The background is a detailed line drawing in a light orange-brown color. It depicts the interior of a large, arched greenhouse. Several people are shown in silhouette: one person stands on the left, reaching up to a vine; another person stands in the center, also reaching up; a third person is seated on the left, looking towards the center; and a fourth person stands on the right, looking down. The greenhouse is filled with various plants, including leafy greens and tomatoes hanging from vines. The structure of the greenhouse is made of curved ribs and a grid-like framework.

# ***The LivingRoom:***

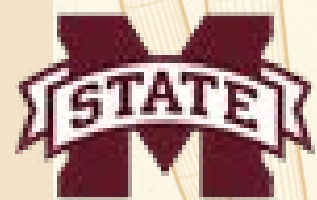
## **A Flat-Pack Learning Garden Addressing Food Equity in Mississippi**

**Abbey Franovich (Wallace)**  
Assistant Professor in Landscape Architecture

**Cory Gallo**  
Professor in Landscape Architecture  
Interim Assistant Dean

**Hans Herrmann**  
Professor in Architecture

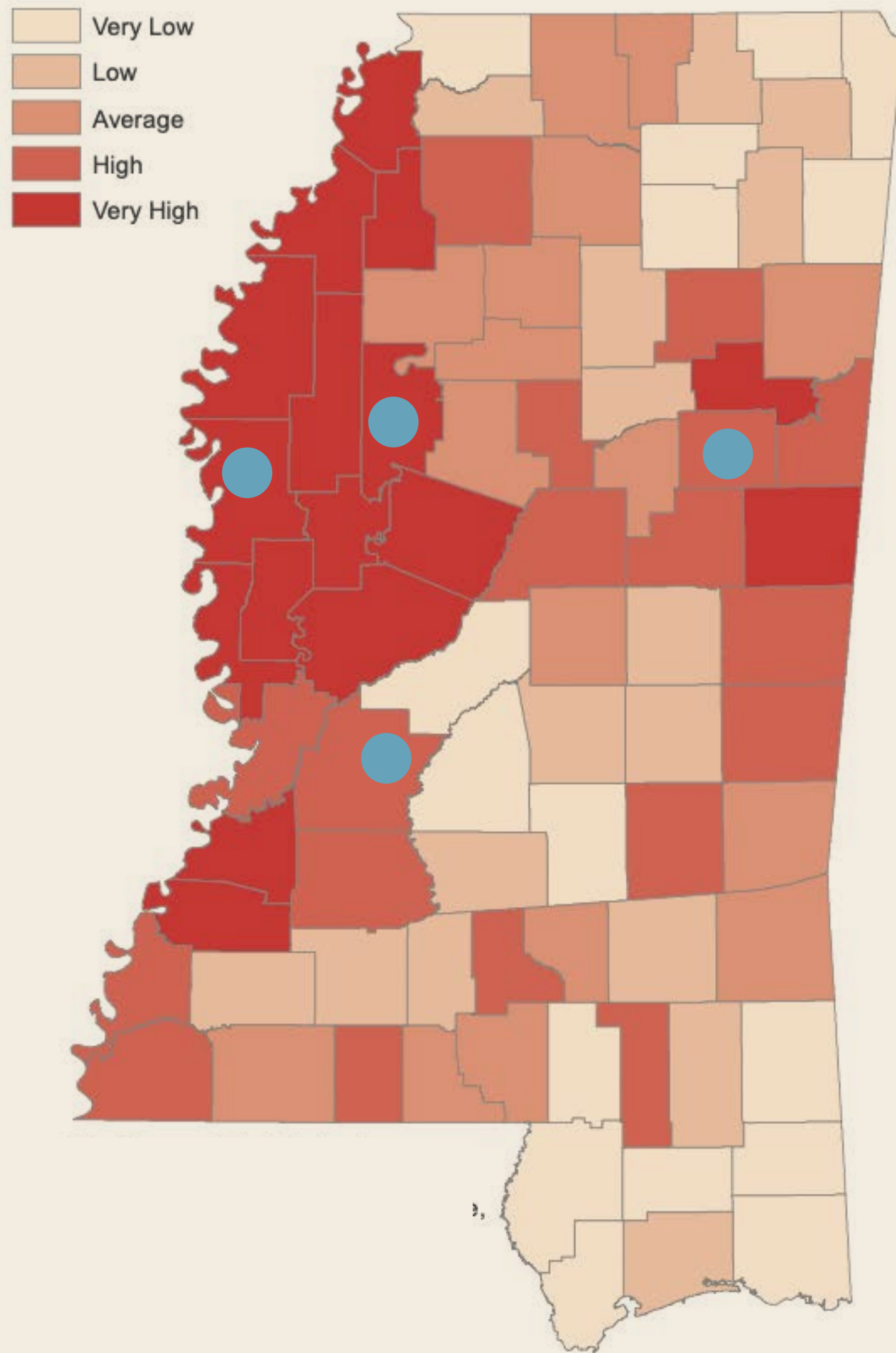
**Nada Abdel-Aziz**  
MLA Candidate



**MISSISSIPPI STATE UNIVERSITY™**  
DEPARTMENT OF  
LANDSCAPE ARCHITECTURE



# Health and Nutrition



Mississippi has the highest prevalence of food insecurity in the nation; Over one-third of our state's population lives in a classified food desert.

- **25.4%** Obesity Among School Children (*Highest in US*)
- **13.4%** Rate of Childhood Diabetes (*3rd Highest in US*)
- **\$4,951** Spent per child on education (*5th Lowest in US*)

# Benefits of School Gardens

Hands-on experiences promote kids' connection to plants and food.

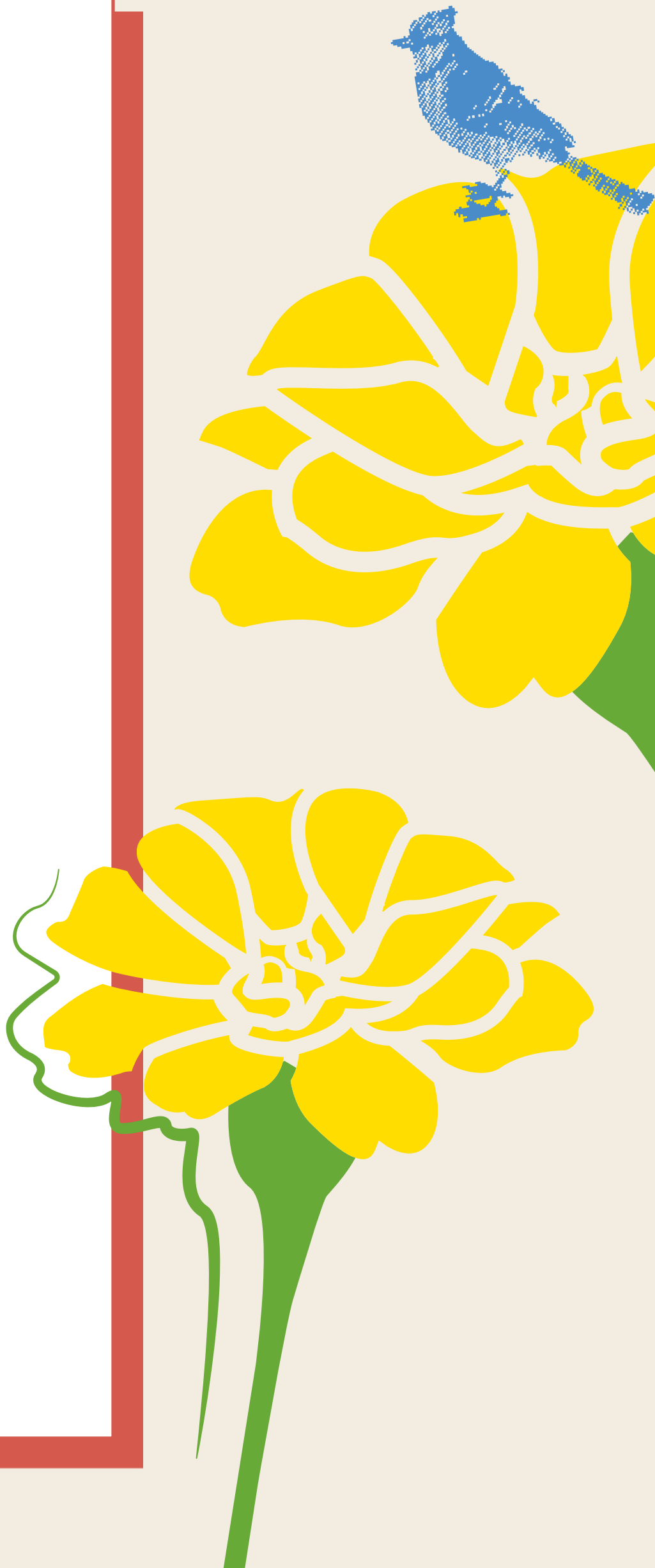
Gardens create a consistent venue for teaching nutritional education.

Gardens can expand nutritional education in an academic year by up to 10xs.

Prolonged exposure to gardens can build an emotional connection to food, allowing them to feel proud of the food they grow and more open to trying new foods.

At schools with garden/experiential food learning programs, kids eat up to 3xs as much fruit and vegetables during school lunch.

Kids who are a part of regular school garden programs are more likely to have healthy food options at home.



# School Garden Use

## School Garden Function

Academic Instruction	89%
Extracurricular Activities	60%
Food Production	39%

## Plants Grown in Gardens

Flowering Plants	90%
Edible Produce	77%
Herbs	53%

## Barriers to Using Gardens

Time Constraints	88%
Lack of Instructional Material	74%
Lack of Teacher Interest/Training	80%

## Subjects Taught in Gardens

Science	95%
Environment Studies	70%
Nutrition	66%
Language Arts	60%
Math	59%
Agricultural Education	46%

## Barriers to Creating Gardens

Lack of Funding	60%
Time Constraints	50%
Lack of Supplies	49%



# Summary

Teachers have limited time to care for gardens.

Teachers have limited resources to create gardens.

Gardens are most effectively used in elementary education.

Science, environmental studies, and nutrition are most often taught in gardens.

Gardens need to support flowering plants, edible produce and herbs.

Academic instruction is the primary function of gardens.



# Precedent Study

Author Ashe, New Orleans

PS-216, Brooklyn

Big Green-Memphis

King Middle, Berkley

PS-7, Manhattan

MSU Community Garden





# Problem Statement

Create a school learning garden that is:

Designed for elementary to middle school education

Focused on instruction

Designed to promote ownership by a class as well as individual students

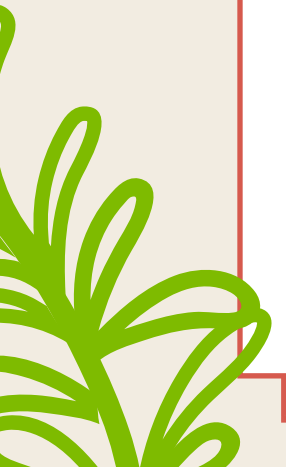
For use in a range of instruction in several different classroom subjects

For growing a variety of plants with various needs

Easy to maintain by teachers and inexperienced gardeners

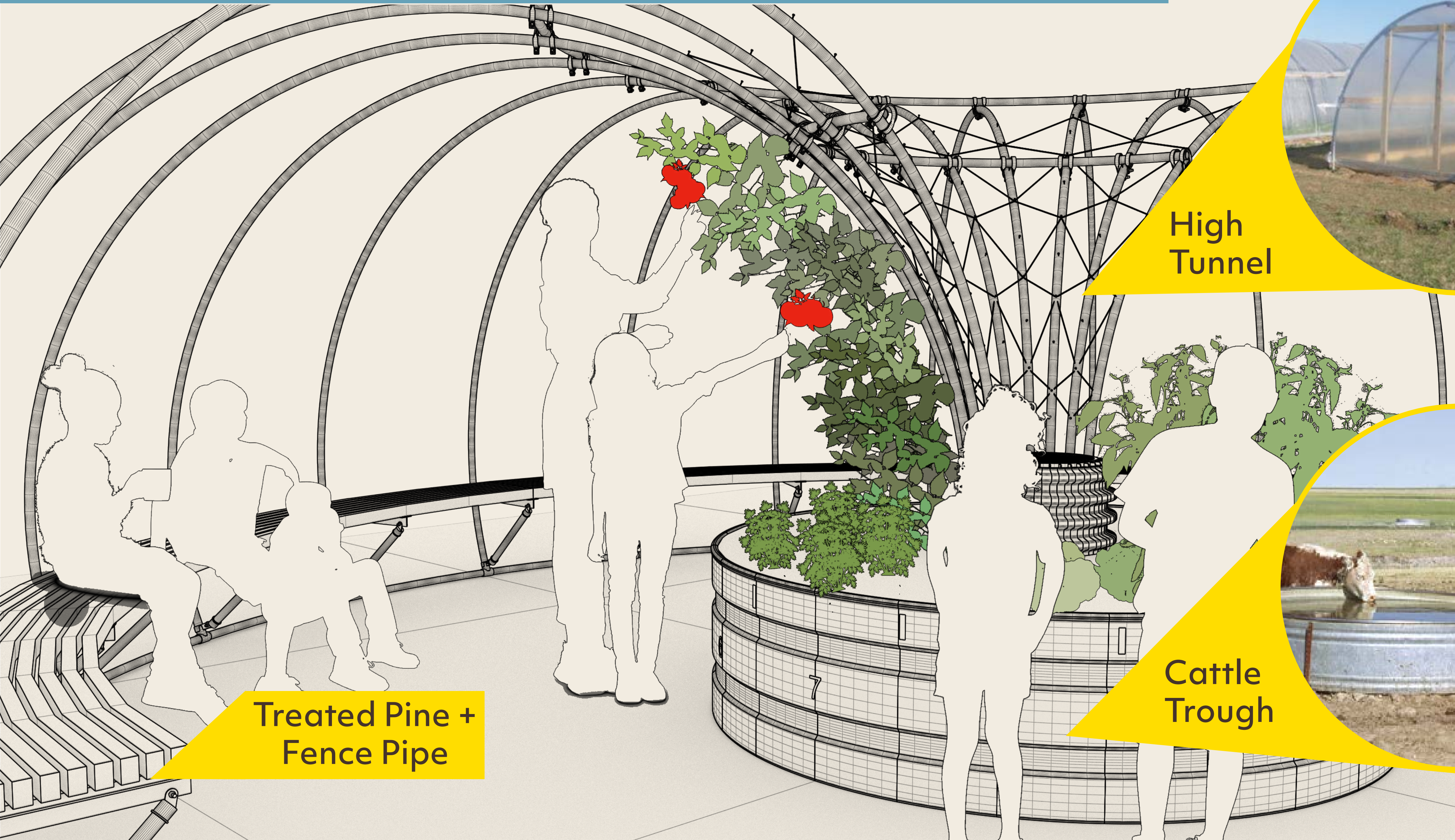
Inexpensive and made from readily available materials

Flexible to allow for expansion and increased planting area with time and interest





# Garden Module Typology



Treated Pine +  
Fence Pipe

High  
Tunnel

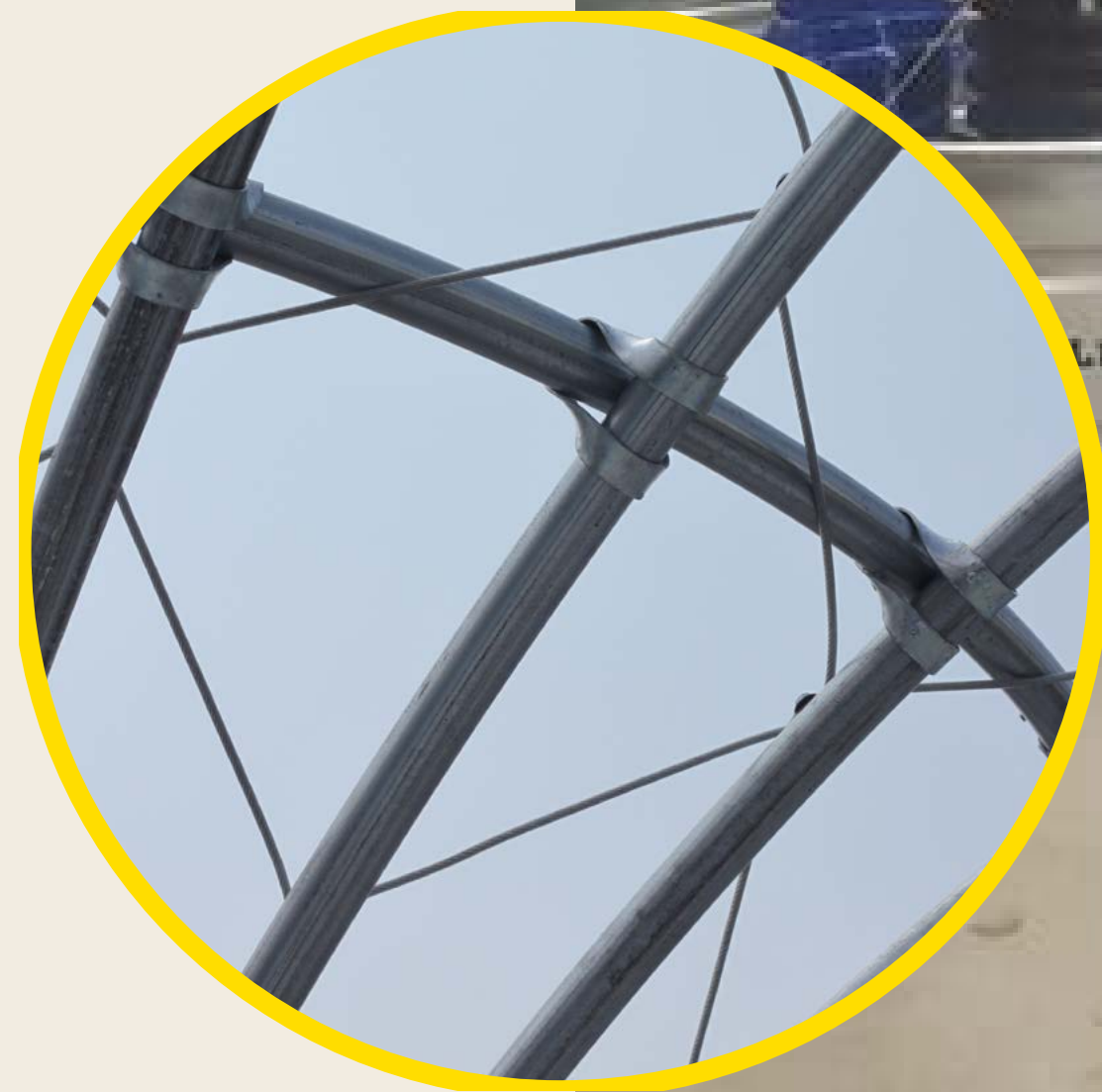
Cattle  
Trough





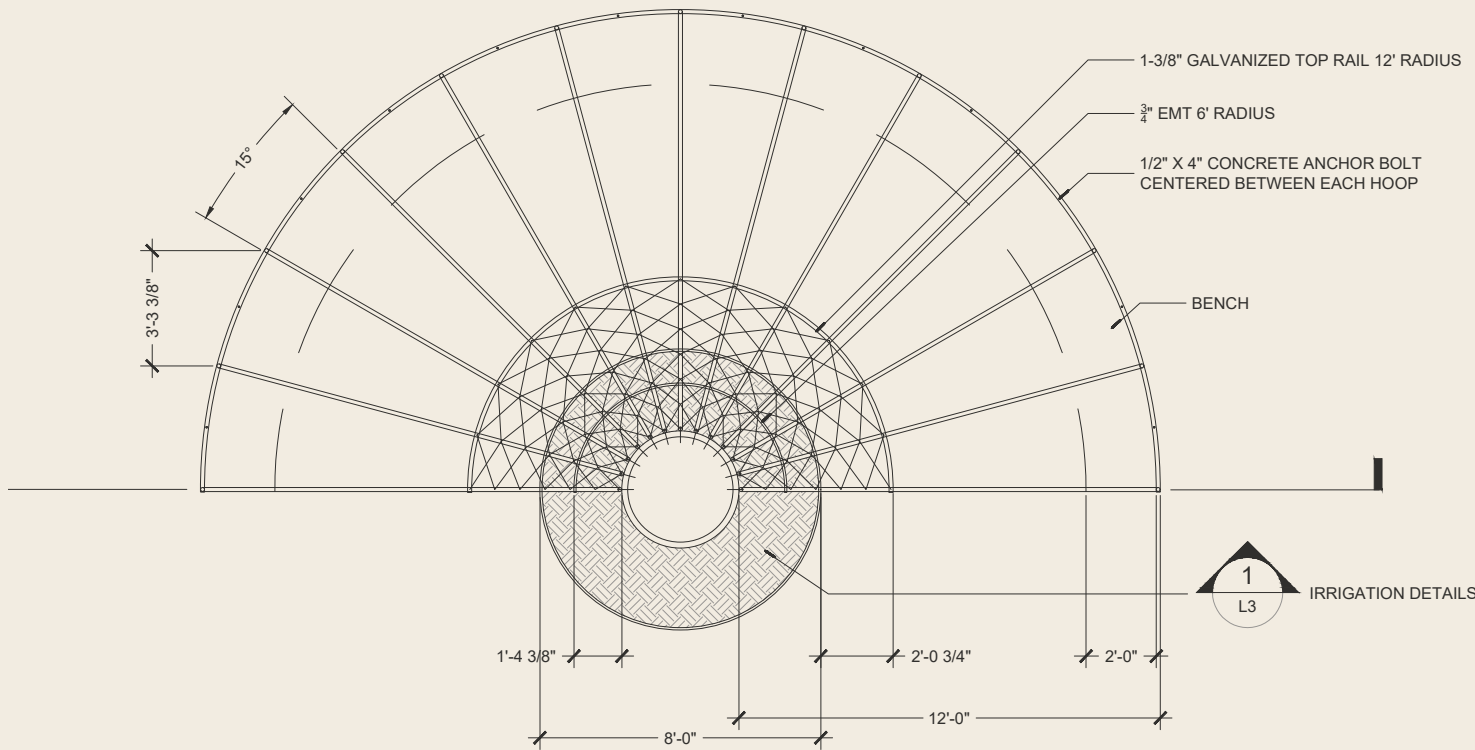
# Refinement/Process

Components Research  
Alternatives  
Modeling  
Fabrication  
Prototyping  
Detailing

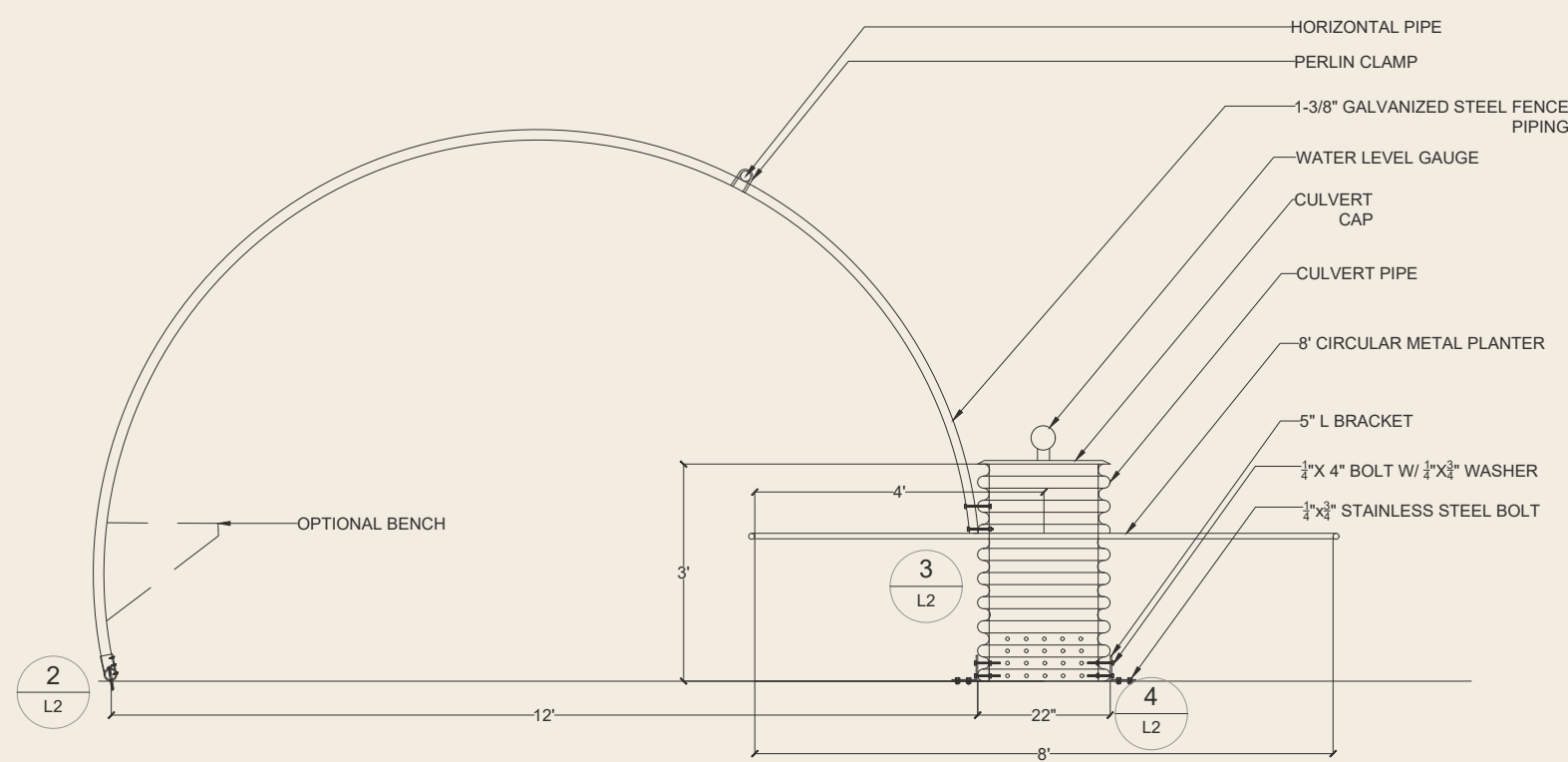




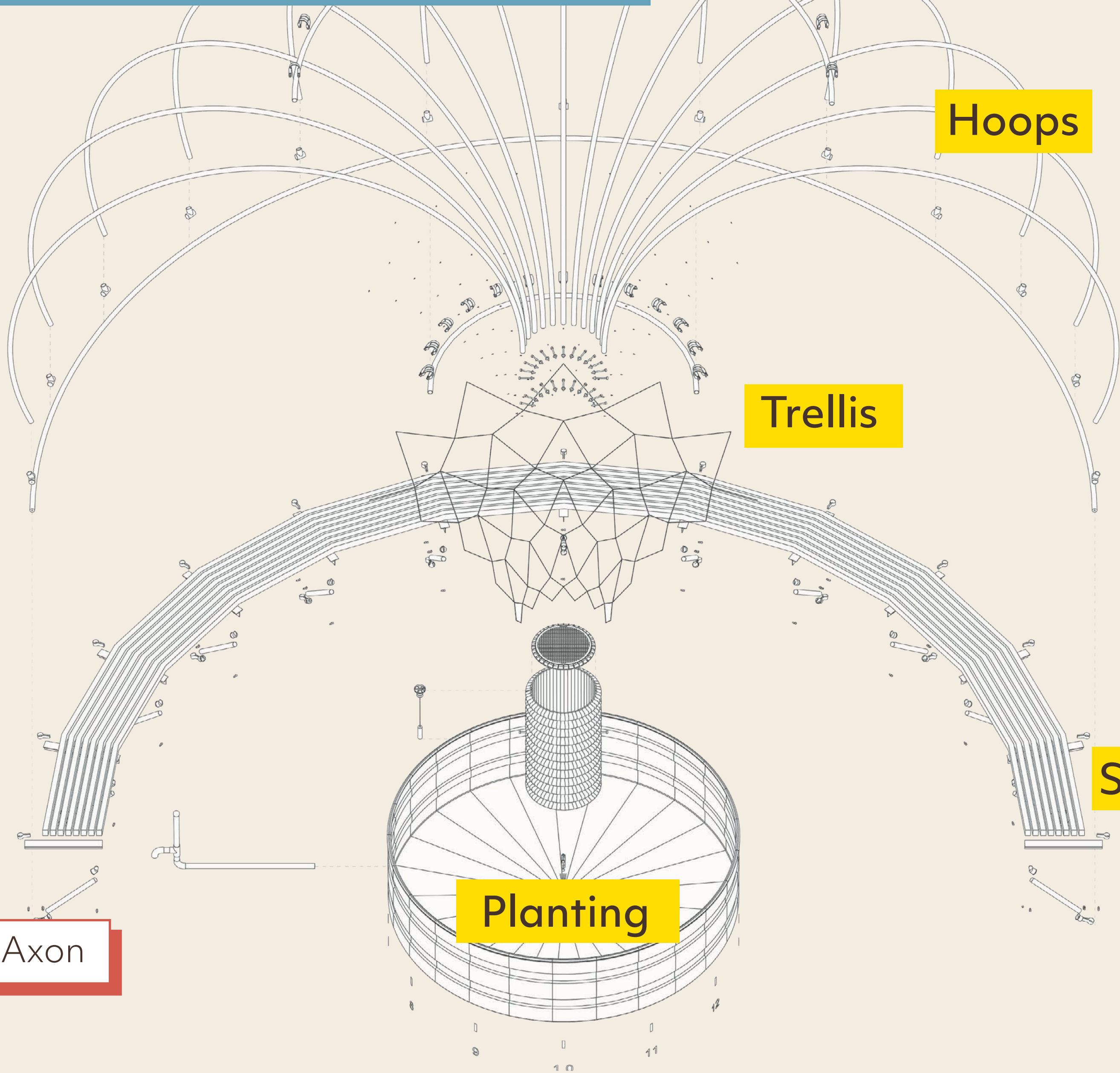
# Garden Components



Plan View



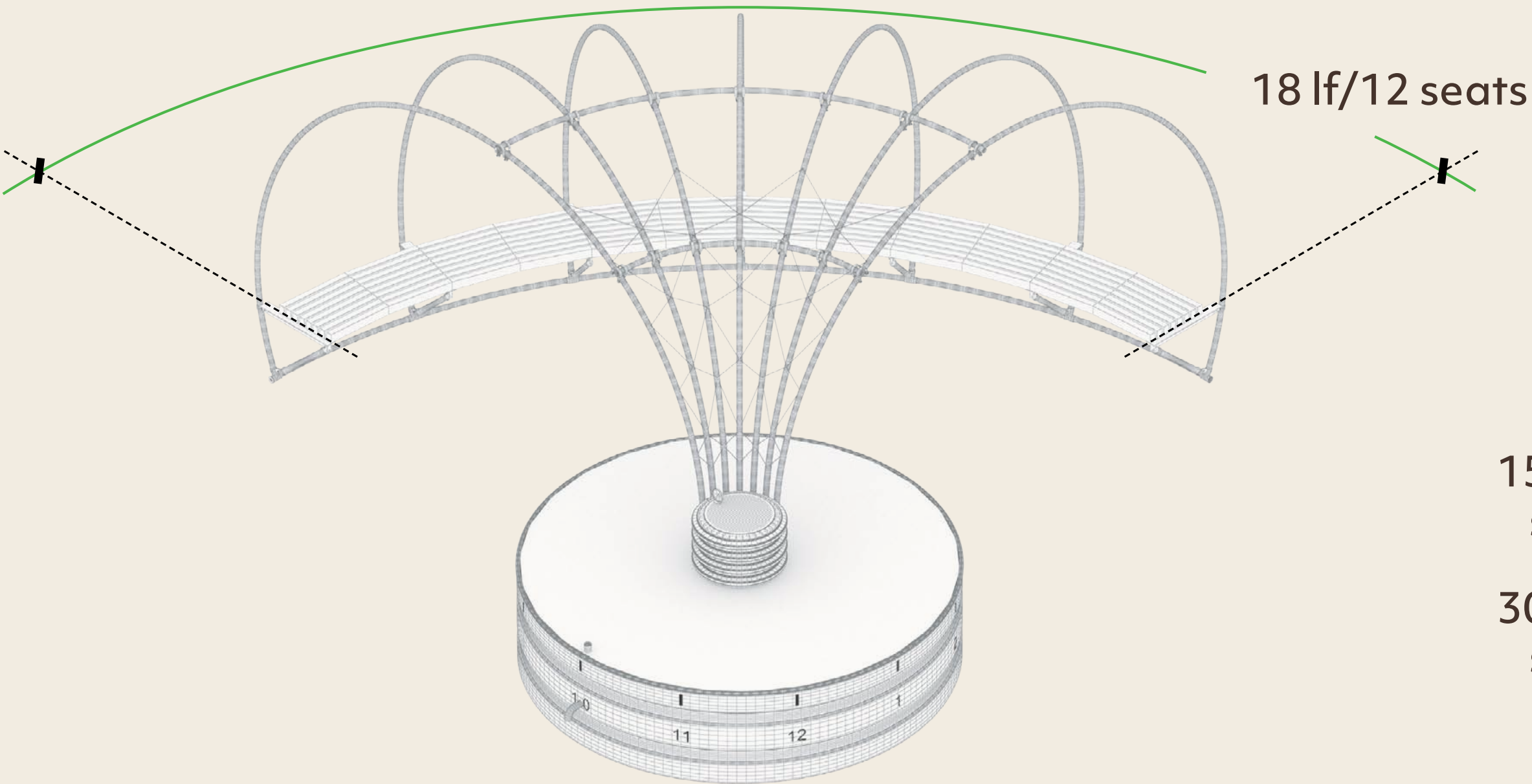
Section



Axon

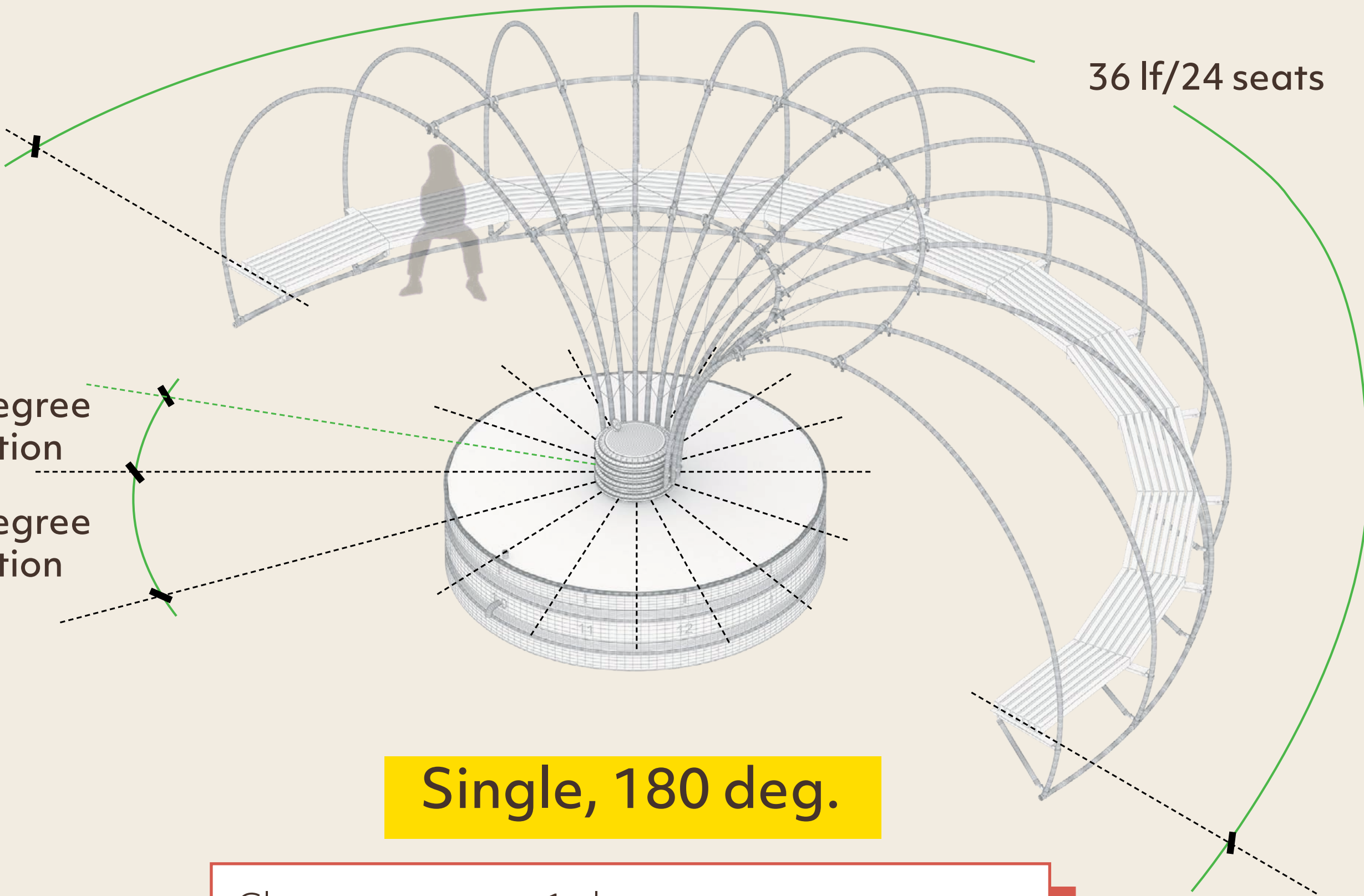


# Garden Configurations - Metrics



Single, 90 deg.

Classes: up to 1 class  
Materials: ~\$1,500  
Planting: 45 sf of planting area  
Seating: 12/garden - 18" seats (18 lf)  
Stations: 12 students (30 degree stations)  
24 students (15 degrees stations)

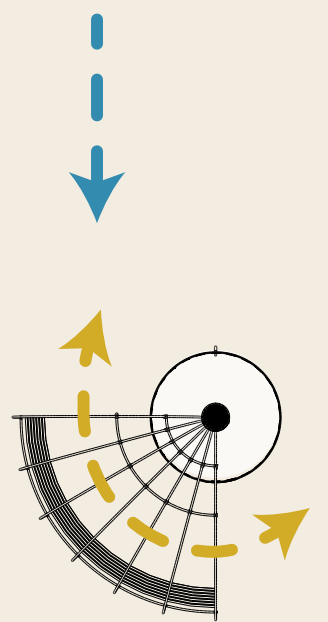


Single, 180 deg.

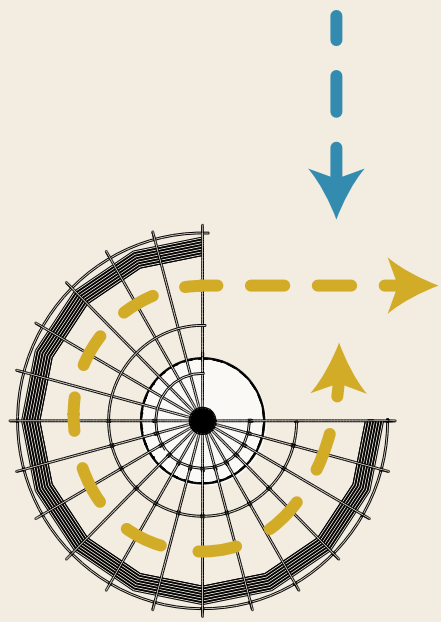
Classes: up to 1 class  
Materials: ~\$2,000  
Planting: 45 sf of planting area  
Seating: 24/garden @ 18" seats (36 lf)  
Stations: 12 students (30 degree stations)  
24 students (15 degrees stations)



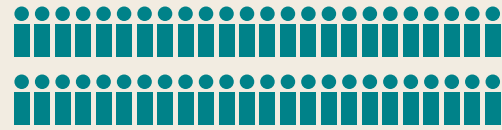
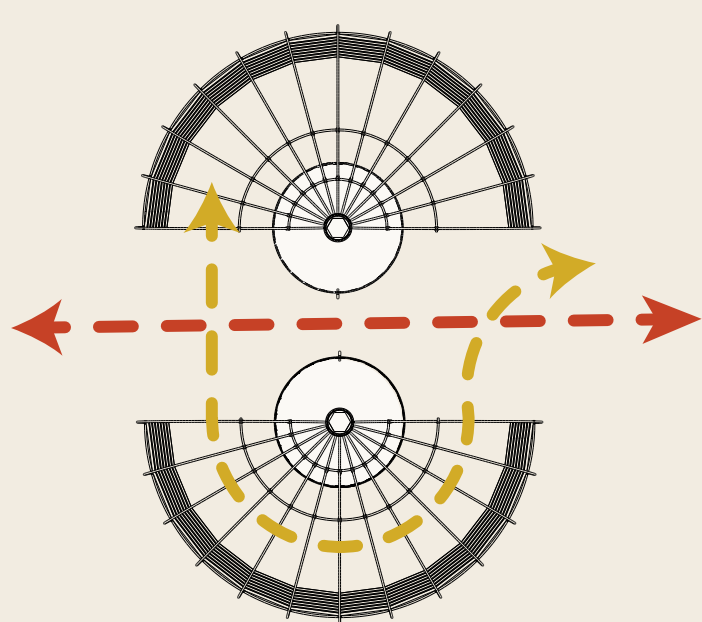
# Garden Configurations - Simple Layouts



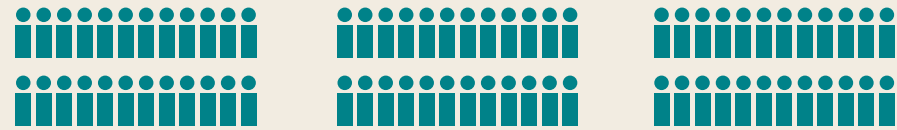
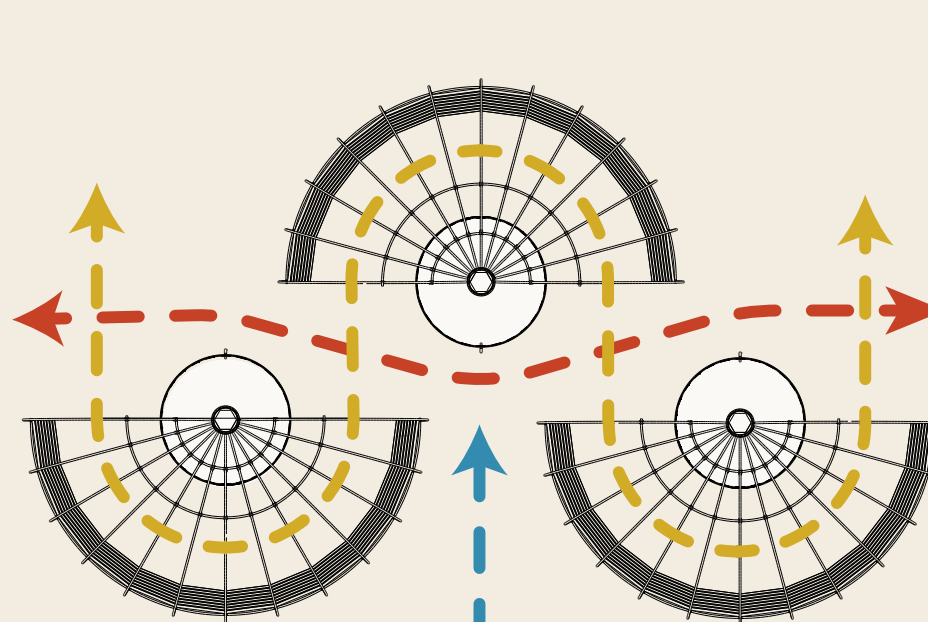
**SINGLE, 90**  
Classes: 1  
Planting: 45sf  
Seating: 12  
Stations: 12@30d  
24@15d



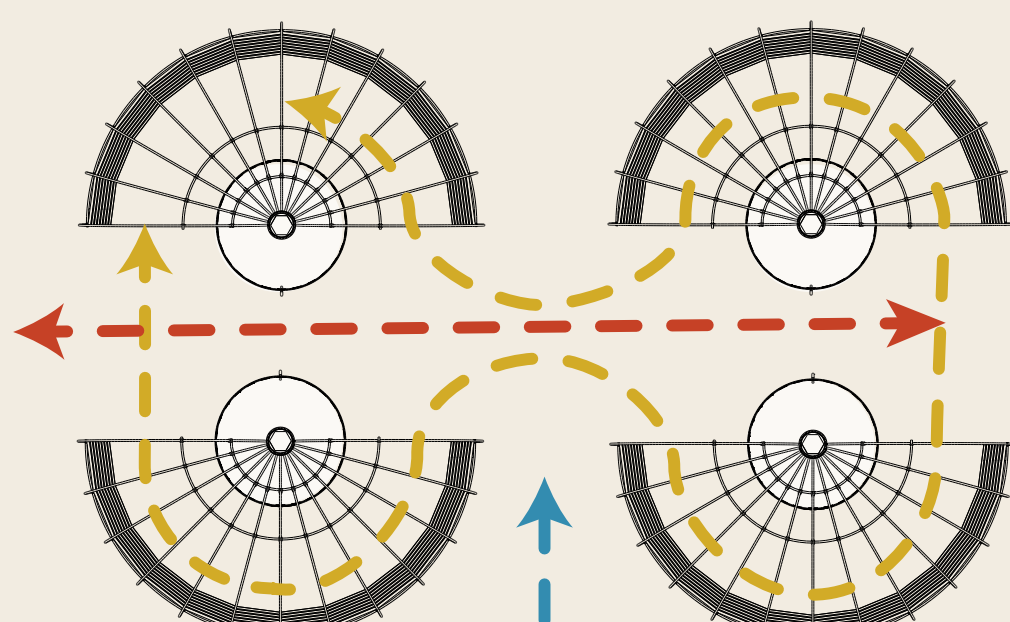
**SINGLE, 270**  
Classes: 1  
Planting: 45sf  
Seating: 36  
Stations: 12@30d  
24@15d



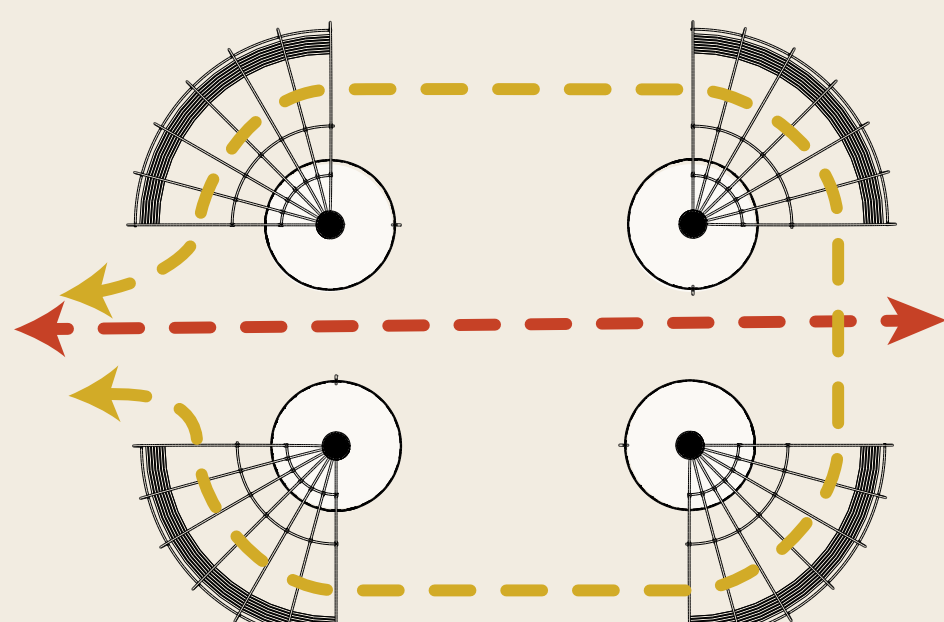
**DOUBLE, 180**  
Classes: 1-2  
Planting: 90sf  
Seating: 48  
Stations: 24@30d  
48@15d



**TRIPLE, 180**  
Classes: 2-3  
Planting: 135sf  
Seating: 72  
Stations: 36@30d  
72@15d

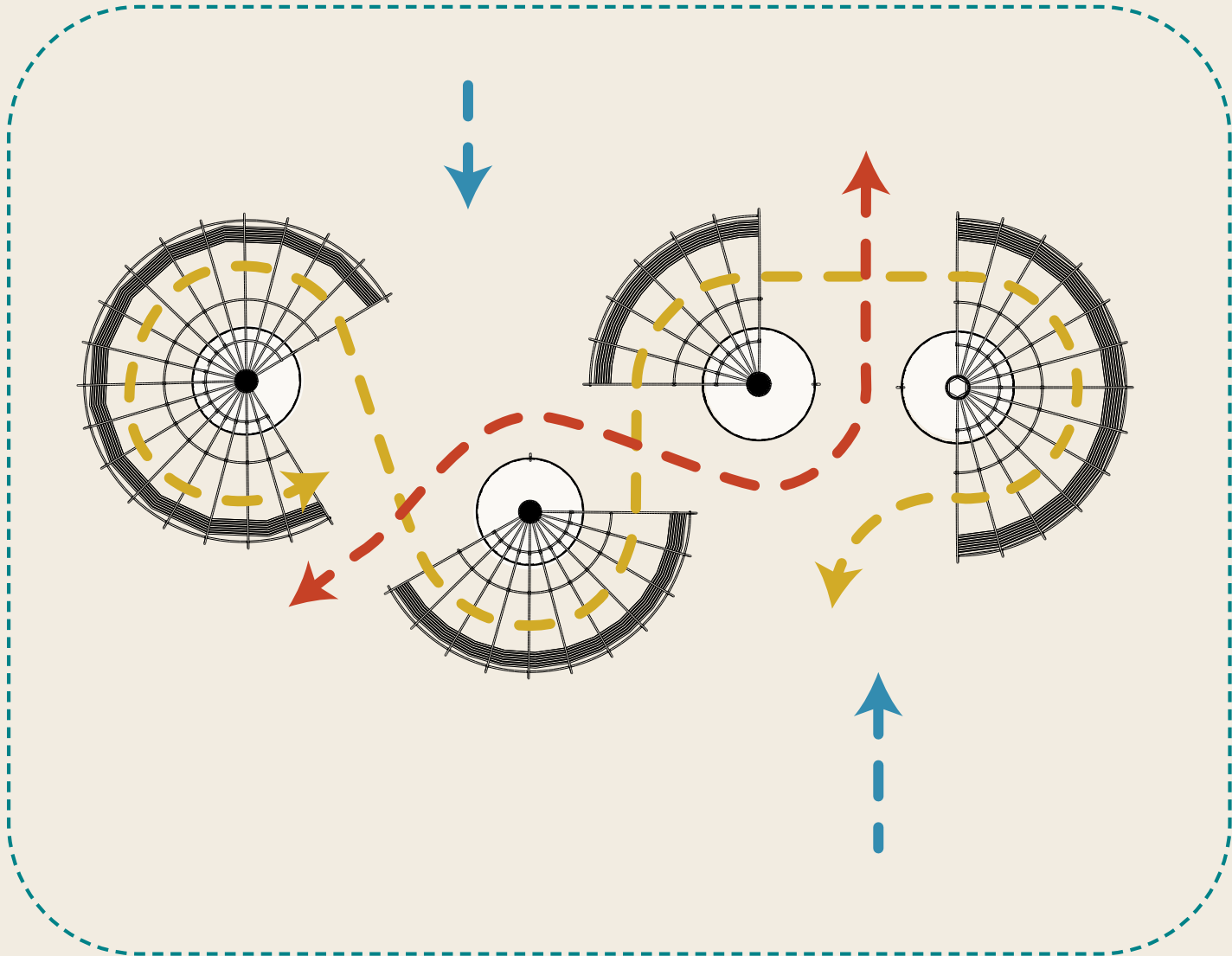
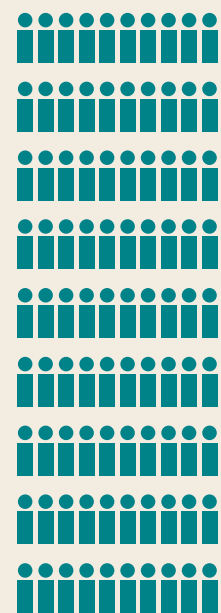


**QUAD, 180**  
Classes: 2-4  
Planting: 180sf  
Seating: 96  
Stations: 48@30d  
96@15d



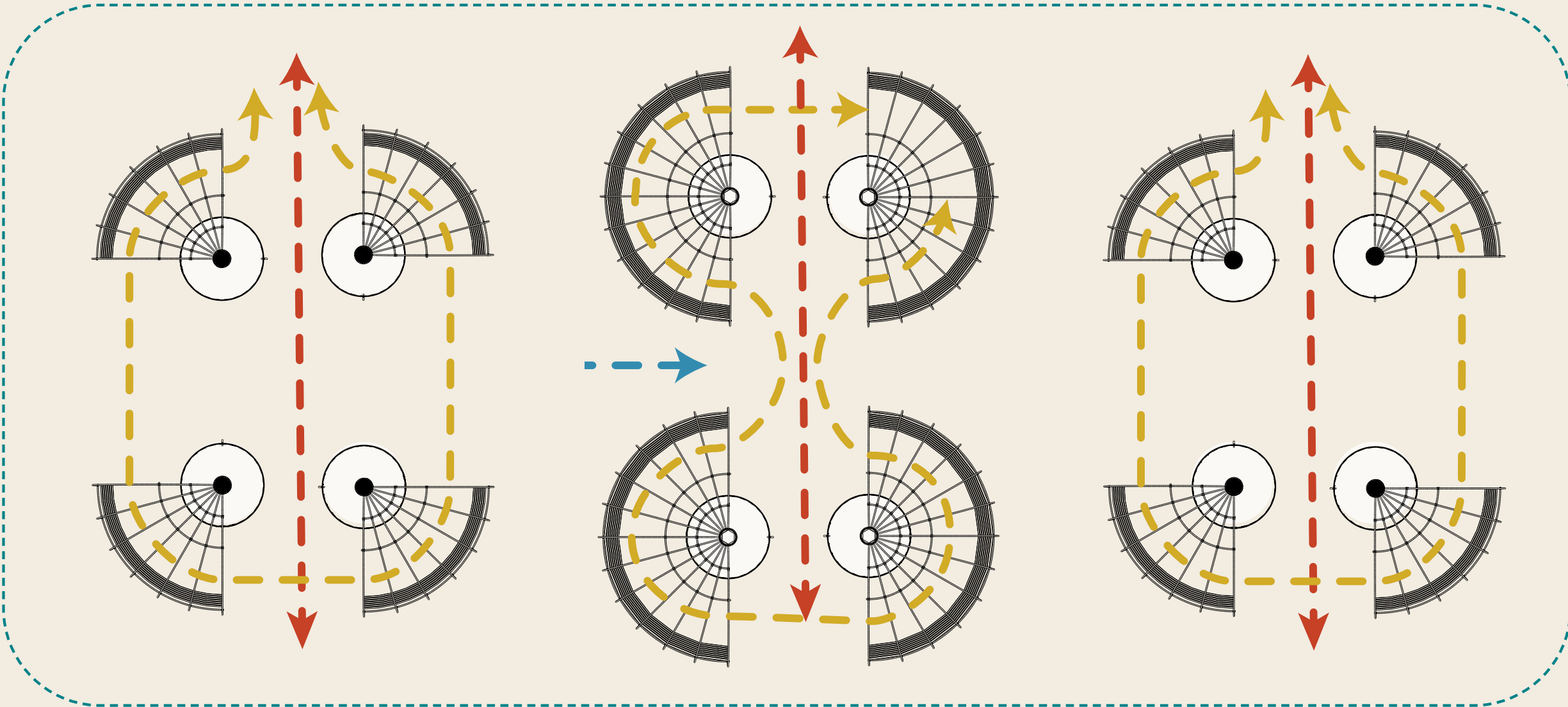
**QUAD, 90**  
Classes: 2-4  
Planting: 180sf  
Seating: 48  
Stations: 48@30d  
96@15d

# Garden Configurations - Complex Layouts



**ORGANIC**

Classes: 2-4  
Planting: 180sf  
Seating: 90  
Stations: 48@30d  
96@15d



**FORMAL**

Classes: 3-6  
Planting: 540sf  
Seating: 192  
Stations: 144@30d  
288@15d



# Collaborative Design - Galloway Elementary





# Proof of Concept 1 Galloway Elementary School

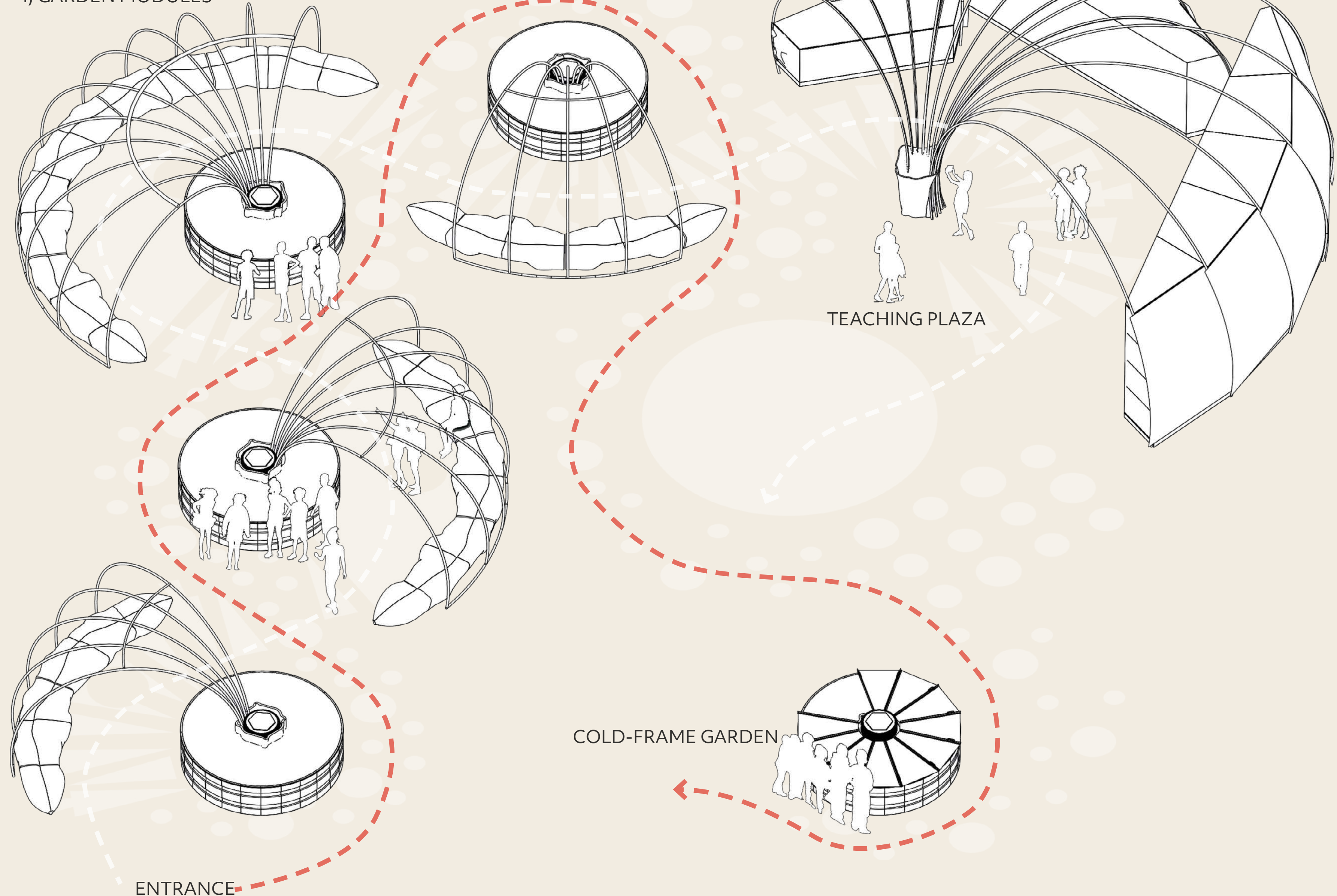
## Metrics

410 Students  
K to 5th Grade  
5 Planters  
5,000 sq. ft. of garden

Funding By:  
The Bloomberg Foundation

Completion: Fall 2020

4, GARDEN MODULES

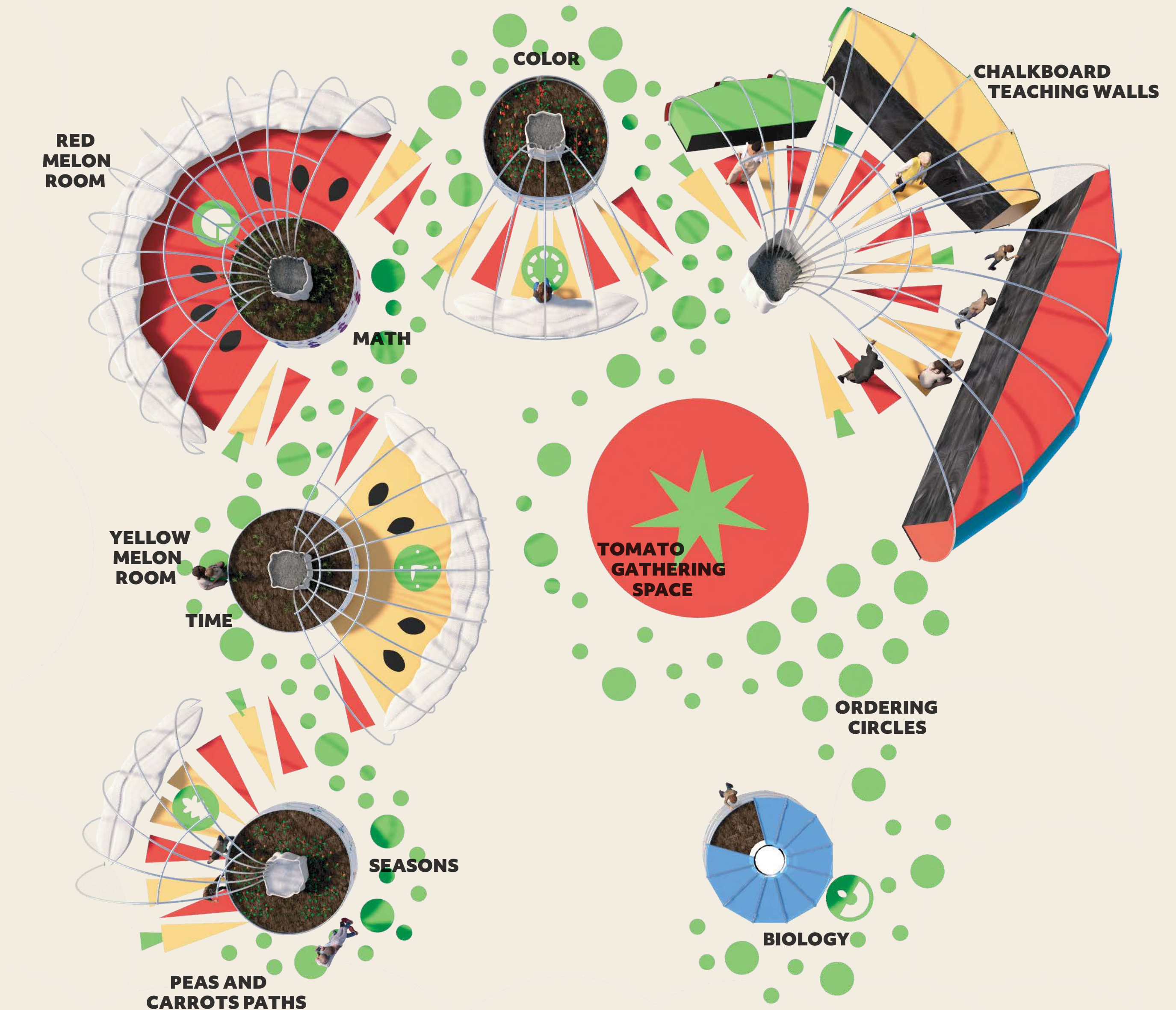




# Proof of Concept 1 Galloway Elementary School

## Modifications

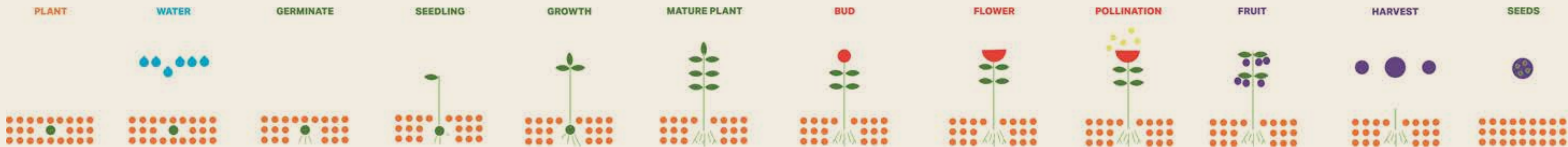
3D Printed Concrete Seating  
3D Printed Concrete Receiver  
Instructional Graphics  
Teaching Space  
Storage Structures



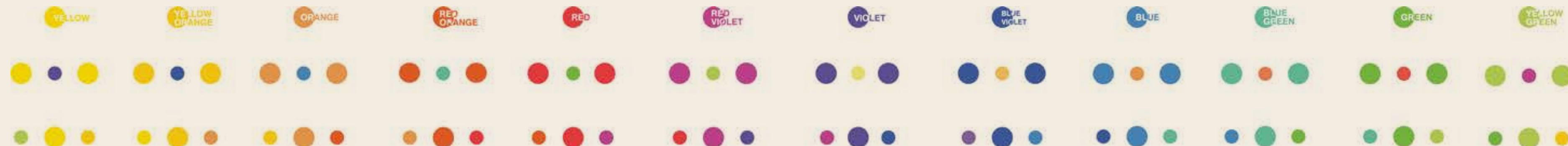


# Informational Graphics

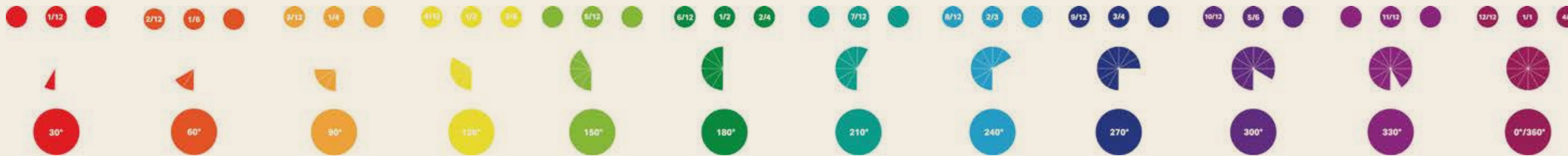
  
LIFE CYCLE



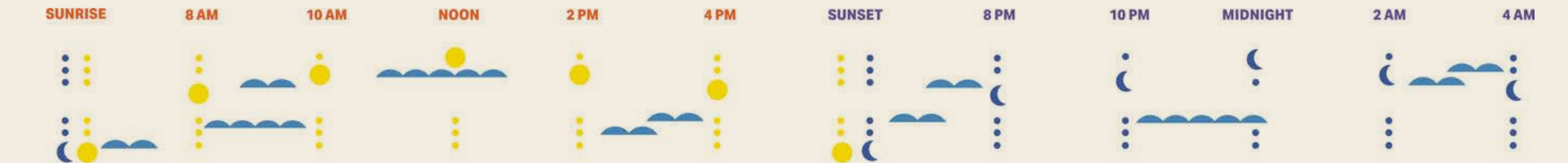
  
COLOR



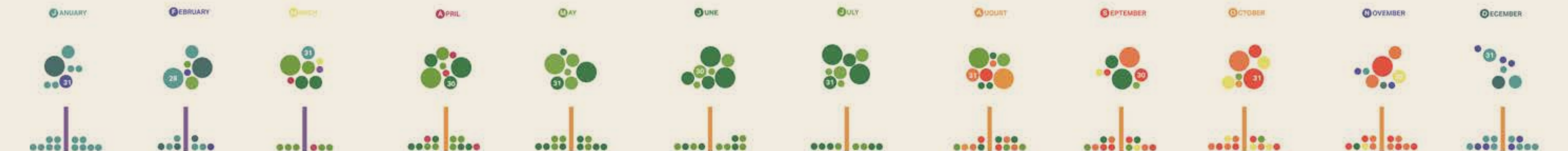
  
FRACTION



  
TIME



  
SEASONS



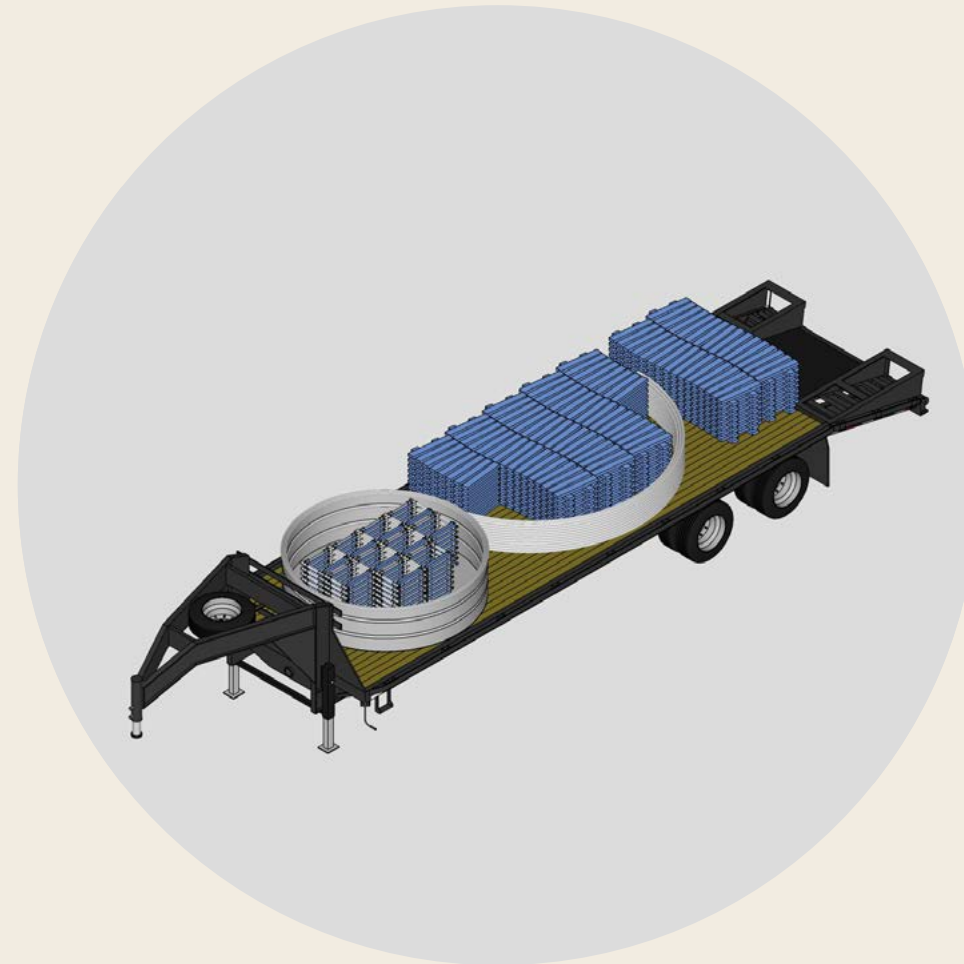


# Proof of Concept 1 Galloway Elementary School





# Construction Galloway Elementary School



fabricate

transport

layout

assemble



# Proof of Concept 1 Galloway Elementary School





# Proof of Concept 2 Partnership Middle School

## Metrics

770 Students  
6th & 7th Grade  
4 Garden "Pods"  
24 Total Planters  
20,000 sq. ft. of garden

Funding By:  
Blue Cross/Blue Shield of MS  
Completion Summer 2020

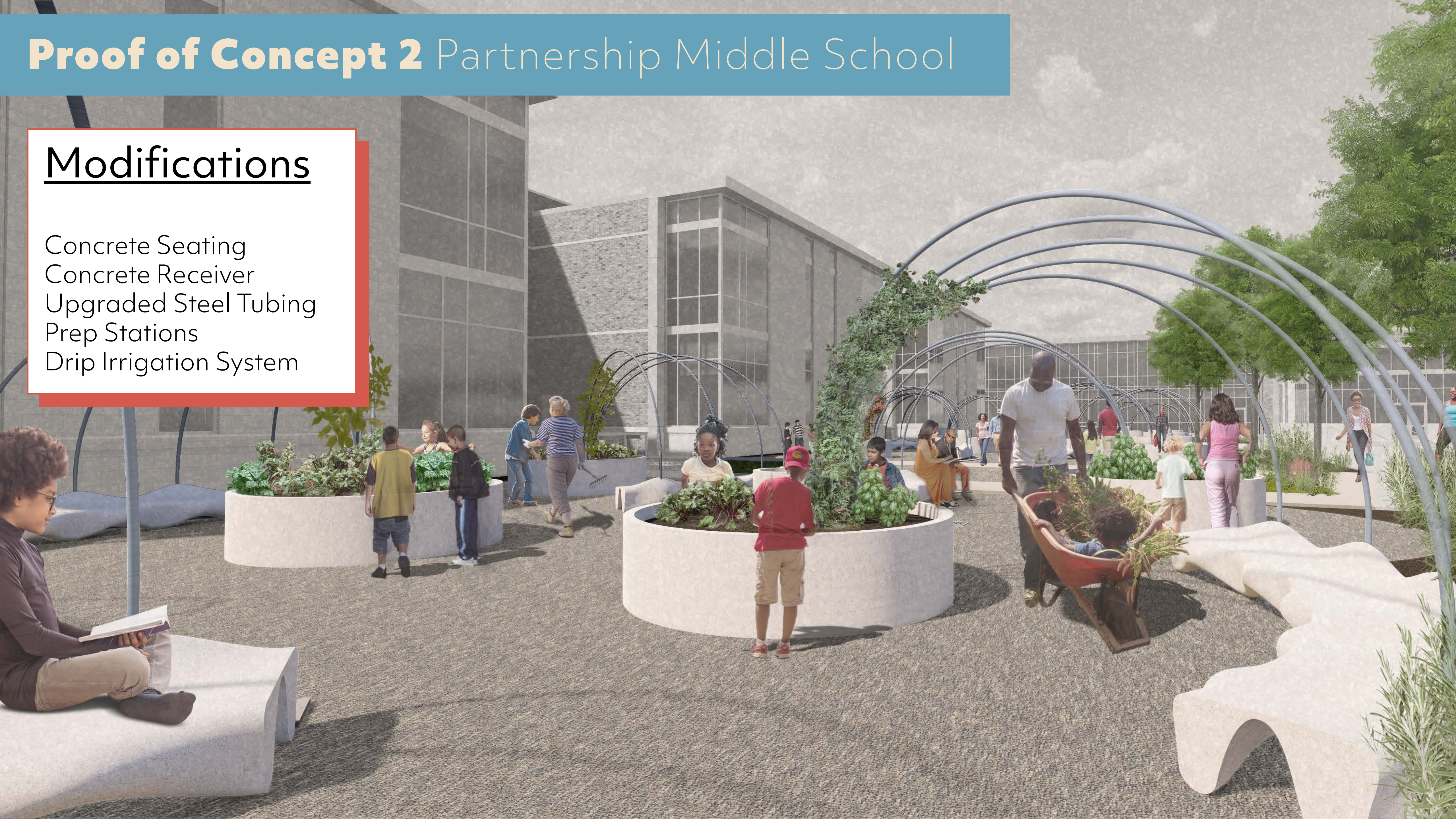




# Proof of Concept 2 Partnership Middle School

## Modifications

Concrete Seating  
Concrete Receiver  
Upgraded Steel Tubing  
Prep Stations  
Drip Irrigation System





# Installation Partnership Middle School





# Proof of Concept 3 Leland Middle School

## Metrics

268 Students  
6th & 7th Grade  
3 Garden Planters  
1200 sq. ft. of garden

Funding By:  
AIM for Change

Completion Summer 2021





# Proof of Concept 3 Leland Middle School

## Modifications

Wood Seating  
Storage Shed  
Teaching Station  
Instructional Graphics





# Teaching Station Leland Middle School





# Garden Module Leland Middle School





# Proof of Concept 4 Leflore Elementary School



## Metrics

312 Students  
PK-6 Grade  
3 Garden Planters  
2,500 sq. ft. of garden

Funding By:  
AIM for Change

Completion Summer 2022



# Proof of Concept 4 Leflore Elementary School

## Modifications

Wood Seating  
Teaching Pavilion  
Greenhouse Storage  
Instructional Graphics  
Ampitheatre Seating





# Teaching Pavilion Leflore Elementary School





# Graphics Leflore Elementary School





# Spring Planting Leflore Elementary School





# Design Concept Leflore Elementary School



Concept 1



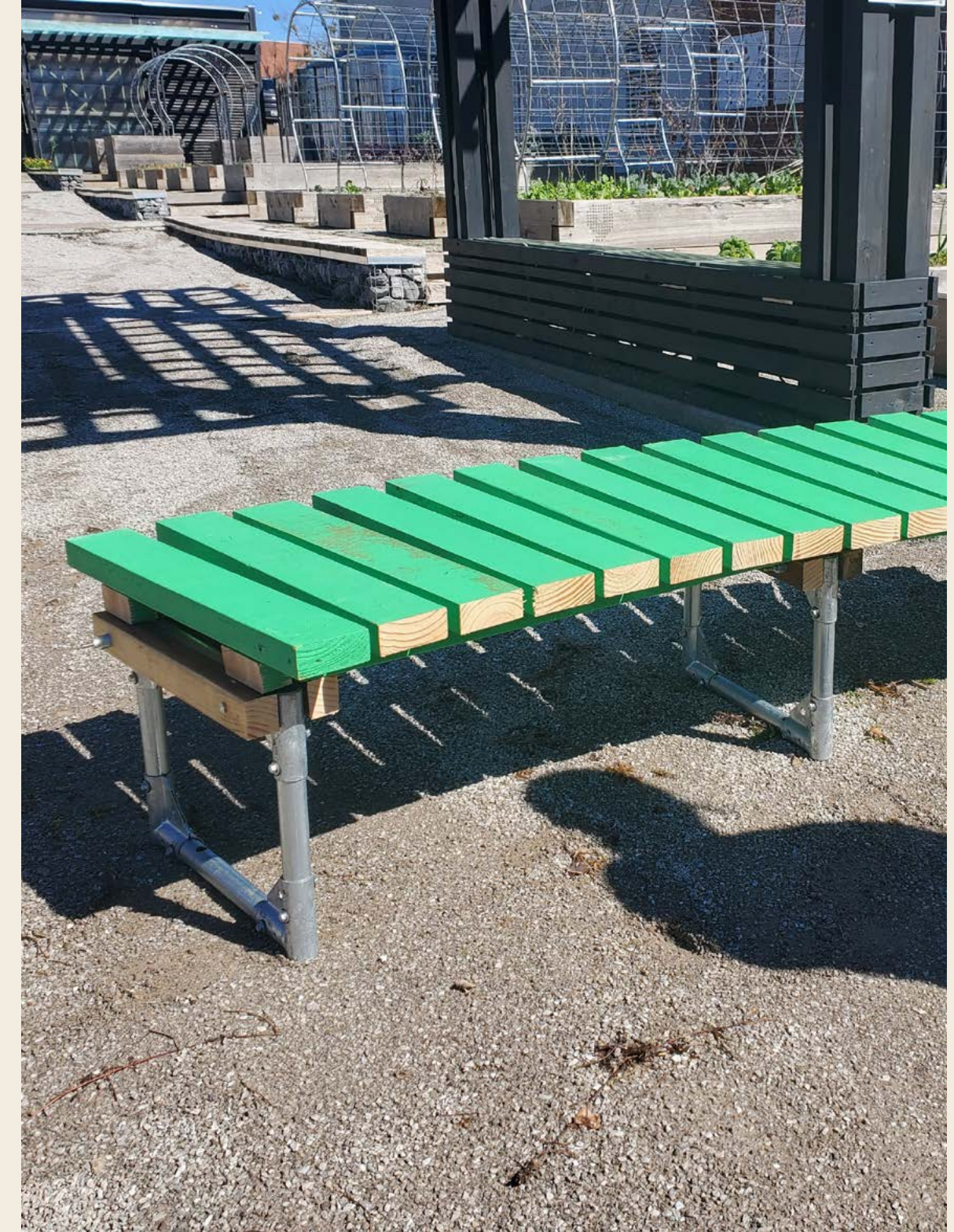
Concept 2



Concept 3



# Design Prototyping Leflore Elementary School





# Construction Leflore Elementary School



Assemble



Store



Paint



# Transport (Day 1) Leflore Elementary School





# Install (Day 2) Leflore Elementary School





# Install (Day 2) Leflore Elementary School





# Install (Day 3) Leflore Elementary School





# Install (Day 3) Leflore Elementary School





# Install (Day 4) Leflore Elementary School





# Install (Day 5) Leflore Elementary School





# Document + Disseminate

## Drawing Set

- L1 Garden Layout
- L2 Planter Details
- L3 Bench Details
- L4 Sub-surface Watering
- L5 Cold-frame Details
- L6 Materials List

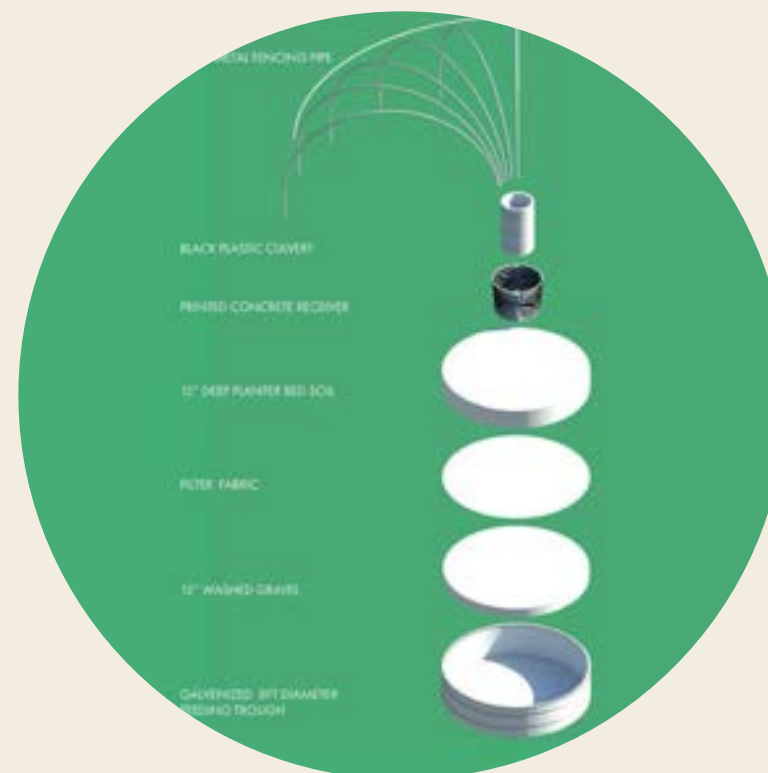
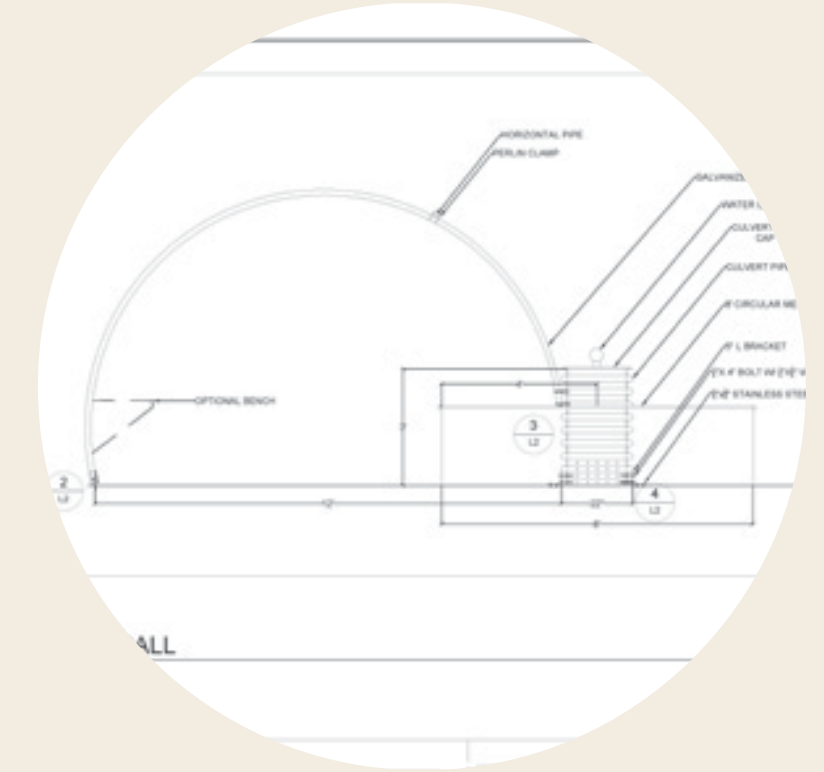
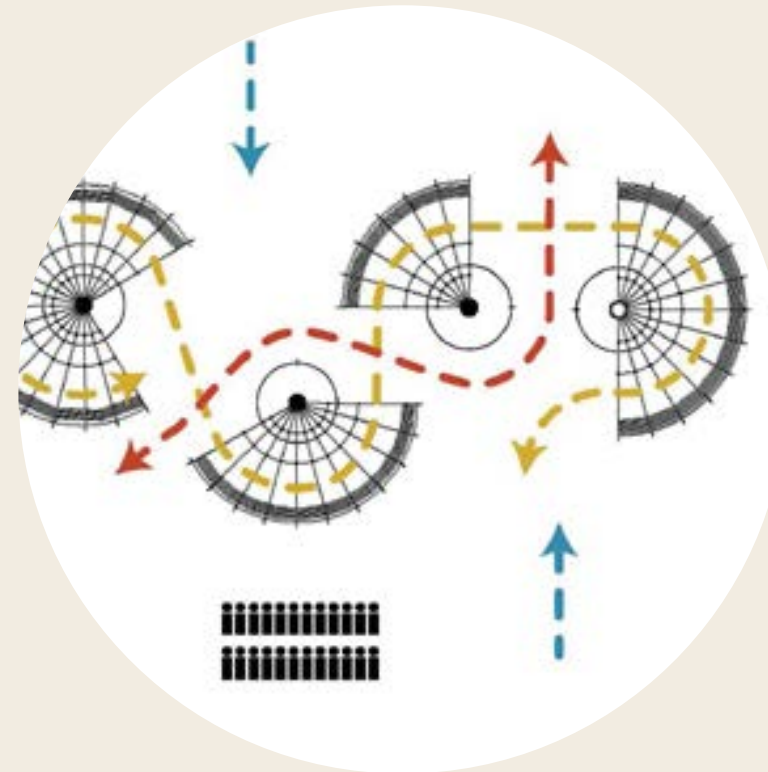
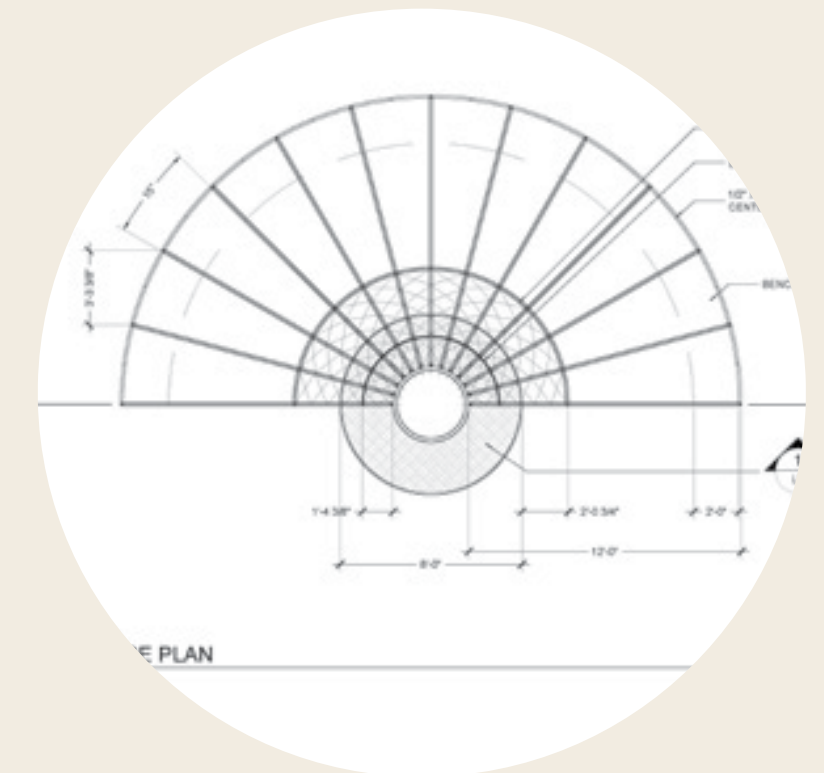
## Brochure

- Arrangement Options
- Construction Process
- Material List
- Cost Estimate
- Student Capacity
- Alternative Components

## Disseminate

- Development Kit
- Scaled Models
- Drawing Set
- Brochure

- Future Website
- Lesson Plans





An aerial photograph showing a school building with a white roof and a sign that reads "LEFLORE COUNTY SCHOOL, MULTIPURPOSE BUILDING". The building is surrounded by green fields and a dirt road. In the background, there are more fields and a line of trees. The sky is clear and blue.

**Thank you!**

Questions?  
[akw253@msstate.edu](mailto:akw253@msstate.edu)

Keep up with our work  
on Instagram:  
[@MSUDesignBuild](https://www.instagram.com/MSUDesignBuild)