STARDEW VALLEY

Missed Connections

Why Stardew?

- Back in March when COVID was just hitting, my partner and I were living apart and made the difficult decision to stay apart until we were able to move in together in June.

- Because of this, we needed new ways to stay connected and he suggested video chatting and playing Stardew Valley together

- Our shared virtual farm got me through a dark time and the game will forever have a special place in my heart

What is Stardew Valley?

- Stardew Valley is an open-ended country life RPG (role playing game) where you maintain a farm and interact with the villagers in the valley

- The game is data rich with information available about the NPCs (non-playable characters) and the hundreds of items in the game, so I immediately wanted to visualize everything

Items

- There are 372 sellable, giftable items in the game with 8 distinct uses:
  - Creating artisan goods
  - Creating refined goods
  - Creating clothing (tailoring)
  - Building farm buildings
  - Cooking meals
  - Crafting other items
  - Gifts to NPCs
  - Quests
  - Donation to the Museum
  - Donation to the Community Center
- Items are the connecting factor in my project
  - Each visualization has the central theme of items and how they can be used

Backpack inventory (bottom) and storage chest inventory (top)

Item Categories

Mineral
- Gems and minerals commonly found in the mines or in geodes

Artifact
- Items found from digging up worms and that can be donated to the museum

Fish
- Can be caught with a fishing pole or crab pot

Crop
- Grown on the farm, seasonal

Artisan Good
- Edible Item (or wool) + Equipment

Refined Good
- Ore or Quartz + Furnace

Dish
- Result of cooking items at the stove with a recipe

Resource
- Common items used mostly in crafting other items

Animal Product
- Items created or dropped from farm animals

Foraged
- Items found on the ground around the map

Non-Playable Characters (NPCs)

Marriage Candidates

Alex   Elliott   Harvey   Sam   Sebastian   Shane

Abigail   Emily   Haley   Leah   Maru   Penny

- Can befriend any of these NPCs, marriage or non-marriage
- Friendship points gained by giving good gifts and completing quests for the character
- As you befriend an NPC, you see cut scenes that give details about them and their personality

Non-Marriage NPCs

Caroline   Clint   Demetrius   Dwarf   Evelyn   George   Gus

Jas   Jodi   Kent   Krobus   Lewis   Linus   Marnie

Pam   Pierre   Robin   Sandy   Vincent   Willy   Wizard

Community Center

- The Community Center, if restored, will be a gathering place for villagers and the process of restoration builds friendship with the villagers
  - Bundles are made up of donated items
  - Completing all bundles will:
    - Make various infrastructure improvements around town
    - Give friendship points
    - Make the JojaMart go out of business with the opportunity to complete one last bundle and unlock a movie theater
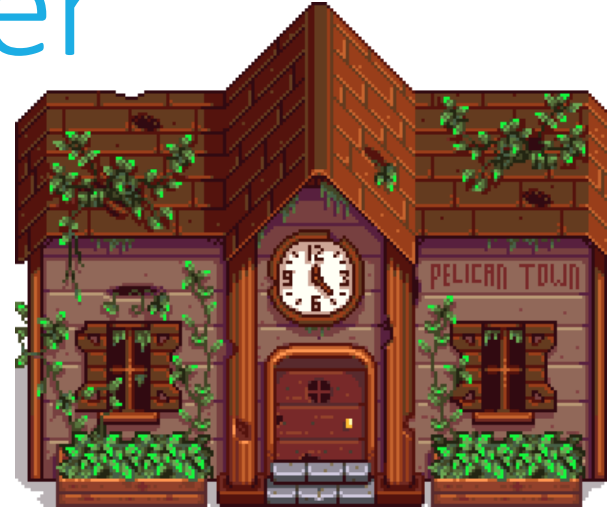
Community Center Before

Community Center After

JojaMart

- JojaMart is the big box grocery story in town, they want to put a warehouse where the old Community Center is
  - Bundle completion can be purchased for $140,000
  - Completing all bundles will:
    - Make various infrastructure improvements around town
    - Replace the Community Center with a JojaMart Warehouse
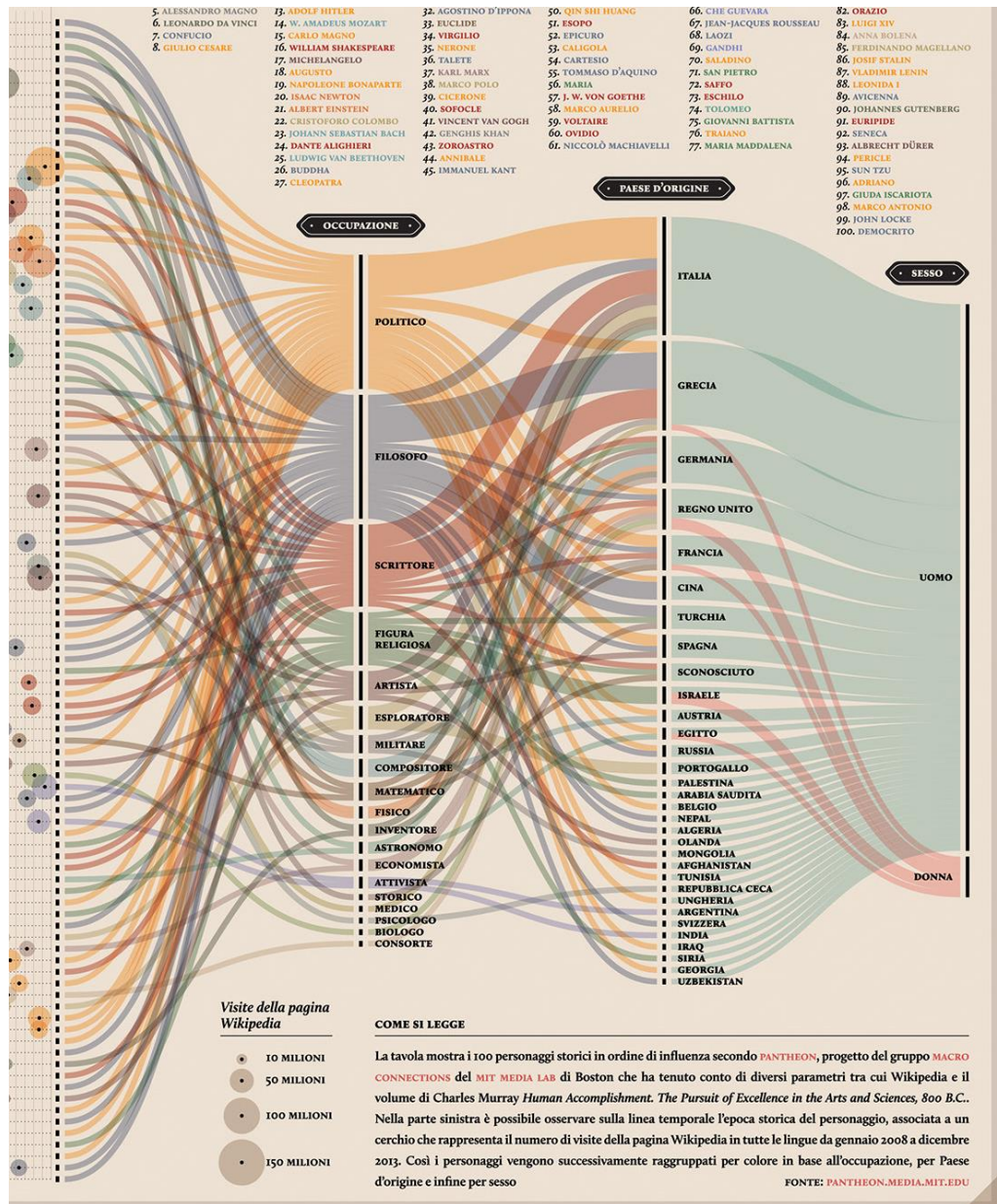

Community Center Before

JojaMart Warehouse

Project Vision

- My vision for this project is to create a web app that will compile the most useful/important information needed while playing the game and visualize it

- The current resources on the game are the Wiki, the Official Guidebook, and the Lookup Anything mod, all of which do something similar, but are not data focused and do not include any data viz

- I want to take inspiration and information from those existing sources to create a data focused application that users can reference and explore while playing the game

Inspiration

- I was inspired by complex chord and alluvial diagrams, as well as the Look Up Anything Mod for the game

- Nadieh Bremer's Ode to Cardcaptor Sakura was particularly inspiring, as well as the Pantheon alluvial diagram from Behance

- These inspired my design, but the content and functionality was inspired by the Look Up Anything mod on GitHub. It combines your game data with info from the Wiki to make your in-game experience seamless

Nadieh Bremer's An Ode to Cardcaptor Sakura:
https://www.visualcinnamon.com/portfolio/cardcaptor-sakura

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Pantheon Alluvial Diagram on Behance:
https://www.behance.net/gallery/26338543/PANTHEON-Corriere-della-Sera-La-Lettura-181

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Lookup Anything Mod on GitHub:
https://github.com/Pathoschild/StardewMods/tree/stable/LookupAnything#showcase

Apple. Fruit.
A crisp fruit used for juice and cider.

Needed for	community center (Bulletin Board: Fodder, Pantry: Artisan), full shipment achievement (ship one)
Sells for	100g (200g for stack of 2)
Sells to	shipping box or Pierre
Likes this	Abigail, Alex, Caroline, Clint, Demetrius, Dwarf, Elliott, Emily, Evelyn, George, Gus, Haley, Harvey, Jas, Jodi, Leah, Lewis, Linus, Marnie, Maru, Pam, Penny, Pierre, Robin, Sam, Sandy, Sebastian, Shane, Vincent, Willy, Wizard
Recipes	Cooking: Cranberry Candy (needs 1) Key:

Abigail. Villager.

Birthday	Fall 13
Can romance	yes
Friendship	❤❤❤❤❤❤❤❤♡ (next in 150 pts)
Talked today	no
Gifted today	no
Gifted this week	0 of 2
Loves gifts	Amethyst, Blackberry Cobbler, Chocolate Cake, Prismatic Shard, Pufferfish, Pumpkin, Rabbit's Foot, Spicy Eel
Likes gifts	Algae Soup, Apple, Apricot, Aquamarine, Artichoke Dip, Autumn's Bounty, Baked Fish, Bean Hotpot, Beer, Blue Jazz, Blueberry Tart, Bruschetta, Carp Surprise, Cheese, Cheese Cauliflower, Cherry,

Audience

- My main audience are *fellow Stardew Valley players*, but I also want to include:
  - Members of the r/StardewValley subreddit
  - Members of the r/dataisbeautiful subreddit
  - Data visualization practitioners and fans
  - Potential future employers and clients
  - Myself! I plan to use my tool once it's complete and think it'll be useful while playing the game

- Designed with audience in mind
  - Included helpful, intuitive filters
  - Incorporated images from the game
  - Web link will be easy to bookmark and access while playing the game

Data Sources

- Data for this project comes from 2 major sources:
  - Data I've collected myself from the Stardew Valley Wiki
  - A spreadsheet from Reddit user u/LasagnaTheories

- The Reddit spreadsheet saved me a lot of time and effort, even though there were some problems with it
  - Not formatted for data viz
  - At least one significant game version out of date – needed manual checking of some values

Item info pane from the Wiki

Data – Reddit

- Data from the Reddit spreadsheet was used in 2 charts:
  - Sankey diagram of items and their uses (and other variables)
  - Dendrogram showing Community Center bundle hierarchy

- Data collected included:
  - Item name, season available, and sale value
    - Eventually joined to my Wiki data
  - Bundle hierarchy (room name, bundle name, bundle requirements)

Spring

Cat.	Plant	Seed Price	Sell Price	Sell Price	Sell Price	Preserve	Keg	Days	Yield	Profit	Profit/d	Reharvest	Profit/Season	Harvests	Profit/Season/d	Place	Continuous	Notes
Fruit	Cherry (Tree)	3,400G	80G	100G	120G	210G	240G	28	-	-	-	-	-	-	-	General Store	Yes	
Fruit	Apricot (Tree)	2,000G	50G	62G	75G	150G	150G	28	-	-	-	-	-	-		General Store	Yes	
Fruit	Ancient Fruit	0G	750G	937G	1,125G	1,550G	2,250G	28	1	750G	-	8 Days	-	-	-	?	Yes	
Fruit	Strawberry	100G	120G	150G	180G	290G	360G	8	1	20G	2.50G	4 Days	500G	5	17.86G	Spring Egg Vestival	Yes	
Veg	Rhubarb	100G	220G	275G	330G	490G	495G	13	1	120G	9.23G	13 Days	240G	2	8.57G	Desert Store	No	
Veg	Potato	50G	80G	100G	120G	210G	180G	6	1.25	50G	8.33G	6 Days	200G	4	7.14G	General Store	No	Multiple per harvest
Veg	Cauliflower	80G	175G	218G	262G	400G	394G	12	1	95G	7.92G	12 Days	190G	2	6.79G	General Store	No	
Veg	Green Bean	60G	40G	50G	60G	130G	90G	10	1	-20G	-2.00G	3 Days	180G	6	6.43G	General Store	Yes	Impassable, multiple yield
Veg	Kale	70G	110G	137G	165G	270G	248G	6	1	40G	6.67G	6 Days	160G	4	5.71G	General Store	No	
Veg	Garlic	40G	60G	75G	90G	170G	135G	4	1	20G	5.00G	4 Days	120G	6	4.29G	General Store	No	
Veg	Parsnip	20G	35G	43G	52G	120G	79G	4	1	15G	3.75G	4 Days	90G	6	3.21G	General Store	No	
Flower	Blue Jazz	30G	50G	62G	75G	-	-	7	1	20G	2.86G	7 Days	60G	3	2.14G	General Store	No	
Flower	Tulip	20G	30G	37G	45G	-	-	6	1	10G	1.67G	6 Days	40G	4	1.43G	General Store	No	

Spring Crops | Summer Crops | Fall Crops | Foraging | Fish | Minerals | Bundles | Artisan Goods | Crafting | Cooking | Misc

Data – The Wiki

- Data from [the Wiki](#) was used in 2 charts:
  - Sankey diagram of items and their uses (and other variables)
  - Gantt chart of character daily schedules and favorite items

- Data collected included:
  - Item name and uses
  - Character name, daily schedule, best friend, birthday, and favorite gifts

Winter 16	[Collapse]
9:00 AM	Behind counter of Blacksmith
10:30 AM	Leaves Blacksmith to go to Harvey's Clinic
1:30 PM	Moves from waiting room to examination room in Clinic
4:00 PM	Leaves Clinic for The Saloon
12:00 AM	Returns home

Raining	[Collapse]
9:00 AM	Behind counter of Blacksmith
5:00 PM	Leaves counter and moves to anvil
7:00 PM	Leaves Blacksmith and heads to The Saloon
12:00 AM	Leaves The Saloon and heads home

Friday (Community Center Restored)	[Collapse]
8:50 AM	Leaves home, heads to Community Center Boiler Room
5:00 PM	Leaves Community Center and heads to The Saloon
12:00 AM	Leaves The Saloon and heads home

Regular Schedule	[Collapse]
9:00 AM	Behind counter of Blacksmith
5:00 PM	Leaves counter and moves to anvil
7:00 PM	Leaves Blacksmith and heads to The Saloon
12:00 AM	Leaves The Saloon and heads home

Schedule as shown in the Wiki

Tools Used

- <u>Excel</u> for data collection and initial cleaning

- <u>R</u> for further formatting and chart experimentation
  - Packages used include the tidyverse, lubridate, collapsibletree, plotly, and vistime (based on plotly)

- <u>R Shiny</u> for web app creation
  - Utilized htmlwidgets and DT packages in addition to the required shiny package

- Why R?
  - I've taken 2 classes on R already, so the learning curve would be relatively small
    - Allowed for inclusion of more charts and interactivity than I would have otherwise
    - Could become familiar with R Shiny and add that to my skillset
  - Considered using Tableau or D3, however…
    - I already have a Tableau portfolio and wanted to learn a new skill
    - The learning curve for D3 and JavaScript was prohibitively steep
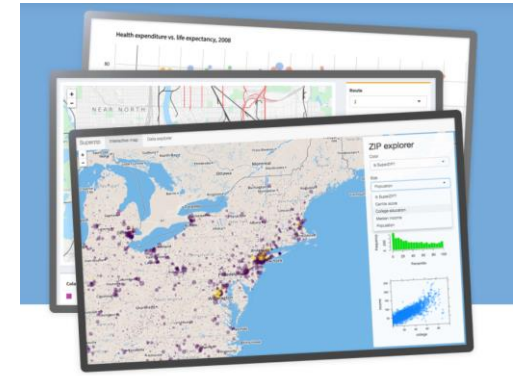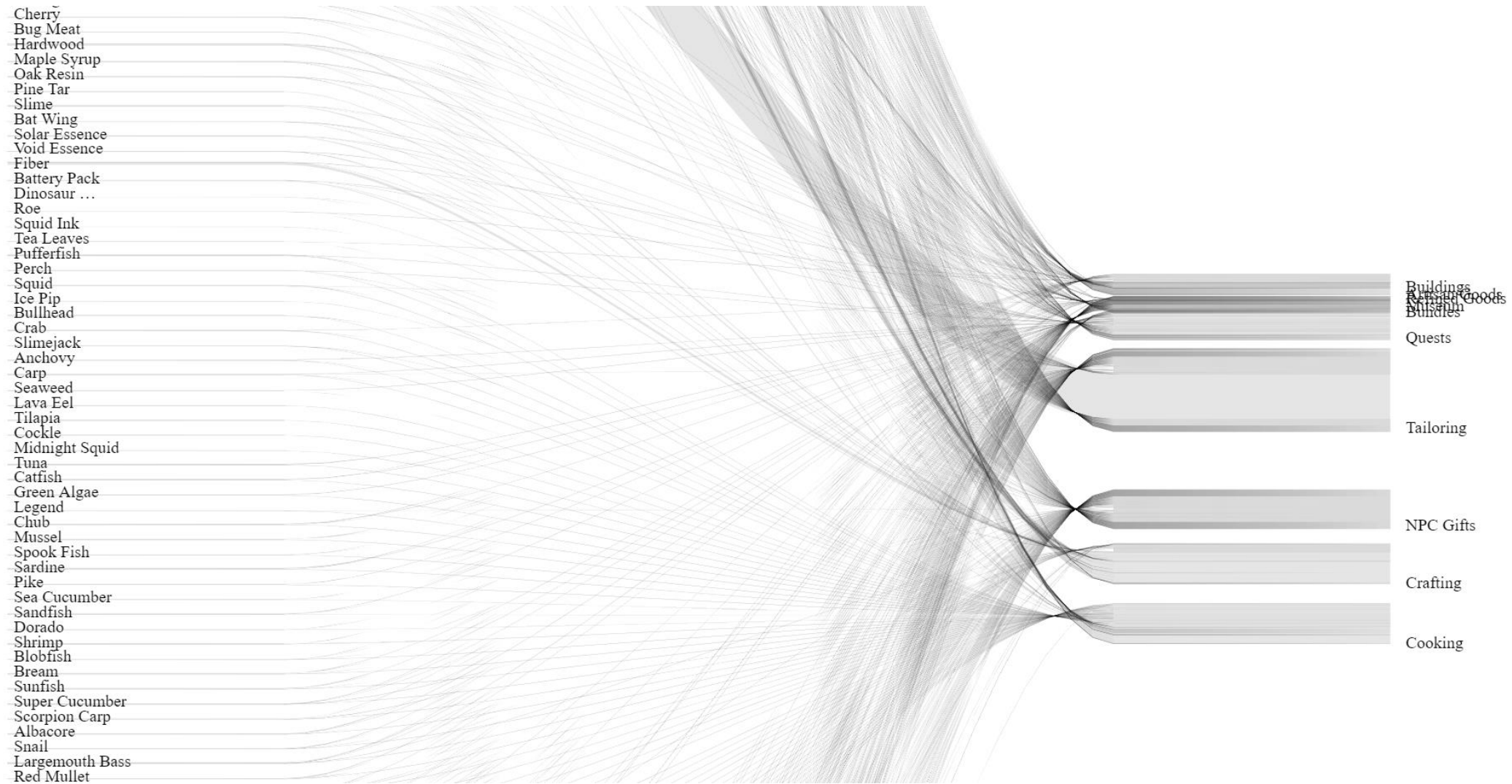
Chart 1: Items Connections

- Purpose:
  - Show connections between items and their uses, hopefully to reveal previously unknown uses to players.
  - Help players determine the usefulness of the items in their inventory (sell or save for later?)

- History:
  - Was going to be the main chart of the project, but became part of a set when I refocused
  - Original concept was a chord diagram, but a Sankey diagram worked better for the volume of data

- Challenges:
  - Getting the data formatted for plotting
    - Going from one dataset to separate nodes and links datasets was difficult
    - Different packages required slightly different formats
  - Choosing a package to use (networkD3 vs plotly)
  - Navigating reactive data in R Shiny
  - Getting my filters and search to work as intended

Cherry
Bug Meat
Hardwood
Maple Syrup
Oak Resin
Pine Tar
Slime
Bat Wing
Solar Essence
Void Essence
Fiber
Battery Pack
Dinosaur …
Roe
Squid Ink
Tea Leaves
Pufferfish
Perch
Squid
Ice Pip
Bullhead
Crab
Slimejack
Anchovy
Carp
Seaweed
Lava Eel
Tilapia
Cockle
Midnight Squid
Tuna
Catfish
Green Algae
Legend
Chub
Mussel
Spook Fish
Sardine
Pike
Sea Cucumber
Sandfish
Dorado
Shrimp
Blobfish
Bream
Sunfish
Super Cucumber
Scorpion Carp
Albacore
Snail
Largemouth Bass
Red Mullet

Buildings
Artisan Goods
Museum
Bundles
Quests
Tailoring
NPC Gifts
Crafting
Cooking

Stardew Valley: Missed Connections

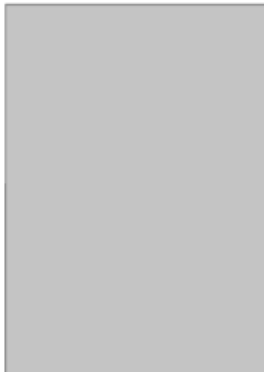Search

Filters:

▽ Season

▽ Sale Value

▽ Item Category

▽ Source

Legend:

Interactive Sankey Diagram

Interactions:

Hover item bar to highlight connections
Hover item bar to see image and description
Search Bar - exact match or loose match?
-- Filter out all other items and just show search result's connections

What is my default, no filter view?
The chart is way too tall to show unfiltered

Stardew Valley: Missed Connections

Search

Search for Items

| Item   ▼ |

Search must be cleared for filters to work

Clear Search

Filter

All filters must have a value for chart to render

Select a Category

| Fish   ▼ |

Select a Season

| Spring   ▼ |

Select a Sale Value

| 0g - 99g   ▼ |

Herring

Halibut

Anchovy

Smallmouth Bass

Shad

Eel

Sardine

Sunfish

Artisan Goods

Cooking

Tailoring
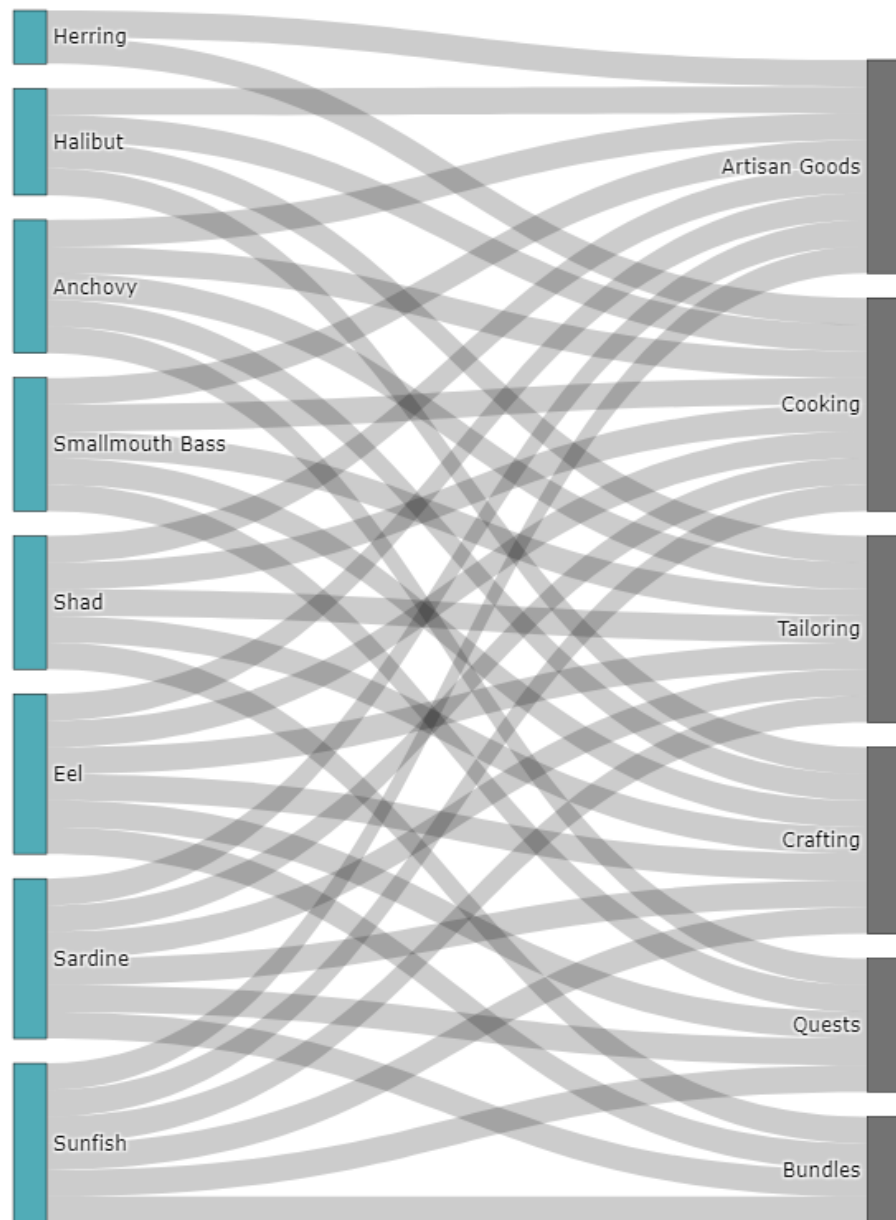
Crafting

Quests

Bundles

Chart 2: Community Center Bundles

- Purpose:
  - Show hierarchy of Community Center bundles
  - Create an interactive and intuitive way to explore that hierarchy and see which items are required to complete the bundles

- History:
  - Original concept was a force directed tree using D3, but pivoted to a dendrogram for improved interaction and readability
  - Debated circular versus vertical layouts and ended up with a horizontal one

- Challenges:
  - Choosing a package to make the plot
    - ggraph and dendextend vs collapsibletree
    - Struggled with ggraph for a while before pivoting to collapsibletree and find it much easier to work with
  - Getting the data into a plottable format
    - There are 2 ways you can structure data for a dendrogram – an edge list or a nested dataframe
    - I started with an edge list and pivoted it to nested when I switched packages

Stardew Valley: Missed Connections

Hierarchical Diagram - Dendrogram

Community Center

Boiler Room   Office   Pantry   Craft Room   Fish Tank

River Fish   Ocean Fish   Crab Pot   Night Fishing   Specialty Fish

Ghostfish   Sandfish   Woodskip   Pufferfish

Dendrogram Ideas:
Click levels to expand
Pan over chart if expanding is a bad call
Orient left to right instead of top down?
Color code hierarchy levels

1st level: rooms in the Community Center
2nd level: bundles in that room
3rd level: items required for that bundle

Stardew Valley: Missed Connections

Explore the Community Center Bundles!

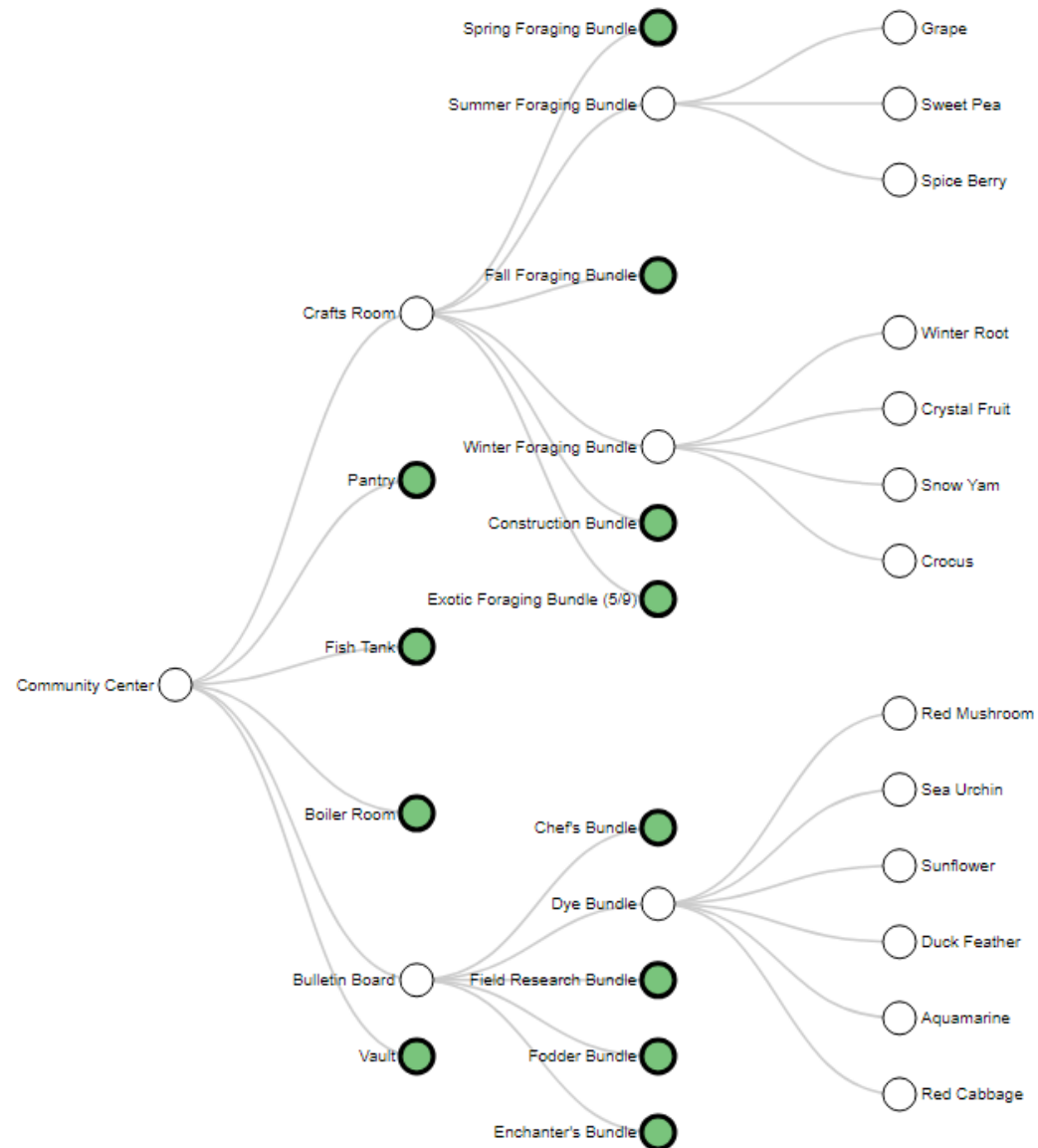Click Circles to Expand the Hierarchy

Chart 3: Character Schedules

- Purpose:
  - Show character schedules in a more intuitive and visual way
  - Put the most relevant character information in one place

- Data Structure:
  - Each schedule varies by day and based on several other factors such as the weather season, Community Center completion
  - Dataset for 2 characters is over 2,300 lines long and there are 33 characters

- Challenges:
  - Choosing a package to make the plot
  - Got hung up on an Excel date formatting artifact for a while but was able to fix it in R after it was discovered
  - Data collection for this was challenging due to the required structure for filtering
    - If I do more data collection, I might try expand.grid() and see if that will save me some time and effort

Stardew Valley: Missed Connections

Filters:

▽ Character

▽ Season

▽ Weather

▽ CC Completion

Legend:

Gantt chart showing schedules for each day of the week - color coded by character location

Monday	Home / Beach / Forest
Tuesday	9am ... 11pm
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

Selected character's most loved gifts in icon form

Will likely be formatted in a table with the image and name filling one cell

Include NPC's birthday here too!

Stardew Valley: Missed Connections

Item Connections | Community Center Bundles | **Character Schedules**

Character Schedule

Monday	Home	Beach	Home	Pelican Town	Home
Tuesday	Home	Beach	Home	Beach	Home
Wednesday	Home	Beach	Home	Pelican Town	Home
Thursday	Home	Beach	Home	Pelican Town	Home
Friday	Home	Beach		Saloon	Home
Saturday	Home	Beach	Home	Pelican Town	Home
Sunday	Home	Beach		Saloon	Home

06:00   09:00   12:00   15:00   18:00   21:00   00:00
Jan 1, 2000   Jan 2, 2000

Filters

All filters must have a value for chart to render

Select a Character

Elliott ▼

Select a Season

Spring ▼

Select the Weather
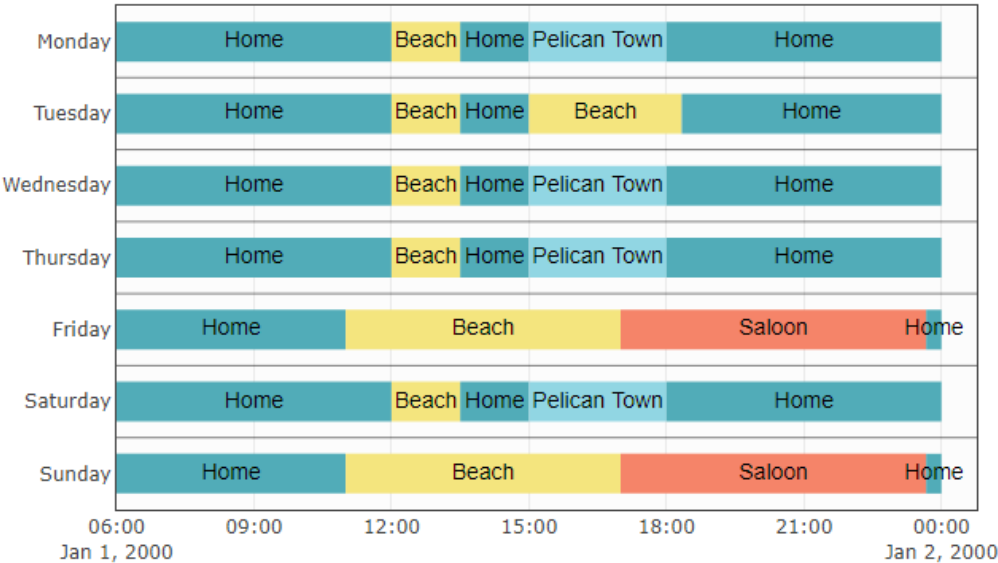
Nice ▼

Community Center Complete?

No ▼

6+ Hearts with BFF?

No ▼

Are you their spouse?

No ▼

Birthday	Best Friend
Fall 5	Leah

Best Gifts	Image	Best Gifts	Image
Crab Cakes		Golden Pumpkin	
Duck Feather		Magic Rock Candy	
Lobster		Pearl	
Pomegranate		Prismatic Shard	
Tom Kha Soup		Rabbit's Foot	

Legend

- Beach
- Cindersap Forest
- General Store
- Home
- Saloon
- Pelican Town

What Didn't Make the Cut?

Looking Back… And Going Forward

- If I had more time, I would:

  - Include more characters in the Gantt chart

  - Implement reactive filters in the Gantt chart as a way to save effort on data collection

  - Add a location/source filter for the Sankey diagram

  - Implement ability to select multiple or all options in Sankey diagram filters

  - Remove Clear Search button and have the search override the filters and the filters override the search

  - Implement more design elements in the application such as choosing non-default fonts

  - Adding and customizing tooltips for all charts

- Looking forward, I could:

  - Work to include at least the bachelors and bachelorettes in the Gantt chart (12 characters vs 33)

  - Share on Reddit in r/StardewValley and r/dataisbeautiful

  - Publish my original dataset on Kaggle and Data.World, and submit it to the Data is Plural newsletter

  - Create a beautifully complex print poster

DEMO

https://mandrews.shinyapps.io/StardewValleyConnections/