Improving Accessibility in Books

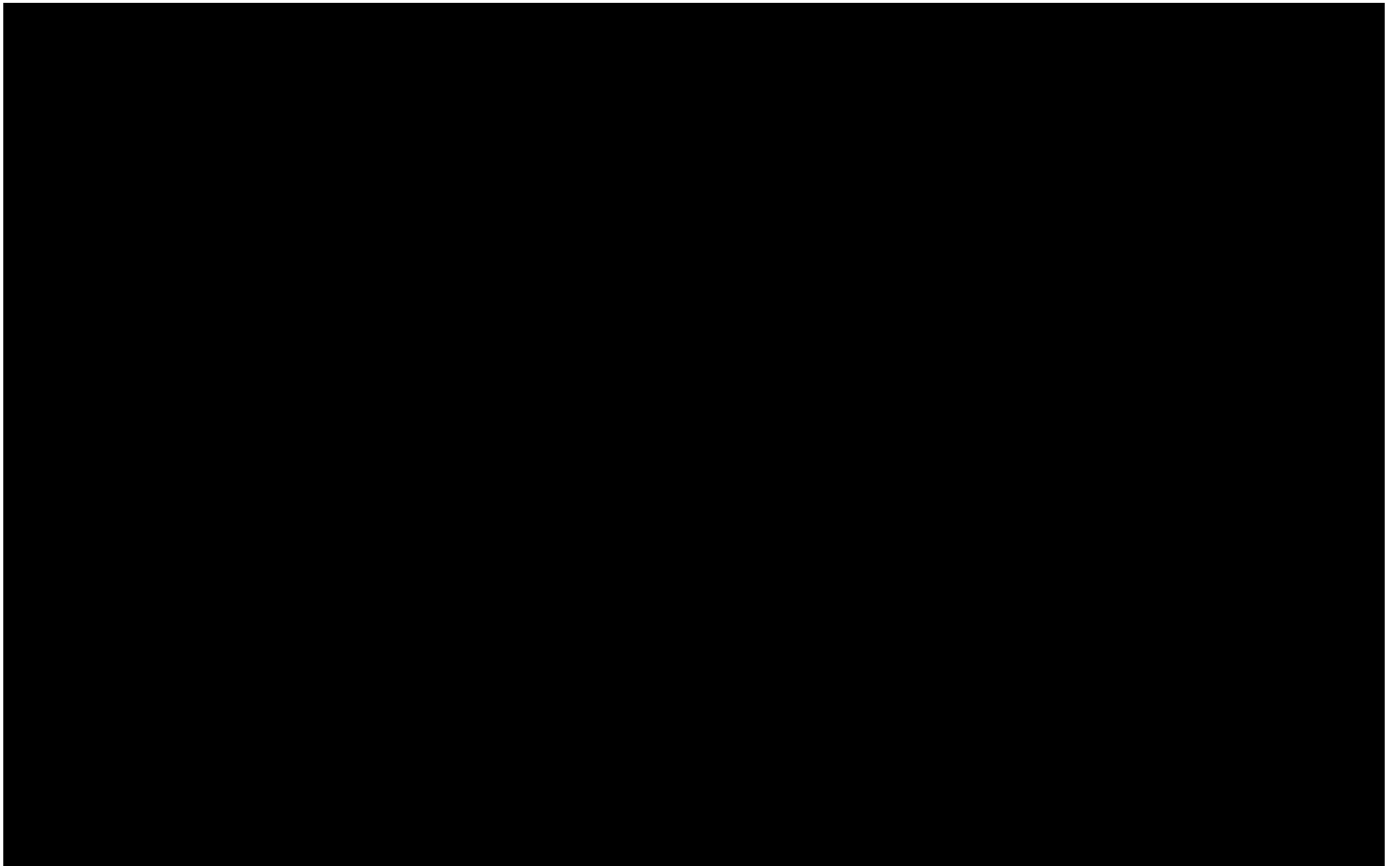
Session 518

James Craig
Apple Accessibility Engineering

These are confidential sessions—please refrain from streaming, blogging, or taking pictures

What Is Accessibility?

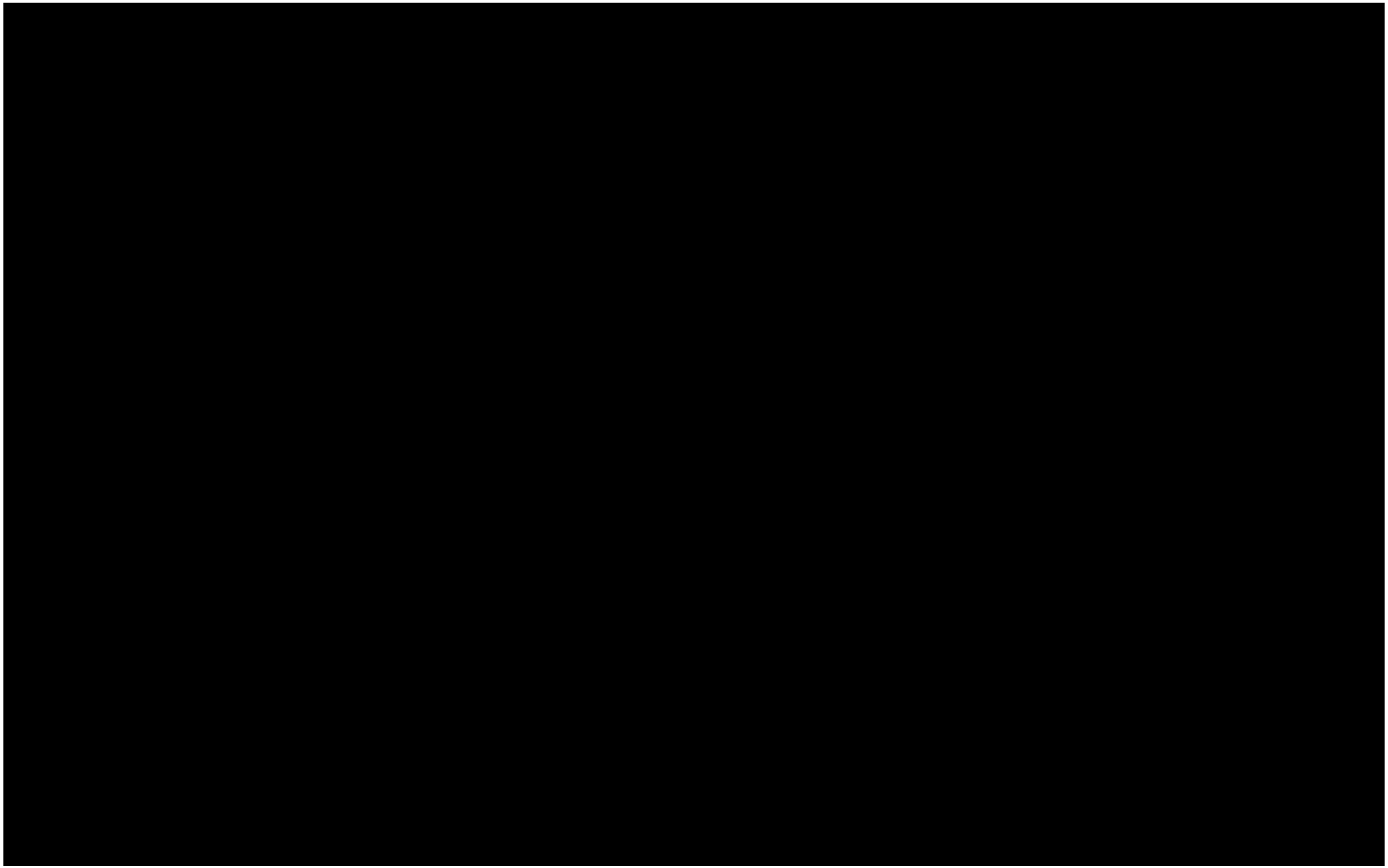
And why does it matter for my readership



50 Million

Americans have a disability

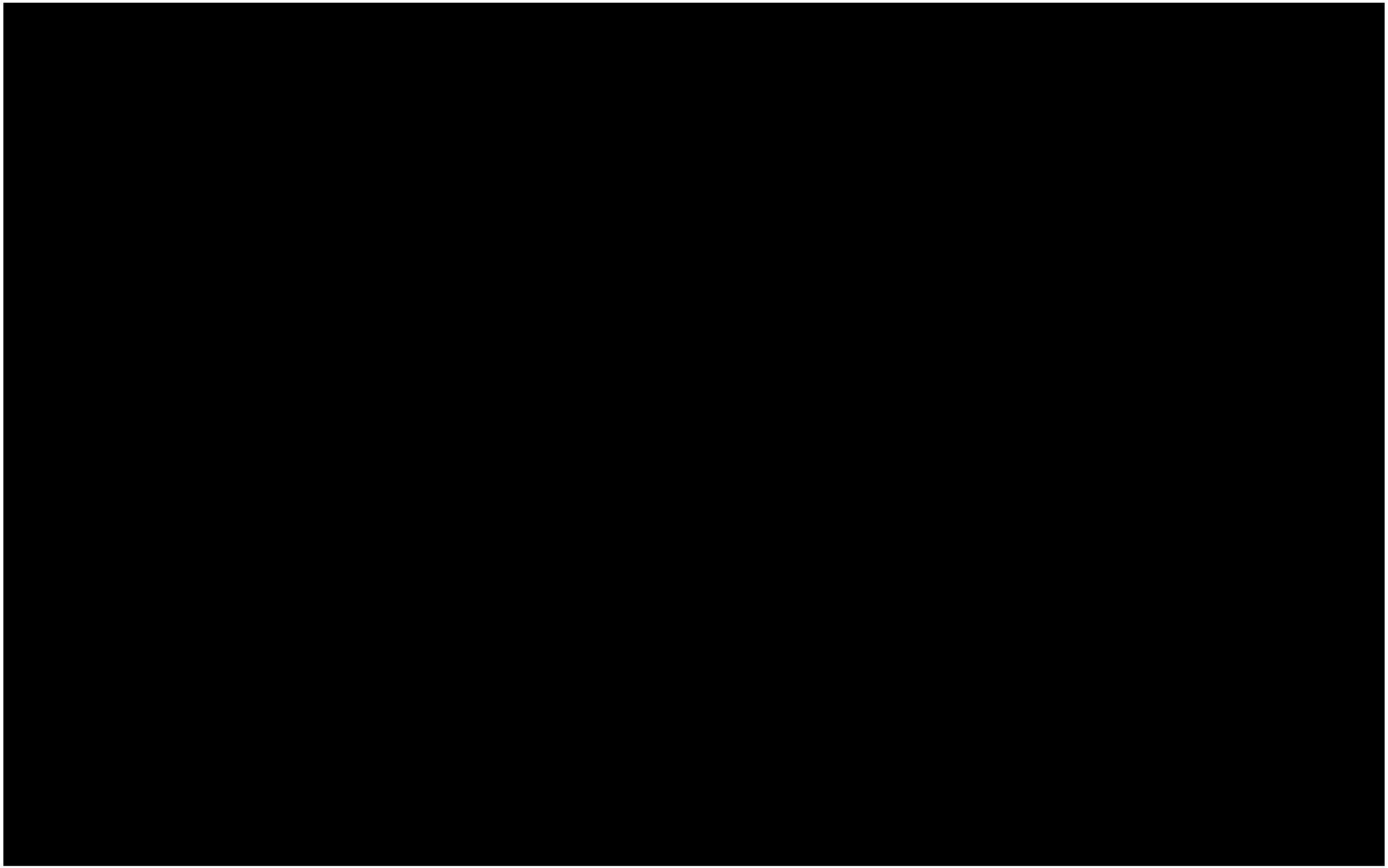
U.S. Census Bureau



31 Million

Americans have a hearing impairment

S. Kochkin. Marketrak vii: Hearing loss population tops 31 million. The Hearing Review, July 2005.



10 Million

Americans have a visual impairment

American Foundation for the Blind, Public Policy Center. Statistical Snapshots, March 2008.

Accessibility on iOS

Assistive technology, built-in since iOS 3.0

"When it comes to embedding accessibility, Apple has set the standard in recent years…It is now up to other manufacturers to follow their lead."

Robin Spinks, Royal National Institute of Blind People (RNIB), United Kingdom

“I believe the advent of accessible iBooks will be viewed by future generations as one of the landmark events in the lives of the blind.”

Bradley Hodges, American Foundation for the Blind, Access World 2010

What You Will Learn

- Basic HTML accessibility in EPUB books

What You Will Learn

- Basic HTML accessibility in EPUB books
- Basics of VoiceOver so you can test your books

What You Will Learn

- Basic HTML accessibility in EPUB books
- Basics of VoiceOver so you can test your books
- Accessibility features of iBooks Author

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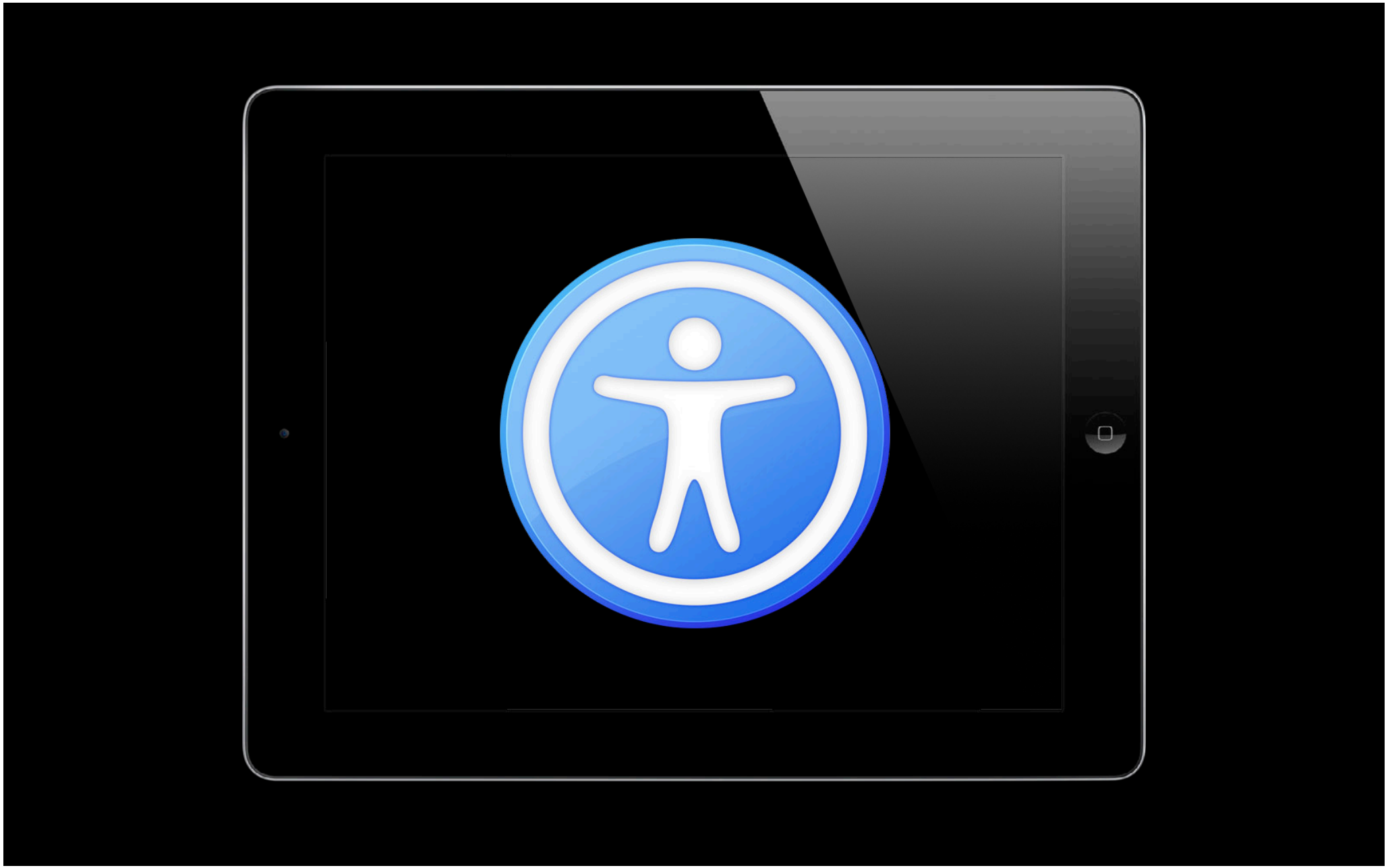
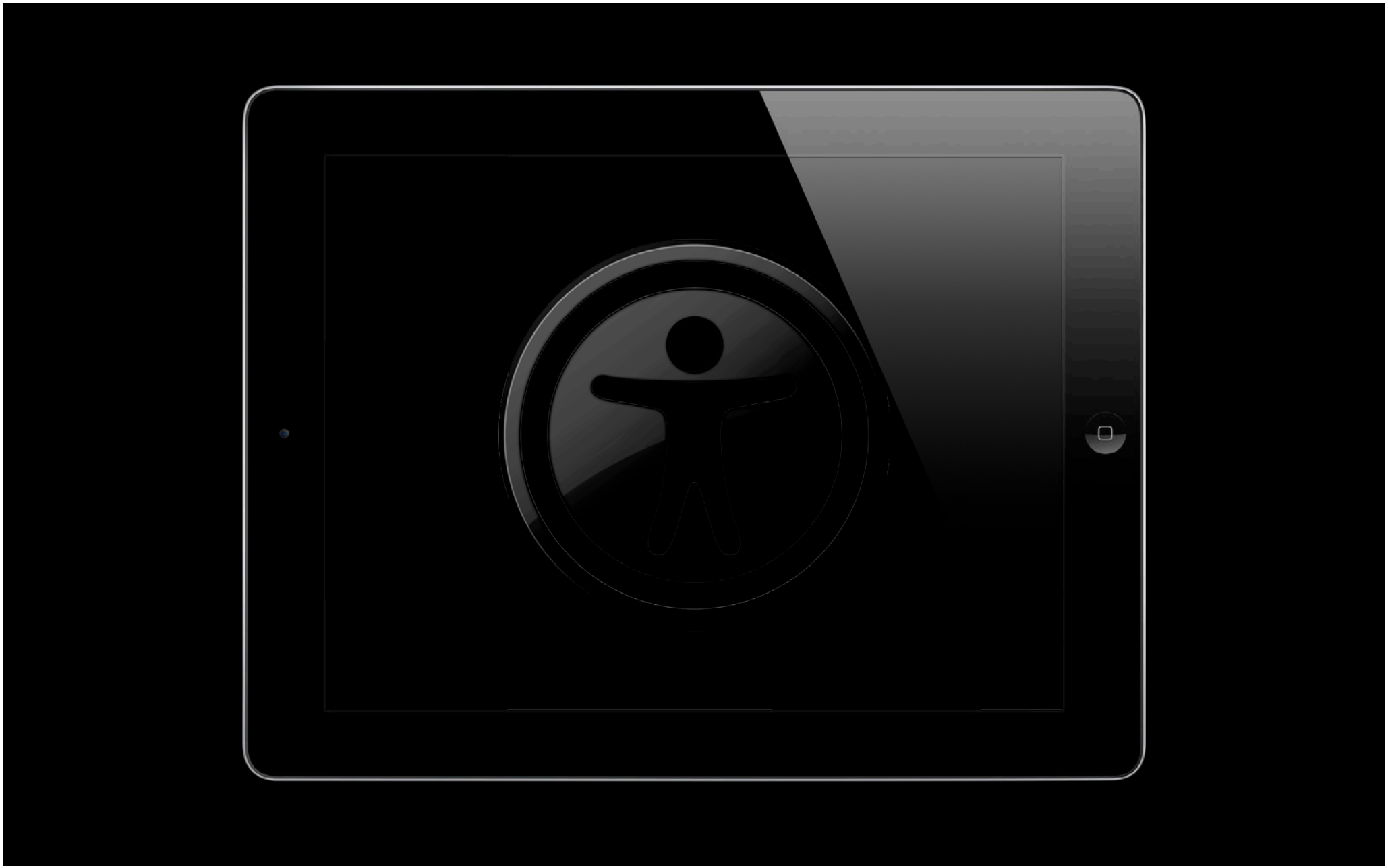
- Basics of VoiceOver so you can test your books
- Accessibility features of iBooks Author
- Techniques for accessibility in custom HTML5 widgets

Accessibility in EPUB

ePUB

ePUB





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The range of frequencies in the electromagnetic spectrum that makes up the radio spectrum is very large. This means that the types of antennas that are used as radio telescopes vary widely in design, size, and configuration. At wavelengths of 30 meters to 3 meters (10 MHz to 100 MHz), they are generally either directional antenna arrays similar

to TV antennas or large stationary reflectors with moveable focal points.

Since the wavelengths being observed with these types of antennas are so long, the reflector surfaces can be constructed from coarse wire mesh. At shorter wavelengths, dish-style radio telescopes

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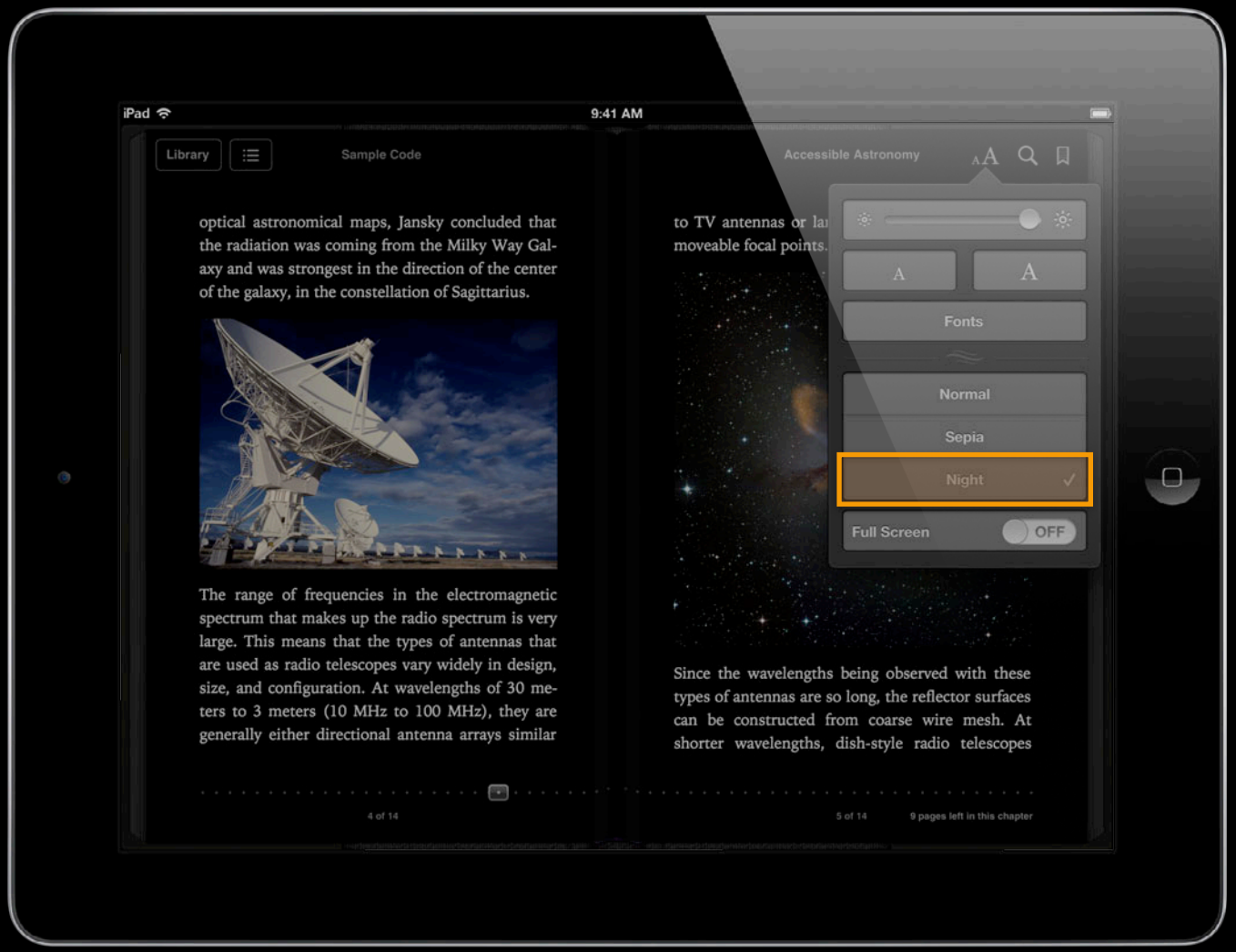
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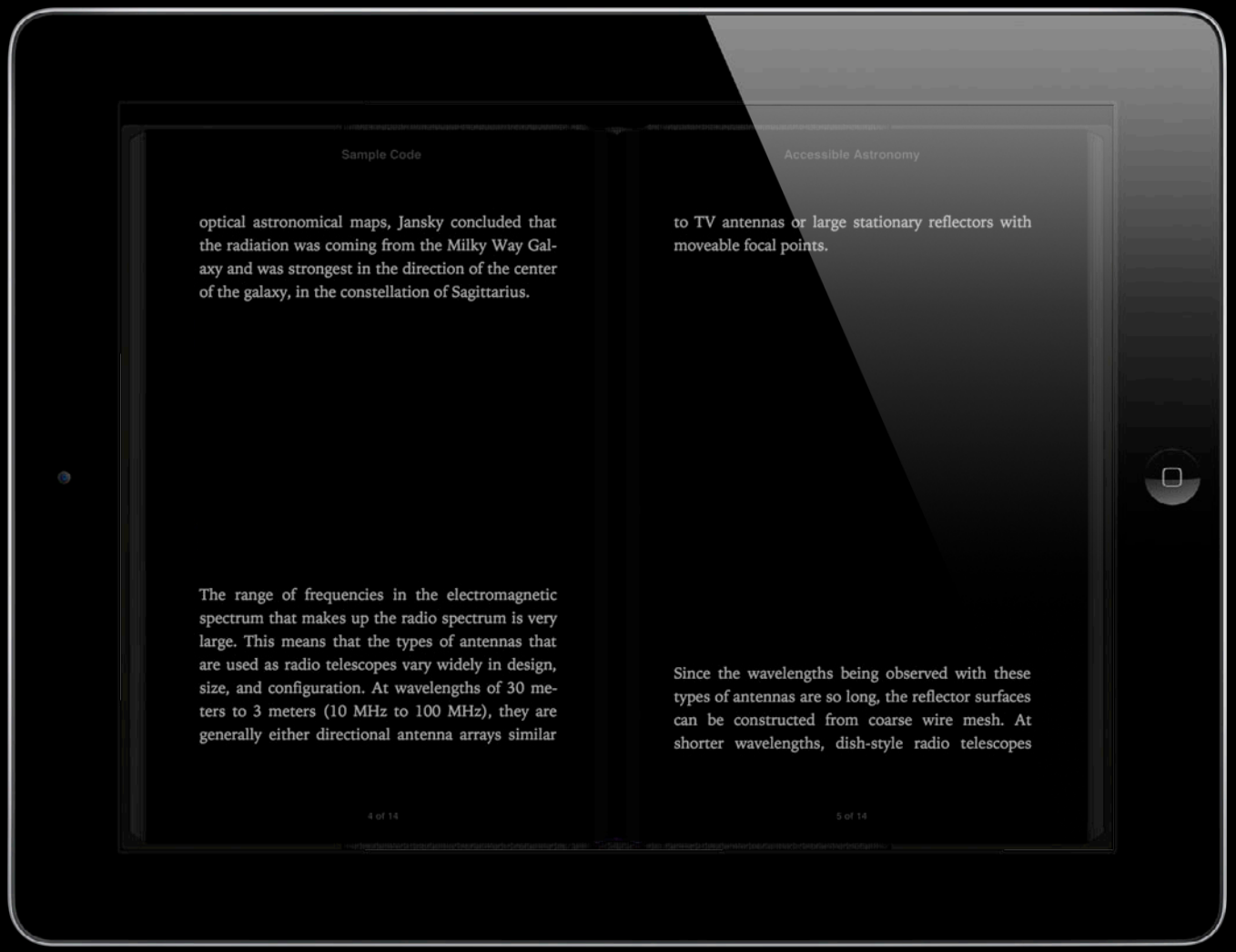
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Basic EPUB Accessibility

Label all content images like you would in HTML

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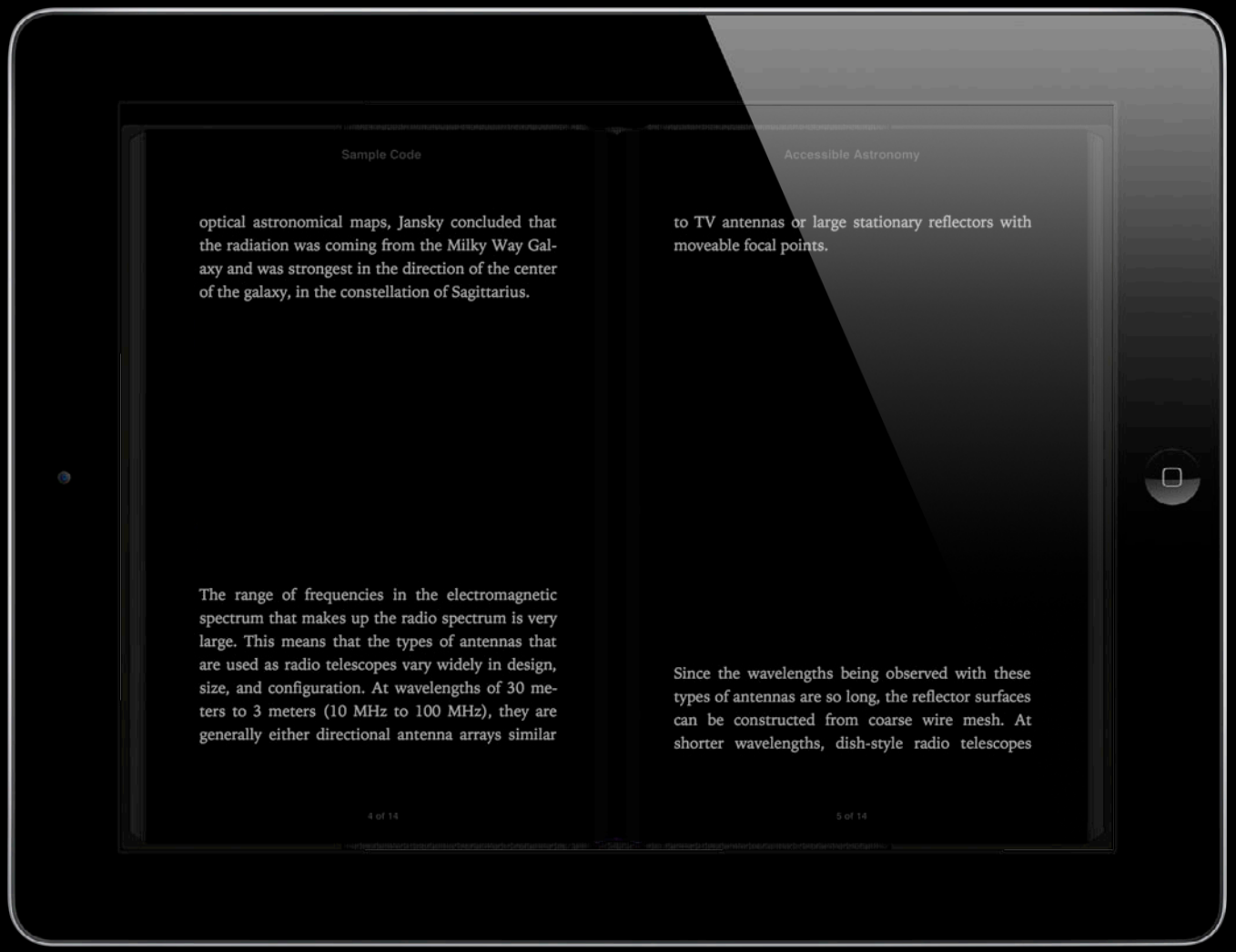
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image, The Very Large Array, an interferometric array formed from many smaller radio telescopes, each dish 25 meters in diameter.

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image, Combined x-ray, microwave, and visible spectrum photograph showing elliptical galaxy Centaurus A, with radio-emitting jets and lobes emanating from its central black hole.

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Demo

Using VoiceOver in iOS and iBooks

Jason Barry
Developer Publications

Review

What we have learned so far about EPUB accessibility

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- View your images in different contexts and different themes

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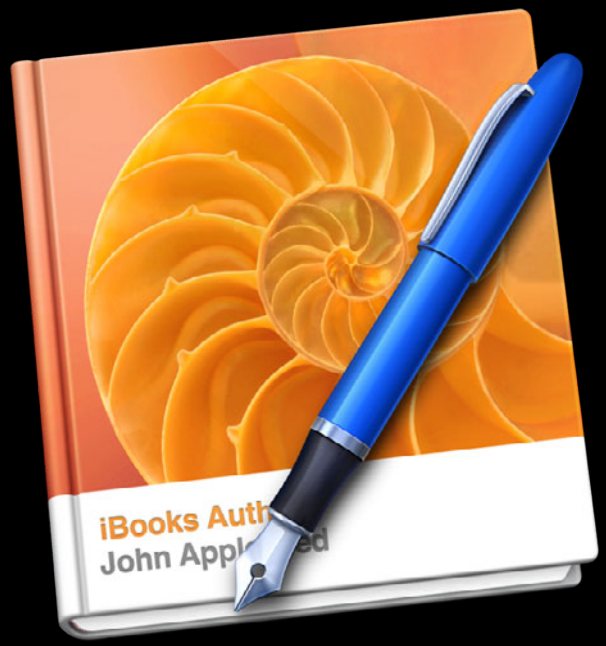
- Test your books with VoiceOver!

Accessibility in iBooks Author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Welcome
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1.2 Cells Are the Unit of Life
1.3 Small Creatures Rule the Earth
1.4 Green Planet
1.5 Project-Based Learning
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Movie Chemical Language of Pheromones

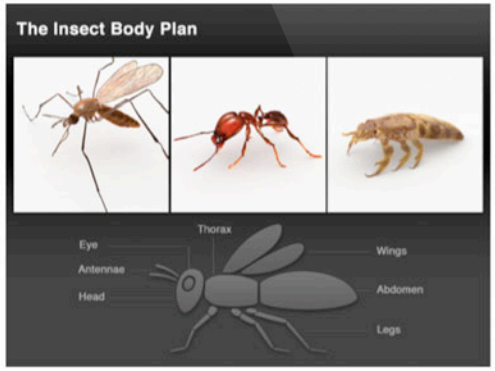
Ants communicate using combinations of ten to twenty chemical signals.

In July and August of 2011 the team filmed in Gorongosa National Park in the southern African nation of Mozambique, bringing home feature material for four chapters in ecology. While shooting in the rain forest atop Gorongosa Mountain, we spent a little time collecting. The carpenter ant to the left, collected on our trip, is a species of the genus *Camponotus* that was previously unknown to science.

Our goal is to have students see the living world the way a naturalist sees it.

To "see," for example, the chemical environment of organisms, such as the plumes of **pheromone** and territory-marking molecules that organisms use to communicate. Ants have been the study of a lifetime for Edward O. Wilson. We'll bring some special lessons to students from the world of ants.

Interactive Insect Body Plan



The word insect *is derived from the Greek meaning "cut into sections." The evolutionary success of insects and their distinctive physiology can be measured by this: as much as 90 percent of all animal species are insects.*

Enhancing Accessibility

Considerations for persons with disabilities

- Adjustable Font Sizes
- Color Concerns
- Captions and Subtitles
- Descriptive Labels

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Section 1
Interstellar Time Travel
FACTS
1. Gravity is the curvature of space-time
2. Space is awesome
3. We're in space and space is the place
The Milky Way is the galaxy that contains the Earth. This name derives from its appearance as a dim "milky" glowing band arching across the night sky, in which the naked eye cannot distinguish individual stars. The Milky Way appears like a band because it is a disk-shaped structure being viewed from inside. The fact that this faint band of light is made up of stars was proven in 1610 when Galileo Galilei used his telescope to resolve it into individual stars. In the 1920s, observations by astronomer Edwin Hubble showed that the Milky Way is just one of many galaxies.
The Milky Way is a barred spiral galaxy 100,000–120,000 light-years in diameter containing 200–400 billion stars. It may contain at least as many planets, with 10 billion of those orbiting in the habitable zone of their parent stars. The Solar System is located within the disk, around two thirds of the way out from the Galactic Center, on the inner edge of a spiral-shaped concentration of gas and dust called the Orion–Cygnus Arm. The stars in the inner 10,000 light-years are organized in a bulge and one or more bars. The very center is marked by an intense radio source named Sagittarius A which is likely to be a supermassive black hole. The Galaxy rotates once every 15 to 50 million years. The Galaxy as a whole is moving at a velocity of 552 to 630 km per second, depending on the relative frame of reference. It is estimated to be about 13.2 billion years old, nearly as old as the Universe. Surrounded by several smaller satellite galaxies, the Milky
2

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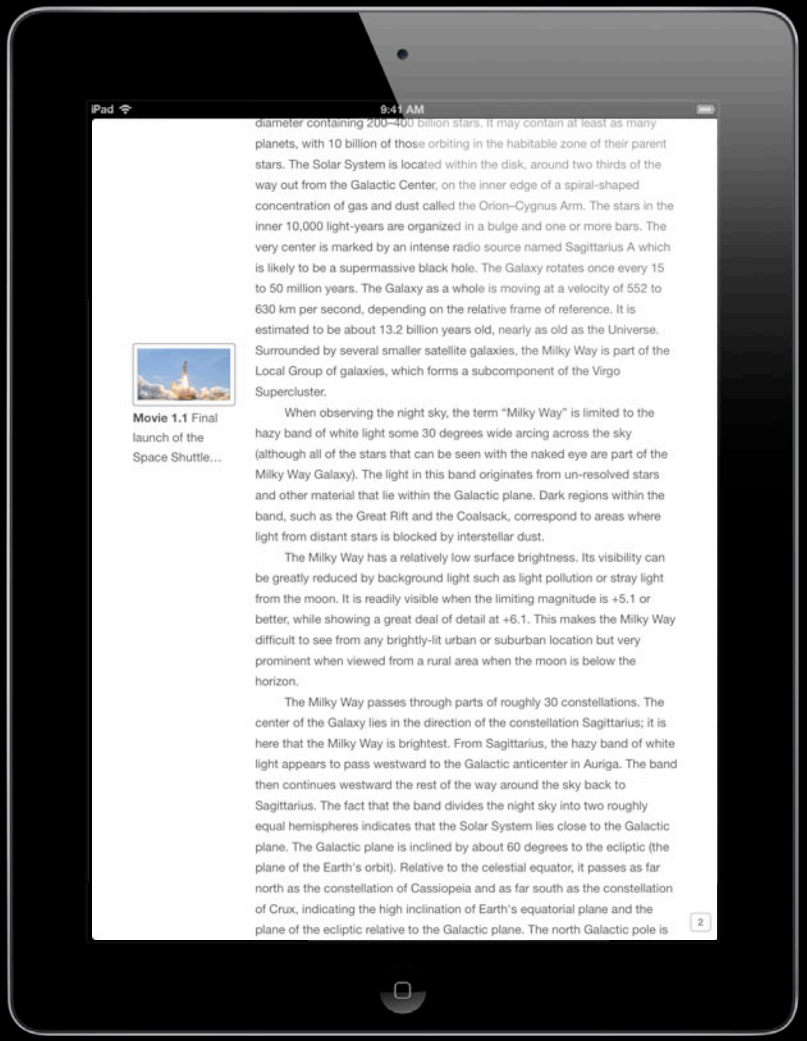
When observing the night sky, the term "Milky Way" is limited to the hazy band of white light some 30 degrees wide arcing across the sky (although all of the stars that can be seen with the naked eye are part of the Milky Way Galaxy). The light in this band originates from un-resolved stars and other material that lie within the Galactic plane. Dark regions within the band, such as the Great Rift and the Coalsack, correspond to areas where light from distant stars is blocked by interstellar dust.

The Milky Way has a relatively low surface brightness. Its visibility can be greatly reduced by background light such as light pollution or stray light from the moon. It is readily visible when the limiting magnitude is +5.1 or better, while showing a great deal of detail at +6.1. This makes the Milky Way difficult to see from any brightly-lit urban or suburban location but very prominent when viewed from a rural area when the moon is below the horizon.

The Milky Way passes through parts of roughly 30 constellations. The center of the Galaxy lies in the direction of the constellation Sagittarius; it is here that the Milky Way is brightest. From Sagittarius, the hazy band of white light appears to pass westward to the Galactic anticenter in Auriga. The band then continues westward the rest of the way around the sky back to Sagittarius. The fact that the band divides the night sky into two roughly equal hemispheres indicates that the Solar System lies close to the Galactic plane. The Galactic plane is inclined by about 60 degrees to the ecliptic (the plane of the Earth's orbit). Relative to the celestial equator, it passes as far north as the constellation of Cassiopeia and as far south as the constellation of Crux, indicating the high inclination of Earth's equatorial plane and the plane of the ecliptic relative to

Movie 1.1 Final launch of the Space Shuttle Atlantis

Launch of the Space Shuttle Atlantis. Enable closed caption display in Video settings.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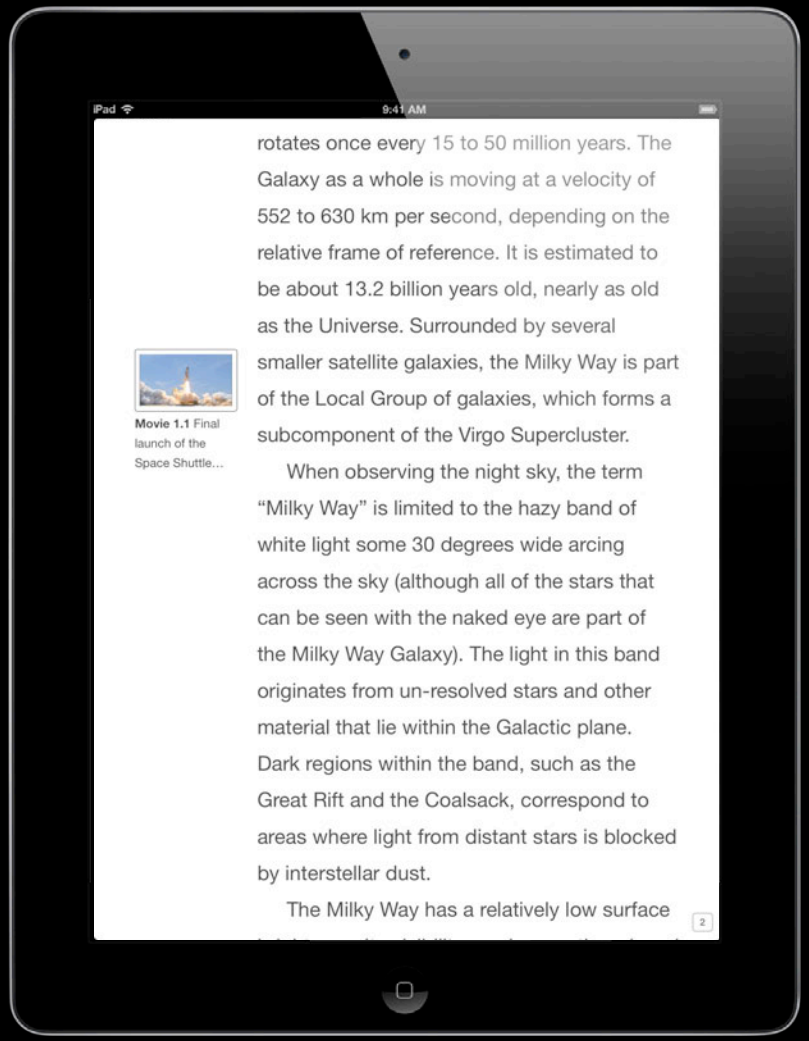
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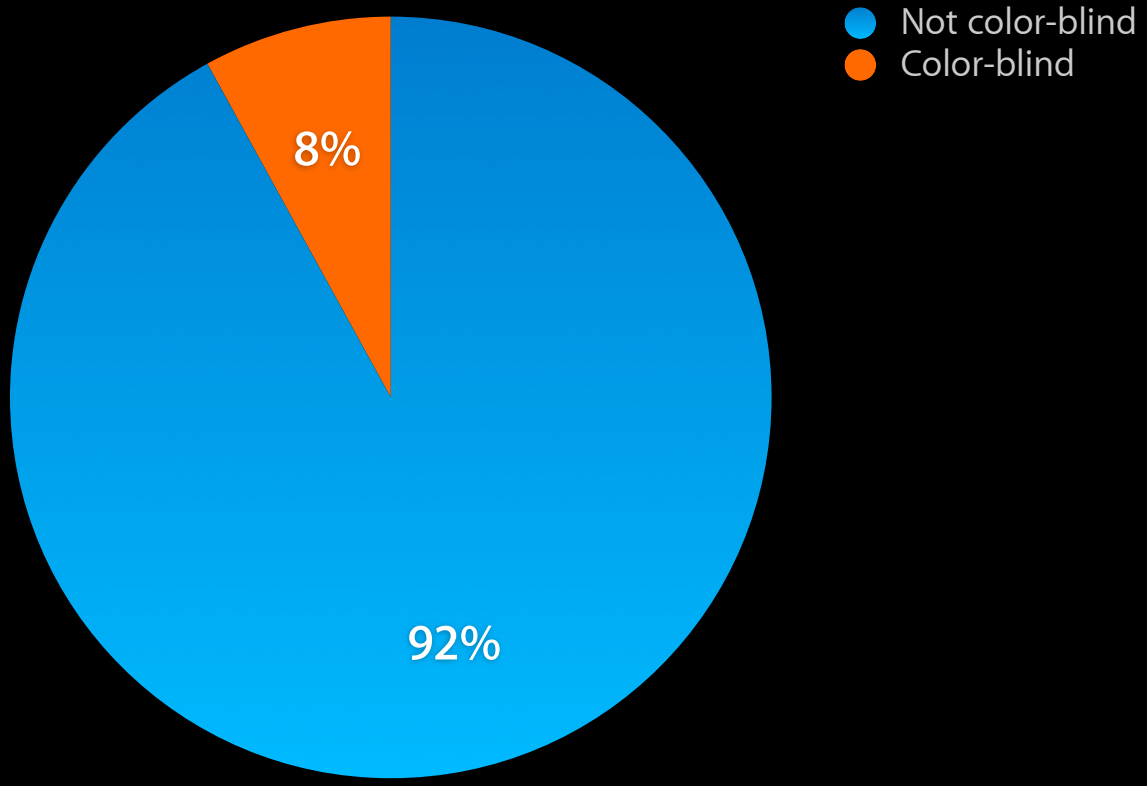
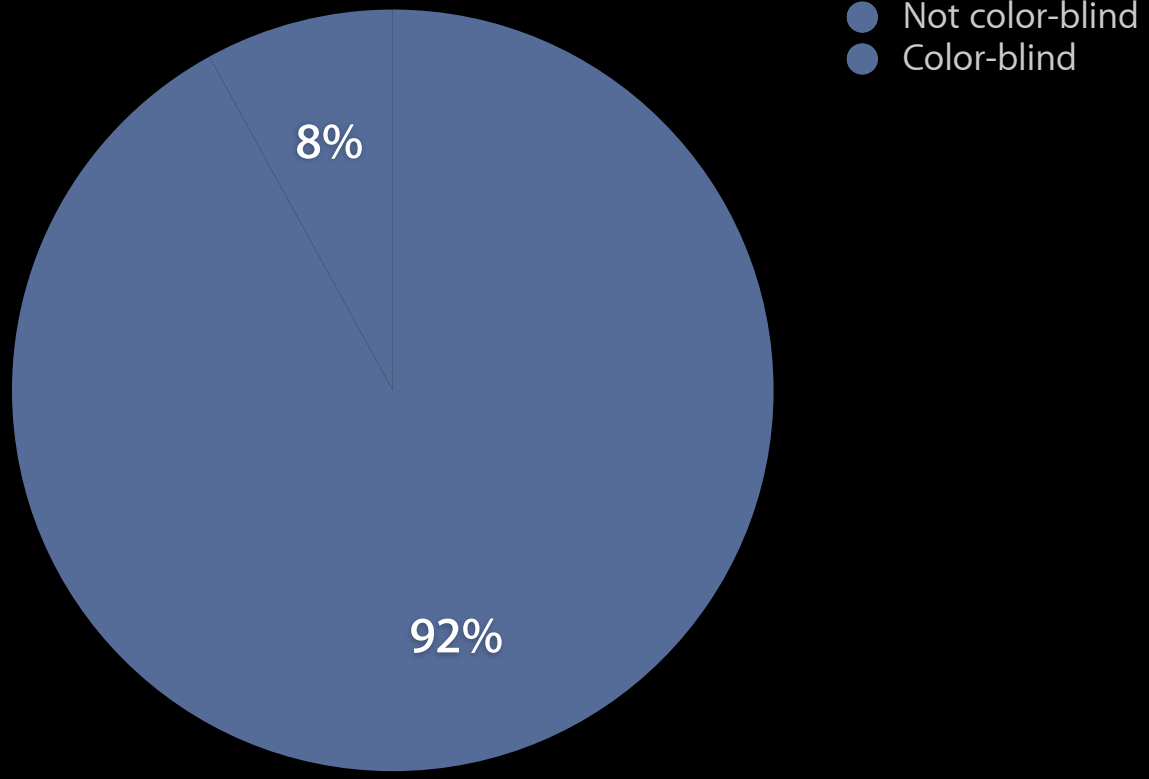
Color-Blindness

Example of what not to do



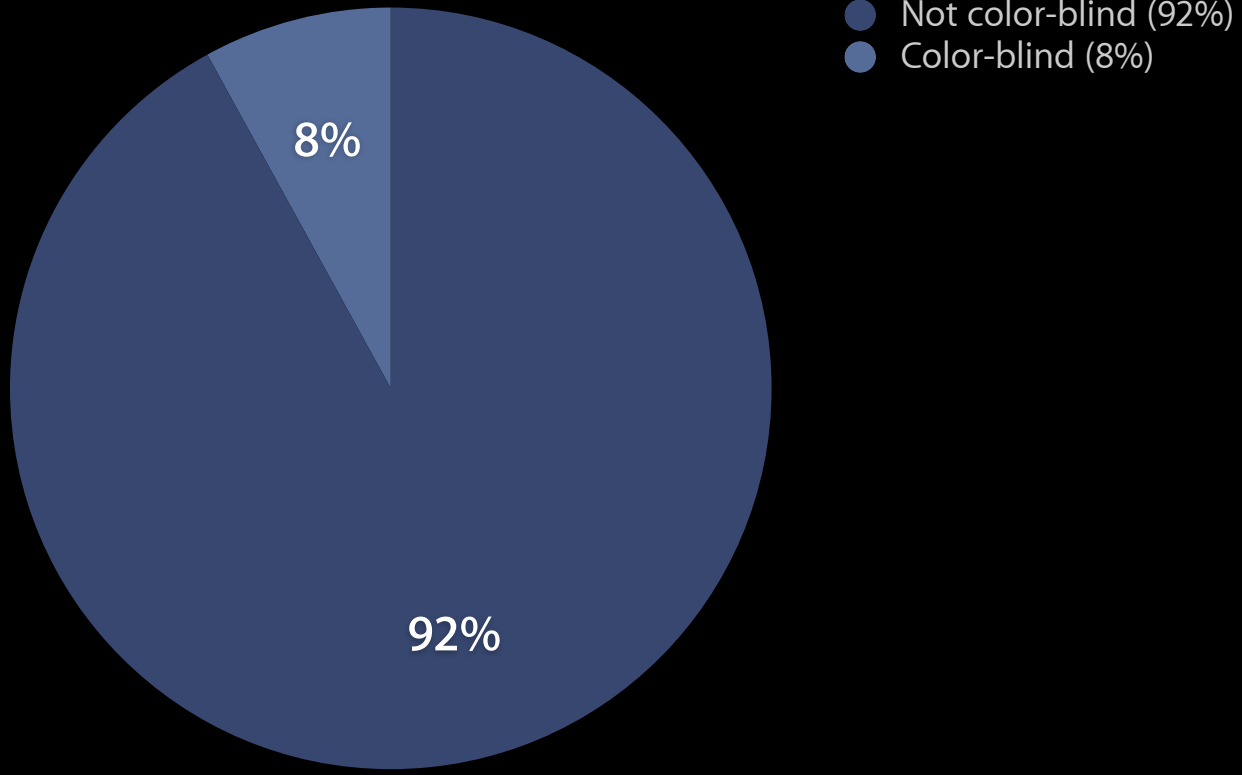
Color-Blindness

Do not convey meaning by color alone



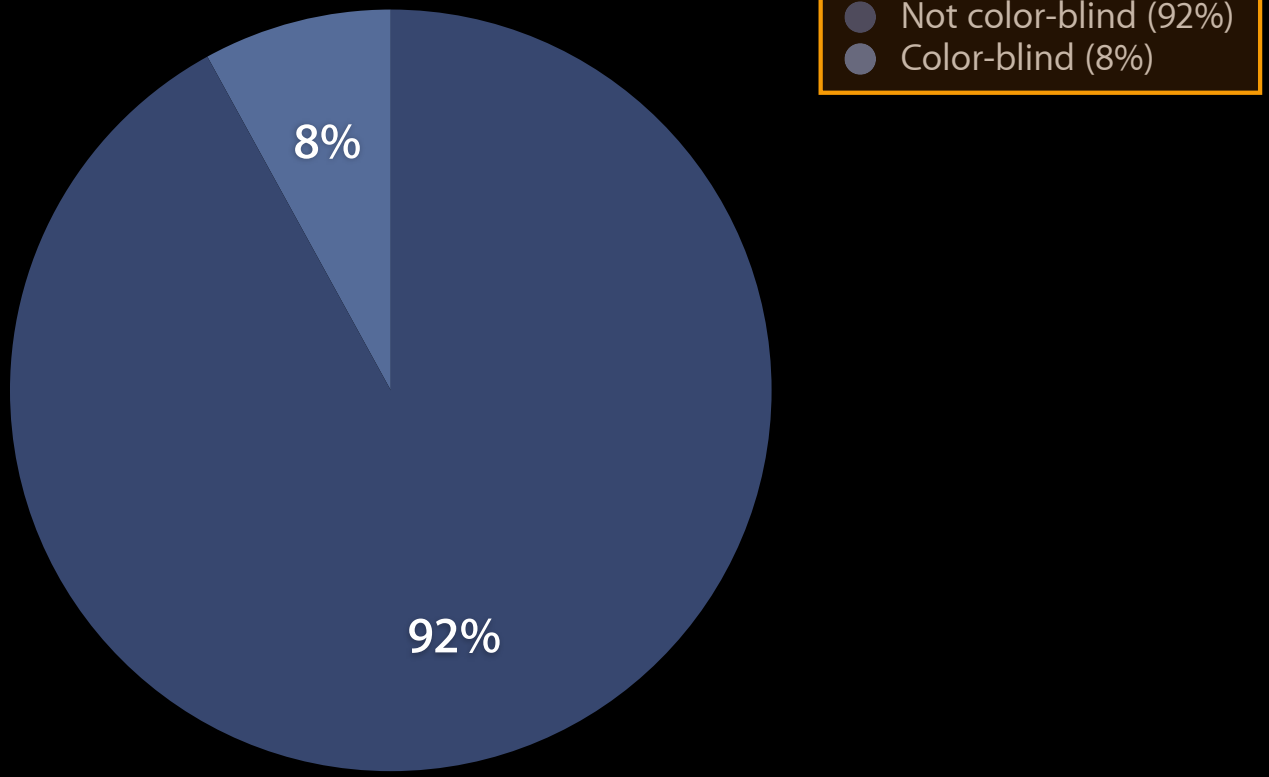
Color-Blindness

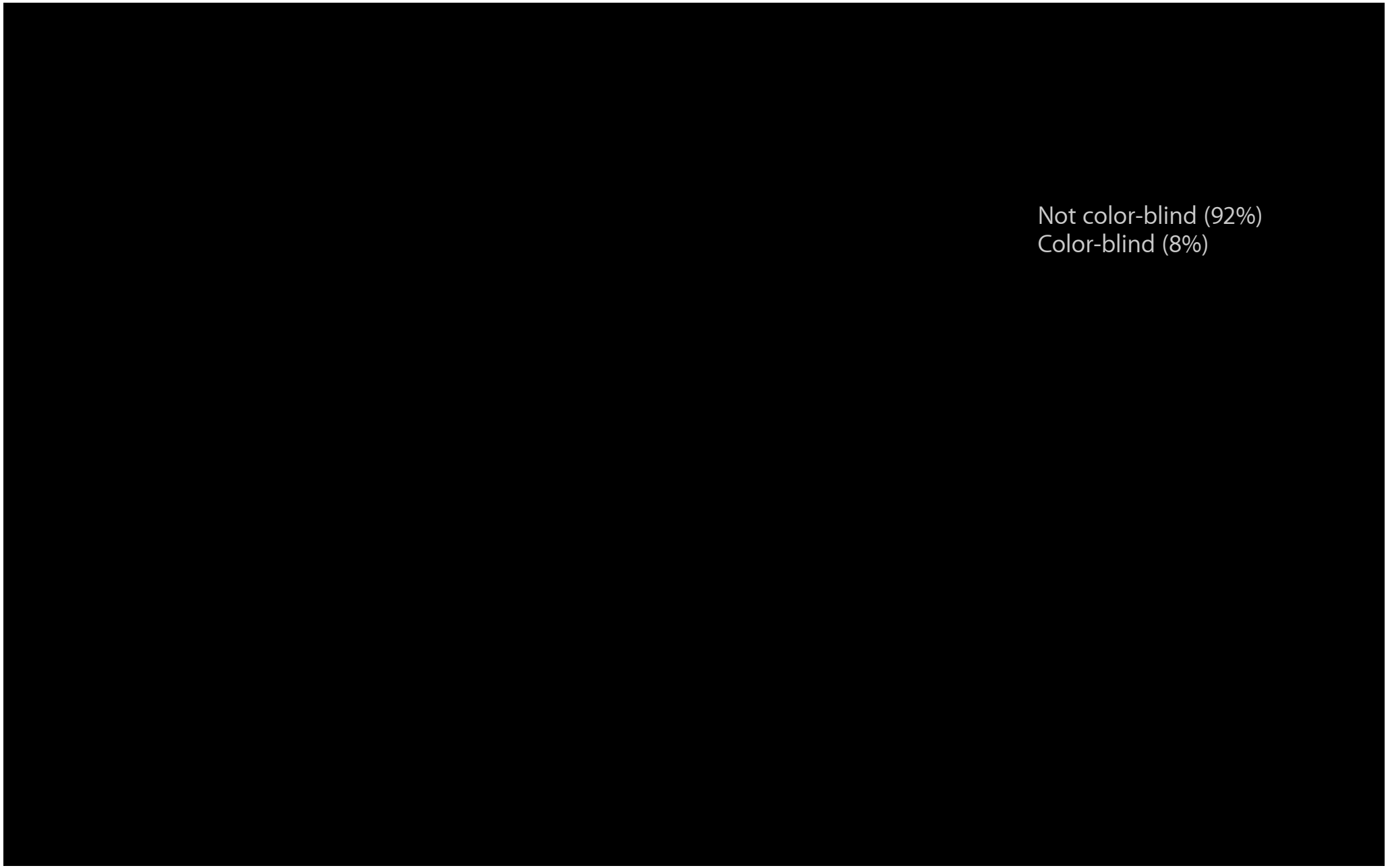
Do not convey meaning by color alone

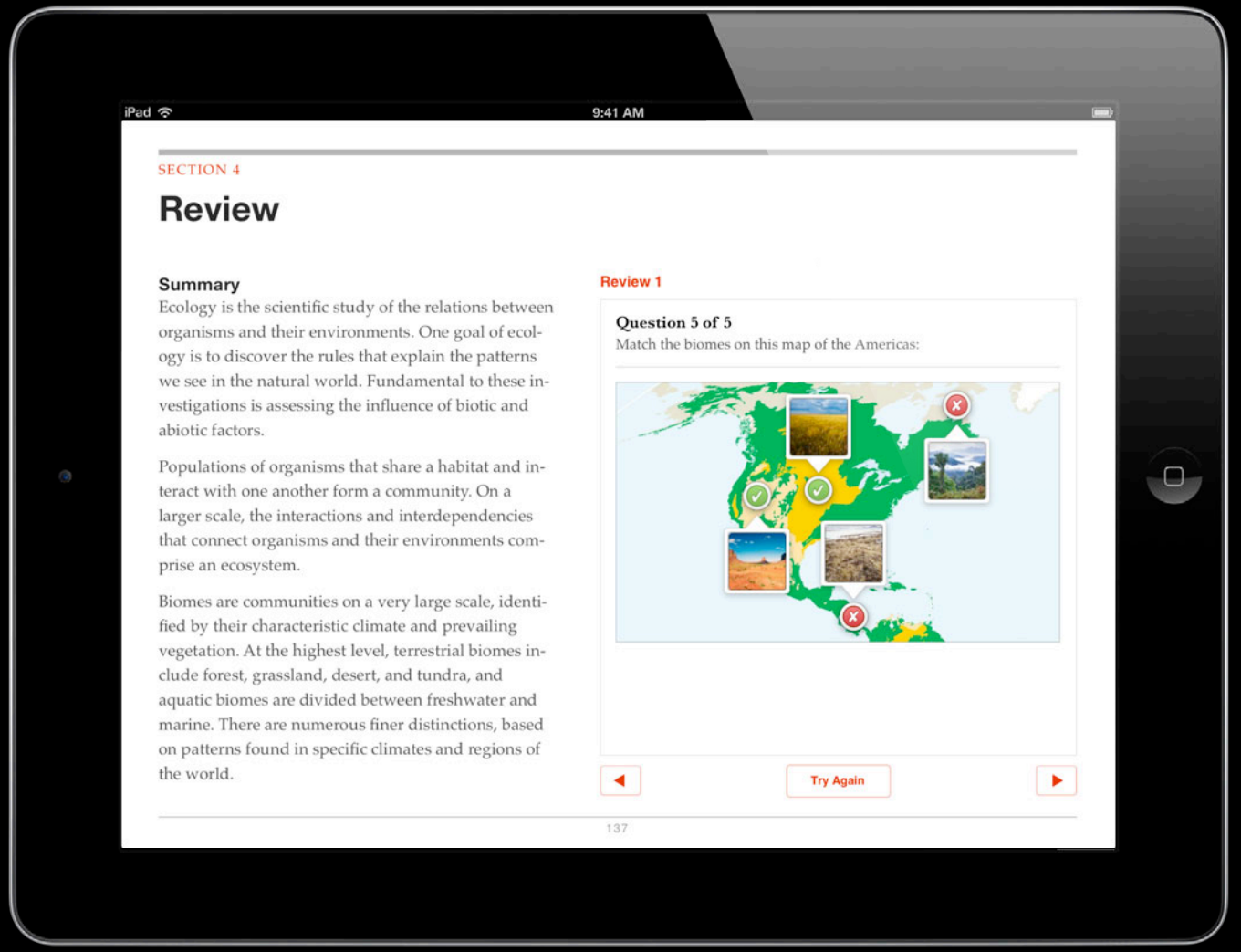


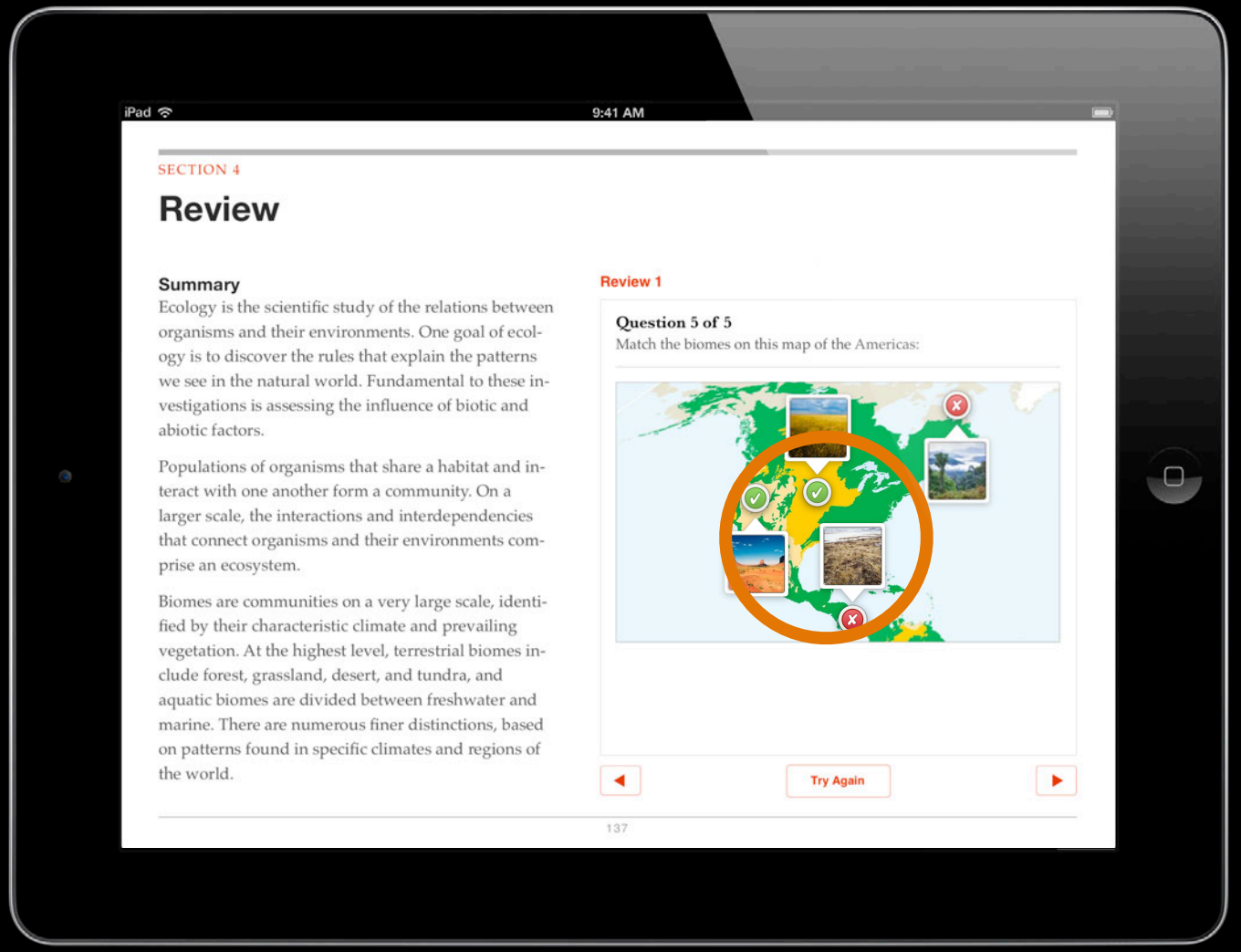
Color-Blindness

Do not convey meaning by color alone




Not color-blind (92%)
Color-blind (8%)


iPad
9:41 AM
SECTION 4
Review
Summary
Ecology is the scientific study of the relations between organisms and their environments. One goal of ecology is to discover the rules that explain the patterns we see in the natural world. Fundamental to these investigations is assessing the influence of biotic and abiotic factors.
Populations of organisms that share a habitat and interact with one another form a community. On a larger scale, the interactions and interdependencies that connect organisms and their environments comprise an ecosystem.
Biomes are communities on a very large scale, identified by their characteristic climate and prevailing vegetation. At the highest level, terrestrial biomes include forest, grassland, desert, and tundra, and aquatic biomes are divided between freshwater and marine. There are numerous finer distinctions, based on patterns found in specific climates and regions of the world.
Review 1
Question 5 of 5
Match the biomes on this map of the Americas:
Try Again
137


iPad
9:41 AM
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Review 1
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Try Again
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iPad
9:41 AM
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Review 1
Try Again
137

Enhancing Accessibility

Considerations for persons with disabilities

- Adjustable Font Sizes
- Color Concerns
- Captions and Subtitles
- Descriptive Labels

Enhancing Accessibility

Considerations for persons with disabilities

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- **Captions and Subtitles**
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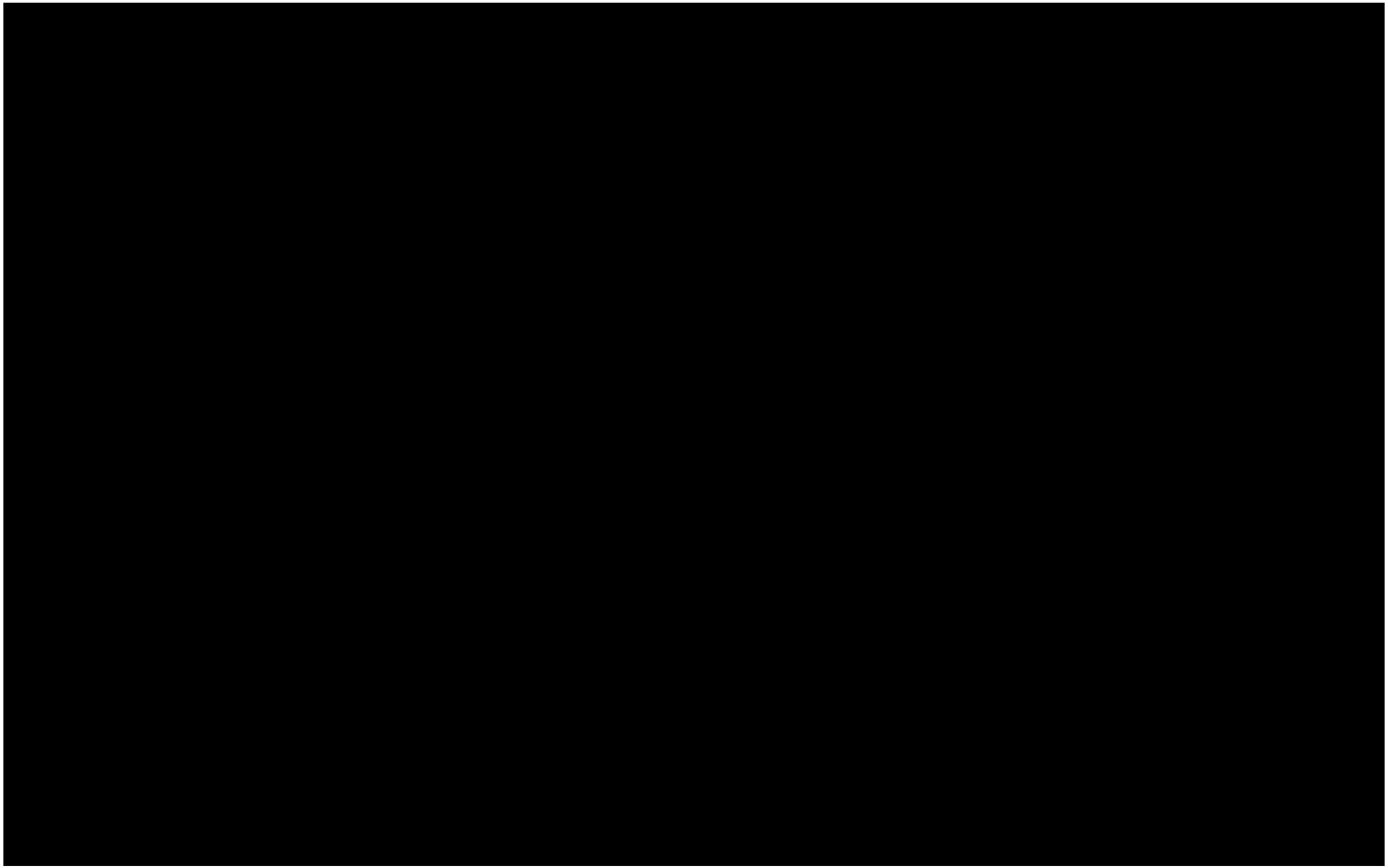

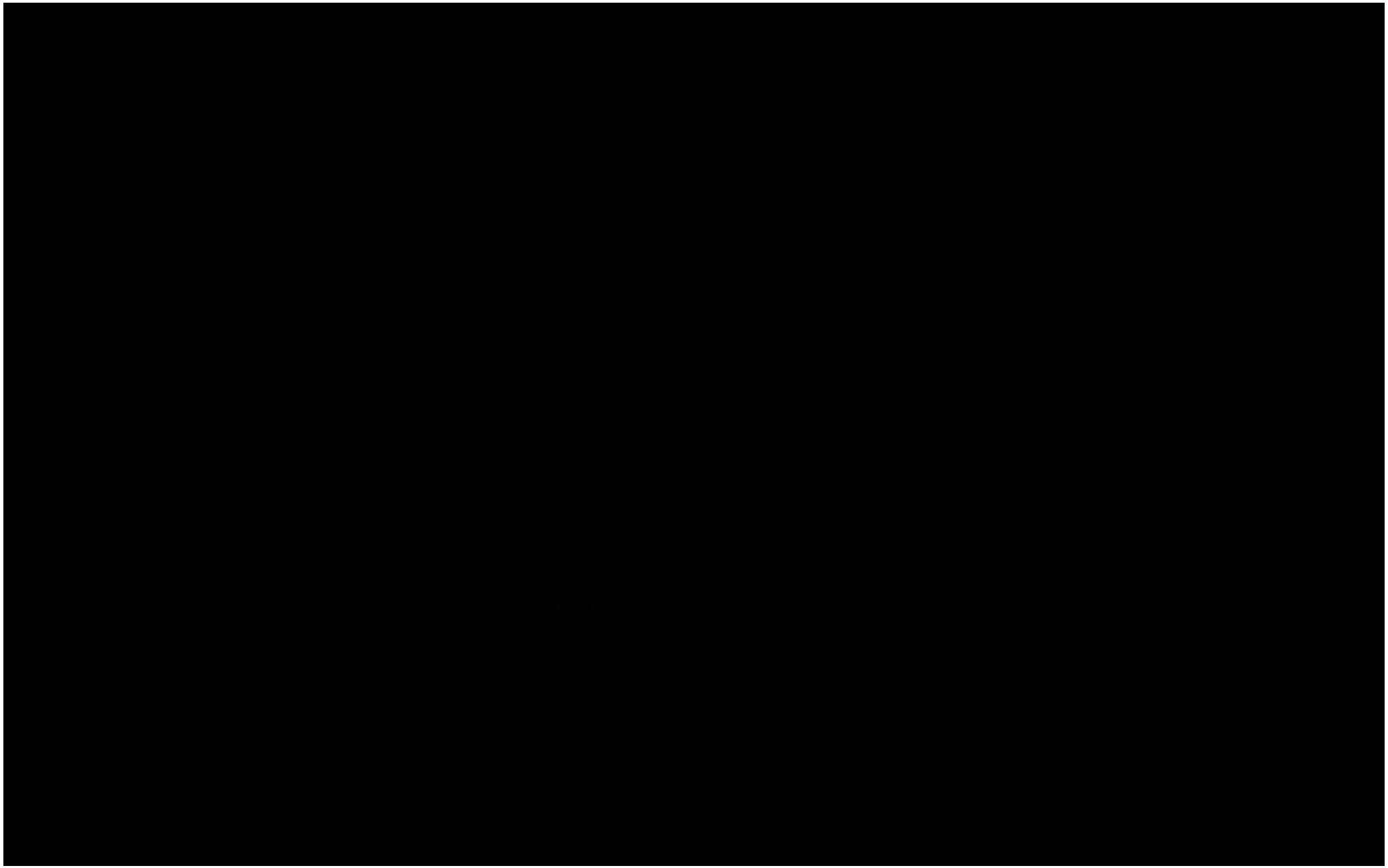

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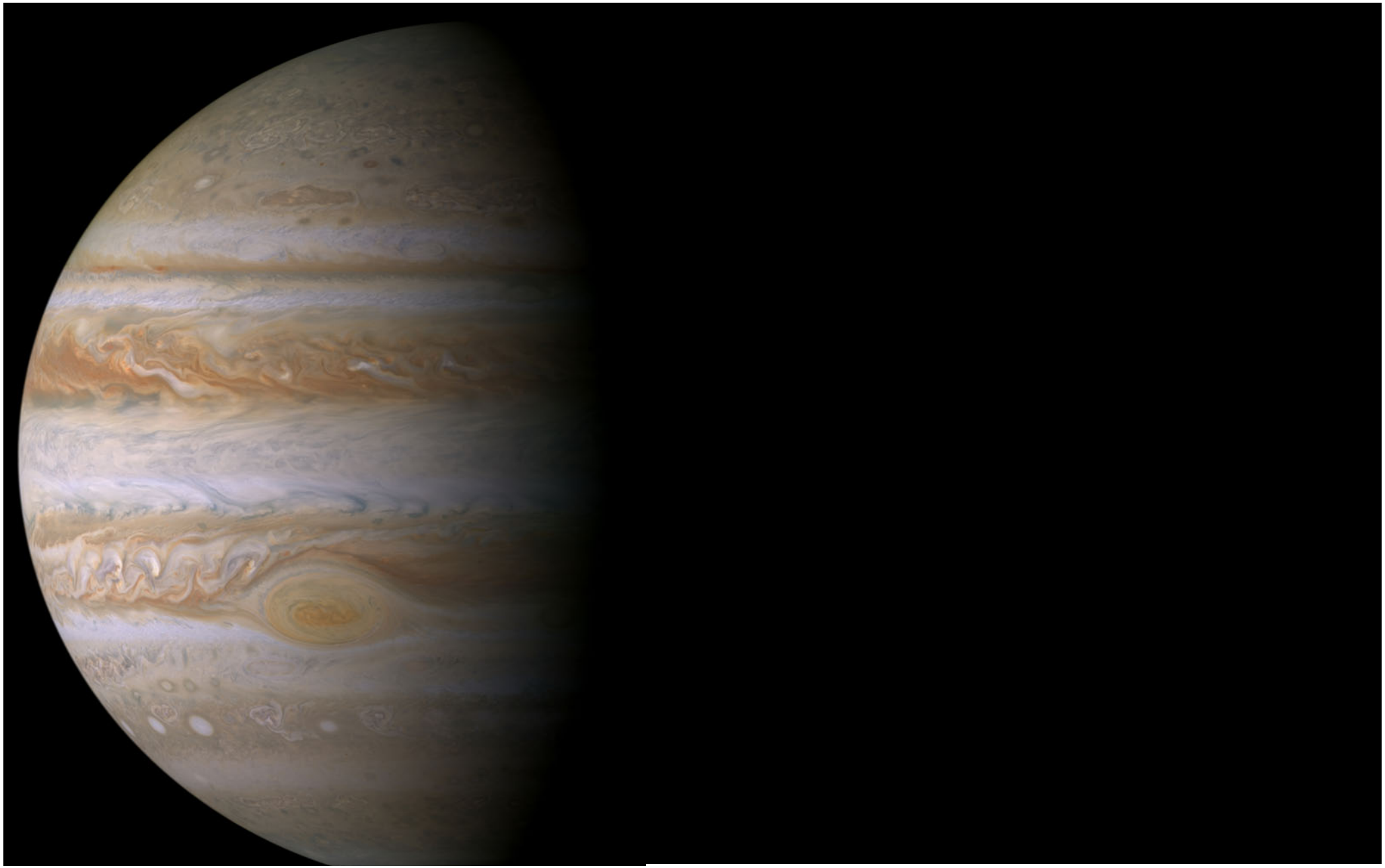
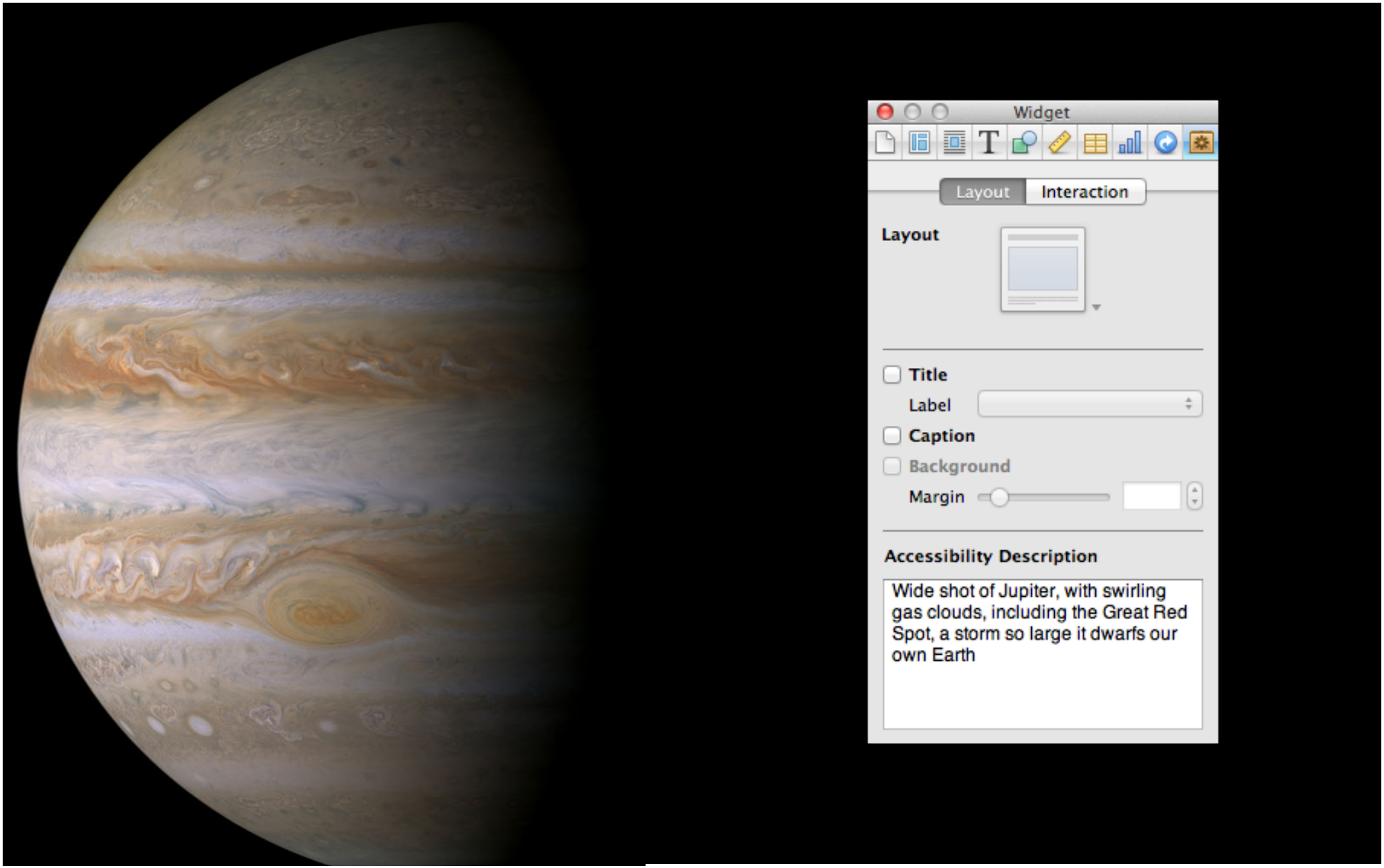
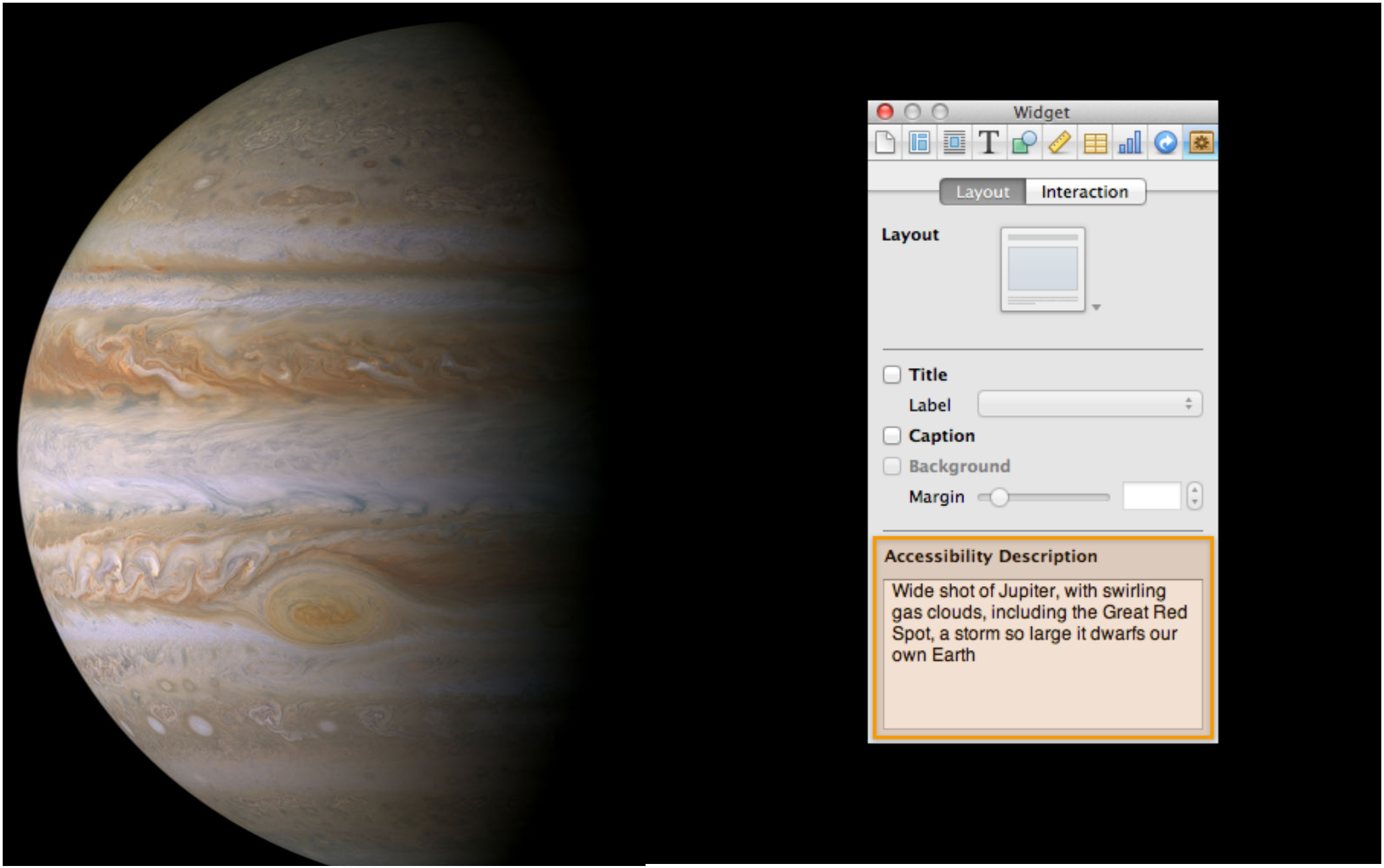



Widget
Layout
Interaction
Layout
Title
Label
Caption
Background
Margin
Accessibility Description
Wide shot of Jupiter, with swirling gas clouds, including the Great Red Spot, a storm so large it dwarfs our own Earth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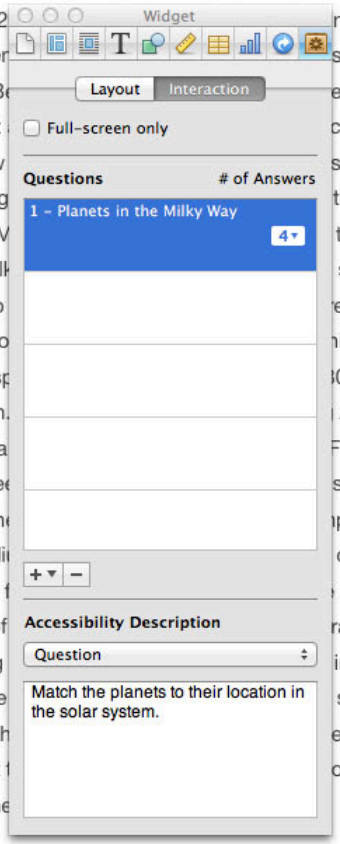
the Galactic plane. The north Galactic pole is situated at right ascension 12 near beta Comae Beren s near alpha Sculptoris. B ending on the time of night can appear relatively low servers from about 65 deg the Earth's surface the M twice a day.

The Milk stars and may have up e depends on the number o hich are hard to detect, esp 00 ly (90 pc) from the Sun. Andromeda Galaxy conta Filling the space betwe st called the interstellar m parable extent in radi of the gas layer ranges f colder gas to thousands of ravitational microlensing indicate that there may be stars as there are stars in th easurements indicate that f ound to host stars than the



Match the images of these planets to their corresponding positions in our solar system.

Planets in the Milky Way

Check Answer

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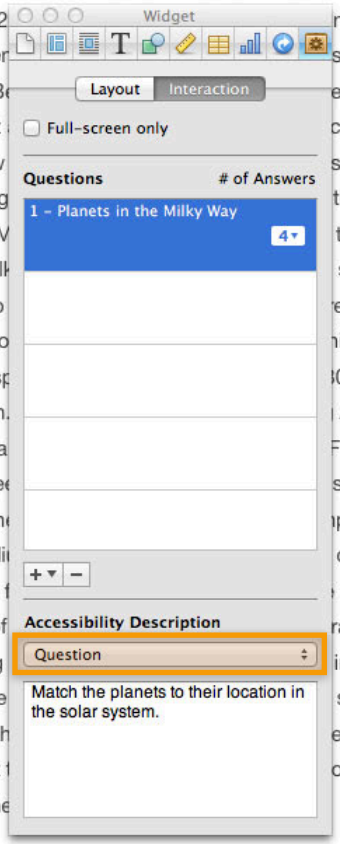

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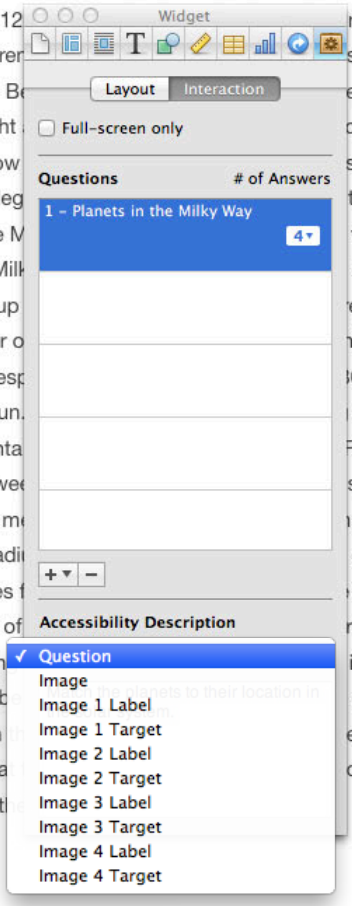

Match the images of these planets to their corresponding positions in our solar system.

Planets in the Milky Way

Check Answer

Demo

Adding accessibility to content in iBooks Author

Review

What we have learned so far about iBooks accessibility

Review

What we have learned so far about iBooks accessibility

- Font size adjustment is already built-in

Review

What we have learned so far about iBooks accessibility

- Font size adjustment is already built-in
- Don’t convey meaning with color alone

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- Add captions or subtitles to video where appropriate

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What we have learned so far about iBooks accessibility

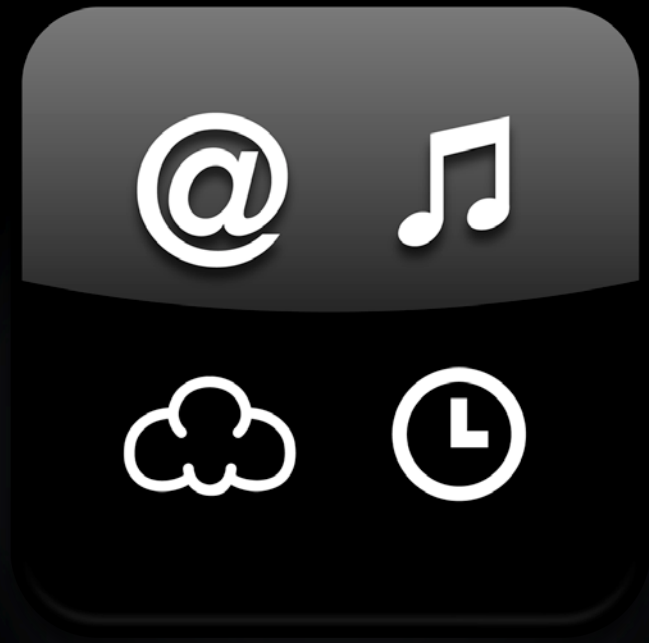
- Font size adjustment is already built-in
- Don’t convey meaning with color alone
- Add captions or subtitles to video where appropriate
- Add alternative text for images, widgets, etc.

Review

What we have learned so far about iBooks accessibility

- Font size adjustment is already built-in
- Don’t convey meaning with color alone
- Add captions or subtitles to video where appropriate
- Add alternative text for images, widgets, etc.
- Test your books with VoiceOver!

Custom HTML Widgets



PLIST

"ARIA allows web pages, or portions of web pages, to declare themselves as applications…"

WAI-ARIA 1.0 Candidate Recommendation, 18 January 2011
http://w3.org/TR/wai-aria/

Using WAI-ARIA

Accessible Rich Internet Applications

Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles

Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles

Using WAI-ARIA

Accessible Rich Internet Applications

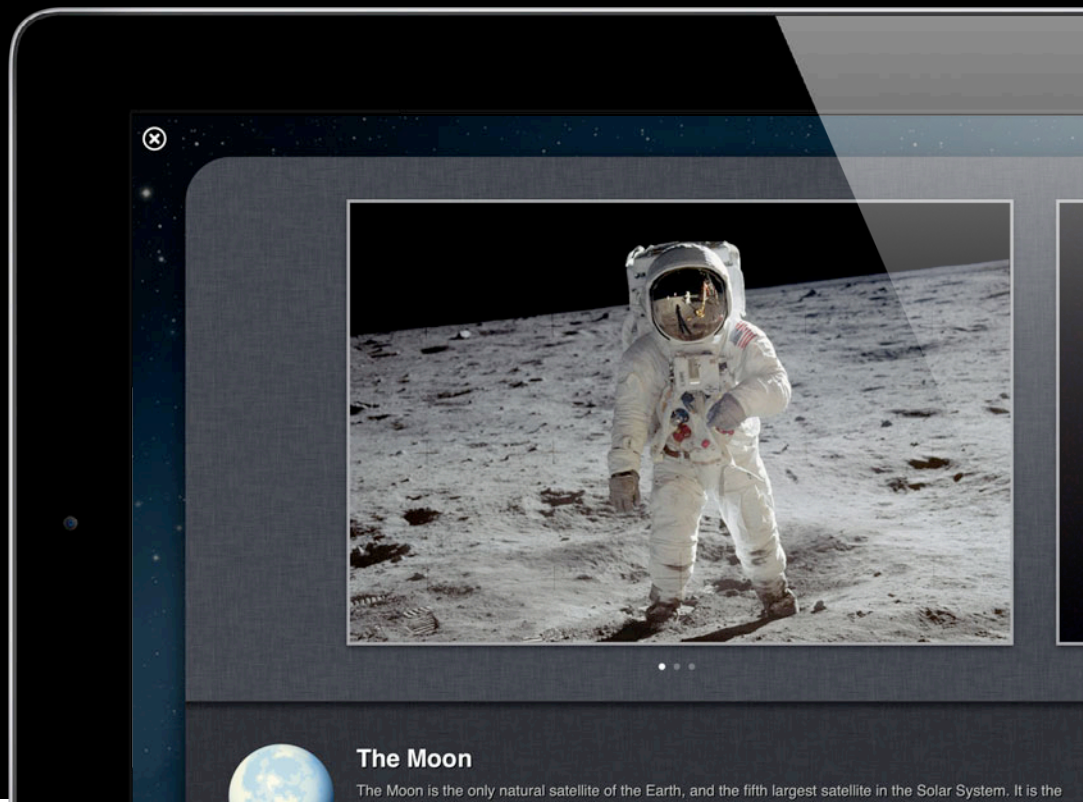
- Assign semantic roles

```
<div class="front" role="button">
</div>
```

Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles

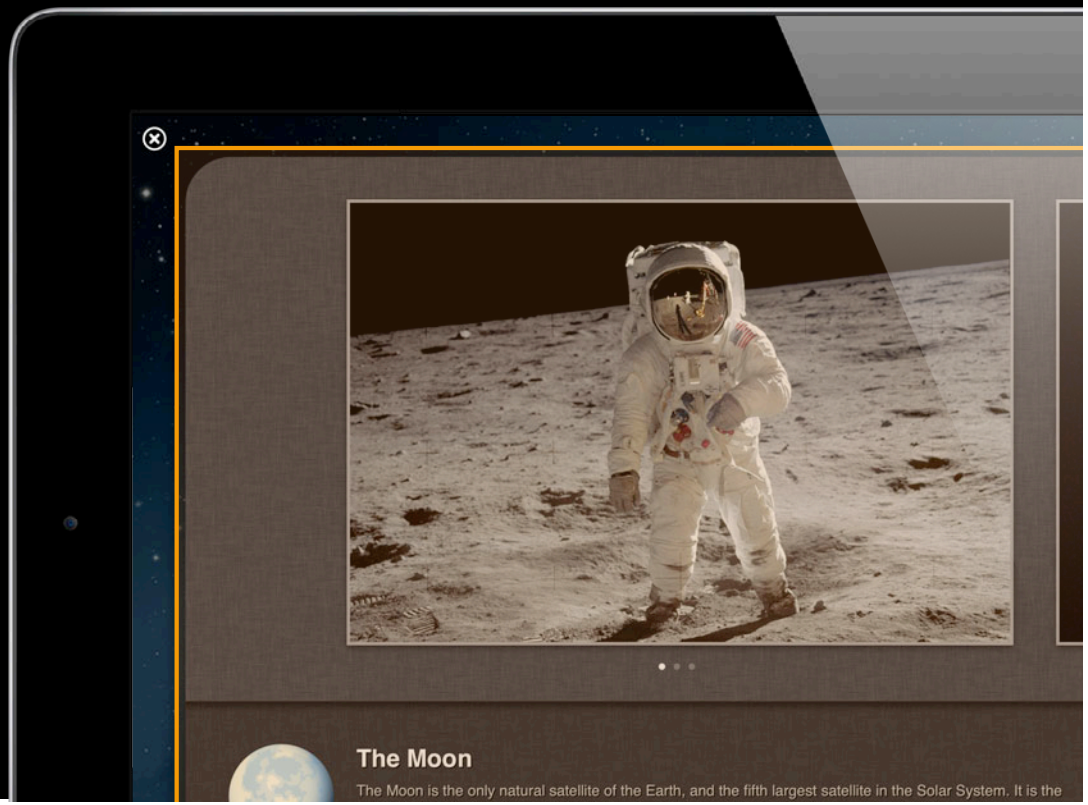


Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles

```
<div class="back" role="dialog">
</div>
```



Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties

Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
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Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties

```
<div class="front" role="button"
   aria-label="The Moon">
</div>
```

Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties

```
<div class="front" role="button"
   aria-label="The Moon">
</div>
```

Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties

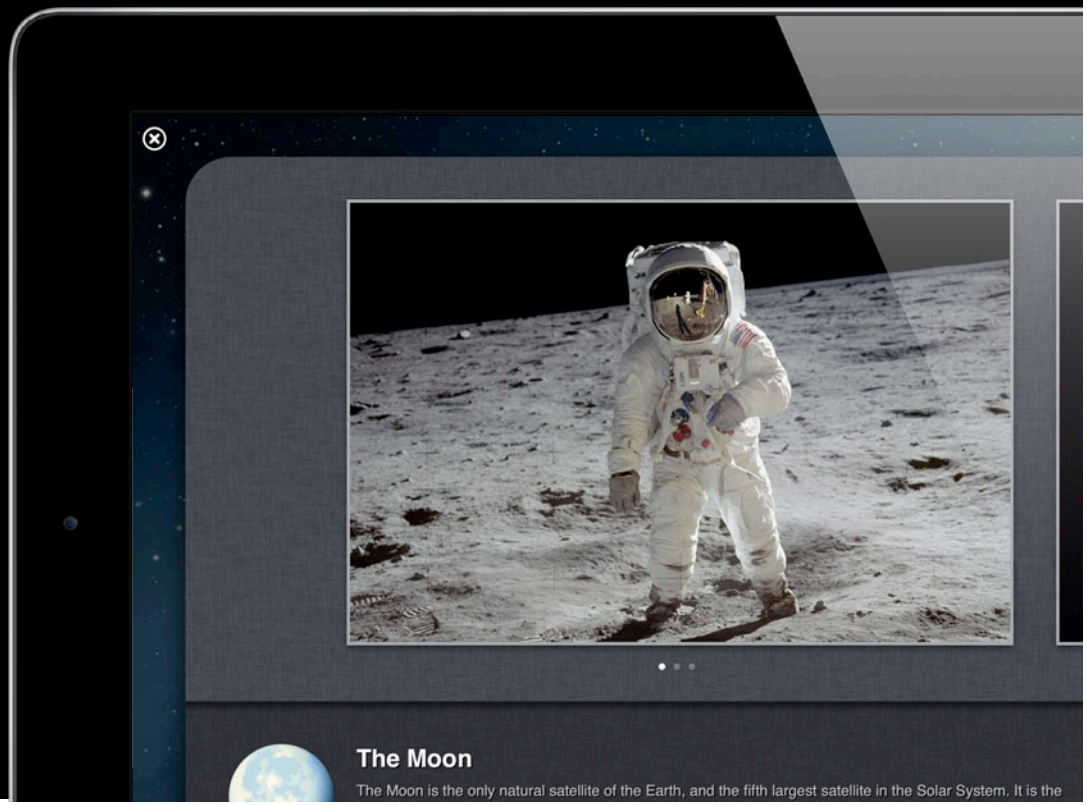
```
<div class="front" role="button"
   aria-label="The Moon">
</div>

<div class="back" role="dialog"
   aria-hidden="true">
</div>
```

Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties

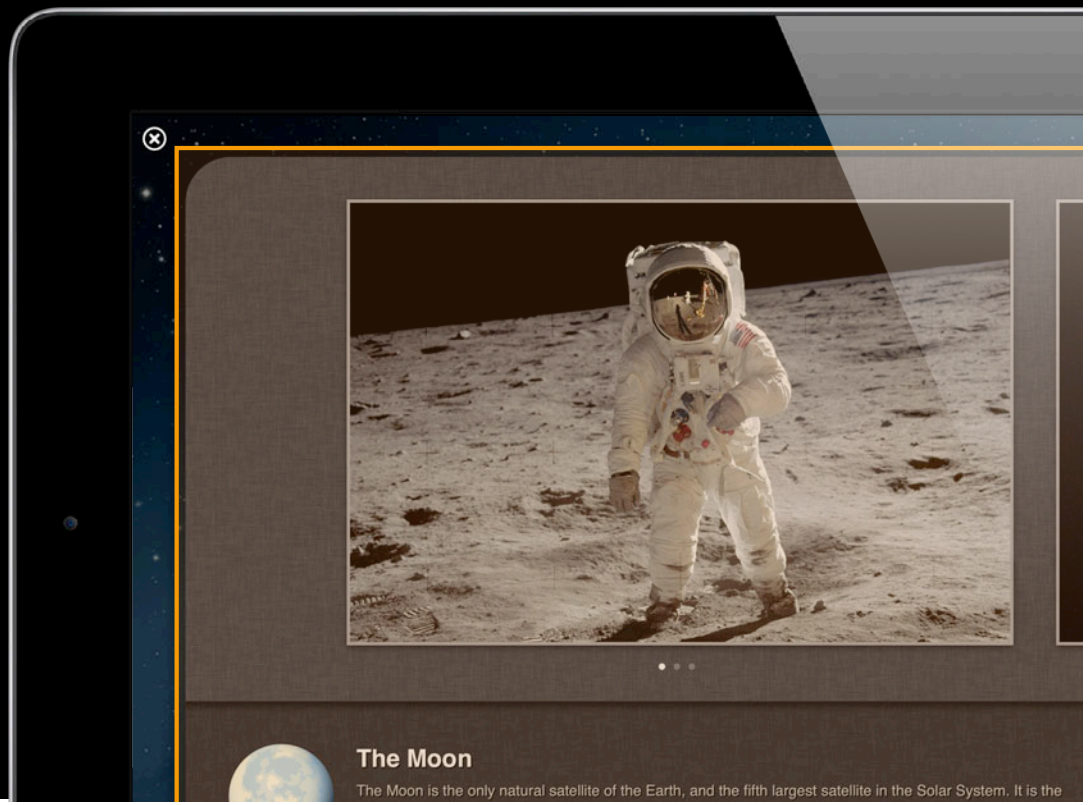


Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties

```
// show the dialog to VO
dialog.setAttribute
       ('aria-hidden', 'false');
```



Using WAI-ARIA

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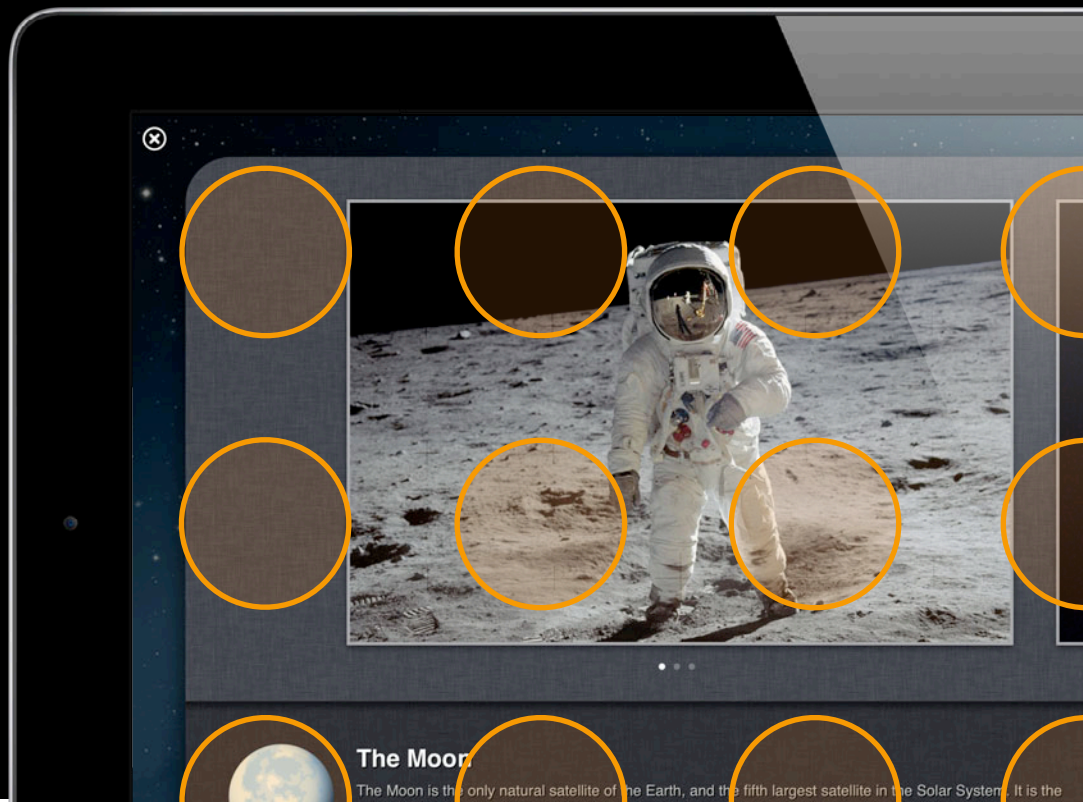


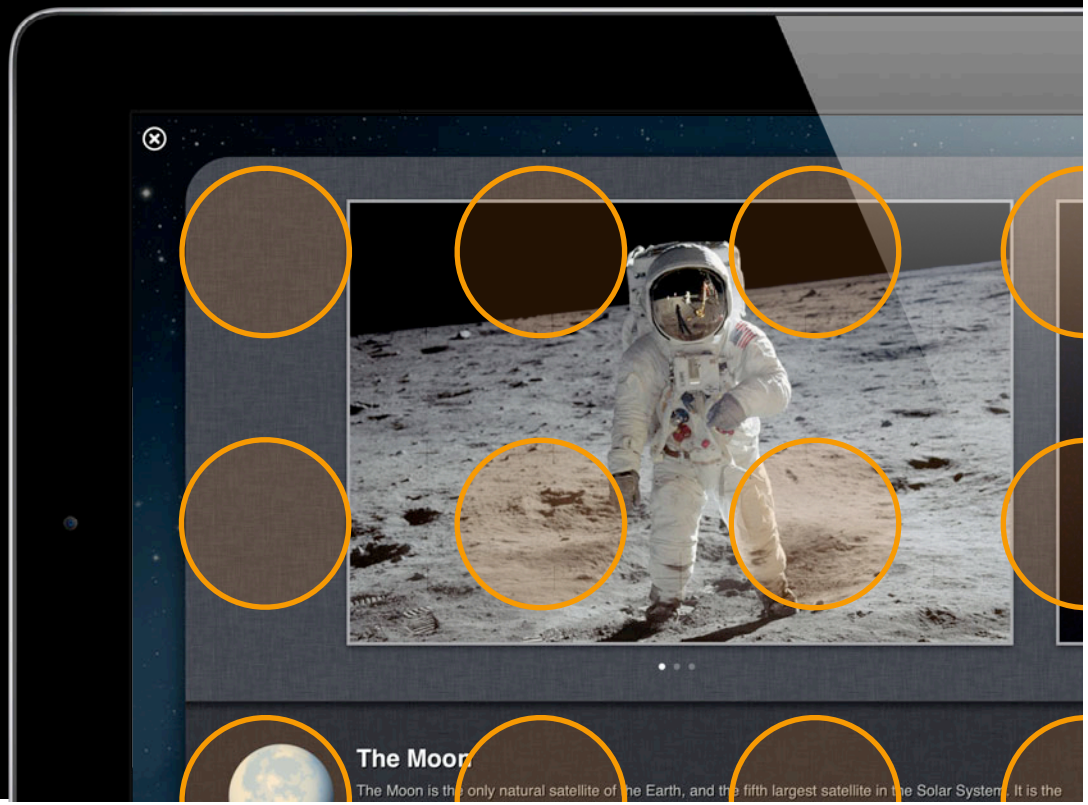
Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties

```
// show the dialog to VO
dialog.setAttribute
       ('aria-hidden', 'false');

// hide the buttons from VO
buttons.setAttribute
       ('aria-hidden', 'true');
```



Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties
- Manage focus

Using WAI-ARIA

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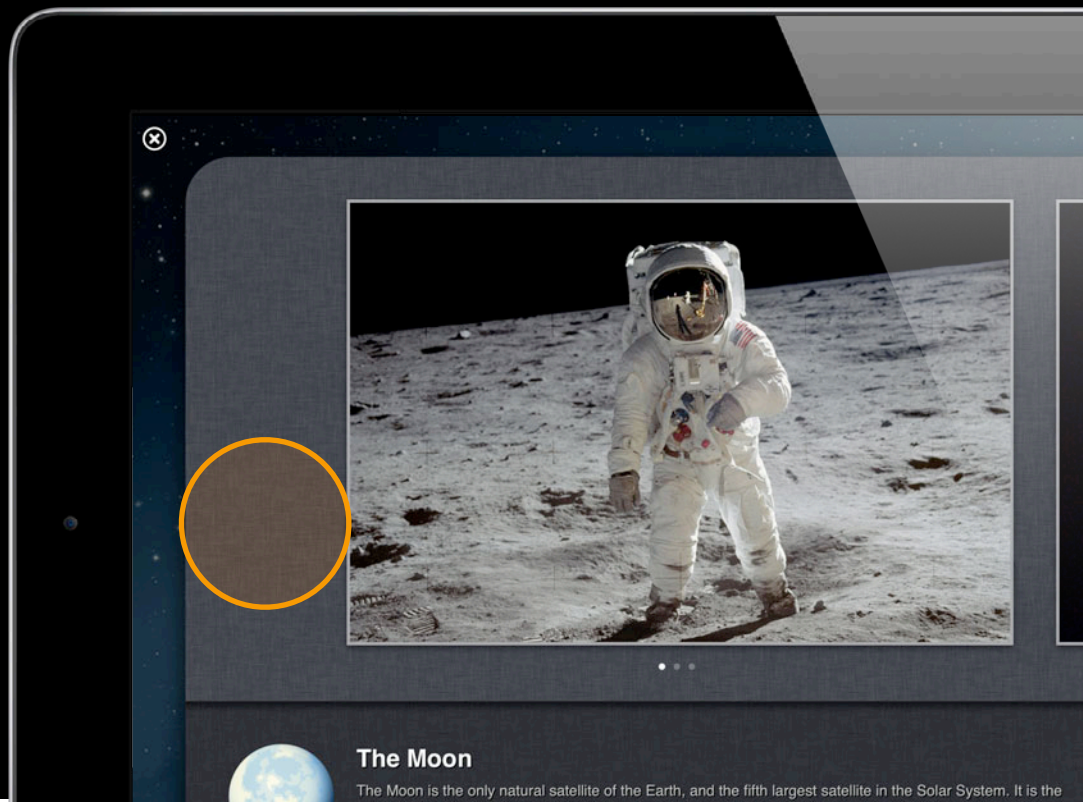
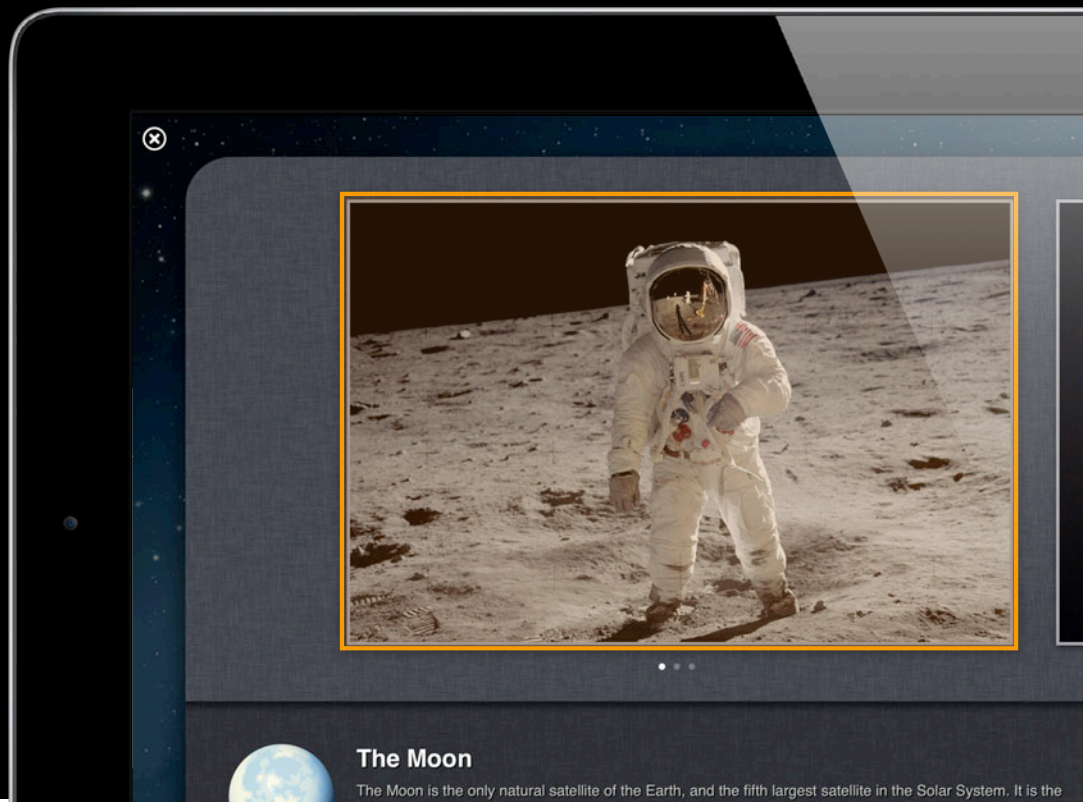


Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties
- Manage focus

```
firstImageInDialog.focus();
```



Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties
- Manage focus

Using WAI-ARIA

Accessible Rich Internet Applications

- Assign semantic roles
- Update states and properties
- Manage focus

```
triggerButton.focus();
```

Using WAI-ARIA

Accessible Rich Internet Applications

Using WAI-ARIA

Accessible Rich Internet Applications

- Retrofit old content without gutting it

Using WAI-ARIA

Accessible Rich Internet Applications

- Retrofit old content without gutting it

```
<div class="front" role="button" aria-label="The Moon"></div>
```

Using WAI-ARIA

Accessible Rich Internet Applications

- Retrofit old content without gutting it

```
<div class="front" role="button" aria-label="The Moon"></div>
```

```
el.setAttribute('role', 'button');
```

Using WAI-ARIA

Accessible Rich Internet Applications

- Retrofit old content without gutting it

```
<div class="front" role="button" aria-label="The Moon"></div>
```

```
el.setAttribute('role', 'button');
```

```
el.setAttribute('aria-label', 'The Moon');
```

Using WAI-ARIA

Accessible Rich Internet Applications

- Retrofit old content without gutting it

```
<div class="front" role="button" aria-label="The Moon"></div>
```

```
el.setAttribute('role', 'button');
```

```
el.setAttribute('aria-label', 'The Moon');
```

- Update your application state when you change element style

Using WAI-ARIA

Accessible Rich Internet Applications

- Retrofit old content without gutting it

```
<div class="front" role="button" aria-label="The Moon"></div>
```

```
el.setAttribute('role', 'button');
```

```
el.setAttribute('aria-label', 'The Moon');
```

- Update your application state when you change element style

```
el.className = 'hidden';
```

Using WAI-ARIA

Accessible Rich Internet Applications

- Retrofit old content without gutting it

```
<div class="front" role="button" aria-label="The Moon"></div>
```

```
el.setAttribute('role', 'button');
el.setAttribute('aria-label', 'The Moon');
```

- Update your application state when you change element style

```
el.className = 'hidden';
el.setAttribute('aria-hidden', 'true');
```

Focus Management

Setting VoiceOver cursor focus on iOS

Focus Management

Setting VoiceOver cursor focus on iOS

- VoiceOver cursor focus is not the same as keyboard focus!

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Setting VoiceOver cursor focus on iOS

- VoiceOver cursor focus is not the same as keyboard focus!

- Don’t focus hidden elements (and don’t hide elements that have focus)

Focus Management

Setting VoiceOver cursor focus on iOS

- VoiceOver cursor focus is not the same as keyboard focus!

- Don’t focus hidden elements (and don’t hide elements that have focus)

```
el.removeAttribute('aria-hidden');  // show the element...
```

Focus Management

Setting VoiceOver cursor focus on iOS

- VoiceOver cursor focus is not the same as keyboard focus!

- Don’t focus hidden elements (and don’t hide elements that have focus)

```
el.removeAttribute('aria-hidden');  // show the element...
el.focus();                         // ...before you move focus to it
```

Focus Management

Setting VoiceOver cursor focus on iOS

- VoiceOver cursor focus is not the same as keyboard focus!
- Don’t focus hidden elements (and don’t hide elements that have focus)

```
el.removeAttribute('aria-hidden');  // show the element...
el.focus();                         // ...before you move focus to it
```

- Use tabindex if needed

Focus Management

Setting VoiceOver cursor focus on iOS

- VoiceOver cursor focus is not the same as keyboard focus!

- Don’t focus hidden elements (and don’t hide elements that have focus)

```
el.removeAttribute('aria-hidden');  // show the element...
el.focus();                         // ...before you move focus to it
```

- Use tabindex if needed

```
el.tabIndex = 0;  // make sure the element is focusable first...
```

Focus Management

Setting VoiceOver cursor focus on iOS

- VoiceOver cursor focus is not the same as keyboard focus!

- Don’t focus hidden elements (and don’t hide elements that have focus)

```
el.removeAttribute('aria-hidden');  // show the element...
el.focus();                         // ...before you move focus to it
```

- Use tabindex if needed

```
el.tabIndex = 0;  // make sure the element is focusable first...
el.focus();       // ...or it will throw an error in some contexts
```

Demo

Creating a custom accessible widget

Review

What we have learned so far about HTML widget accessibility

Review

What we have learned so far about HTML widget accessibility

- Standard HTML accessibility techniques still apply

Review

What we have learned so far about HTML widget accessibility

- Standard HTML accessibility techniques still apply
- Use ARIA to declare application semantics where HTML cannot

Review

What we have learned so far about HTML widget accessibility

- Standard HTML accessibility techniques still apply
- Use ARIA to declare application semantics where HTML cannot
- Manage focus when application state changes

Review

What we have learned so far about HTML widget accessibility

- Standard HTML accessibility techniques still apply
- Use ARIA to declare application semantics where HTML cannot
- Manage focus when application state changes
- Test your books with VoiceOver!

Takeaways

- Books are for everyone

Takeaways

- Books are for everyone
- Accessibility is for everyone, not just those with disabilities

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- Adding accessibility to books is easy

Takeaways

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More Information

Vicki Murley
Safari Technologies Evangelist
vicki@apple.com

Apple Accessibility
http://www.apple.com/accessibility

WAI-ARIA
http://www.w3.org/TR/wai-aria

Apple Developer Forums
http://devforums.apple.com

Related Sessions

Accessibility for OS X	Marina Tuesday 10:15AM
Building Books with iBooks Author	Mission Tuesday 11:30AM
Accessibility for iOS	Russian Hill Wednesday 9:00AM
HTML, CSS, and DOM for Book Authors	Nob Hill Wednesday 3:15PM

WWDC2012