Universal Design for Learning

Hershey, Pennsylvania
January, 2011

November 2010

Dear Members of Congress:

Education is vital to America's individual and collective economic growth and prosperity.....

To that end, I am presenting you with the Administration's National Education Technology Plan, *Transforming American Education: Learning Powered by Technology*. The plan calls for applying the advanced technologies used in our daily personal and professional lives to our entire education system to improve student learning, accelerate and scale up the adoption of effective practices, and use data and information for continuous improvement.....

...The model of learning described in this plan calls for engaging and empowering personalized learning experiences for learners of all ages. The model stipulates that we focus what and how we teach to match what people need to know and how they learn. It calls for using state-of-the-art technology and Universal Design for Learning (UDL) concepts to enable, motivate, and inspire all students to achieve, regardless of background, languages, or disabilities.

UDL in public policy

The Higher Education Opportunity Act of 2008

Section 103(24) **UNIVERSAL DESIGN FOR LEARNING.--**The term `universal design for learning' means a scientifically valid framework for guiding educational practice that—

``(A) provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and

UDL in public policy

The Higher Education Opportunity Act of 2008

``(B) reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students with disabilities and students who are limited English proficient.".

A harbinger of the future

I) NIMAS (2008)

The National Instructional Materials Accessibility Standard

What is NIMAS?

..NIMAS is a standard for digital source files that can be used to accurately and reliably produce instructional materials in a variety of alternate formats using the same source file.

…addresses the national need to increase the availability and timely delivery of print instructional materials in accessible formats to blind or other students with print disabilities in elementary and secondary schools.

NIMAS OUTCOMES:

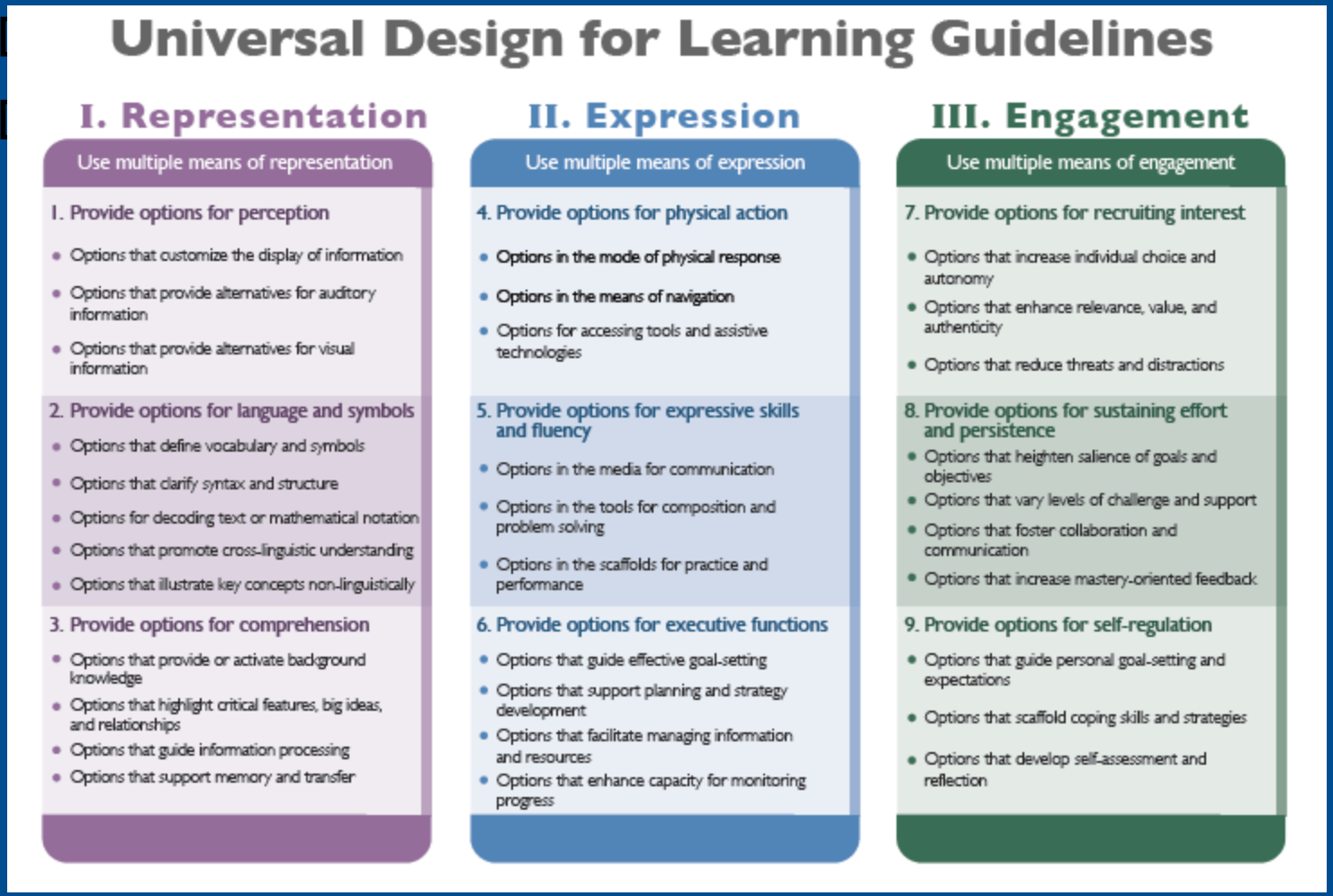
Virtually every textbook in American schools published after 2006 is now available in a digital XML version to any child with a print disability.

What is a print disability?

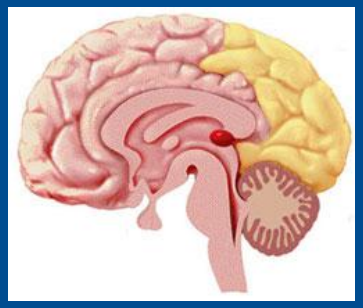
Who has a print disability?

What is the difference between a learning disability and a print disability?

Meeting the challenge of Diversity
Differentiation and UDL



Understanding what learning requires



Recognition networks

Strategic networks

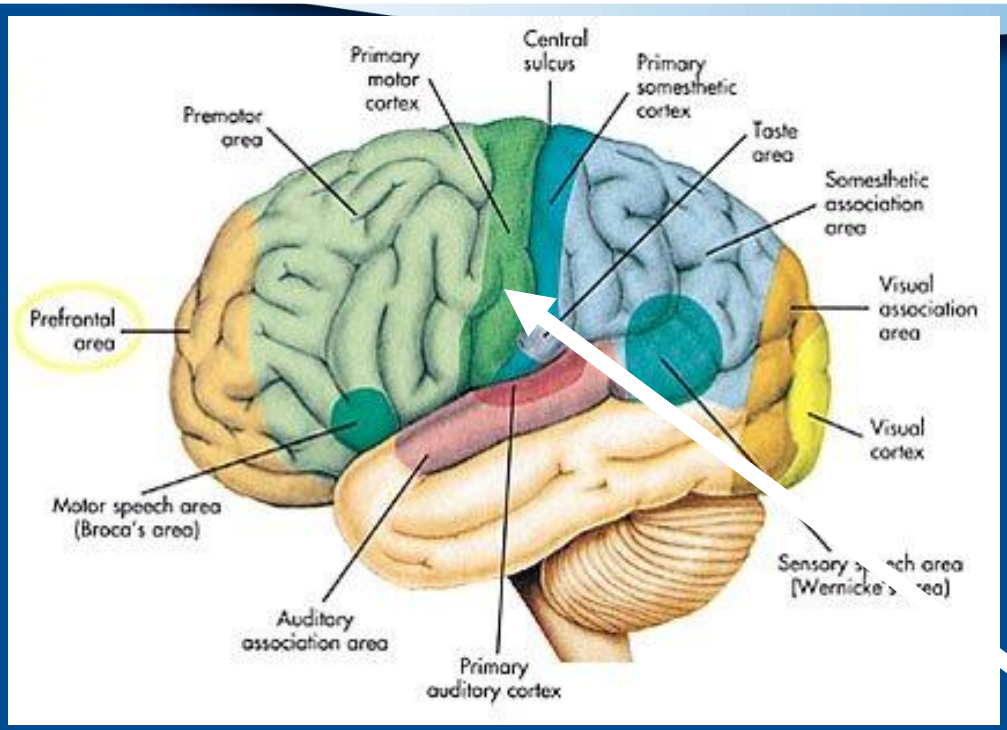
Affective networks

Understanding the science of what learning is

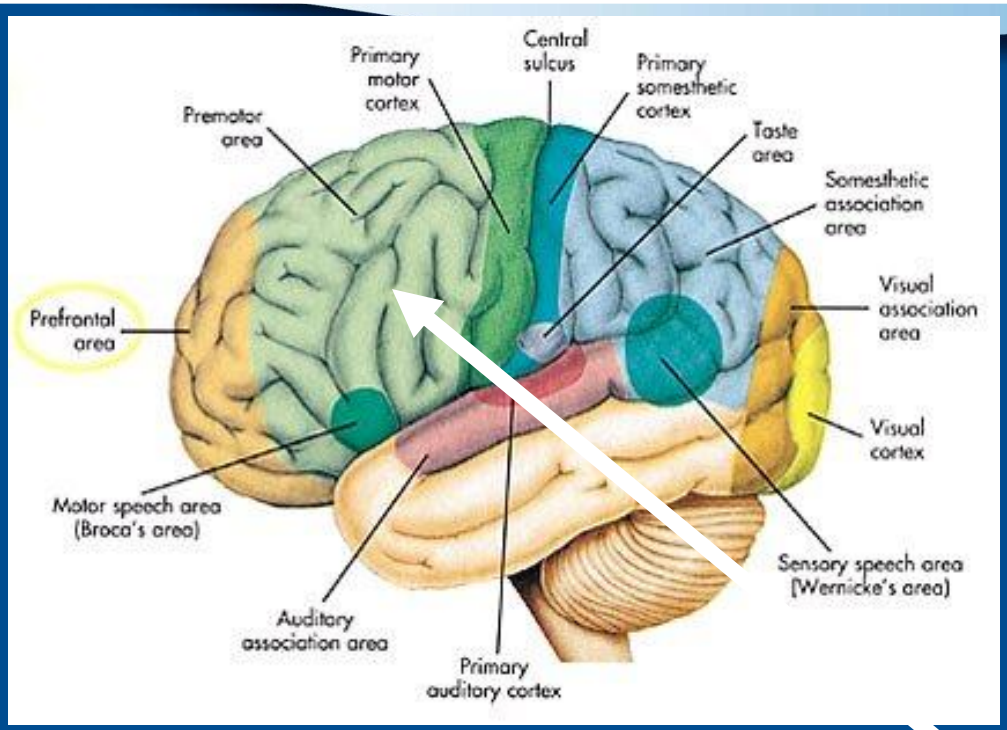
Strategic networks

Where do guidelines come from?

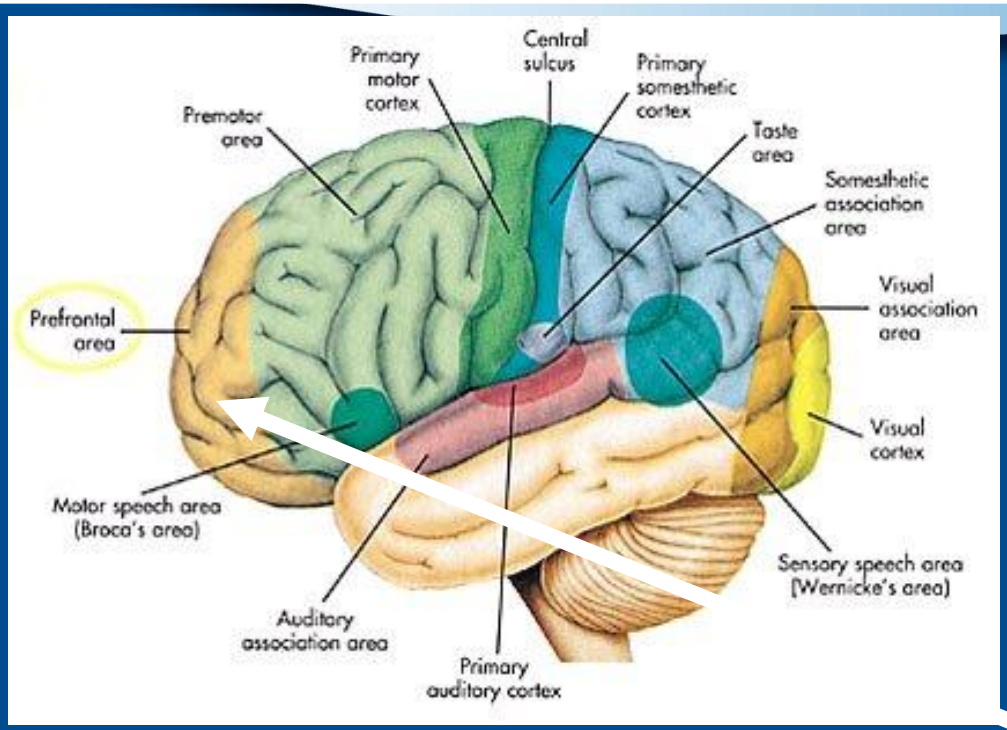
What goes into strategic action and expression?



Physical Actions or Movement



Skills and Fluency



Executive Functions

II. Expression

Use multiple means of expression

4. Provide options for physical action

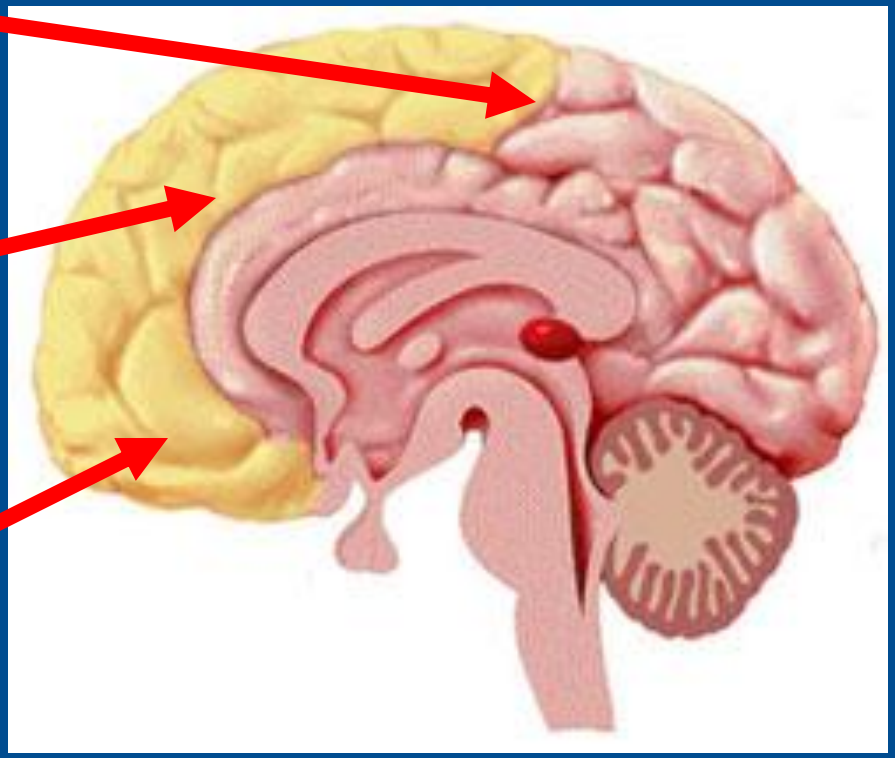
- Options in the mode of physical response
- Options in the means of navigation
- Options for accessing tools and assistive technologies

5. Provide options for expressive skills and fluency

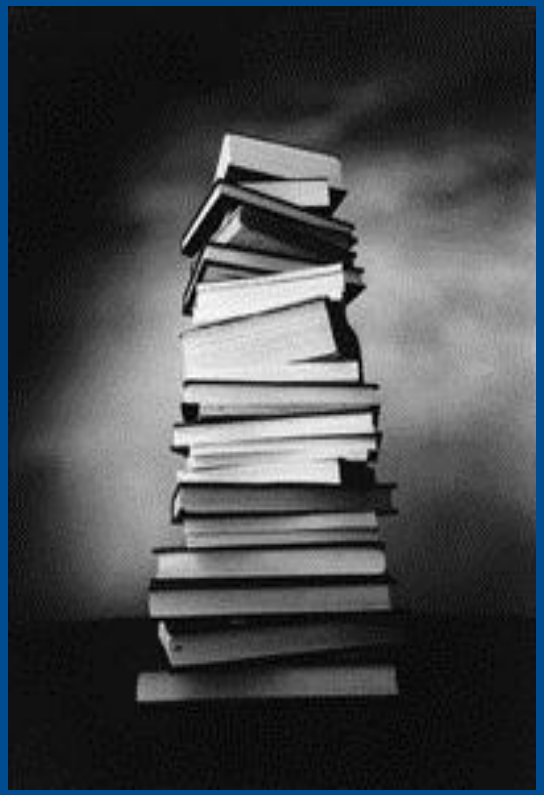
- Options in the media for communication
- Options in the tools for composition and problem solving
- Options in the scaffolds for practice and performance

6. Provide options for executive functions

- Options that guide effective goal-setting
- Options that support planning and strategy development
- Options that facilitate managing information and resources
- Options that enhance capacity for monitoring progress



As a framework for design



Print is too disabled as a medium to meet the challenge of diversity

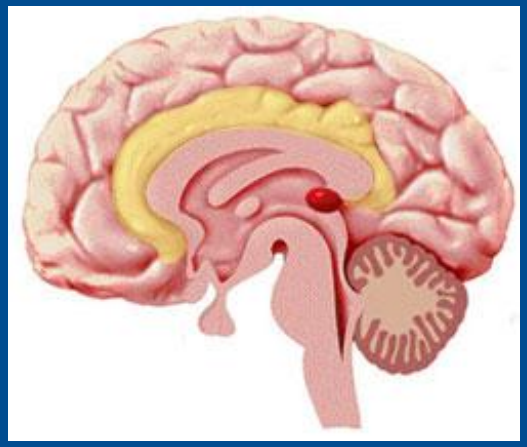
I. Representation

Use multiple means of representation

1. Provide options for perception
   - Options that customize the display of information
   - Options that provide alternatives for auditory information
   - Options that provide alternatives for visual information
2. Provide options for language and symbols
   - Options that define vocabulary and symbols
   - Options that clarify syntax and structure
   - Options for decoding text or mathematical notation
   - Options that promote cross-linguistic understanding
   - Options that illustrate key concepts non-linguistically
3. Provide options for comprehension
   - Options that provide or activate background knowledge
   - Options that highlight critical features, big ideas, and relationships
   - Options that guide information processing
   - Options that support memory and transfer

UDL

New media provides dynamic options for engagement and motivation



III. Engagement

Use multiple means of engagement

7. Provide options for recruiting interest

- Options that increase individual choice and autonomy
- Options that enhance relevance, value, and authenticity
- Options that reduce threats and distractions

8. Provide options for sustaining effort and persistence

- Options that heighten salience of goals and objectives
- Options that vary levels of challenge and support
- Options that foster collaboration and communication
- Options that increase mastery-oriented feedback

9. Provide options for self-regulation

- Options that guide personal goal-setting and expectations
- Options that scaffold coping skills and strategies
- Options that develop self-assessment and reflection

Multiple Means of Expression and Action

Examples:

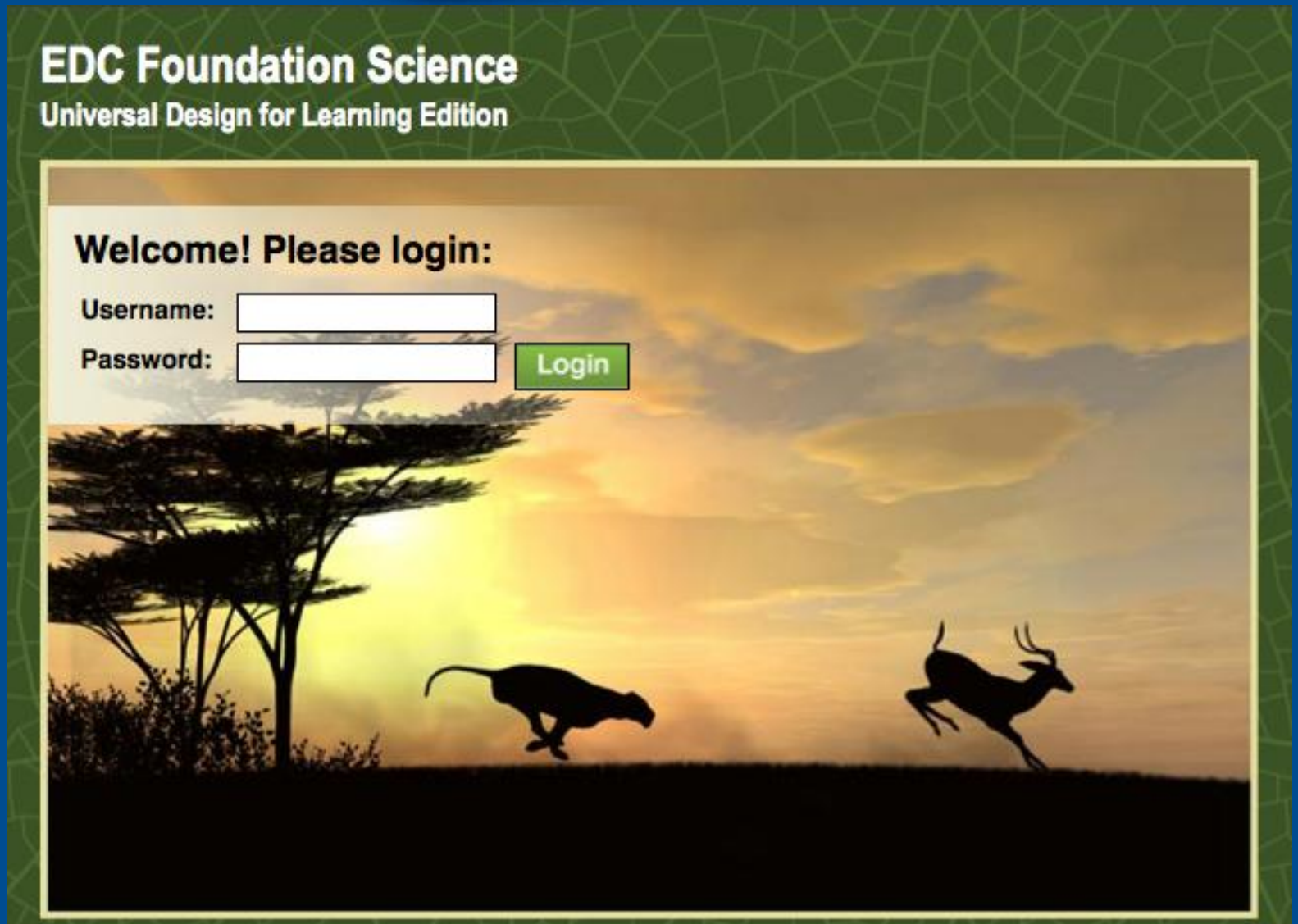
NSF's Science Writer

Carnegie's Strategy Tutor

Scholastic's Expert Space

Scholastic's Expert Space

Expert


EDC Foundation Science
Universal Design for Learning Edition
Welcome! Please login:
Username:
Password:
Login

UDL

Investigating and Questioning our World through Science and Technology
Universal Design for Learning Edition

Welcome! Please login:

Username:

Password:

Login

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University of Michigan EDC Center for Science Education CAST NSF

Foundation Science

Quick Flip: Go

Expand All | Collapse All

Not Finished ✔ Finished

listen

lookup

Student Training:

Learning Experience 1: Introduction: Stalking Nature's Pharmacy — The Search for Medicinal Plants

✔ Overview

CONSIDER

✔ Brainstorming: What do you already know about plants and the characteristics of life?

✔ Task: Living or Not?

What's the Story? Searching for the Shamans' Cures

INVESTIGATE

Challenge: Do common herbs or spices have the capacity to cure bacterial infections?

Reading: Some Like It Hot

Reading: Bacteria: Friend or Foe?

Activity: Hot and Spicy

Reading: Take Two Dandelions and Call Me in the Morning

Address the Challenge: Prepare your presentation

PROCESS

Share: Present to investors

Discuss: To search for medicinal plants or not

REVIEW & EXTEND

Amazon Tribes Fight Patent on Sacred Vine

Career: Veterinary Pharmacologist

Extending Ideas

Learning Experience 2: Simple Change, Unintended Consequences: Exploring Ecosystems

Class Message

Welcome to the start of the new year!!!!

Tags

★ ★★ ★★★ diagram evidence important interesting

Tag Options

» view as: **cloud** | list

» sort by: **alpha** | freq

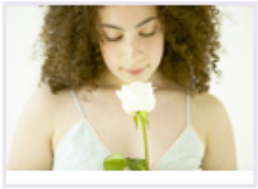
How Can I Smell Things From A Distance?

Open All | Close All

listen

lookup

- Lesson 1: Can you smell what I smell?
- **Lesson 2: What is similar among an odor, sugar, and milk?**



Activity 2.1: Can Something I Can't Feel Have Mass?
Go to page: 12

Reading 2.1: Can Something I Can't Feel Have Mass?
Go to page: 13 14 15 16

Reading 2.2: Why Do My Lungs Expand When I Breathe In Air?
Go to page: 17 18 19 20 21 22

Reading 2.3: Having No Scent Stinks
Go to page: 23

Homework 2.3: Mass and Volume
Go to page: 24

- Lesson 3: What must happen to matter so I can smell it?
- Lesson 4: How can we model the things gases do?
- Lesson 5: What makes the paper change color?
- Lesson 6: How do I know whether things that look the same really are the same?
- Lesson 7: What makes particles different?
- Lesson 8: What does it mean that "odors are in air"?
- Lesson 9: Why do substances have different odors?

Class Message

Welcome to Summer School! You all deserve the best.

Tags

Tag Options

» view as: **cloud** | list

» sort by: **alph** | frequency

Open All | Close All

Big Ideas

listen

highlight

lookup

What could air be made of if I can compress air?

Think of some other things that you can **compress**. You can squish foam balls, sponges, and bread so they have less volume. You can compress these objects because there are small spaces in the objects. Think about the bread you eat. You can see small holes in the bread. And, you can squish bread to make it smaller and smaller. When you squish it, the material that makes up the bread comes together and there are less spaces between the bread material. Bread can be a model of air. It can be compressed because of the small spaces. A piece of bread might help you explain why air can compress.

Give an example

Explain compression

Sponges can also be a model of air. Like bread, there are tiny spaces between the material that makes up the sponge. The tiny spaces allow sponges to be compressed. Do you think that what happens when you compress a sponge might also happen when you compress air?

iScience

Check it out, it's a great video for you and only you!

Stop and Think!

If you can compress things that have spaces in the material, then why might you be able to compress air? Could there be spaces in the material that makes up air? In the space below, explain whether you think there might be small spaces within air, and why.

Get Started | Check My Work

To answer the question above, click the Write, Draw, Record, or Upload button above.

My Questions

How can I Smell Things From a Distance?

- How does an odor get from the source to my nose?
- What makes one odor different from another?
- How can a material change so that you can smell it?
- This is my question in purple!?

+ Create New Question

My Tags: smell

My Notes

Open All | Close All

Reading: Living In the System

Big Ideas

The modern version of the periodic table that was first created by Mendeleev in 1869 is the most important document that is used by chemists. The following reading describes some of the information found in the modern periodic table of elements.

The periodic table is one of the most important chemistry references. Important information about the atoms of an element is shown in a box in the table. Information about the properties of each element is indicated by the arrangement of the elements in the table. Once you are familiar with the periodic table, you can use it to find out details about each element.

Updating Mendeleev's Table

Figure 3.5: The modern periodic table of elements.

Mendeleev's table was updated as chemists discovered more elements. Chemists tested these new elements to determine their properties. They tested whether each element reacted with other elements. They measured each element's hardness, ductility (ability to bend), solubility, melting point, boiling point, density, heat conductivity, and electrical conductivity. The observations of new elements confirmed Mendeleev's discovery that there were periodic trends relating to chemical and physical properties among many of the elements. The modern periodic table shown in **Figure 3.5** includes the new elements discovered since Mendeleev's time.

The moern table has many similarities to Mendeleev's table. The elements are placed so that elements with similar physical and chemical properties fall in the same column. The modern table also has rows called periods and columns called groups

What's Important?

Some other expandable area

Think About What You Read

1. List the different groups and categories within the periodic table that have elements with similar properties.

Get Started | Check My Work

To answer the question click the Write, Draw, Record, or Upload button above.

Page Highlights

main ideas
confusing
Save
Erase Highlights

Page Notes

Lorem Ipsum Dollar Sit Amor Gamut, Lorem Ipsum. Ipsum Dollar.
Edit | Copy to Notebook

Chapter 1 Go Page 2 of 24 Go Glossary How am I doing?

Monster of the Not So Deep - The Story of Lake Victoria

The story of Lake Victoria is the story of a rich and diverse ecosystem that is slowly dying. Located at the equator surrounded by Kenya, Tanzania, and Uganda, it is the second largest freshwater lake in the world, surpassed only by Lake Superior in the United States. Refer to Figure 2.1. As with many lakes, the water in Victoria temporarily collects there as it flows from rivers from higher ground surrounding the lake. Eventually, the water flows out of the lake via streams and rivers to the ocean. Although it is a shallow lake (with an average depth of 120 ft), it takes 123 years to flush and replace its waters completely because of its enormous size (250 miles long and 150 miles wide, about the size of Ireland) and the slow flow rates of the rivers feeding into and flowing out of it. Its warm temperatures (between 70° and 81°F) and alkaline pH (7.2 to 8.8) have made the lake a suitable habitat for many different kinds of organisms, including algae, zooplankton, shrimp, and many different kinds of fish, including catfish, sardines, tilapia, and a highly diverse group of small fish called cichlids. This rich source of fish has been the main source of protein for 30 million people living in the region.

However, in the past 20 years, the nature of the lake has been changing. In 1958, as the natural fish populations began to decline due to overfishing, a decision was made to introduce a new species of fish to the lake. In addition to providing a new source of protein, stocking the lake with the Nile perch—an aggressive fish that can grow to six feet and can weigh up to 200 pounds—provided a new sport fish for anglers anxious for a bigger challenge. Refer to Figure 2.2.

Highlighting Tips

Biotic components are the living things that are part of an ecosystem; abiotic components are the non-living things, like sunlight and temperature, that help the living things survive; an ecosystem is how the biotic and abiotic work together to create a particular place.

Hint

Model

Heat Map

View a heat map of what other readers have highlighted for:

- Abiotic components
- Biotic components

Abiotic

Biotic

Main Ideas

Erase

My Word Cards

This section introduced you to the new terms **predator/prey relationships**, **symbiotic relationships**, **mutualism**, **parasitism**, **food chain**, and **food web**. For each term, create a Word Card that shows your current understanding of the term.

To start a Word Card, click on the icon ( ) next to a word in the list below.

- Symbiotic relationships
- Mutualism
- Parasitism
- Predator/prey relationships
- Food chain
- Food web

Last Updated: Tuesday, January 20th, 12:12 PM

Symbiotic relationships

clownfishR.jpg Download File

Edit

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listen

lookup

Address the Challenge: Prepare your presentation

Big Ideas

You are now ready to address the challenge and prepare your presentation to investors using what you have learned about

- Mark Plotkin's work in the Amazon;
- the use of spices and herbs in different cultures;
- the efficacy of spices in inhibiting the growth of bacteria;
- the research to date on medicinal plants found in plants.

In this learning experience, you have explored the use of spices and herbs in other cultures, used modern microbiological techniques to determine the **bactericidal** (ability to kill bacteria) activity of certain spices, and learned about compounds in plants that are effective against human diseases. In this part of this learning experience, you will take on the role of a scientist preparing a presentation that will be used to seek funds to carry out research.

iScience

Video about reaching a conclusion.

Rate this video:

As a team of scientists, you and your group will prepare a five to seven minute presentation that provides investors with the following:

a. background on the use of spices and herbs in different cultures and current understandings about compounds from plants that are known to be effective against human diseases
b. your experimental data on the efficacy of certain spices in slowing down or inhibiting bacterial growth
c. a description of a new experiment or investigation that you propose to carry out with additional funding that would further investigate the medicinal value of different plants
d. a concluding statement as to why this work would merit funding

Complete the following two steps to prepare your presentation.

Page Highlights

Main Ideas | Save | Erase

Page Notes

To make a note about this page, click the Write, or Record button above.

A “grown up” example of UDL: IDA’s journal

Perspectives on Language and Literacy, Winter, 2010

What kinds of disabilities does your curriculum have?

1) Sensory and Perceptual Disabilities

Information presented in one modality only

Symbols and images are presented in one size

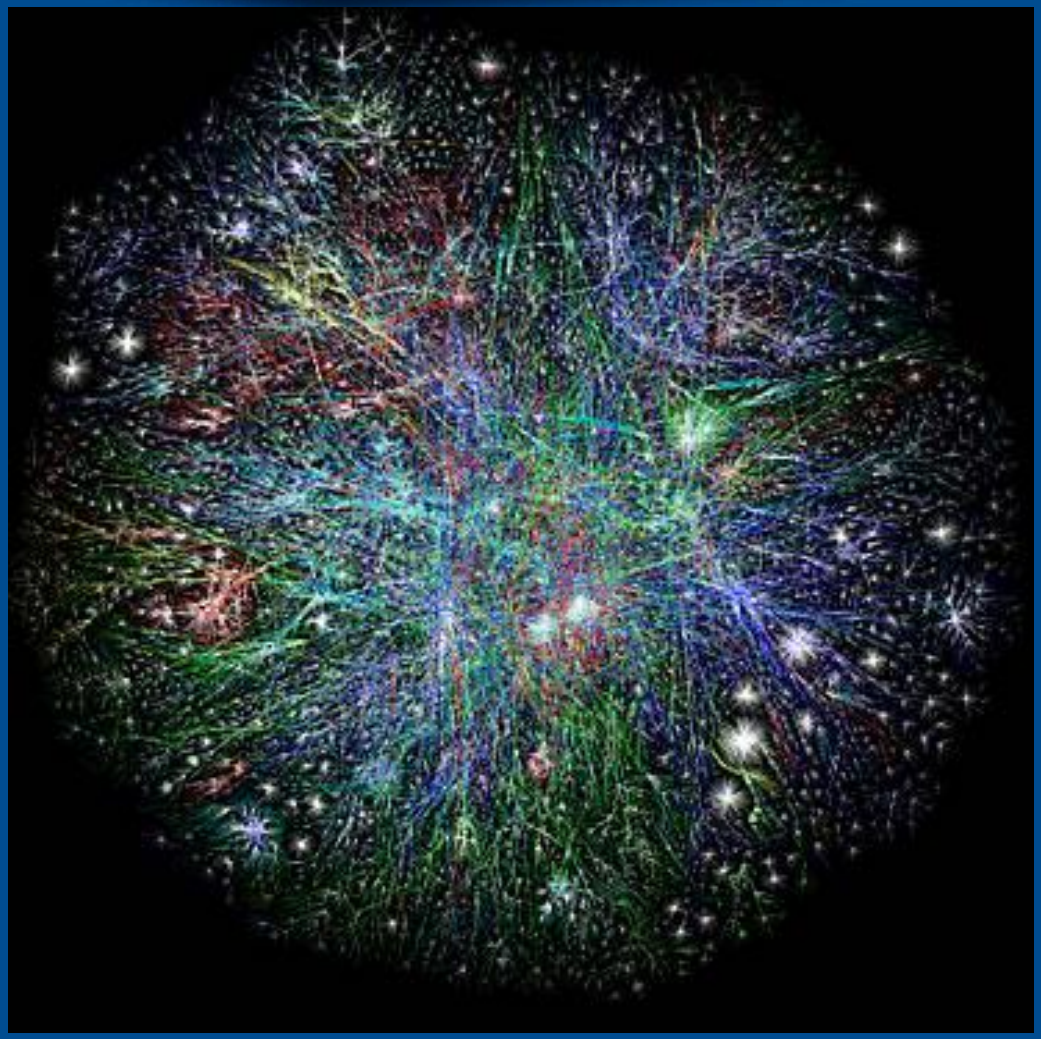
2) Language and Symbolic Disabilities

Information must be decoded

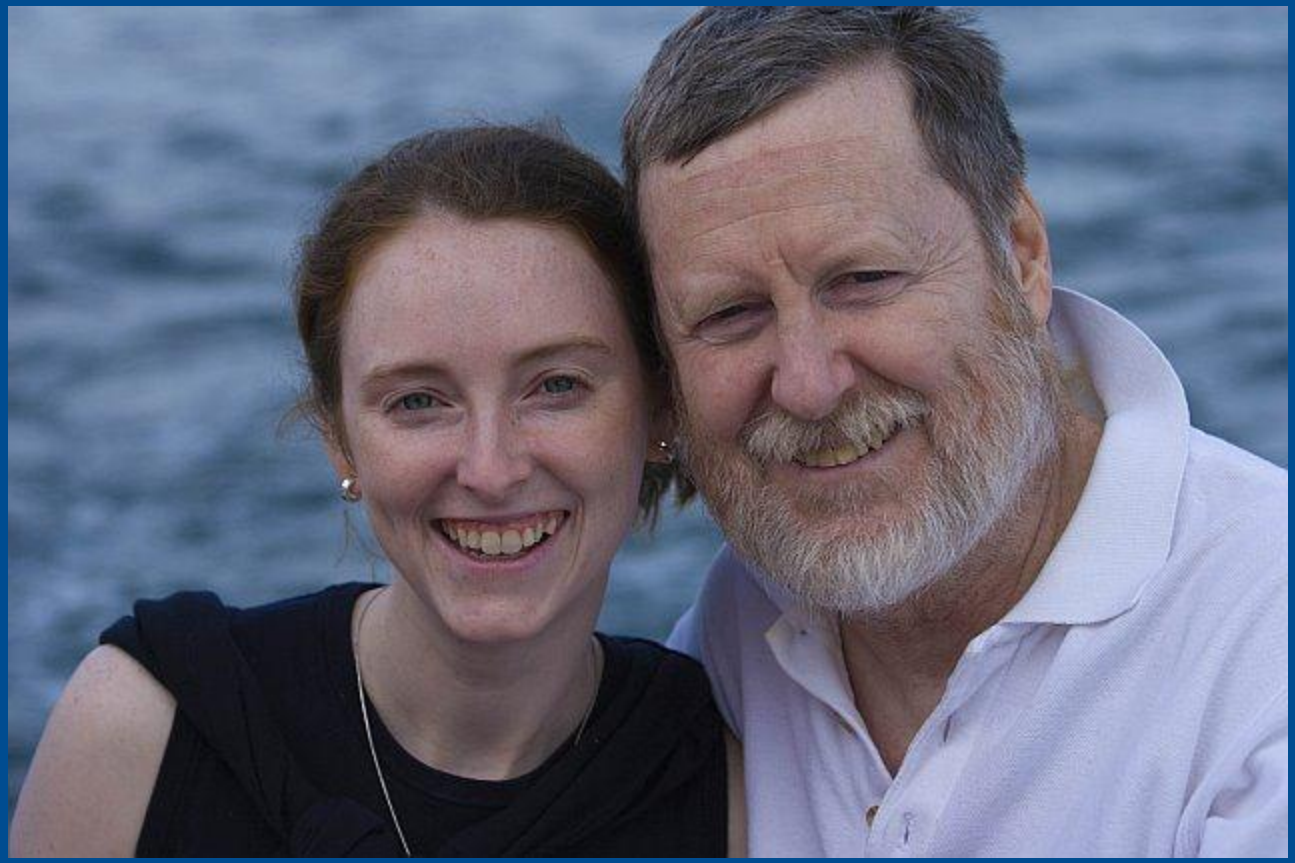
Requires prior knowledge of vocabulary

Disabilities in *who* they can assess

Disabled in *what* they can assess accurately and informatively



Disabled in how they prepare students for their future



Signs of Frustration, Signs of Hope

Janet Sloand

- Debby Holzapfle in the west
- Frank Irby in central
- Susan Gill in the east

National Center on Universal Design for Learning

National Center on Universal Design for Learning

UDL Task Force

UDL Implementation Resource Network

UDL in public policy

The Higher Education Opportunity Act of 2008

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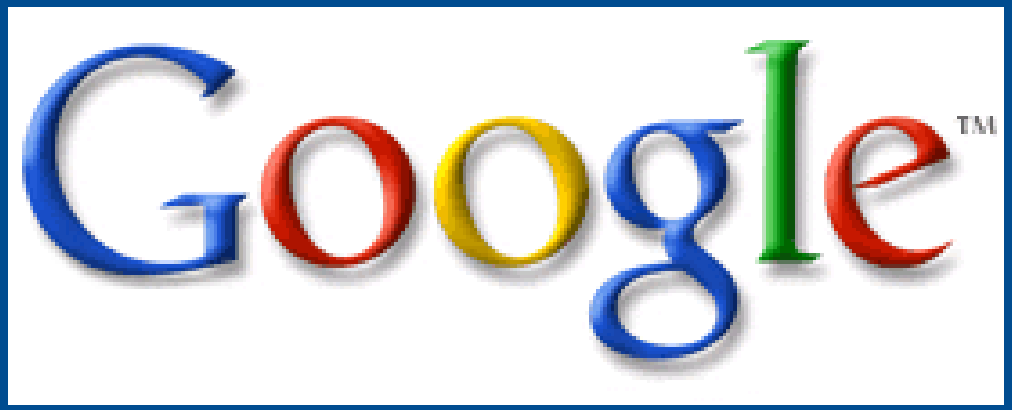
UDL in public policy

UDL in commercial networks



The UDL Task Force

General Education

American Federation of Teachers
National Education Association
National Association of Secondary School Principals
National School Boards Association
National Association of State Boards of Education
Council of Chief State School Officers
Association for Supervision and Curriculum Development (ASCD)

UDL in public policy

The UDL Task Force

Disability Organizations

American Foundation for the Blind
Easter Seals
Autistic Self-Advocacy Network
Learning Disabilities Association of America
National Center for Learning Disabilities, Inc
National Down Syndrome Congress Autistic
National Down Syndrome Society
National Center on Severe and Sensory Disabilities
TASH
The Advocacy Institute
The Arc of the United States
United Cerebral Palsy

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Special Education Organizations

National Association of State Directors of Special Education
Council of Administrators of Special Education, Inc.
Council for Exceptional Children
American Occupational Therapy Association
Association of Assistive Technology Act Programs
VSA arts

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The UDL Task Force

Higher Education Organizations

American Association of Colleges for Teacher Education
Higher Education Consortium for Special Education
Teacher Education Division of the Council for Exceptional Children
Association on Higher Education and Disability
Association of Teacher Educators

Why is this so hard,

even frustrating?

UDL

Because our schools are so disabled by their print disabilities.