Final Project Brainstorm

IDEA 1: Building Science Game

2 categories of following:

- Research - my research is around retrofit strategies for building owners, and I've always wanted to do something to help people find a game.

- Story - what else can we do?

  - Find an intuition about how much energy different upgrades save you over as a homeowner.
  - Selling - Audience = general public, homeowners. The average ones who don't know anything about buildings.
  - Source - Data will be sourced from a simple 2D box energy model run in different climates with different upgrades. Also potentially leverage ReStock data (publicly available).

Data will be in a flat file, not an API. Data will be 2 years simple.

### Upgrades
- Double pane windows
- LED lighting
- Upgrade insulation
- Energy star equipment
- Improve furnace or heat pump

Update

- costs or tax
- base now + 25 years: i.e. heat pump electric vs. gas, but in 25 years looks to big savings.
IDEA 2 Favorite Foods

- tacos
-. yucca
- seafood
- egg or omelet
- pancakes
- waffles
- chicken salad

- colorful
- spicy
- leafy
- Variety
- Sweet

Categorize favorite dishes and user scrolls through each to see the profile for each dish.

Personal curiosity

Story: Is there a common denominator among our favorite foods? Balance of sweet/spicy? colorful?

Audience: foodies/cooks or mainly my own curiosity

Source: self-generated flat file vs. very subjective. Is other sources?
Iteration 1 | Simple version to get code up and running with simple interaction
- Goals: want user to be able to scroll over different upgrades and see them appear in the building diagram.
Iteration 2 | Include energy data
- Goals: User scrolls over different upgrades, sees them appear in the building diagram and the total energy use also appears.
Iteration 3 | Energy game - Include energy data and display interactions between

Goals:
- User checks the boxes for different upgrades and sees them appear in the building diagram
- Total energy use appears.
Heat Pump
Replace furnace with a high efficiency heat pump.

Insulation
Upgrading attic insulation and wall blown-in cellulose.

Smart Thermostat
Install a smart thermostat system.

Double Pane Windows
Replace existing windows with double pane.

Air Sealing
Seal air leakage prone areas, such as around windows, doors, and outlets.

Savings Calculator

<table>
<thead>
<tr>
<th></th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Energy (kWh)</td>
<td>Cost</td>
</tr>
<tr>
<td>60%</td>
<td>40%</td>
</tr>
<tr>
<td>Typical New England Home</td>
<td>1970 ft²</td>
</tr>
<tr>
<td>3 bed 2 bath</td>
<td>zone heating</td>
</tr>
</tbody>
</table>
Insulation

Heat Pump
Replace existing furnace with high performance heat pump

Airsealing

Upgrade Windows

Savings Calculator
Total Energy Use
Insulation
Insulate attic and empty wall cavities with blown-in cellulose

Airsealing
Seal key areas for air leakage, such as around windows and doors, using DIY gaskets

Heat Pump
Replace existing furnace with high-performance heat pump

Upgrade Windows
Replace single pane with double pane

Savings Calculator
Hello Homeowner!

Mouse over each box to see potential savings in your energy bill!

- **Insulation**
  - Insulate attic and empty wall cavities with blown-in cellulose

- **Heat Pump**
  - Replace existing furnace with high performance heat pump

- **Airsealing**
  - Seal key areas for air leakage, such as around windows and doors, using DIY kits

- **Upgrade Windows**
  - Replace single pane with double pane

- **Savings Calculator**
  - Total Energy Use
Hello Homeowner

Click on each upgrade to see potential savings on your energy bill.

**Insulation**
Insulate attics, walls, and crawlspaces with blown-in cellulose, foam board, or fiberglass batting.

**Airsealing**
Reduce heat loss by sealing leakage-prone areas such as around doors and windows. (DIY or gasket install)

**Windows**
Replace single-pane windows with high-performance, double- or triple-pane.

**Heat Pump**
Replace furnace with a high-efficiency heat pump.

---

**Savings Calculator**

<table>
<thead>
<tr>
<th>Annual Energy Use</th>
<th>Savings</th>
<th>Annual Energy Bill</th>
</tr>
</thead>
<tbody>
<tr>
<td>15,866 kWh</td>
<td>$5,236</td>
<td>$14,333</td>
</tr>
</tbody>
</table>

66% Savings
Hello Homeowner

Click on each upgrade to see potential savings on your energy bill.

- **Insulation**
  - Insulate walls, attic, and crawlspaces with blown-in cellulose, foam board, or fiberglass batting.

- **Airsealing**
  - Reduce heat loss by sealing leakage points around doors and windows.

- **Windows**
  - Replace single-pane windows with high-performance, double- or triple-pane windows.

- **Heat Pump**
  - Replace furnace with a high-efficiency heat pump.

---

Savings Calculator

Annual Energy Use

$14,323
Hello Homeowner

Click on each upgrade to see potential savings on your energy bill.

Savings Calculator

- Annual Energy Use: $14,333
- Annual Energy Bill: xxx

Insulation
- Insulate attics, walls, countertops, and crawlspaces with blown-in cellulose or spray-foam batting.

Airsealing
- Reduce heat loss by sealing leakage-prone areas.

Windows
- Replace single-pane windows with high-performance double- or triple-pane.

Heat Pump
- Replace furnace with a high-efficiency heat pump.
Hello Homeowner
Click on each upgrade to see potential savings on your energy bill.

- **Insulation**
  Insulate attic walls, ceilings, and crawlspace with blow-in cellulose, foam board, or fiberglass batting.

- **Airsealing**
  Reduce heat loss by sealing, leakage-prone areas, both exterior and interior doors, and windows.

- **Windows**
  Replace single-pane windows with high-performance double or triple-pane.

- **Heat Pump**
  Replace furnace with a high-efficiency heat pump.

---

**Savings Calculator**

Typical New England Home - 3,200 sq ft - 100% efficiency gains

- Annual Energy Bill: $14,333
- Savings: $14,333
- Annual Energy Use: 3,800 kWh

---

*Note: Savings calculator estimates based on typical New England home and 100% efficiency gains.*
Hello Homeowner

Click on each upgrade to see potential savings on your energy bill.

Savings Calculator

- Annual Energy Bill
  - Savings: $11,323
  - Annual Energy Use

- Airsealing
  - Reduce heat loss by sealing leaks. Provide draft proof around doors and windows.

- Insulation
  - Insulate attics, walls, and crawlspaces with blown-in cellulose, foam board, or fiberglass batting.

- Windows
  - Replace single-pane windows with high-performance double- or triple-pane.

- Heat Pump
  - Replace furnace with a high-efficiency heat pump.
Hello Homeowner

Click on each upgrade to see potential savings on your energy bill.

- **Airsealing**: Reduce heat loss by sealing leakage-prone areas, such as around doors and windows.

- **Insulation**: Insulate attics, walls, and crawlspaces with blown-in cellulose, foam board, or fiberglass batts.

- **Windows**: Replace single-pane windows with high-performance double- or triple-pane.

- **Heat Pump**: Replace furnace with a high-efficiency heat pump.

---

**Savings Calculator**

Annual Energy Bill: $14,323

Annual Energy Use: [Blank]

Savings: [Blank]
Hello Homeowner

Click on each upgrade to see potential savings on your energy bill.

- **Insulation**
  Insulate attic walls, crawl spaces, and ceilings with blown-in cellulose, foam board, or fiberglass batting.

- **Heat Pump**
  Replace furnace with a high-efficiency heat pump.

- **Airsealing**
  Reduce heat loss by sealing leakage-prone areas such as around doors and windows.

- **Windows**
  Replace single-pane windows with high-performance double- or triple-pane windows.

---

**Savings Calculator**

Annual Energy Bill: $14,323
Hello Homeowner

Click on each upgrade to see potential savings on your energy bill.

- **Insulation**
  Insulate attic, wall cavities, and crawlspaces with blown-in cellulose, foam board, or fiberglass batting.

- **Airsealing**
  Reduce heat loss by sealing leakage-prone areas, such as around doors and windows.
  (DIY gaskets instead)

- **Windows**
  Replace single-pane windows with high-performance double- or triple-pane.

**Savings Calculator**

- **Annual Energy Bill**
  $14,323

**Typical New England Home**
3600 sq ft 1170 sf

**Annual Energy Use**
43404 kWh
Hello Homeowner

Click on each upgrade to see potential savings on your energy bill.

- **Insulation**
  - Insulate attic, wall cavities, and crawlspaces with blown-in cellulose, foam board, or fiberglass batting.

- **Airsealing**
  - Reduce heat loss by sealing leakage-prone areas, such as around doors and windows (DIY weatherstripping).

- **Windows**
  - Replace single-pane windows with high-performance double- or triple-pane.

---

**Savings Calculator**

- **Annual Energy Use:** 15,856 kWh
- **Savings:** 66%
- **Annual Energy Bill:** $14,323
- **Annual Energy Savings:** $5,236