Semester Project 1

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Word count
3691

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School of technology and digital media

1. Planning and Research

1.1. Planning

I started by doing a read though all the materials to begin with to pick out the aspects that were required vs my original plan, as well as to make a site map so I know what to aim for in terms of pages to wireframe and design.
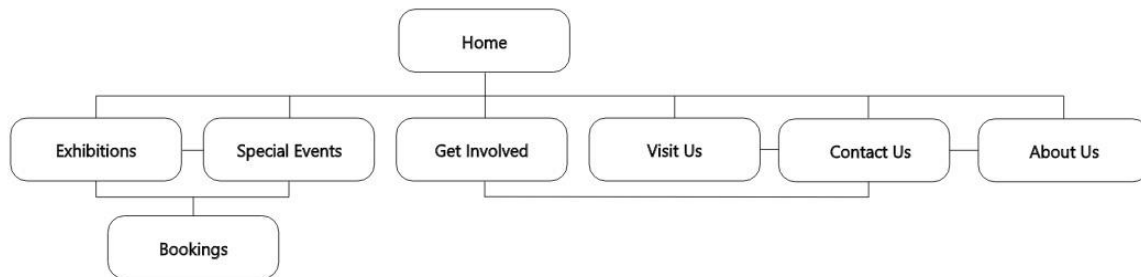

Figure 1. Initial site map.

This was my first draft of a site map, I ended up combining the contact us and booking pages together.
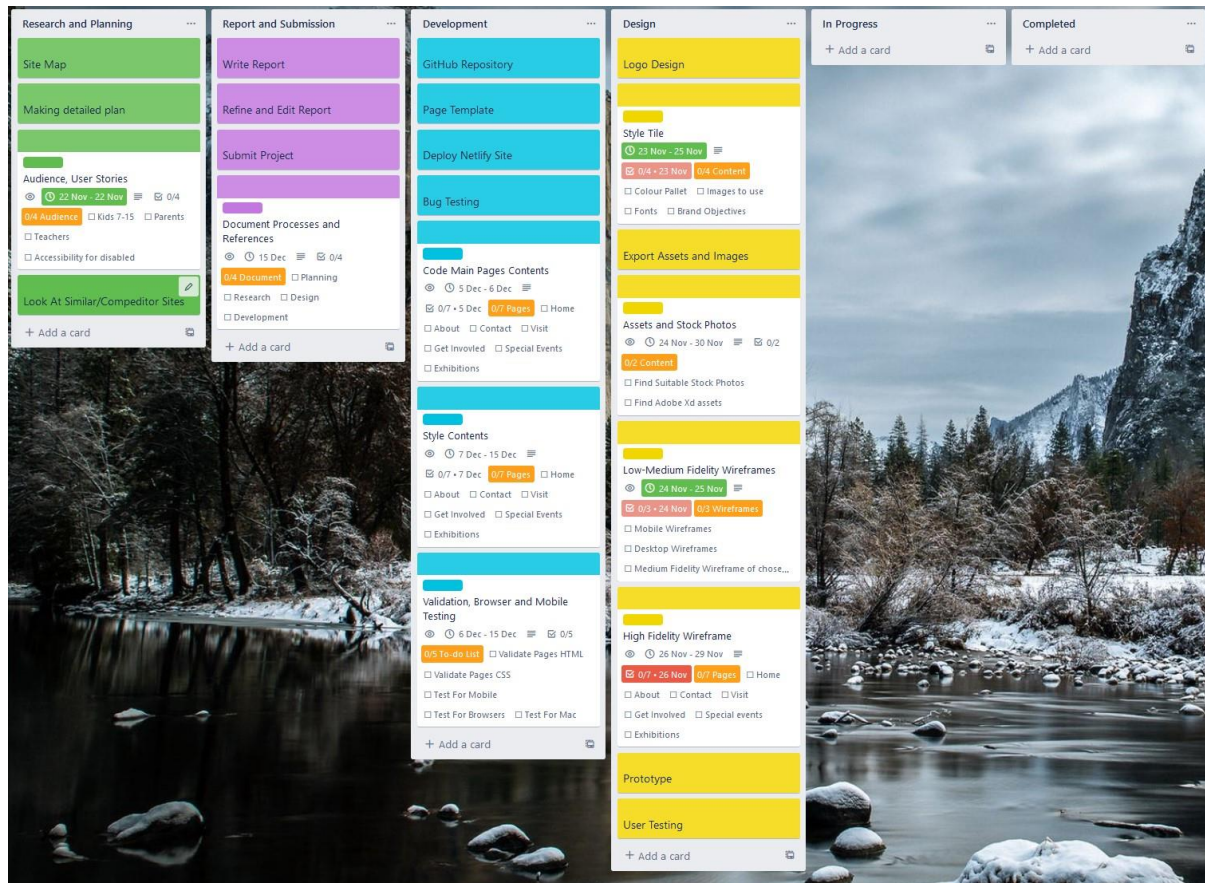

Figure 2. Trello board.

I added making a logo to the task list, as well as named the pages I would need to design and code in the check-lists, adding due dates to all the checklist items within the core tasks.
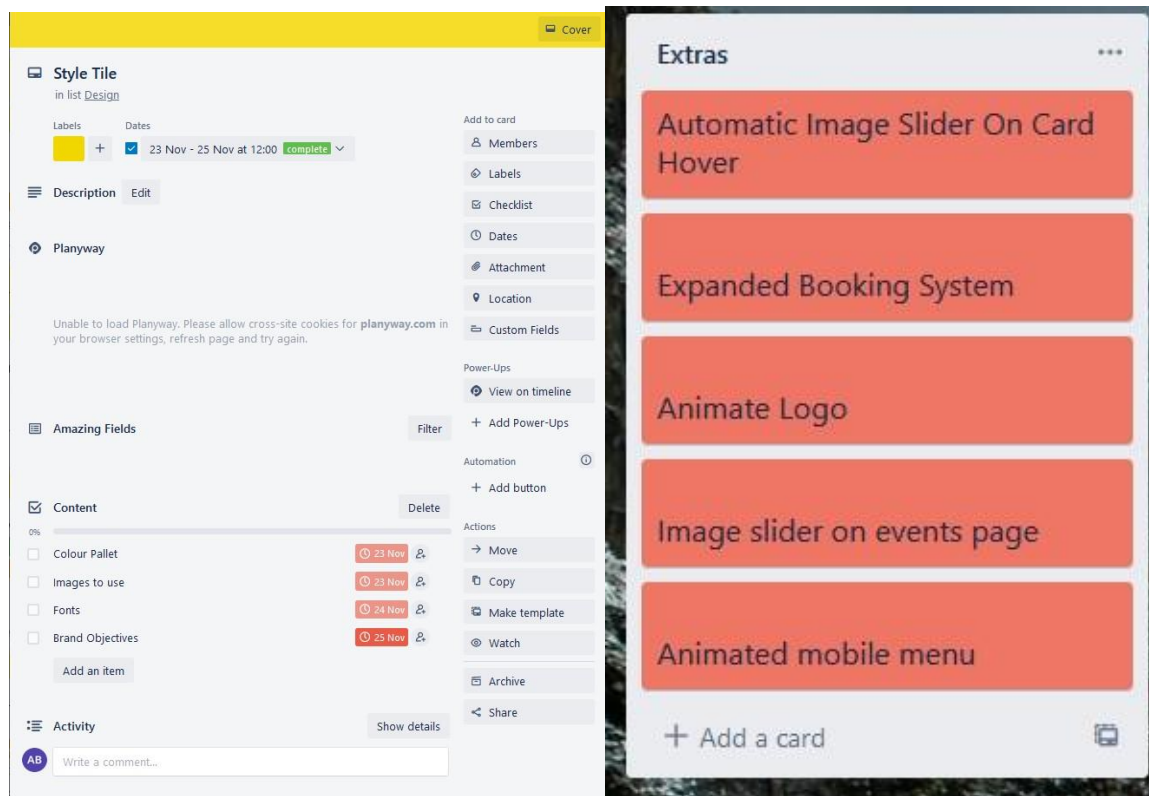

Figure 3. Example of a card with due dates on check lists.
Figure 4. Extras tasks added to Trello.

I also added an Extras section, in which I had a list of things I would like to implement if time allowed. This included;

- Animating a logo in After Effects.
- Building my own image slider on the event page.
- Animating the mobile menu icon and slide in.
- Adding an automatic image slider for some of my cards.
- Adding a more in-depth booking system.

I did not give these due dates but if I were ahead of my plan, I would devote some time to them.

My milestones had not changed much from my original and were laid out like so:

- Research and planning to be done in 1-2 days.
- Design phase of 9 days.
- 14 days to the development of the website code and testing.

- Report writing to mostly be done in the final 5-6 days before hand-in, but I documented my processes in note form throughout and adding any reference material.

The plan was mostly followed spending a couple of days less on the design phase, and a bit more time on coding. With the coding I ended up making the entire home page as the template, as it incorporated a lot of overlapping styles with the other pages.

Figure 5. Updated Planyway calendar for tasks.

1.2. Research

Once my plan was completed, I began by looking at various museum websites to get a feel for the way they layout and present their information. Of the many websites I looked at I predominately spent my time looks at the following;

- London Science Museum
- VilVite
- Science Museum Oklanhoma
- Museum of Science, Boston
- Museum of Science + Industry Chicago
- Deutsches Museum
- Universeum

1.3. User Stories

I created some simple user stories with what various users would want;

- Young kid, interested in space wants to see pictures of the exhibits on show at the museum.
- Young kid, wants something fun and exciting to do over the weekend.
- Parents, want to find fun activities for their kids to do over summer.
- Parents, with bright children looking for regular clubs and activities over the weekends for their kids.
- Parents, planning a day trip want to find the location of the museum.
- Teachers, looking for an engaging way to allow their pupils to explore the wonders of science.
- Teachers, want to book a day trip and find out about facilities for the kids.
- Researchers and volunteers, looking for ways to contribute to the museum.

2. Design and Prototype

2.1. Logo

Made in illustrator, after doodling many designs, decided to combine an atom and a solar system, then turned it into PNG and sent to adobe.

Figure 6. Logo.

With some left-over time, I also created an animated version of the logo exporting the layers from Illustrator into After Effects, I made the planets spin along the ellipses, and the sun spin around in the centre, this was then rendered into a video and opened in Photoshop where I turned it into a GIF. Initially the size of the GIF was too big to be used, so I used the website 'ezgif.com', to compress the gif, remove some frames and adjust the speed until I got it under 200kb.

2.2. Colours

I decided in the interest of accessibility to go for a light-grey/off-white on black as the core colours to give the written content and headings as much legibility as possible. I then picked out an orange from my sun logo I liked but due to poor contrasting I darken and made it more red. I then chose a purple for my buttons with the aims to use the purple for general transitions between pages and the orange more toward submitting details and forms as well as possible moving to pages that require some user input. Ultimately, I wanted to pick colours with good contrast ratios and allow the sites pictures to do most of the talking, as younger and older children are likely to be drawn in by pictures rather than blocks of text.

WCAG Color Contrast Checker
Version 1.0.5 - Acart Communications Inc.

Color Contrast Samples

		Foreground	Background	Ratio
AA AAA AA AAA colors 414	SAMPLE TEXT SAMPLE TEXT sample text sample text	#E03400 RGB(224,52,0)	#E6E6E6 RGB(230,230,230)	3.61
AA AAA AA AAA colors 489	SAMPLE TEXT SAMPLE TEXT sample text sample text	#FFFFFF RGB(255,255,255)	#E03400 RGB(224,52,0)	4.51
AA AAA AA AAA colors 404	SAMPLE TEXT SAMPLE TEXT sample text sample text	#E6E6E6 RGB(230,230,230)	#4E11BF RGB(78,17,191)	7.8
AA AAA AA AAA colors 479	SAMPLE TEXT SAMPLE TEXT sample text sample text	#FFFFFF RGB(255,255,255)	#4E11BF RGB(78,17,191)	9.74
AA AAA AA AAA colors 690	SAMPLE TEXT SAMPLE TEXT sample text sample text	#E6E6E6 RGB(230,230,230)	#000000 RGB(0,0,0)	16.83

Figure 7. Contrast Checker read outs for my colours from contrastchecker.com.

2.3. Typography

For my font I took a selection of standard and popular fonts from google fonts, placing them on a page in Adobe XD to compare their overall feel in relation to each other and then picked base on the easiest I found to read on a screen.
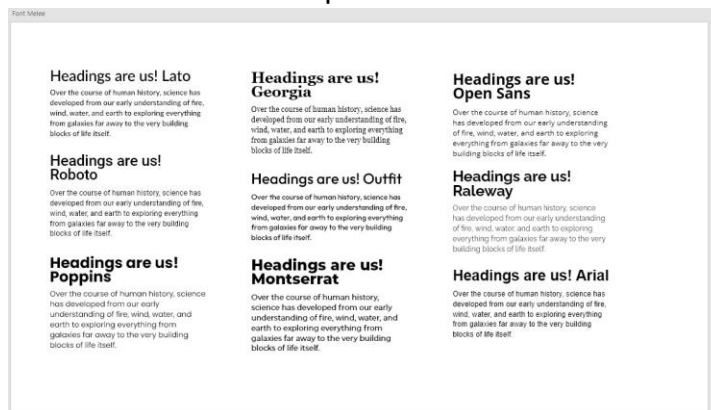
Figure 8. Font comparison page.

I ended up using 'Outfit' medium weight for my body text, semi-bold for my h1, extra-bold for my h2, and bold for my h3, with the font sizes varying from desktop to mobile for my h1 and h2s, for the body I kept it the same throughout. For my buttons I opted to use Lato bold.

2.5. Images and Icons

I spent a bit more time than planned looking for suitable pictures to use for the headers, card images and exhibit images. As well as additional images I used for creating some image sliders. With the way I ended up setting up my headings and exhibits page, I had to try and find some images where the content was appropriately positioned for my setup.

I got my icons from the 'Icons 4 Design' adobe plugin, predominantly from 'Font Awesome', but in the case of a dinosaur head icon I made my own by tracing a T-rex head image in illustrator, smoothing the lines, and cutting out the details, then converting it into a PNG image for adobe XD usage.

Figure 9. Dino head icon creation.

2.5. Style Tile
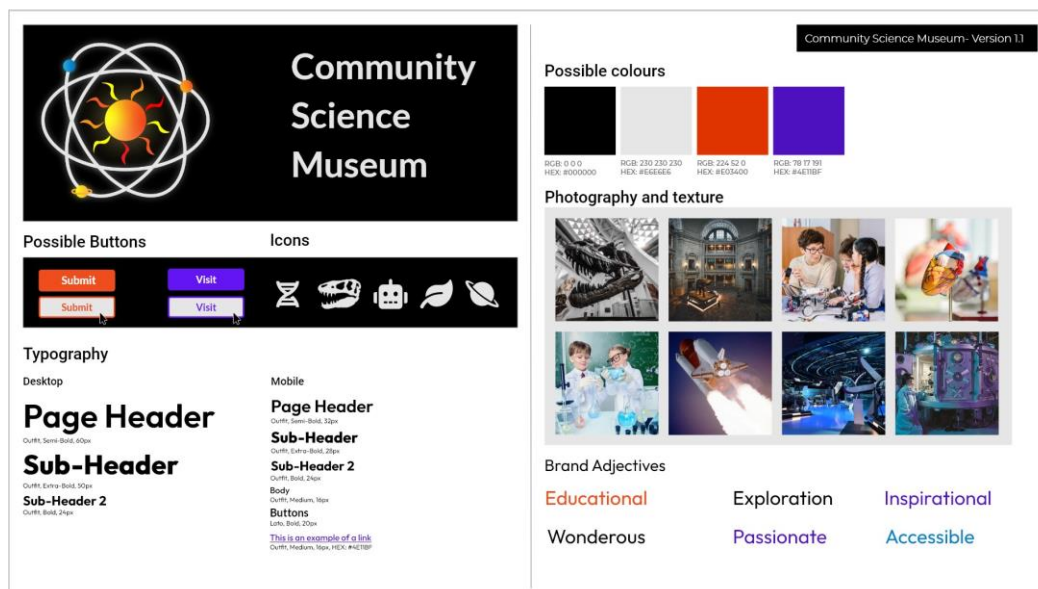
Figure 10. Final version of style tile.

2.6. Low Fidelity Wireframes
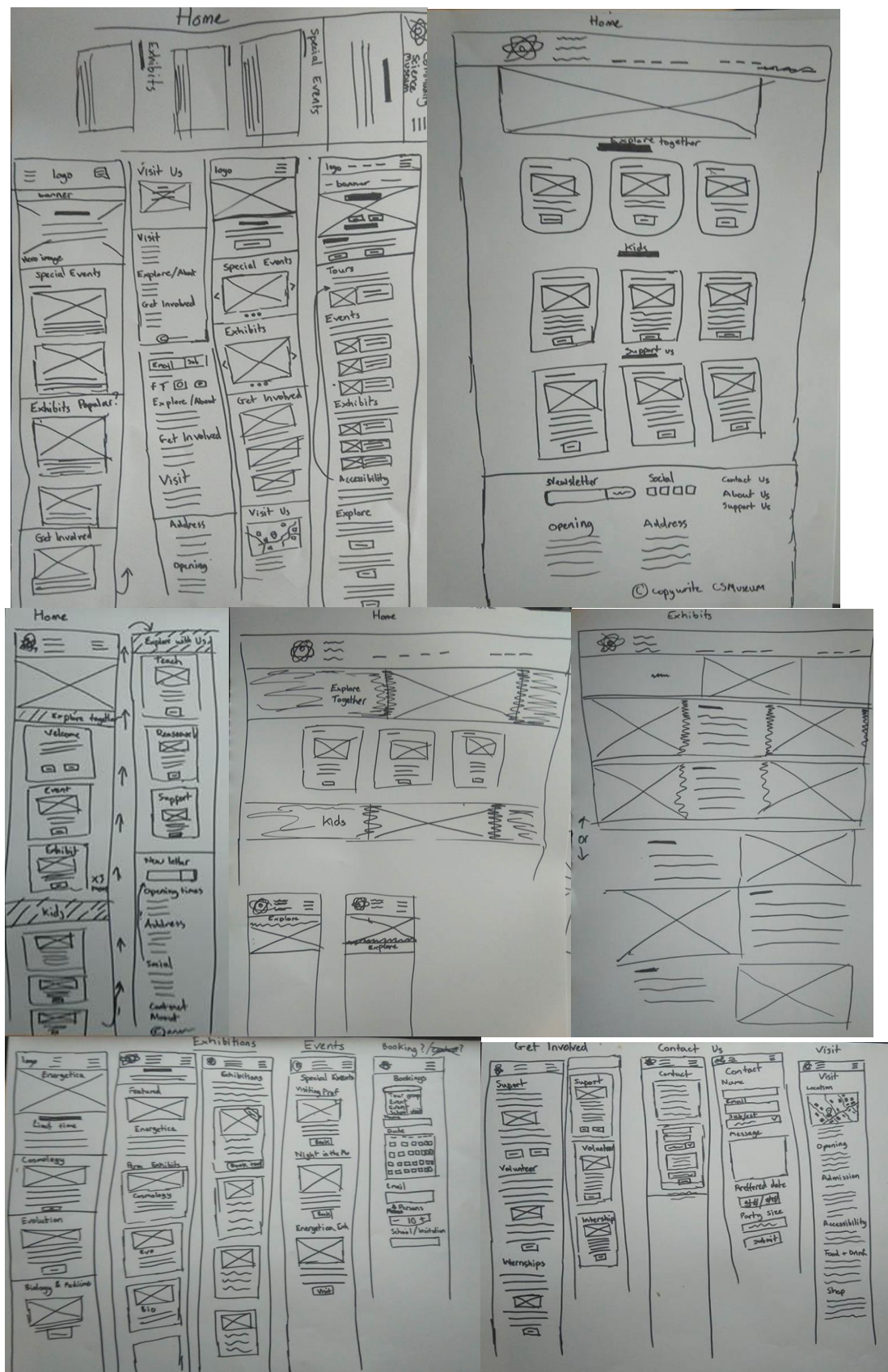
Figure 11. Wireframe images.

I created several wireframes for mobile once I decided on the ones, I liked I scaled some of them up for desktop to get a feel for how I want things to grow. I then quickly made some medium fidelity versions in XD and tweaked some things that didn't quite work as intended, these then gradually evolved into my higher fidelity designs.

2.7. High-Fidelity Wireframe

Once I was happy, I expanded upon my medium fidelity designs and started adding images, and making components. I used a lot of images across the design as pictures are a fantastic way to appeal and draw a younger audience, for a real museum I would have used a lot of images of the exhibits and facilities themselves mixed in with relevant images relating to the content, and divide the exhibits themselves onto their own individual pages.

I made the main heading and sub-heading for each page follow the same style with an image above or to the side of it depending on the screen size, and an overlay to blend the edges into the heading texts background. This setup would also avoid having text over images which could create contrasting issues.

I then made cards which would house my content and be used across most of my pages, I also added a hover effect where by the cards with links on them would appear to lift off the page.

Most of my pages follow a card layout with 1/2/3 cards or 1/2 cards, but for my exhibits page I tried to do something a bit different, I encompassed the text in pictures top and below for mobile and then left and right on larger screens adding an overlay to fade the edges into the text, I am pretty happy with the way this turned out, after some fiddling.

2.8. Prototyping and User Testing

When I creating my high-fidelity design, I had a template page of main components so when I began the prototype, I could simply link all the buttons and links across my pages with that one. Due to the nature of my card hover I had to make each card individually and link it so the main components for them are on their pages. I then created an image slider for the events page as I was ahead of my planned schedule.

For my user testing I handed my design to some family members to find bugs, problems and make minor changes to the design before finalising it and moving onto coding.

2.8. Closing thoughts on design

I was pleased with the design I produced, this time having a better understanding of my limitations made it easier to plan out my design and features. I do wonder if I should have been a little more adventurous with the colouring but prioritised ensuring its colouring was accessible using images to draw the audience. The use of the cards allowed for a straightforward way to lay content out in grids for responsiveness, as well to contain the text and avoid too much sprawl.

3. Coding and Deployment

3.1. Page Template

For the header I used view port percentages with max widths on elements to allow responsive growth to its max size. I also added a hover effect to my logo, from a PNG to the animated GIF. For the nav links I added a hover underline using the before element, creating a dot the same colour as the background to the left and when hovered over it expanded and changed colour to my light grey, using this hover style as a current page indicator as well to indicate a user's place in the website.
I enclosed my weblinks as a list in a nav element, then used the hamburger menu hack hiding the menu items off to the side so it would slide in and out from the left. I animated the hamburger menu to a cross, after having seen plenty ways to do it most notably on 'Slider Revolution, Hamburger Menu Icons and Their Animations'. I kept it simple making 3 divisions, as the bars, and set the top and bottom to shift their positions and rotate 45 degrees to the centre, and the middle division to disappear. I later change the divisions to spans as this generated an error in the validator.

In one of the list items in my nav, I also added a division with more specific links to the section IDs on the exhibits page, which I hid when the menu expanded on larger screens adding a hover to display it. I added my icons in the after element as background images as the before was being used for the hover effect. I originally tried to add them in the content of the element but I had problems sizing them, looking at a question on 'Stack Over Flow' I found the solution, making them background images instead.

For my footer I created a grid and added my content, for the social media I originally tried to have an image which would fade on hover with a coloured version as a background image, but even with the container set to the same size things did not line up on the page. So, I just put two images in and swapped the display state on hover.

Figure 12. Icon misalignment on back background images.

My newsletter email input I created a container and filled it with the input overlaying the submit button on top. Styling it with my CTA pre-set, as well as removing the safari stylings.

3.2. Wrappers, HTML and CSS

I created a main styles sheet and then an additional sheet if another page needed it to add the adjustments required to keep the header images positioned appropriately, as well as to make page specific adjustments in the end I had 5 additional sheets, the exhibits and about CSS stylesheets were combined. I laid out my colours and font stylings in the root to make it easier for me to add them to elements later.

As I wrote out the main HTML, I create some general grid layouts to use expanding from 1-2/3 depending on the amount of text and content, as well as what looked good for the content. My design had the content contained in a 1300px wrapper but I expanded it to 1400px allowing a bit more space for things to fill out. I made sure to added headings to each section, most of my card have h3 as their headings but in the case of cards directly below the main h1, I opted to have 1 card have a h2 that was descriptive to the rest, or apply h2s to all the cards, especially on pages without a h2 image heading place. I also added a unique title and description to each page in the head meta tags.

I validated the pages using w3 html checker and corrected any errors and warnings.

3.3. Components

The headers and subheadings had a fixed height on larger screens, so I used viewport width allowing them to expand outside their containers as needed hiding the overflow, I cropped and sized the images for best effect with 2 images swapping them from smaller to larger screens. I add an overlay to them with a gradient to darken the transition of them to the edges. Mobile to desktop, images go from above to the right, so a changed the flex direction from column to row, as well as reversing the row flex direction. I then set the text flex to 1 and the image to 2. In the case of my h1 I expanded its wrapper to allow the image span across to the edge of 1920px screen size, leaving the h2's contained with the page content wrapper. Due to the nature of this design I had to adjust the image positions individually depending on their content at tablet screen sizes.

For my page content I made a card template as well as pre-set CTA styles for buttons. The content within the cards was placed into two divisions with a grid to ensuring the card link is at the bottom in line with other cards links. I then added a hover effect made by shifting margins on the cards, and increasing the box shadowing size. I created a class for content that did not need a hover effect as it had no CTA elements, and for the contact forms as I thought it might get annoying as you fill in the forms.

For the visit page to get my map I simply picked a building on Google maps and used an embedded link to add an interactive map, then styled the CSS to increase its height at break points.

For the events pages I wanted to make an image carousel, where the images would slide from one to the next. I looked at a lot of different ways to do predominately taking from Chris Coyier, "CSS-Only Carousel" article and some CSS only examples on APPCODE, "15 CSS Image Slider Examples and Code" article. I used radio buttons labels to control the movement of the slider making a strip of images by setting the width of the image sider to the number of images times 100% hiding the overflow, then simply shifting the margin of the slider a negative percentage to get the next image. I made two labels absolute positioned either side of each image to shift back and forth between images, making some arrow heads using code from a CSS Tricks article 'The Shapes of CSS'. I also added a set of label buttons along the bottom to click to any image in the slider. With media queries I adjusted the size of the buttons and side arrows for different screens and added hover effects for desktop sizes.

After I made my image slider, I also added a variation of it to my cards so an animation would trigger when hovering on the card. In this case I had to add a best fit view width percentages to the heights of the images, and adjust in the media queries as the grid columns grew. Because in Safari my images began to stretch and grow randomly from card to card without it, I was unable to find a cause having set no image heights, and not having the problem on my events slider or any other browser I tried.
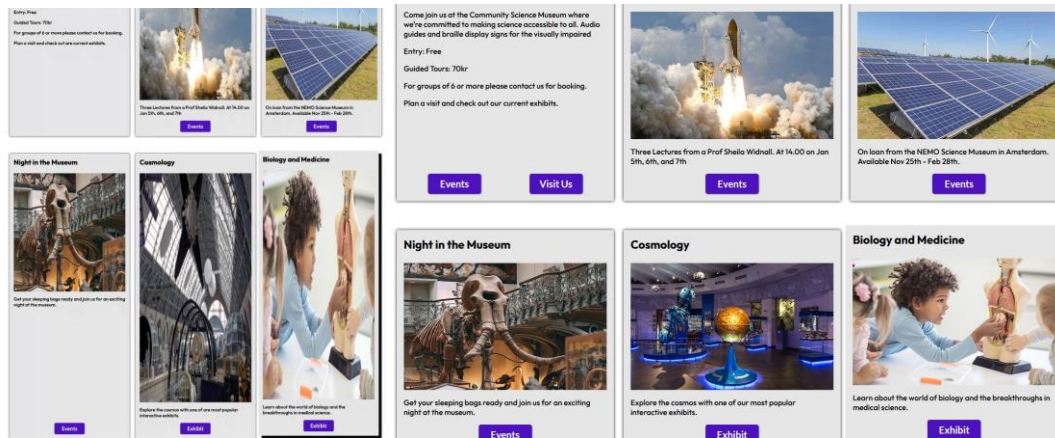
Figure 13. Safari image slider cards without set heights vs other browsers.

For my exhibits page and about us page my designs differed from the standard format, and are similar to my headers in their use of overlays to fade the images into the text areas. For mobile my images appear top and below the text with linear gradient overlays that faded into the text. Then on desktop my images were left and right, with overlays that faded into the text and the edges of the screen to maintain the effect on larger screen sizes. In this case I use max heights on my images to ensure they filled their containers and allow them to expand beyond them, hiding the overflow setting them absolute positioned and horizontally centred. I added some extra classes to images to adjust positioning in the media queries for tablet screen sizes.

3.4. Images

I used a lot of them so I cropped them all to the same aspect ratio based on their usage and I made sure after my pages were laid out to get the maximum sizes the images might be blown up to and then cut the image sizes down to size to try and get them as small as possible with the aims to get them under 100kb where possible to avoid making the page loading too heavy. In the case of my heading images, I allowed them to get a bit bigger upto 150kb as these were to grow bigger. As I had a lot of images, and to make it easier to find them I separated them base on what they were for making folders for events, exhibits, headings, and other images.

3.5. inputs and forms

For my contacts page I had two forms, a query form, and a booking form. The query form was a simple set of email, text, and text area inputs with required attributes and a submit button. The booking form included a date input with a

minimum date, further validation would require java such as preventing bookings on Mondays as well as to adjust the time selection inputs options based on daily opening hours. I then added a number input for party sizes allowing for values between 6-50 I also added a tool tip to the label using a method learn from Kevin Powell, "CSS Before and After pseudo elements explained - part two: the content property" YouTube video. I left date and time inputs to their default styling only removing the border radius as getting a uniform look across browsers would require a bit of java.

3.6. Media Queries

My site has 2 main break points for the grids in the media queries at 600px for the double card grid and then 900px for 3 cards, as well as the expansion of my nav bar. I also have an additional break point at 1300px which I use for adjustments to the page headings, exhibits and about us pages to allow their images to nicely expand to full screen sizes.

3.7. Validation, Accessibility, Bug, and User Testing

As I coded my pages, I regularly check the results and fixed visible bugs in both Firefox and Chrome. As I finished pages, I would then check the results on my pad and phone to find bugs on android. Once all my pages were complete, I began using "TestingBot" to check out my site on safari as I don't own any apple devices.

I ran my CSS files through W3Cs validation website to look for errors correcting any that I found. I also ran my completed site through Waves web accessibility evaluation tool, and tried to correct the errors. I was unsure what to do about my hamburger menu as the label produced an error as it contained no content, also my image slider on the event page produced a lot of errors with labels too something that might be easier to address and fix using java scripts in the future.

Once all the bugs I had found were fixed I began giving the weblink to family and friends to have them find further bugs and give me input on aspects that I could improve. Creating a further check list of minor bugs to fix for the final deployment.

4. Conclusion

Overall, the site meets the requirements for SEO with unique meta tags for every page, the content laid out hierarchically in the html, and a simple navigation with an identifier for the current page, as well as the page heading reinforcing that. The colours are WCAG compliant for their uses with the main navigation, headings and content having good contrast values. I have tried my best to avoid the site being overly heavy by cutting images to their intended sizes and only used my on-hover image slider on the first homepage section. The site is responsive although there are elements to the way I designed my exhibits page that make the images look a little squeezed around the breaking points, in future project I think it might be good practice for me to create a simple mock-up of a tablet size for my designs to address potential problems earlier. My user testing has been positive amongst family and friends with no problems navigating around the site and minor bugs they found were easily fixed.

5. References

5.1. Hamburger menu animation
SR Staff, "Cool CSS Hamburger Menu Icons and Their Animations", August 2, 2021. https://www.sliderrevolution.com/resources/css-hamburger-menu/ [accessed: Dec – 2021]

5.2. Icons on hover menu

Stack Over Flow, "How to change the size of an image inserted with "::before" or "::after" peudo-element in CSS", 2017. https://stackoverflow.com/questions/41584709/how-to-change-the-size-of-an-image-inserted-with-before-or-after-peudo-e [accessed: Dec – 2021]

5.3. Image sliders

APPCODE, "15 CSS Image Slider Examples and Code", September 12 2021. https://appcode.app/15-css-image-slider-examples-and-code/
 https://appcode.app/ [accessed: Dec – 2021]
From article I focused on the code from these 4 examples for inspiration;
- Dudley Storey, "HTML CSS Driven Responsive Image Slider", https://codepen.io/dudleystorey/pen/kFoGw
- Joshua Hibbert, "Pure CSS Featured Image Slider", https://codepen.io/joshnh/pen/KwilB
- Sandra Vos, "Image Slider CSS Only", https://codepen.io/sandra90/pen/xwMGgB
- Mayur Birle, "Pure CSS3 Responsive Slider", https://codepen.io/mayurbirle/pen/eEevBZ

Chris Coyier, "CSS-Only Carousel", Jan 10 2020. https://css-tricks.com/css-only-carousel/ [accessed: Dec – 2021]

Chris Coyier, "The Shapes of CSS", Oct 1, 2018 (Updated on Feb 13, 2021). https://css-tricks.com/the-shapes-of-css/ [accessed: Dec – 2021]

5.4. Tool Tip

Kevin Powell, "CSS Before and After pseudo elements explained - part two: the content property", 22 Feb 2018. https://www.youtube.com/watch?v=xoRbkm8XgfQ&t=207s [accessed: Dec – 2021]

6. Research and Inspiration

London Science Museum,
https://www.sciencemuseum.org.uk/home

VilVite,
https://www.vilvite.no/english

Science Museum Oklahoma,
https://www.sciencemuseumok.org/smoathome

Museum of Science, Boston,
https://www.mos.org/explore/exhibits

Museum of Science + Industry Chicago,
https://www.msichicago.org/

Deutsches Museum,
https://www.deutsches-museum.de/en

Universeum,
https://www.universeum.se/experiences/space/

8. Resources Used

TestingBot, browser and device testing,
https://testingbot.com/

GIF compressor
https://ezgif.com/

Contrast Checkers
https://contrastchecker.com/
https://webaim.org/resources/contrastchecker/

Waves web accessibility evaluation tool
https://wave.webaim.org/

W3 validators for HTML and CSS
https://validator.w3.org/nu/
https://jigsaw.w3.org/css-validator/

GTmetrix, site performance checker

https://gtmetrix.com/