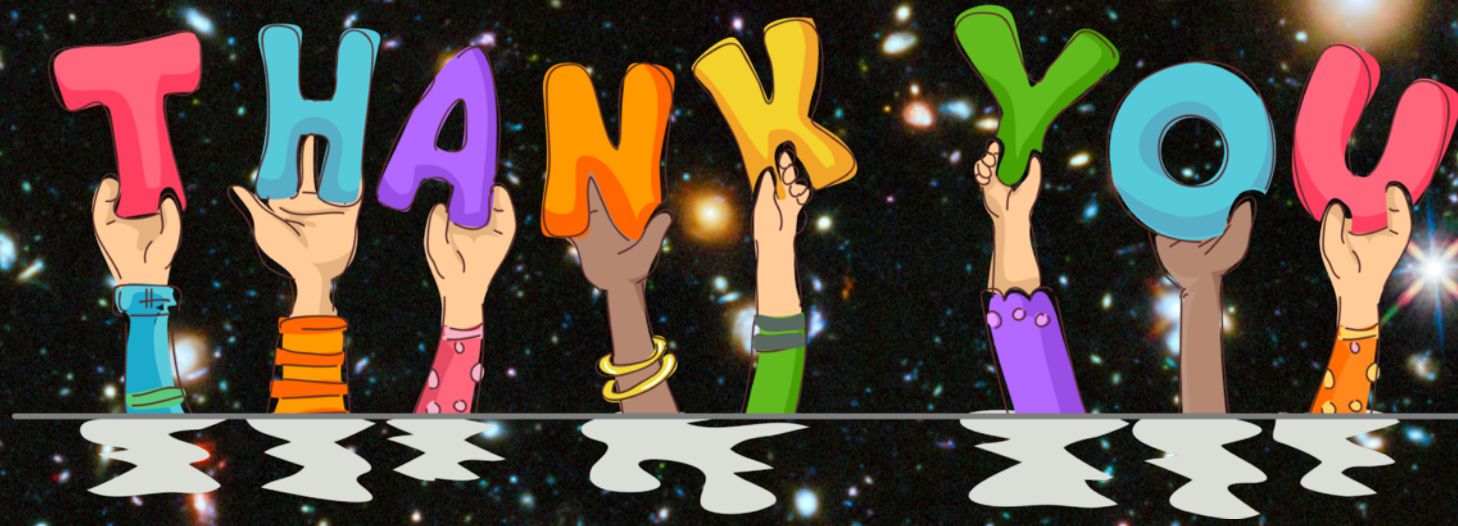
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Inclusion is a big word. But a far bigger one is exclusion, which is something many students around the world unfortunately know so well. The feeling of being excluded by something or someone can be very daunting and a big barrier for self development. It is probably fair to say that all educators would like to make sure all the learners in their classroom have a sense of belonging and recognise their schools as a continuation of their homes. The notion that this is not happening in one's classroom and the fear of failure can be a very alarming to educators. But there is help available and it is not a complicated process, it is just necessary to adopt a new mindset towards education, its means and its ends. Let's start step by step. Watch this short animation depicting the main characteristics of inclusion:





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