

Inclusive Universal Design Applied to Introductory Geosciences Learning Spaces

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Accessible Poster Tutorial Comments In order to foster a more inclusive experience, this presentation attempts to be more accessible to all attending whether or not one identifies as being a Person with Disability (apparent and non apparent). If this was a printed poster, I would hang it at easy reading height split between wheelchair seated- to standing-level access and make a digital version available, as well. For this EER online digital event, this poster was built in PowerPoint* with careful attention to using high contrast and sans serif larger fonts. Further, the color palette selected is to better serve a wider range of visioned guests including those with Color Vision Deficiency. Content has been maximized for screen-reader use by both visioned (but may have a learning disability) and non visioned guests. Objects used in this slide have been ordered for logical screen-reader flow. In this case, to mimic the visual flow starting from the top left corner sweeping initially left to right, but then in each of the four graphical regions below from left to right then downward within each area before proceeding to the next one to the right. Hyperlinks are embedded into word or phrase using the link tool in the slide generator so those using a screen-reader do not have to listen to each character read separately (tedious). However, in the editable .pptx format one can hover the cursor over the word or phrase to access the full web address. Please note that a few alternative formats provided are from running this presentation through the Ally feature included within the Course Management System I can access through my institution. And be sure to ungroup objects ultimately to order for screen reader use. *Google Slides also has recommended accessible slide templates and accessibility checker.

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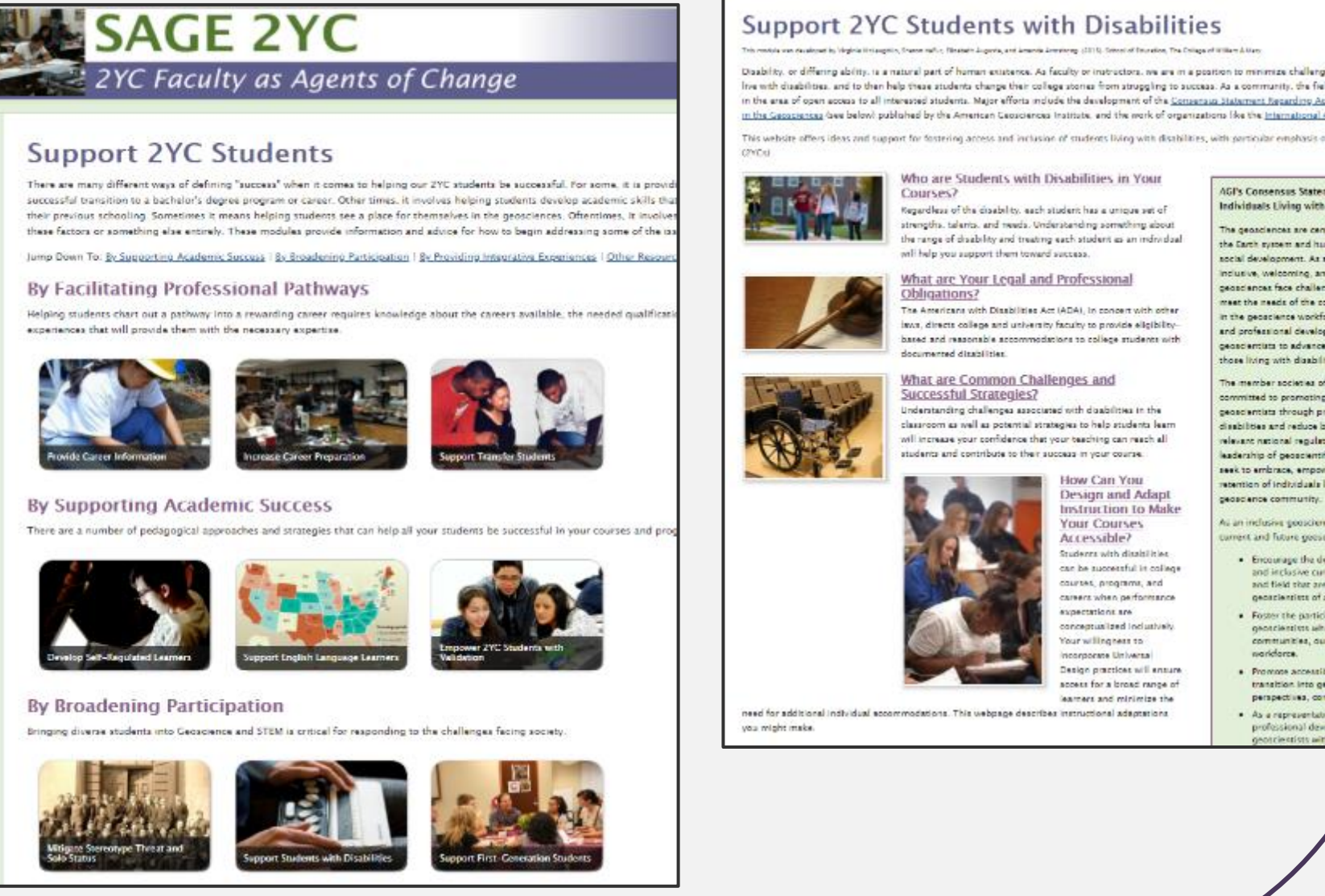
ABSTRACT

Overviews and generalized examples of how to apply Universal Design in Instruction (UDI) with embedded strategies to diminish barriers for Persons with Disabilities have been shared during earlier Earth Educator Rendezvous sessions (2017 and 2018) and through a recent NAGT Professional Webinar (28 April 2021) to promote better design for equity and inclusion in various STEM learning spaces. This poster includes a synopsis of strategies for apparent and non apparent disabilities and focus on several introductory geoscience activities modified and mapped to UDI guidelines addressing engagement, representation and action – expression. This is to provide discipline-specific examples designed for: (1) access through recruiting interest and providing options for perception and physical action; (2) building skills to sustain and persist; and (3) internalizing through self-regulation, comprehension and executive function. UDI reaches a wide range of learners and, additionally, is best modeled for pre-service teacher candidates also enrolled in general core introductory courses.

FROM ONE PRACTITIONER TO ANOTHER

I have been faculty with both 2YC and 4YCU institutions since ~1996, but it was when I was part of a UA-Little Rock cohort to learn and implement inclusive Universal Design techniques during the early 2000's that I began to deliberately use multi-modal delivery and student-centered learning strategies with my students. It is now my “way of doing” that incorporates pedagogical *best practices* (an example follows below from SAGE 2YC) which I have found to not only better engage all learning preferences and most persons with differing abilities. Holistic approach. Applying UDL makes me much better prepared as I meet new students every term with less and less real-time new accessibility accommodation adaptations needed. Please consider learning more overarching considerations from the 28 April 2021 NAGT Professional Webinar by myself and Sean Thatcher: [Inclusion through STEM Experiences](#) .

Another “go to” source of holistic approaches for student success is SAGE 2YC (focusing upon community college students, however much of this is applicable to a much broader range of students in my opinion.



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UNIVERSAL DESIGN PORTALS TO LAUNCH YOUR EFFORTS

Universal Design guidelines naturally include many of the suggested “best practices” for learner-centered instructions, such as use of *appropriate* :

- Visual and Auditory Media
- Tactile Representations
- Interpersonal Strategies and/or Learning Space Management
- Routines and Predictable Structure or Patterns to “Doing”
- Blended Instructional Techniques

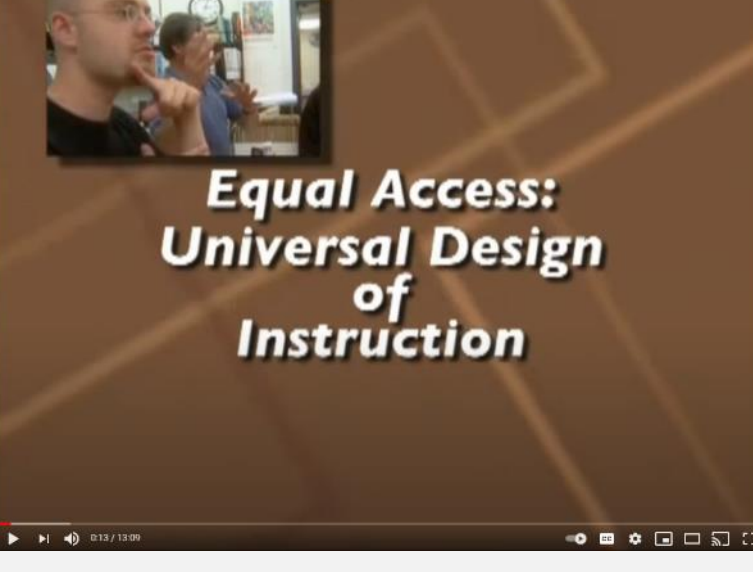
**Remembering that what is one person’s “appropriate” may be another person’s barrier...*

The two groups that I use frequently for guidance are:



For an overview of Universal Design for equal access and also about non apparent (invisible) disabilities in higher education, please access* the following two streaming videos from The DOIT Center. Note that various embedded accommodations are examples of closed captioning (CC) and more advanced but recommended scene narration / audio descriptions (which you may recognize available for your home use through entities such as Netflix and Amazon Prime, for instance.

[Equal Access:](#)
[Universal Design of Instruction](#)



[Invisible Disabilities and Postsecondary Education](#)



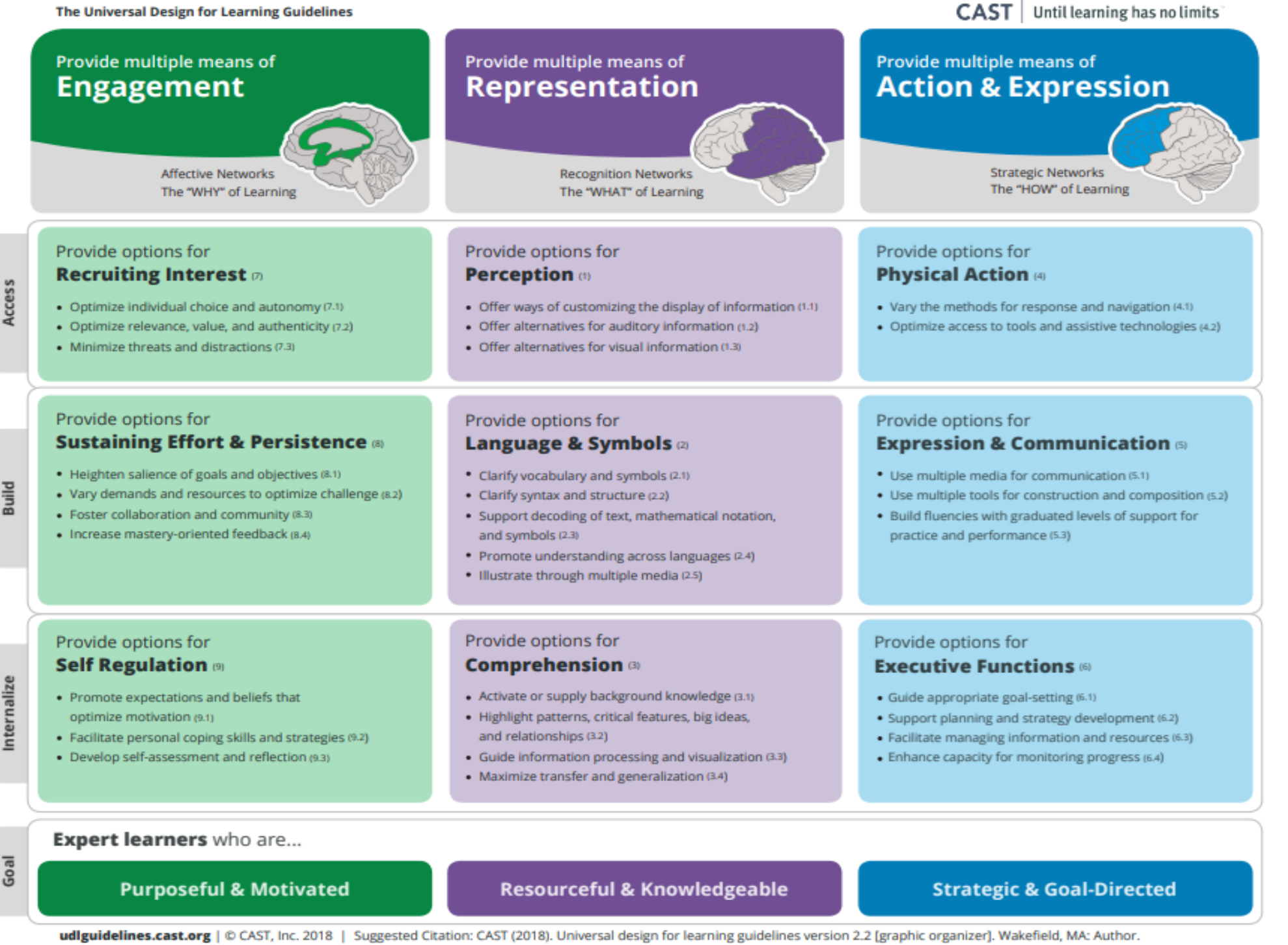
To learn more about *scene narration* (also referred to as *audio description*)...consider the Library of Congress National Library Service for the Blind and Print Disabled [Audio Description Resource Guide](#) .

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TAKING A CLOSER LOOK AT UDL GUIDELINES

Consider what you/we DO / CAN DO in learning spaces...

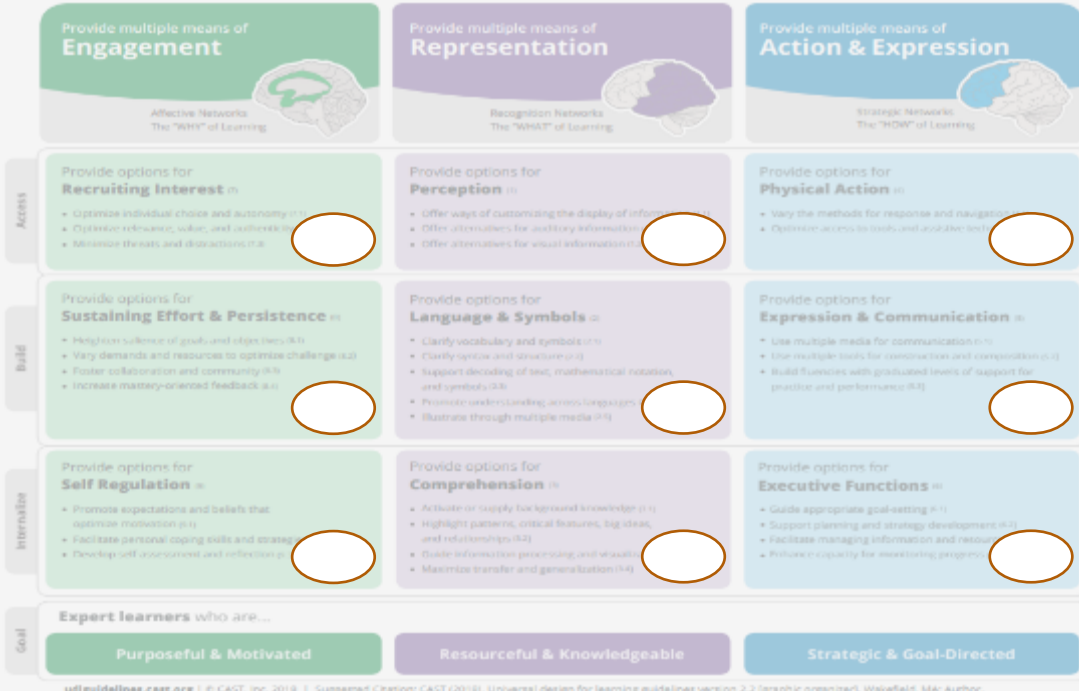
[CAST UDL GUIDELINES](#) (Interactive at their site.)



Many of the topics we encountered earlier at the SAGE 2YC Student Success site easily tie in to the holistic approaches in the above UDL Guidelines.

A quick sampling from the [Teach the Earth Portal](#) (filtered for Exemplary Activities then filtered for Geology) provides us with content to consider through the lens of Universal Design. I then selected a few activities appropriate for introductory geology courses that do have UD elements. As with any item, there are “spot on” aspects and ways to adopt and adapt to increase Universal Design and accessibility with respect to Persons with Disabilities. *NOTE: I want to thank each of the authors for submitting to the SERC site over the years . Your willingness to share to the broader community is IMMENSE!*

Please consider each link and **map** the letters to all **aspects** that you consider **addressing** the UDL matrix. **How can we adapt, as well?**



- A Taphonomy: Dead and Fossilized Board Game
- B Societal Implications of Climate Change: Stakeholder Report
- C Introduction to MATLAB for Oceanographic Data
- D Slicing Cylinders
- E Contour Mapping With Playdough

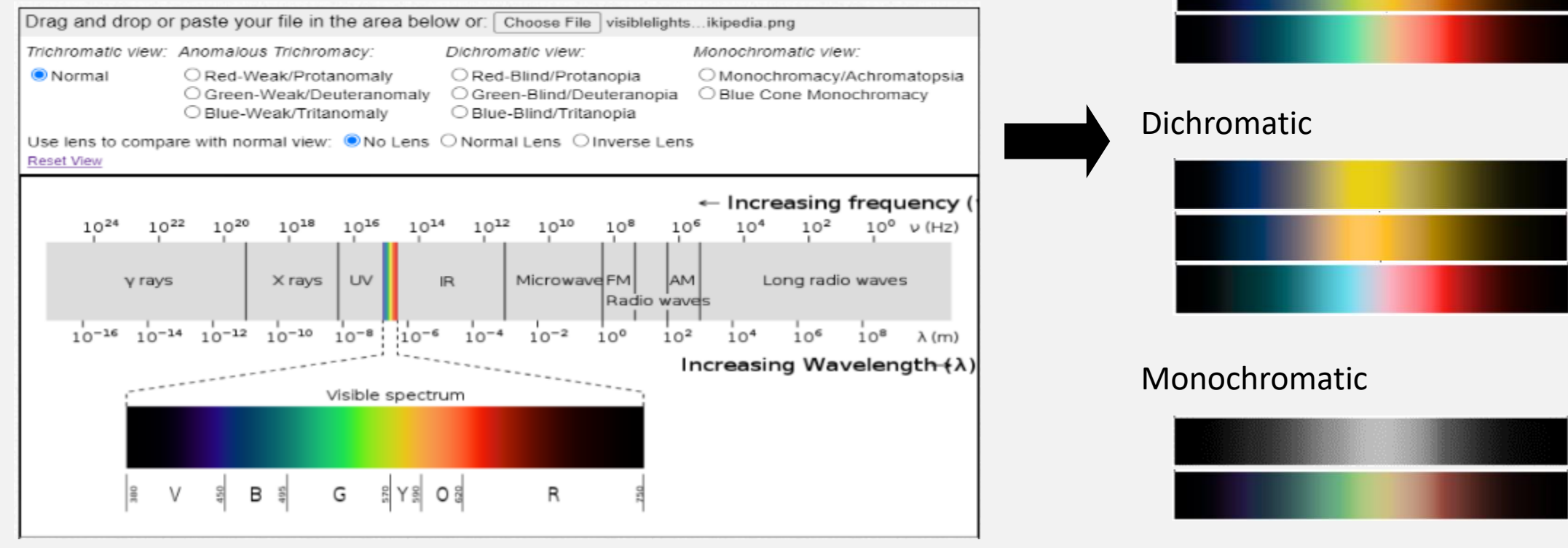
Also please **consider what adaptations would help address American with Disabilities Act (ADA) compliance using UDL strategies.**

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SOME ADDITIONAL CONSIDERATIONS

Here are some *things to think about that would help address American with Disabilities Act (ADA) compliance using UDL strategies.*

Basic background on Color Vision Deficiency (CVD modern term) and [Coblis color blindness simulator](#)



Is this familiar to you from geology?



On the right are examples of how “looks” to people with CVD (tri, di and mono). Please consider how color is used in our interactions. Ideas?

Avoid only conveying **key data** as **RGB color** palette. Use symbols, types of lines and distinct line weights to help visually discern. Provide objective description as Alt Tag, detailed figure caption, or in narrative for both visual and non visual (auditory with screen-reader) access.

If you work with web and application coding projects and/or consider adopting products to use in your learning and work environment, please follow these protocols or preferentially acquire only ADA compliant tools moving forward...

World Wide Web Consortium
[Making the Web Accessible](#)
[Web Accessibility Tutorials](#)



Also seek out mobile app accessibility. A primer to consider is a free eBook found at [UsableNet](#)

Please visit [28 April 2021 NAGT Webinar](#) for additional resources including articles.