# WCAG 101:

Accessibility for all

## WE WILL COVER

What’s accessibility?

Who cares?

How can you make the world a better place?

Examples and practice

# What’s accessibility?

## WHAT'S ACCESSIBILITY?

Accessibility is the practice of making our applications usable by as many people as possible.

## WHAT'S WCAG?

The Web Content Accessibility Guidelines (WCAG) provide a baseline, specific guidance, and strategies for serving people with a range of abilities. They detail how content, design, and technology must work in concert to provide an accessible experience to as many people as possible.

Always refer to **https://www.w3.org/WAI** for the latest guidance and up-to-date guidelines.

## Everyone should meet WCAG Level AA success criteria

All visual artifacts designed and/or code developed will meet Web Content Accessibility Guidelines Level AA success criteria (defined at https://www.w3.org/WAI), unless client instructs in writing to bypass the guidelines.

Who cares?

# WE ALL CARE, BECAUSE WE ALL BENEFIT

## Easier to read

- Clear information hierarchy
- Multiple affordances for understanding visual information
- High contrast, legible fonts with appropriate line spacing make content easier to read in variable conditions (sun, dark, glare, etc.)
- Writing to an 8th grade reading level means our content can be understood by a greater audience

## Easier to navigate

- Clear information hierarchy
- Helps with tabbing order
- Increased speed to keyboard access
- Easier to interact on mobile while walking / holding other objects

# WE ALL CARE, BECAUSE WE ALL BENEFIT

## Smoother experience

- Helps our sites load faster
- More consistent across numerous web browsers
- Increased device portability

## Graceful degradation

Content will still be accessible even if JavaScript and CSS are disabled due to WCAG 2.0 AA information hierarchy.

# WE DO THIS FOR OUR CLIENTS AND OUR AUDIENCE

## Reaching a broader audience

As the population ages, many people acquire a disability, and yet do not identify as a “person with a disability.” In countries with life expectancies of over 70 years of age, people spend 11.5% of their lifespan living with a disability.

Accessibility can make it easier for people to find a website, access it, and use it successfully. Not only for people with different abilities, but also for many others with special needs or who are using special hardware or software. Having an accessible website means giving equal to access the content or the services offered, increasing effectiveness, and thus increasing potential customers and audience.

## Designing for assistive technology

Most assistive technologies for people with motor challenges either work through the keyboard, or emulate the functionality of the keyboard. Knowing this, we can focus on making content accessible to the keyboard, and ensure that the site is navigable with as few keystrokes as possible.

## Reducing costs

Increased accessibility contributes to cost savings when it is integrated into existing and ongoing development cycles. Technology updates and redesigns that include accessibility along with other best practices have demonstrated reduced costs for maintenance and service.

# AND, WE ARE LEGALLY BOUND TO CARE

It’s worth noting that the number of accessibility-related lawsuits is still climbing in the USA. Globally, the following acts and initiatives help to govern accessibility requirements:

- Americans with Disabilities Act (ADA) – USA
- Equality Act - UK
- Accessibilità – Italy
- Disability Discrimination Act – Australia
- Federal Ordinance on Barrier-Free Information - Germany

How can you make the world a better place?

# FOLLOW BEST PRACTICES

## Web Accessibility Initiative

- Created by World Wide Web Consortium (W3C) in 1997
- Designing for Inclusion
- People with disabilities
- Older People
- Mobile Accessibility established in 2001
- Web Content Accessibility Guidelines (WCAG)
- Currently at version 2.1
- Levels of compliance are A, AA, AAA (Full)

# WCAG PRINCIPLES

## Perceivable

Make sure users can recognize and use your service with the senses that are available to them.

## Operable

Make sure users can find and use your content, regardless of how they choose to access it (for example, using a keyboard or voice commands.

## Understandable

Make sure people can understand your content and how the service works.

## Robust

Make sure your content can be interpreted reliably by a wide variety of user agents (including reasonably outdated, current and anticipated browsers and assistive technologies).

# PERCEIVABLE

- Include ALT tags and photography descriptions
- Provide transcripts/captions and audio descriptions for video and audio
- Make sure content can be read if stylesheets are turned off
- Do not use color as only means to explain something
- Test color contrast ratio
- Provide visual focus indication for keyboard focus
- Inform non-visual users of dynamic content updating

# OPERABLE

- Write headings and labels that are descriptive and organize the content
- Make sure everything works with a keyboard
- Provide skip navigation links
- Write links and buttons to ensure that users know where a CTA will take them
- Make webpages appear and operate in predictable ways
  - Consistent look and behaviors that are predictable
  - Do not override default browser functions
  - On Focus: when any component receives focus it does not initiate change of context
  - On Input: changing the setting of any user interface component does not cause change of context unless the user is notified

# UNDERSTANDABLE

- Use clear language
- Keep sentences short
- Do not use phrases that people won’t recognize
- Avoid the use of abbreviations and acronyms
- Make sure all forms fields have labels
- Avoid “see above / below,” which does not apply to some people with visual impairments
- Use a tool such as readable.com to ensure your copy is within the reading comprehension requirements

# ROBUST

- Use valid HTML so user agents, including assistive technologies, can accurately interpret and parse content
- Make sure your code lets assistive technologies know what every feature is for, and what state it’s currently in
- Keep a comprehensive browser matrix to test against

# Accessibility ≠ Limitation

Accessible principles can push design to its most elegant and simple essence

# UNIVERSAL DESIGN = A BETTER WORLD

"The concept of designing all products and the built environment to be aesthetic and **usable to the greatest extent possible by everyone**, regardless of their age, ability, or status in life."

— Ronald Mace

Becoming comfortable with the principles of accessibility has many benefits. Among them, a more empathetic approach to Universal Design. This means:

- Understanding how people with different abilities access our sites and apps
- Knowing the source and reason for the guidelines, so that we can develop appropriate work-arounds, especially as technology evolves
- Making the guidelines more relatable, which in turn makes them easier to remember, and a more natural part of the design process

# Examples and practice

# WHAT DIFFERENT ABILITIES DO WE NEED TO BE AWARE OF?

We are all unique, with varying needs and abilities. For learning purposes, our audience can be roughly grouped into people with different:

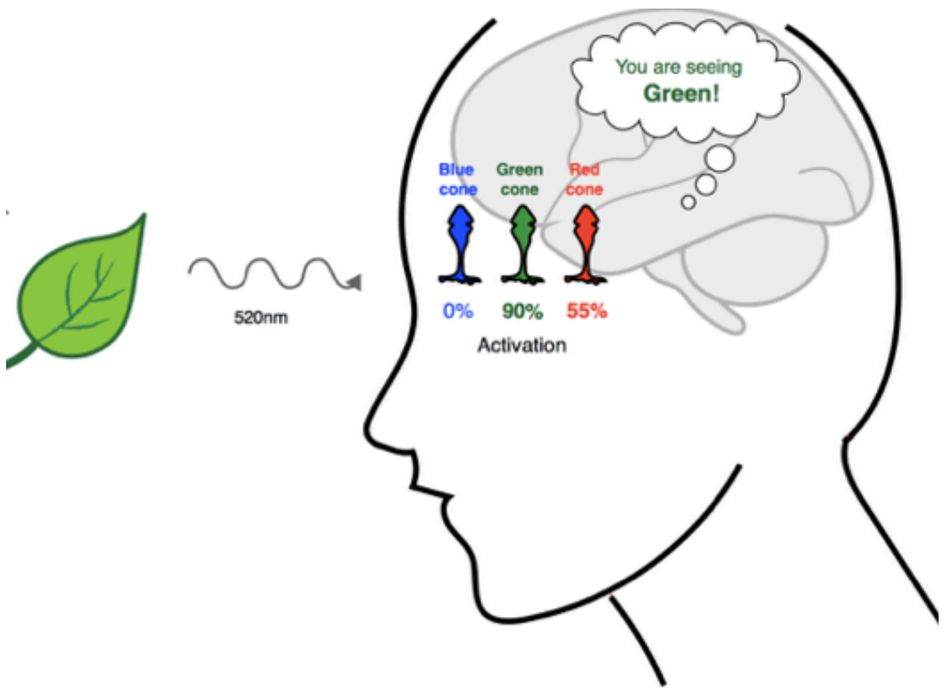
- Visual impairments
- Motor impairments
- Cognitive disabilities
- Hearing disabilities

Always refer to **https://www.w3.org/WAI** for the latest guidance and up-to-date guidelines.

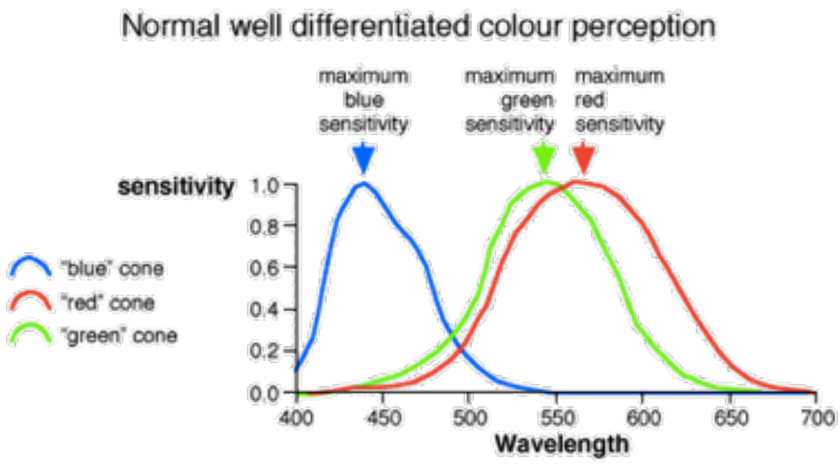
Color blindness

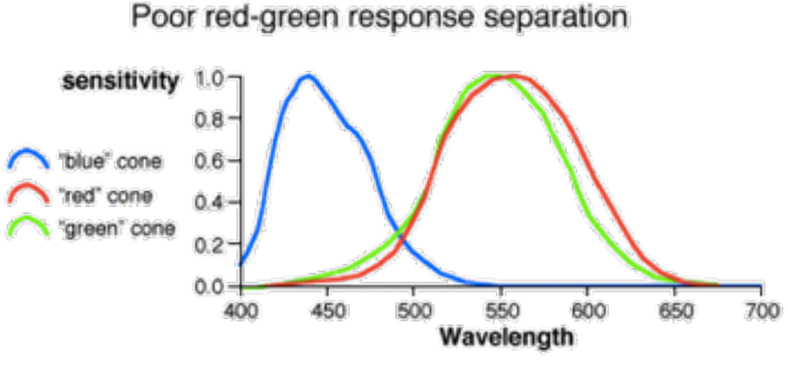
# WHAT IS COLOR BLINDNESS?

Blue, green and red receptor cones in our eyes perceive their respective color's light. Combined, they create the color spectrum.




A color-blind user has one type of cone that does not work properly or is missing.



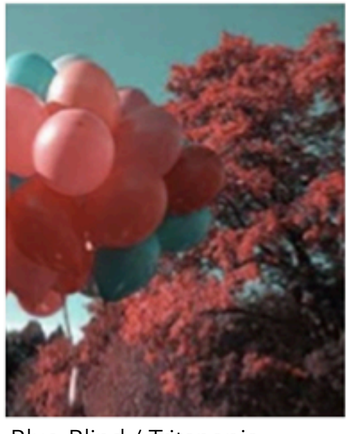



# TYPES OF COLOR BLINDNESS

Normal Vision

Red-Blind / Protanopia

Green-Blind / Deuteranopia



Blue-Blind / Tritanopia

Monochromacy / Achromatopsia

Red-Weak / Protanomaly

Green-Weak / Deuteranomaly

Blue-Weak / Tritanomaly

# ACCESSIBILITY CONSIDERATIONS

- Use a simulator to check for problematic color combinations
- Avoid red or green on dark backgrounds and vice-versa
- Make sure data visualizations can be understood without color and in color-blindness simulations
- Don’t rely on color alone as an indicator

# ACCESSIBILITY CONSIDERATIONS


https://www.color-blindness.com/coblis-color-blindness-simulator/

# BENEFITS OF DESIGNING FOR COLOR BLINDNESS

- Forces more readable color combinations
- Allows multiple affordances for understanding visual information

Legal blindness

# WHAT IS LEGAL BLINDNESS?

This person may not be completely without vision, but cannot rely on vision for daily tasks such as reading, driving, and manipulating visual interfaces and objects.

# ACCESSIBILITY CONSIDERATIONS

- All interactions need to be operable by keyboard: trackpads / touch / mouse may not be available
- Touch targets for smartphone devices need to be large enough for touch navigation
- Strong information hierarchy
- Non-visual affordances for interaction and understanding
- Media with elements that are purely visual need to be accompanied by a transcript / audio description
- Content should be able to be read using a screen reader

# ACCESSIBILITY CONSIDERATIONS


https://www.youtube.com/watch?v=dEbI5jvLKGQ

# BENEFITS OF DESIGNING FOR LEGAL BLINDNESS

- Graceful degrading (old browsers, slow speeds)
- Tabbing order / fast keyboard access
- Enforces clear information hierarchy

Other vision impairments

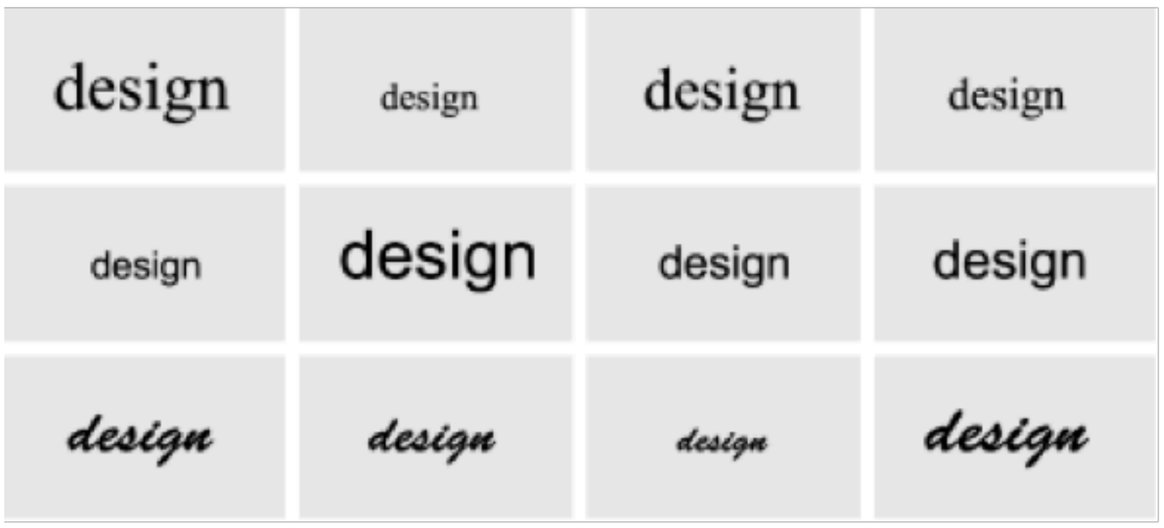
# WHAT ARE OTHER VISION IMPAIRMENTS?

Ways vision can be affected:

- Visual acuity
- Contrast sensitivity
- Color perception
  (see previous section on color blindness)
- Usable visual field
- Glare

# VISUAL ACUITY

This affects the ability to see fine details of objects. Sometimes, but not always, correctable with glasses/contacts  (e.g. macular degeneration).




# CONTRAST SENSITIVITY

This affects the ability to discriminate between different brightness levels.

# USABLE VISUAL FIELD

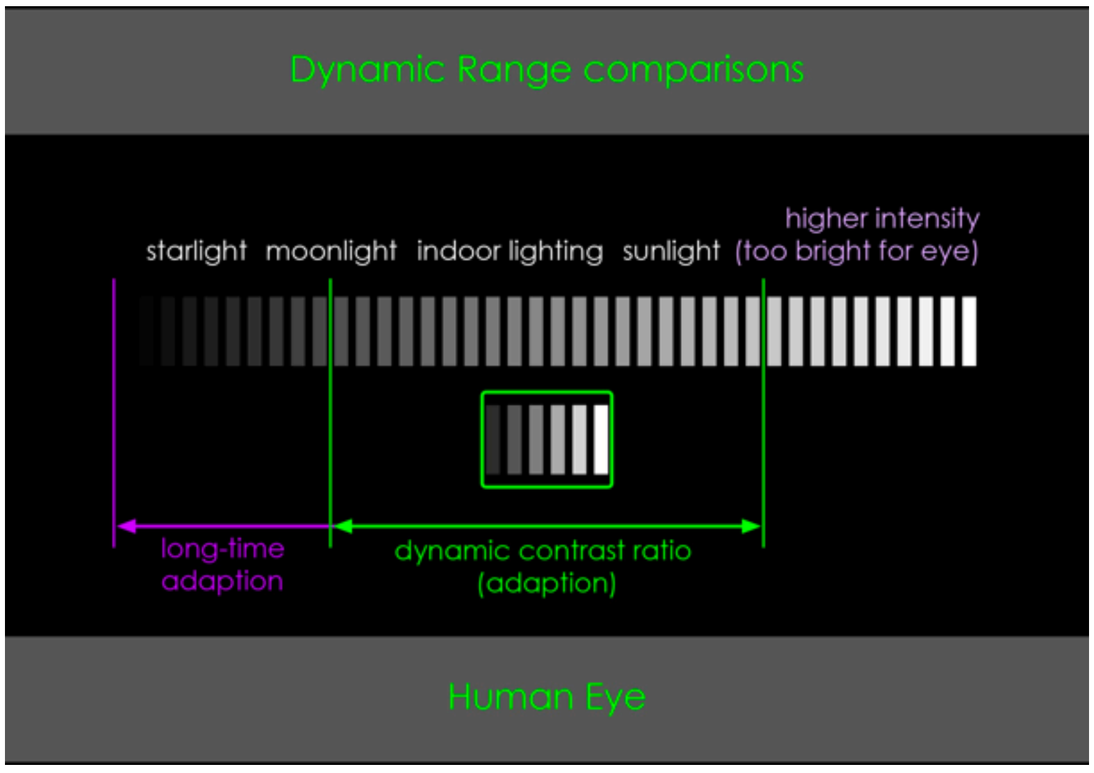
This affects the ability to use the whole of the visual field to perceive detail in the area being looked at and / or the ability to see the surrounding area.


Area being looked at


Surrounding area

# GLARE

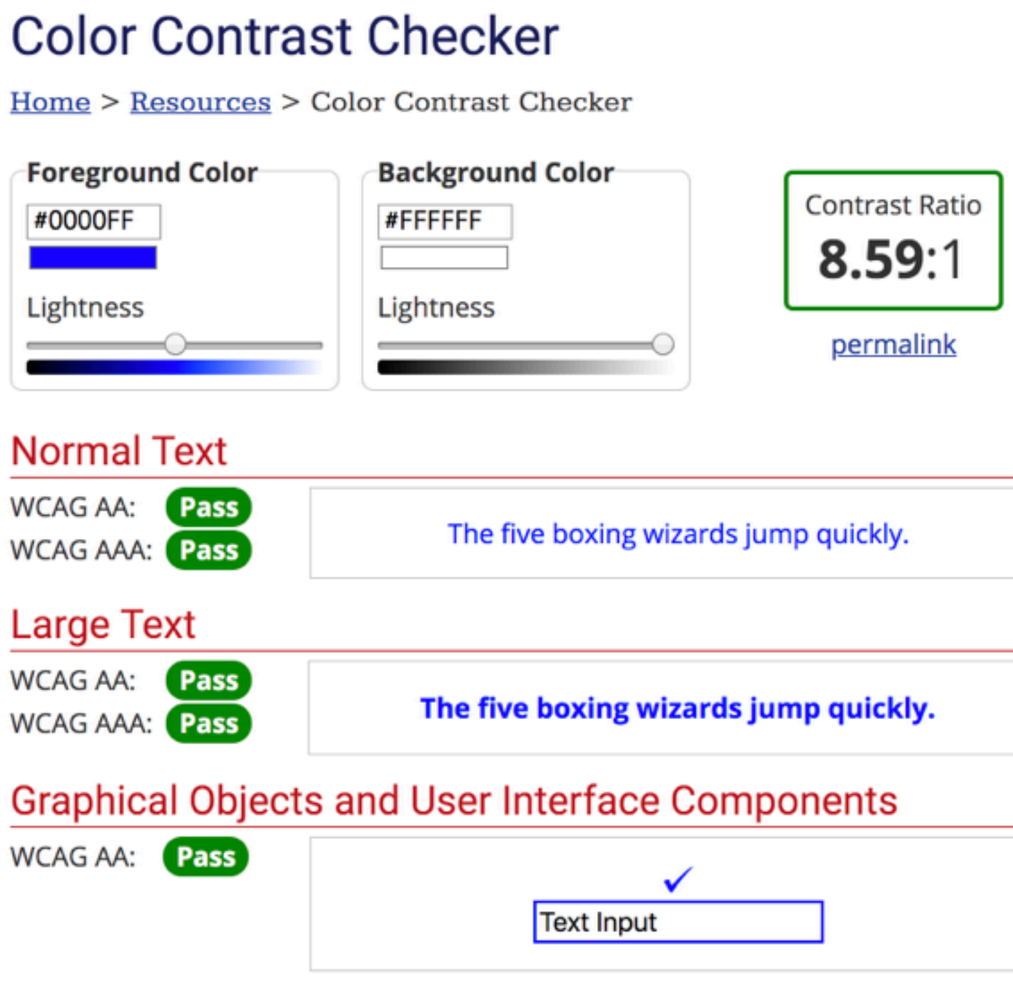
Eyes can take time to adjust to different light levels, so we need to take into account the dynamic range of the human eye as applied to digital screens. This is a prime example of how we all benefit from awareness of accessible design principles.



# ACCESSIBILITY CONSIDERATIONS

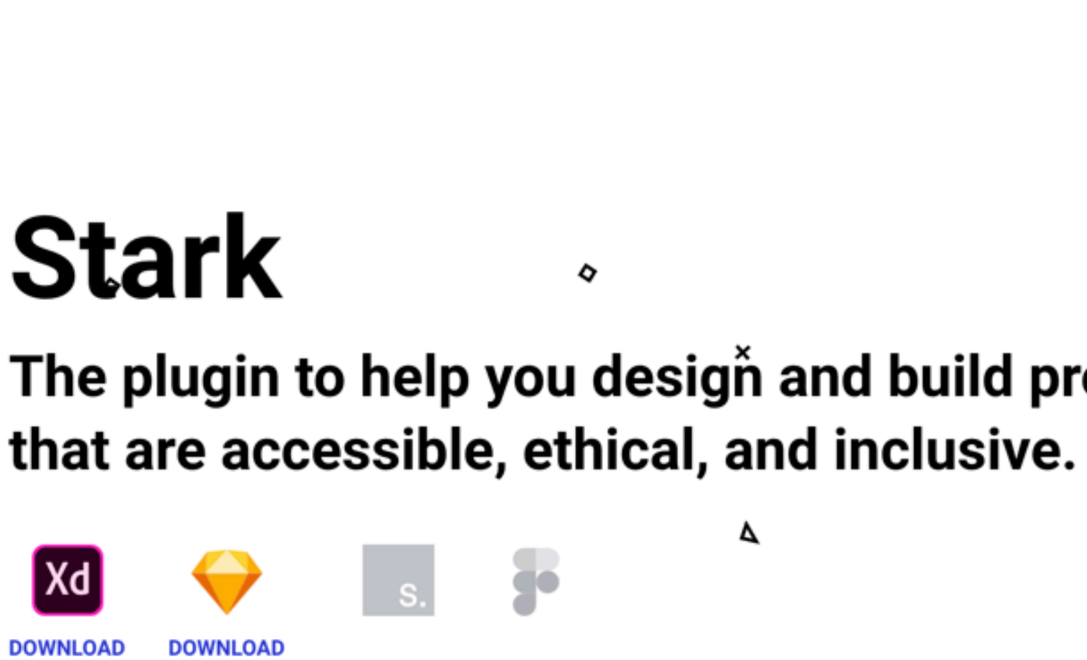
- Consider multiple viewport sizes
- Ensure contrast ratio between page elements and their background are high enough for readability
- Consider legibility of font choices and spacing
- Accommodate for potential of text resizing within the visual layout
- Avoid images of text (except for elements such as logos)

# ACCESSIBILITY CONSIDERATIONS

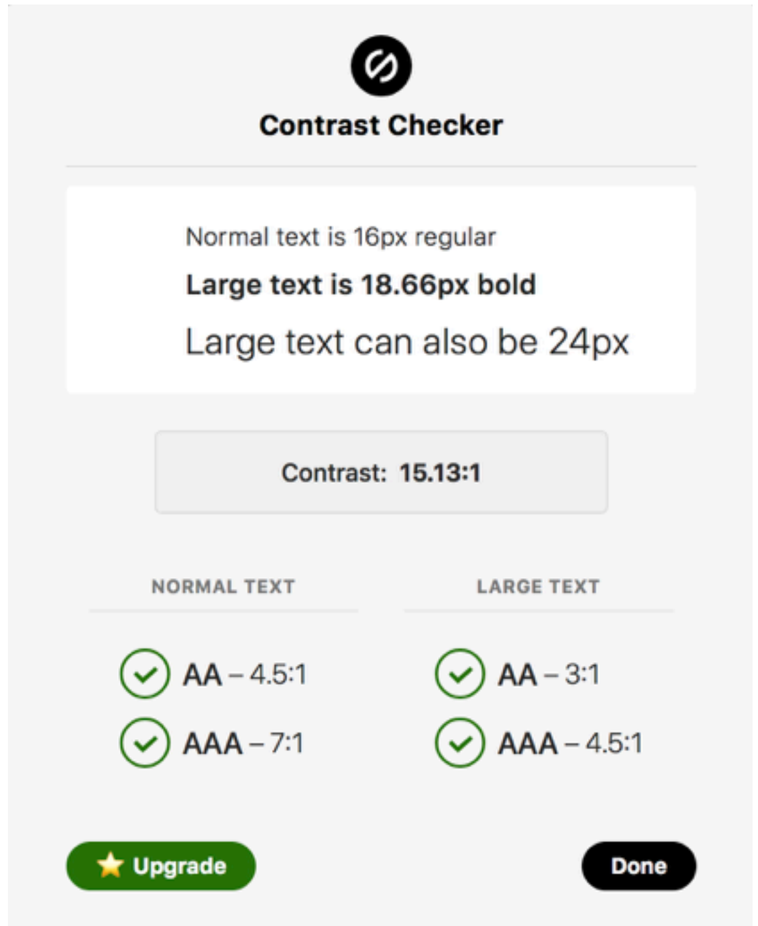



https://webaim.org/resources/contrastchecker/

# ACCESSIBILITY CONSIDERATIONS




https://getstark.co/



# BENEFITS OF DESIGNING FOR VISION PROBLEMS

- Device portability
- High contrast, legible fonts, appropriate line spacing makes pages easier to read in different conditions (sun, dark, glare, etc.)
- Clearer visual hierarchy makes pages easier to use

Motor disabilities

# WHAT ARE MOTOR DISABILITIES?

Conditions that make it impossible or difficult to use limbs for daily tasks.

Users may not be able to use their hands for mousing or touch surfaces with much degree of accuracy – or at all. Causes can include:

- Paralysis
- Tremors
- Arthritis
- Cerebral Palsy

# HOW DOES SOMEONE WITH A MOTOR DISABILITY ACCESS THE WEB?

People with motor disabilities use many devices to access the internet. They can include:

- Mouth sticks
- Head  wands
- Single-switch access
- Sip and puff switches
- Adaptive keyboards
- Eye tracking
- Voice recognition software

# MOUTH STICKS AND HEAD WANDS

Due to its simplicity and low cost, the mouth stick is one of the most popular assistive technologies. Someone with no use of the hands could use a mouth stick to type or manipulate a trackball mouse. Head wands are very similar in function to mouth sticks, where a person moves their head to make the head wand type characters or navigate.

# SINGLE-SWITCH ACCESS & SIP AND PUFF SWITCHES

People who have very limited mobility use this type of device. The clicking action is usually interpreted by special software on the computer, allowing the person to navigate, and it uses auto-complete functionality to facilitate typing. Sip and puff switches interpret the person's breath actions as on/off signals.

# ADAPTIVE KEYBOARDS

In cases where a person does not have reliable muscle control for precision movements, an adaptive keyboard can be useful. Some adaptive keyboards have raised areas in between the keys, rather than lowered areas, to allow the person to first place the hand down on the keyboard, then slide the finger into the correct key.

# EYE TRACKING

Eye tracking devices can be a powerful alternative for individuals with no control, or only limited control, over their hand movements. The device follows the movement of the eyes, and allows the person to navigate through the web with only eye movements.

# VOICE RECOGNITION

Software that allows a person to control the computer by speaking. This is another example of how accessible design leads to universal benefits.

# ACCESSIBILITY CONSIDERATIONS

- Avoid complex interaction and mechanisms that can’t be operated without fine motor control (this includes rollover menus, touch target sizes, etc.)
- Mechanisms and navigation should be navigable purely by keyboard
- Saved steps and pre-filled information saves work for users with motor impairments
- Consider the number of links and items on a page

# BENEFITS OF DESIGNING FOR MOTOR DISABILITIES

- Walking / holding other objects while using your smartphone
- Keyboard navigation is faster than clicking in certain circumstances, e.g. forms
- Auto-complete for faster input
- Voice commands for alternate navigation

Cognitive disabilities

# WHAT ARE COGNITIVE DISABILITIES?

Cognitive disabilities as they relate to accessible design include:

- Attention / distractibility
- Reading comprehension
- Seizures
- General interaction
- And other cognitive disabilities

# ATTENTION / DISTRACTIBILITY

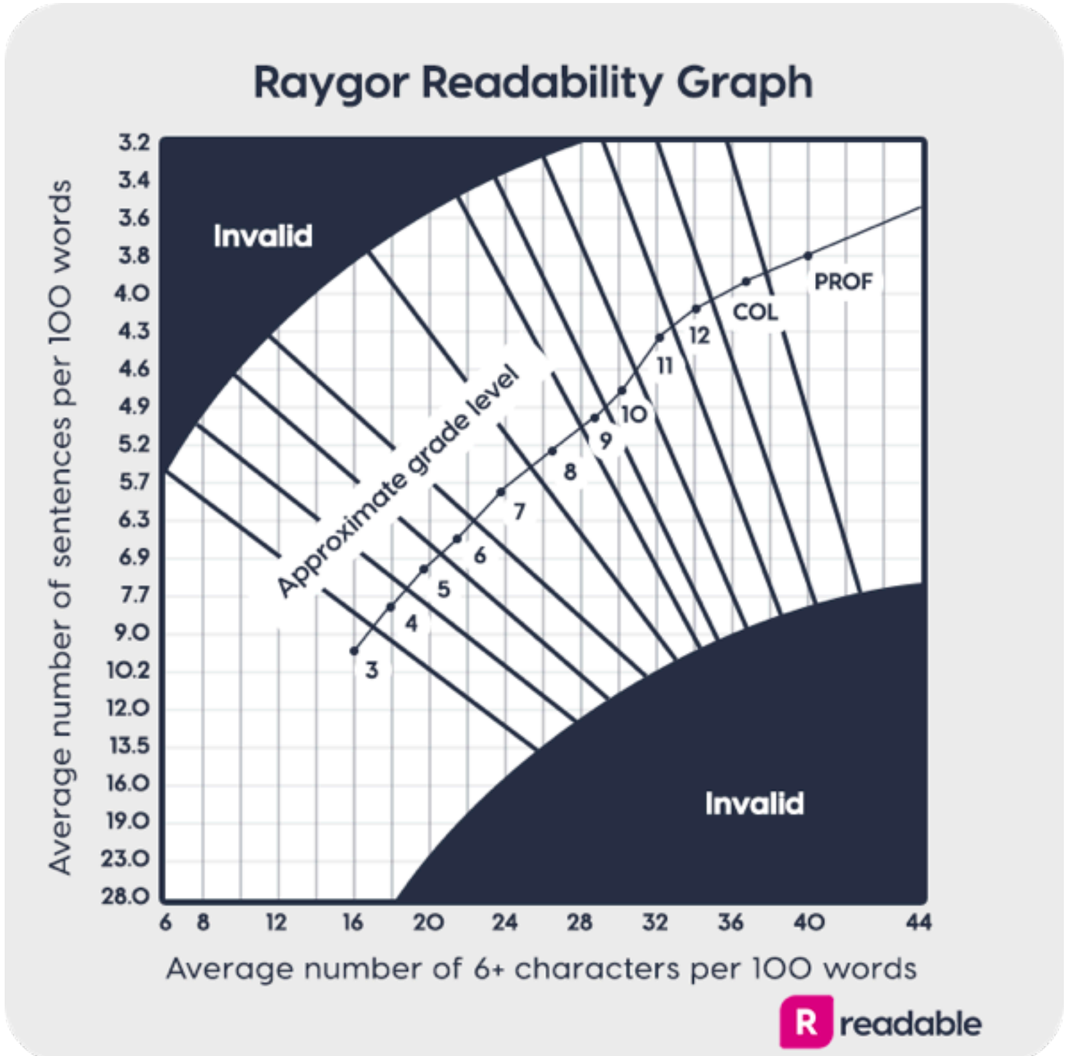
Looping animations or videos that can’t be hidden or paused can distract some people, so much so that your page becomes unusable.

# READING COMPREHENSION

President Obama signed the Plain Writing Act on October 13, 2010. The law requires that federal agencies use "clear Government communication that the public can understand and use.”

WCAG Guidelines suggest no higher than “lower secondary level reading comprehension.” Use a tool such as readable.com to ensure your copy is within the reading comprehension requirements.

# READING COMPREHENSION

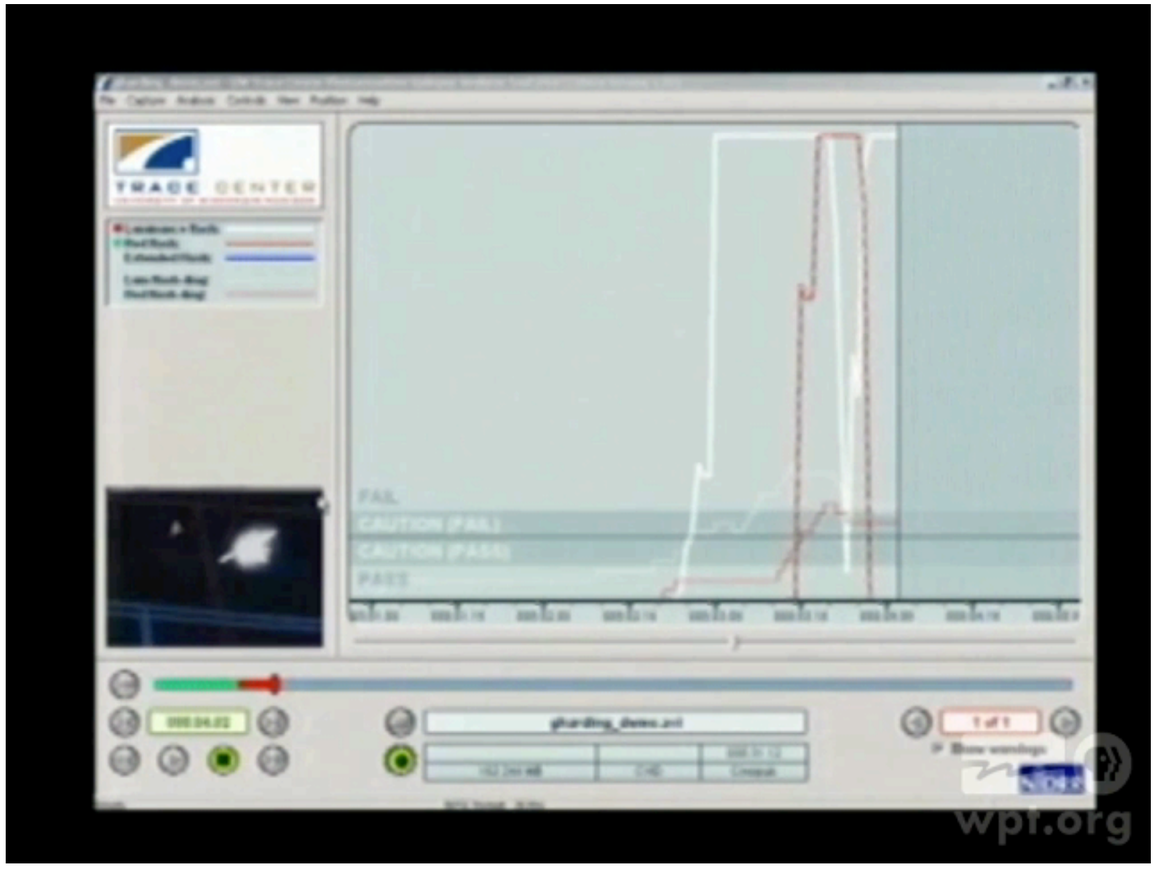



https://readable.com/

# SEIZURES

In general, if content flashes more than three times per second, is notably large, or has bright contrast in the flashes, it may cause a seizure and should be avoided.

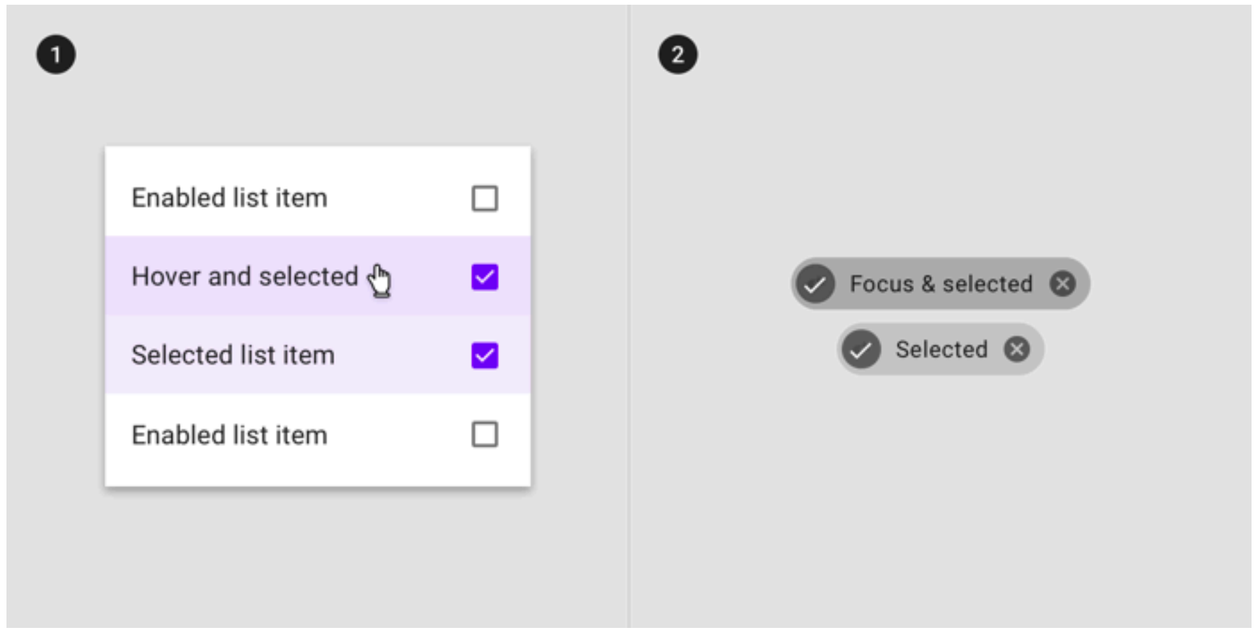
# SEIZURES




https://trace.umd.edu/peat

# GENRAL INTERACTION

Interface mechanisms that show responses to interactions and inputs provide valuable feedback to users. This feedback can be visual, audible, and / or haptic.



# OTHER COGNITIVE DISABILITIES

Environmental and lifestyle factors are all thought to influence cognitive health. These factors can include health problems, brain injuries, medication, lack of physical activity, poor diet, smoking, drinking alcohol, sleep problems, or even driving.

# ACCESSIBILITY CONSIDERATIONS

- Highlight changes and alerts
- Provide interaction feedback
- Avoid overly complex interactions and processes
- Utilize templates and common patterns
- Avoid looping animations and distractions
- Test animations / videos with flashing elements
- Use clear, common language, and test the reading comprehension level
- Create a hierarchy of information

# BENEFITS OF DESIGNING FOR COGNITIVE DISABILITIES

- Simple and clear interfaces help the user easily find the information they need
- Clear and understandable content make calls to action more effective and concise
- Familiar design approaches help to reduce errors and mistakes
- Items like breadcrumbs can help orientate the user and help the user restore the context when lost

Hearing disabilities

# WHAT ARE HEARING DISABILITIES?

A hearing impairment is a hearing loss that prevents a person from totally receiving sounds through the ear. This includes:

- Conductive hearing loss
- Perceptive deafness
- Crackling tinnitus
- Whistling tinnitus
- Loud noises, listening to music, etc.

# HOW DOES SOMEONE WITH A HEARING DISABILITY ACCESS THE WEB?

There are several ways we can support people with hearing disabilities. These include implementing Closed Captions, Transcripts, ASL Interpretations, and visual alternatives to alert sounds (e.g. flashes, highlighting, etc.).

# ACCESSIBILITY CONSIDERATIONS

- Alert sounds need alternative visual approach
- Media players need volume controls
- Media players need to provide options to adjust the text size and colors for captions
- Content that is only accessible in audio format, or video with audio needs to be transcribed and / or captioned

# BENEFITS OF DESIGNING FOR HEARING DISABILITIES

- Transcripts are available, when you don’t want to watch a whole video, and provide people a way to consume your content in a quiet or loud space (without needing headphones)
- Transcripts improve SEO
- Transcripts improve comprehension and retention of media content for all users
- Captioning makes it easier for non-native speakers to comprehend your message

# Responsibilities

# RESPONSIBILITIES

**Designer** - The starting point of accessibility. Incorporates universal design throughout projects. Knows what tools to use and uses all available to check accessibility. Designs with accessibility in mind while understanding client needs.

- Ensure contrast ratio meets industry standards
- Ensure color combinations meet industry standards
- Font sizes and legibility are met
- Page/content hierarchy is understandable
- Amount of content is assessed and is as simple as possible
- Collaborate with other team members to ensure highest standards are met

# RESPONSIBILITIES

**Creative director** - needs to know all accessibility guidelines and ensures all design and copy are doing their due diligence in ensuring guidelines are met.

- Intimate knowledge of what accessibility is and how it applies to the project.
- Deep understanding of each discipline’s role.
- Calls out instances that should be checked against guidelines.
- Ensures consistency throughout project.

# RESPONSIBILITIES

**Copywriter** - The starting point when it comes to content. Incorporates universal design principals throughout. Knows what tools to use and uses all available to check accessibility. Writes with accessibility in mind while understanding client needs.

- Uses clear language
- Writes to appropriate language level
- Considers content hierarchy
- Keeps it short and simple when appropriate
- Avoid acronyms and other forms of communication that people might not understand
- Writes ALT tags for images as needed

# RESPONSIBILITIES

**UX** - Incorporates universal design throughout projects. Understands client needs. Considers content hierarchy throughout while keeping consistency in the experience

- Considers content hierarchy
- Simplification of information and pages
- Structure
- Ensure application interactions are consistent across experience

# RESPONSIBILITIES

**PM** - Brings awareness to the team. Understands what level of accessibility guidelines we are adhering to (if different from our standard AA). Follows up with team to make sure standards have been met.

- High level overview of what accessibility is
- General understanding of each discipline’s role.
- Ensure contract has appropriate language for accessibility

# RESPONSIBILITIES

**Technologists** - Knows what tools to use and uses all available to check accessibility. Codes with accessibility in mind while understanding client needs.

- Reviews design and flags any accessibility concerns
- Uses proper semantic code
- Ensures all images have alt tags
- Makes sure content hierarchy makes sense
- Ensures tabbing order throughout project
- Uses necessary skip links
- Ensures video and audio have appropriate captions/.transcripts/descriptions

# RESPONSIBILITIES

**QA** - Knows what tools to use and uses all available to check accessibility. Understands client needs. Keeps broad set of devices for testing,

- Checks designs and flags any accessibility concerns
- Checks all images have alt tags
- Checks content hierarchy
- Checks tabbing order works
- Checks necessary skip links are present
- Checks video and audio have appropriate captions/.transcripts/descriptions
- Tests with screen readers
- Tests in high contrast mode

Following these guidelines will make content accessible to a wider range of people with disabilities, including blindness and low vision, deafness and hearing loss, learning disabilities, cognitive limitations, limited movement, speech disabilities, photosensitivity and combinations of these.

**Following these guidelines will also often make your Web content more usable to users in general.**