Rain Gardeners

AR Educational Experience

Project

Team

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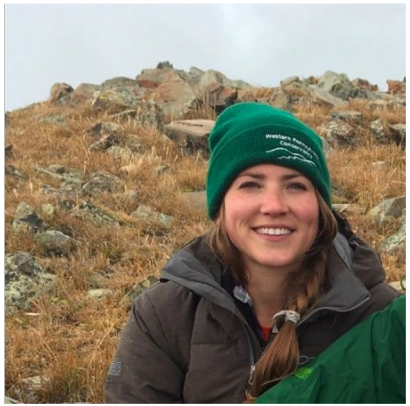


Marah Fielden

Rain Garden

A type of water capture feature in landscaping that helps slow and absorb runoff from storms

Lincoln School

Description

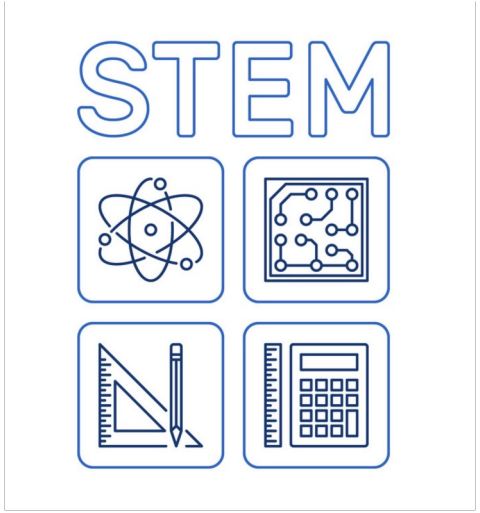
We are creating **a fun and intuitive digital tool using AR technology for educators** at Lincoln School who want to educate **3-5 grade students** about the ecology of a rain garden.

The goal is to help students have a better understanding of how rain gardens work, how plants benefit from flooding, and the ecosystem by making an AR experience on tablets. This is a project that **supports and enhances the educators' teaching experience.**

Design Goals

Target User

STEM Educators
3-5th Grade Students at Lincoln School
who have prior knowledge in rain gardens

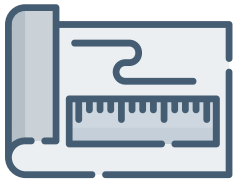


Tech

Android App on a tablet
Two Independent **AR** applications

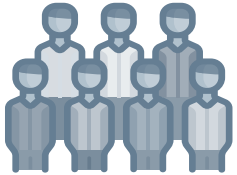
Metric Matrix

Client requirements



Interactive prototypes

Supplement educational experience

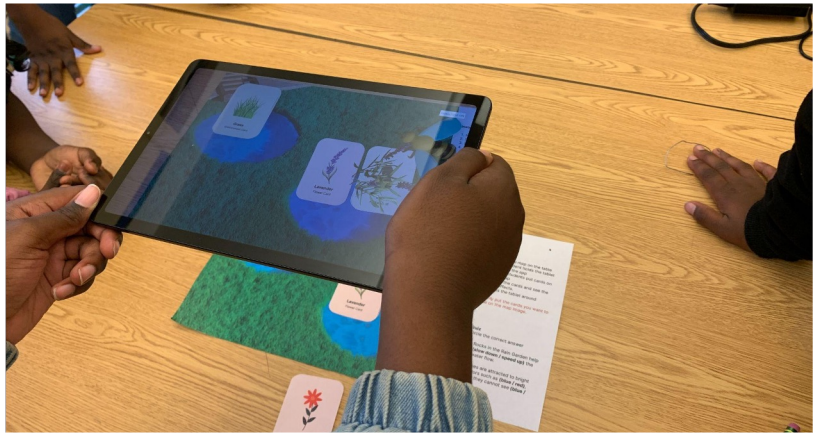


Playtests

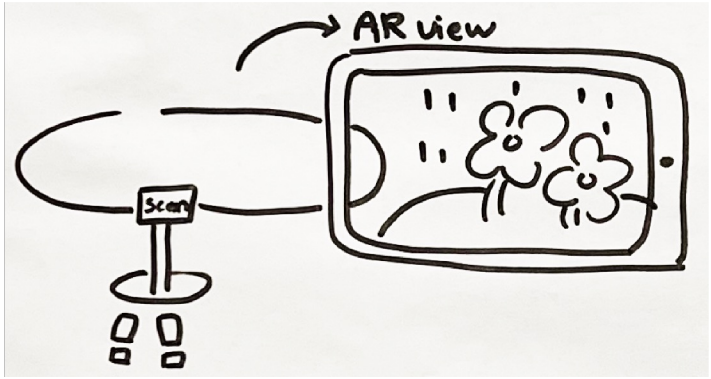
Two independent experiences

On-site experience at the rain garden

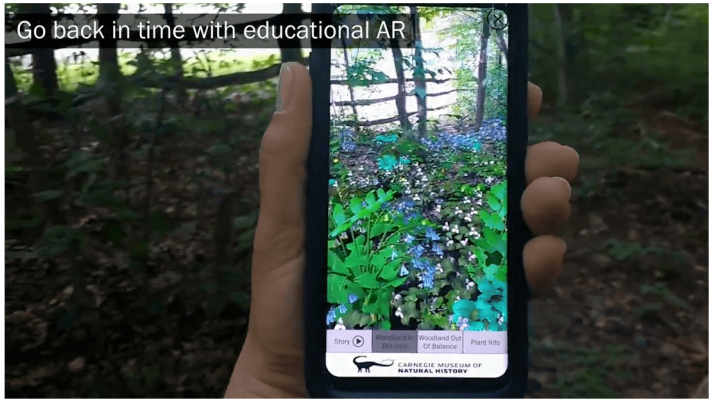
Indoor card experience



On-Site Idea Development



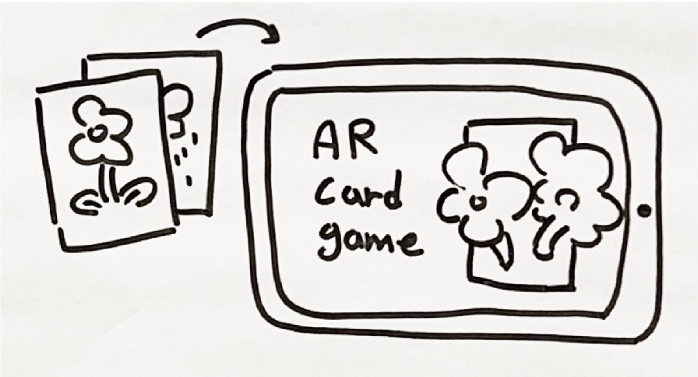
Users can stand in a designated spot to view the AR environment using a digital tablet.



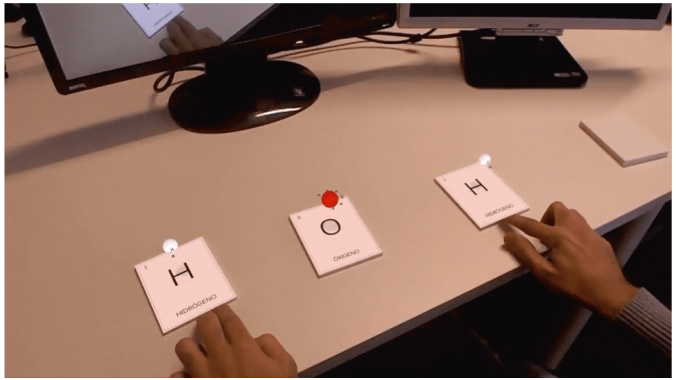
Reference

CMU Natural History Museum

Indoor Idea Development



Users can scan cards anywhere to view AR



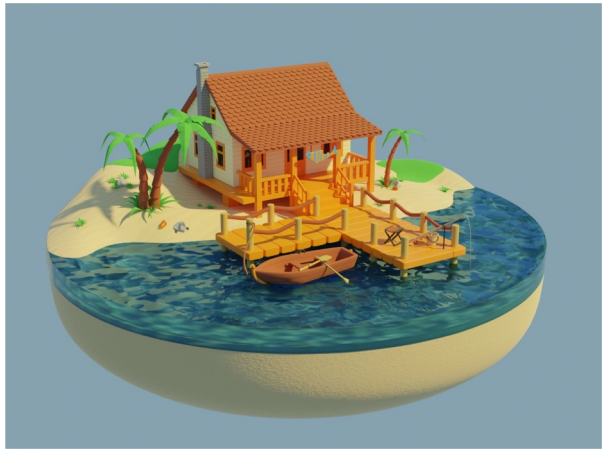
Reference

AR chemistry learning experience

Reference - Art style

Low-poly stylized art

- Figurative representation that is easy to understand
- Reduce loading time
- Within the scope



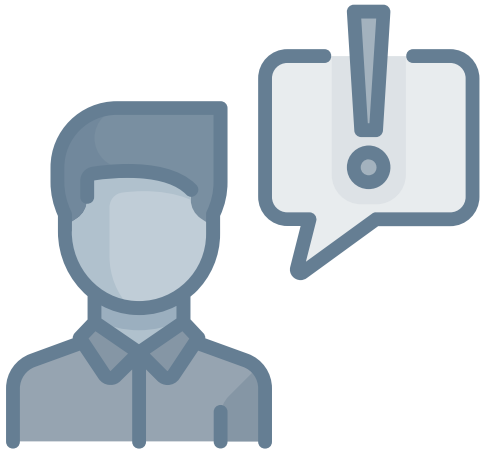
Progress since Quarter

Feedback from Quarter

Q. Device Selection
A. 3-5 android tablets

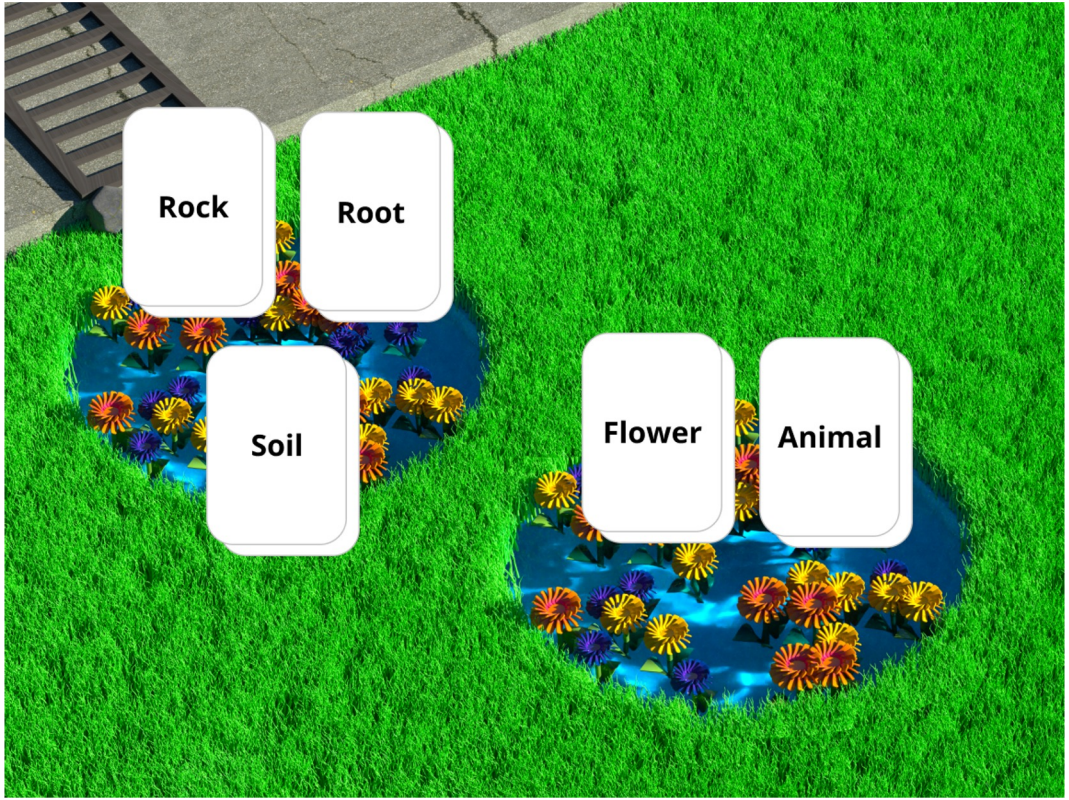
Q. More engagement from students
A. Students can proactively interact with the AR technology, instead of mere observation

Q. Measurement for learning
A. Provide guiding questions



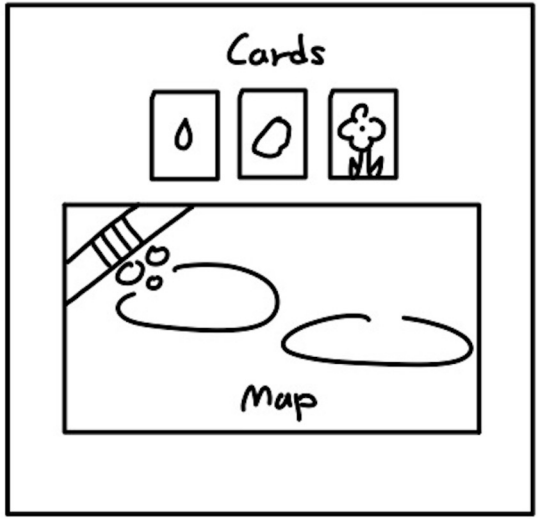
Indoor Overall vision

- 3-5 students
- 1 Tablet, 1 Map, 10 cards
- 20-30 minutes



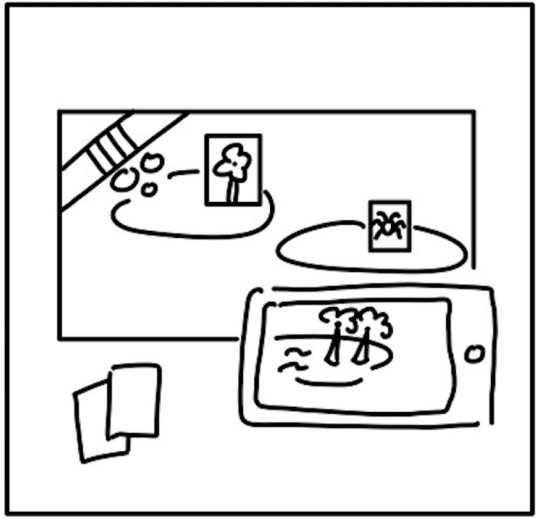
Indoor Experience Design

What we provide



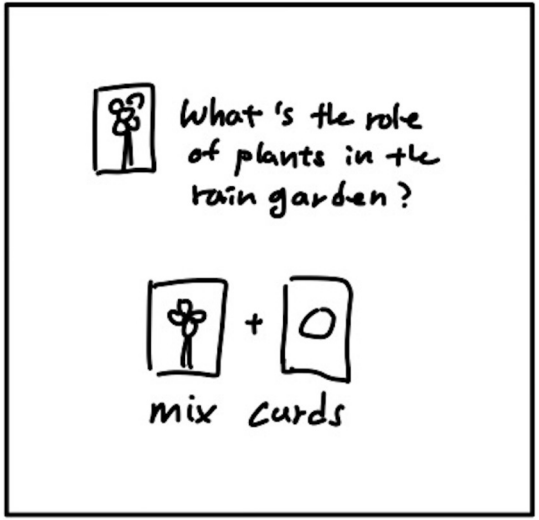
We provide printable cards and the rain garden map

What students do



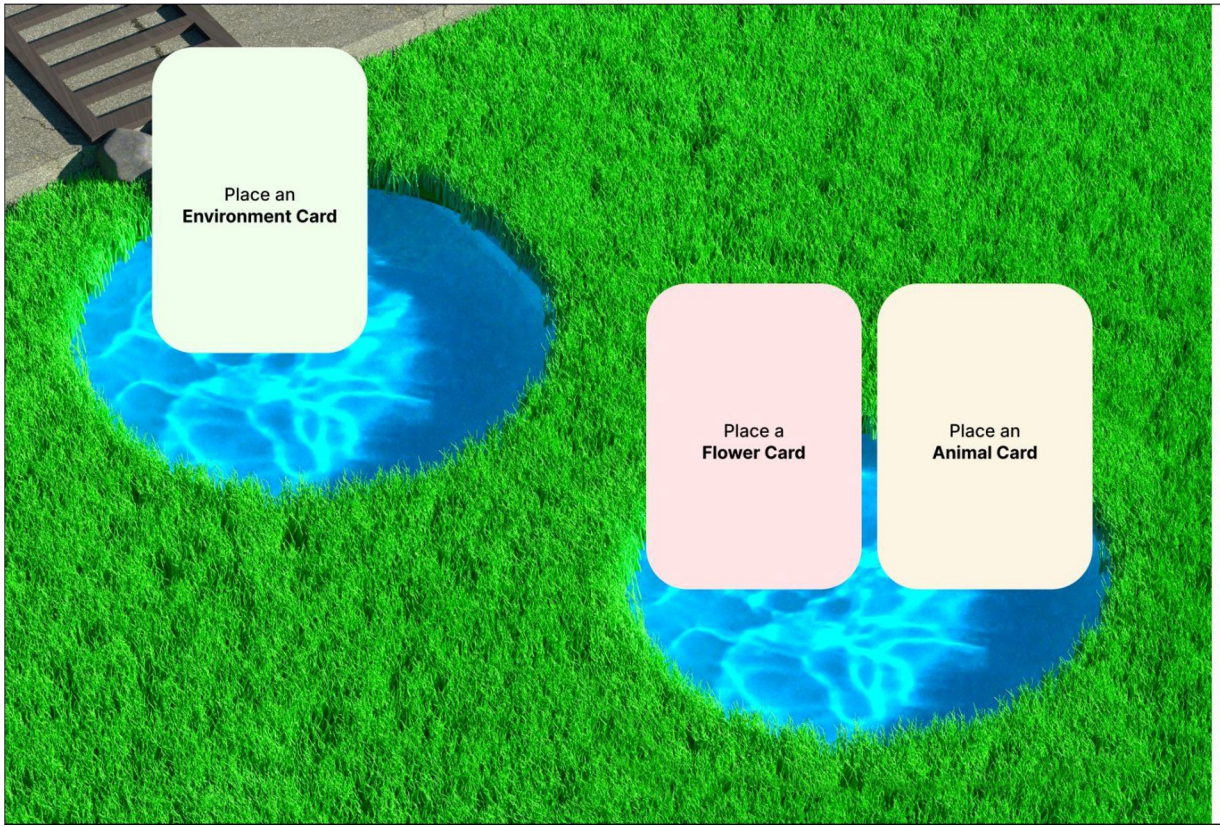
Students put cards on the map and view what happens using tablets

What students learn



Students learn what's the role of each component in the rain garden

Indoor Progress



Instruction

1. Place the map on the table
2. One student holds the tablet
3. Launch the app
4. Other students put cards on the map
5. Scan the card and see the AR effects. Make sure to place cards in a specific direction.
6. Pass the tablet around

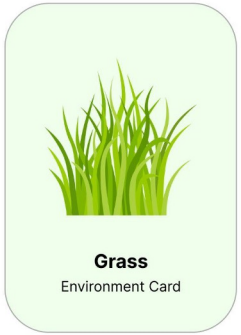
Quiz
Circle the correct answer

1. Rocks in the Rain Garden help **(slowing down / speeding up)** the water flow.

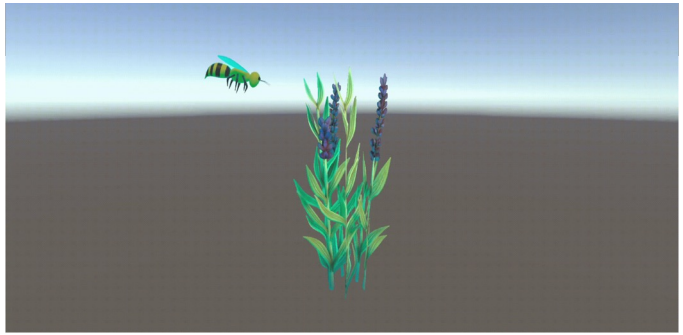
2. Bees are attracted to bright colors such as **(blue / red)**, but they cannot see **(blue / red)**

Indoor Progress

Cards



AR animations when scanned



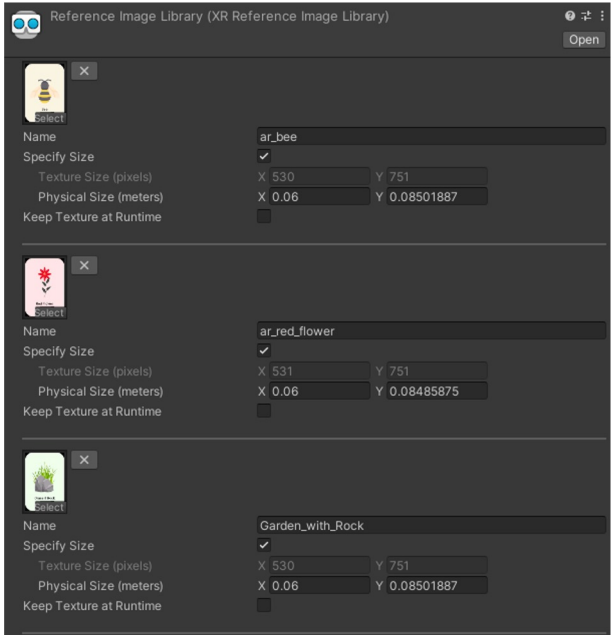
Indoor Tech

Unity ARCore

Platform

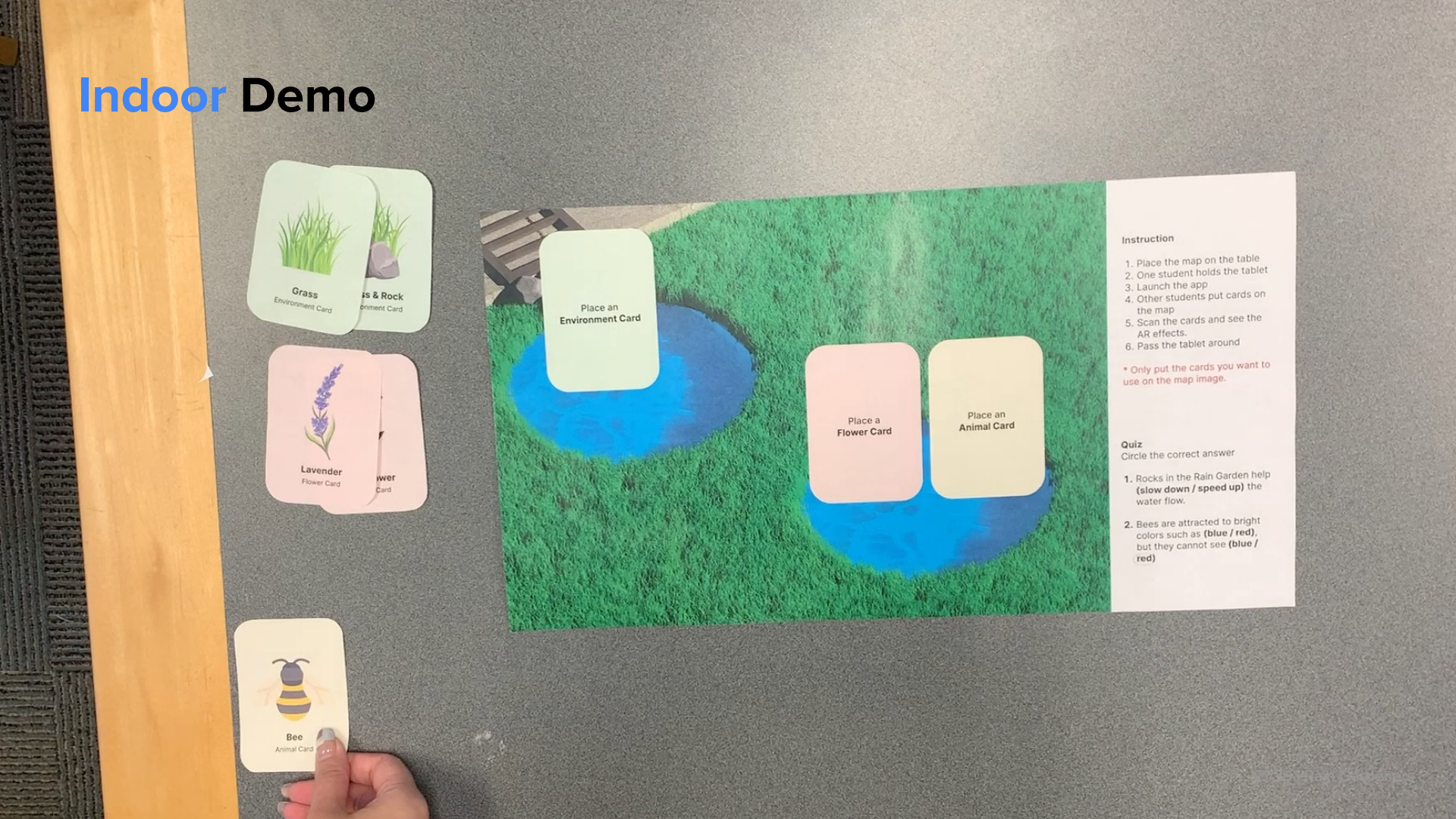
Unity + ARCore with AR Foundation

Built-in Reference Image Library



Indoor Demo Progress

Indoor Demo

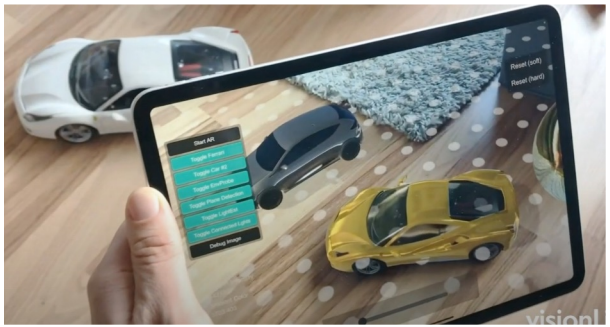

Grass
Environment Card
Lavender
Flower Card
Bee
Animal Card
Place an
Environment Card
Place a
Flower Card
Place an
Animal Card
Instruction
1. Place the map on the table
2. One student holds the tablet
3. Launch the app
4. Other students put cards on the map
5. Scan the cards and see the AR effects.
6. Pass the tablet around
* Only put the cards you want to use on the map image.
Quiz
Circle the correct answer
1. Rocks in the Rain Garden help (slow down / speed up) the water flow.
2. Bees are attracted to bright colors such as (blue / red), but they cannot see (blue / red)

On-site - Tech

Initial Research Ideas:

- Marker based
- Model tracking
- Location based

AR + GPS LOCATION



On-site - Initial approach : AR + GPS

Models will be created at the pre-set GPS coordinates.

Pros:

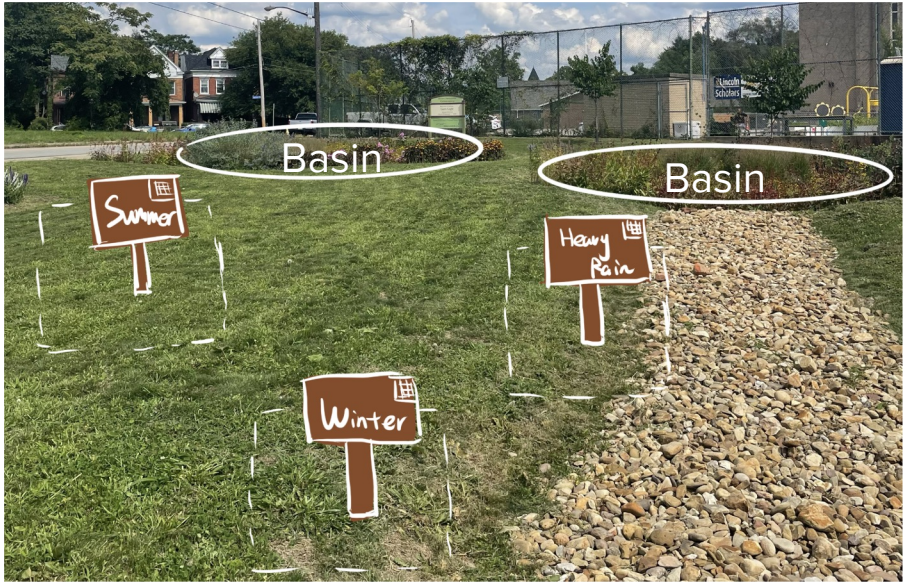
- Lighting is not an issue anymore

Cons:

- GPS accuracy varied on device
- Hold tablet walking around is not safe

On-site - Final approach : Designated Spot View

- 1 Tablet, 3 spot
- 3-5 students
- 15-20 minutes



Pros:

- More engagement for students
- Safety: manageable for educators

Cons:

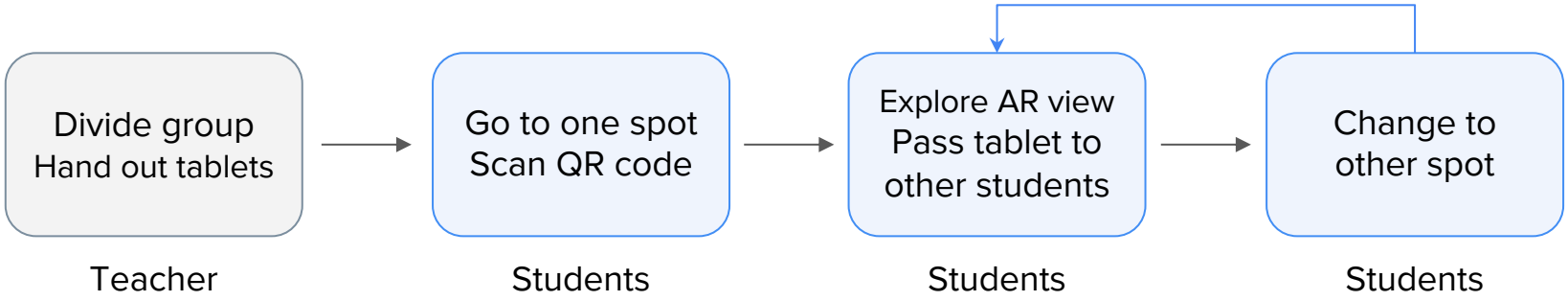
- Lighting

On-site Overall vision

3 different spot with wooden sign

- Winter session (showing water frozen and snow, animals sheltered by snow)
- Summer session (showing flowers blooming and creatures all around)
- Heavy Rain session (showing the water cycle)

Exploring Flow

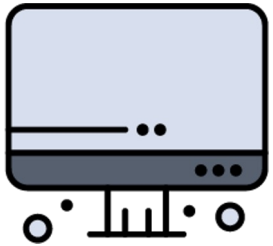


Playtesting

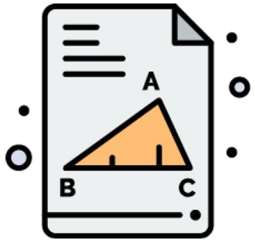
Playtesting - Goals

Understanding

Fun



Tech issues



Clarity of art & instruction

Educator’s role

Playtesting - Indoor experience

Lincoln School

23 5th graders
1 instructor
Had prior knowledge in rain gardens

Mary Queen of Apostles School

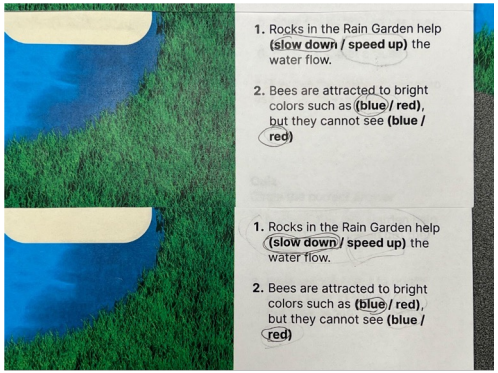
25 6th graders
2 instructors
Had prior knowledge in water cycle

Playtesting

Playtesting

Playtesting - Reaction of students

- Understanding the concepts we are trying to deliver
- Exploring various combinations of cards freely
- Having discussions and cooperating within the team



Playtesting - Feedback from students

“**I love this experience!**
So how did you make this?
Is AR different than VR?”

“This feels magical. I hope I can play with this more. It **helped me understand the concept better** by watching how it works.”

Playtesting - Room for improvement

“The indoor experience looks great so far, but it would be even better if this can be **related to the outdoor experience** as well.
- Client

“It would be great if we can have **more cards**. I think the experience will be richer with more variance.”
- Student

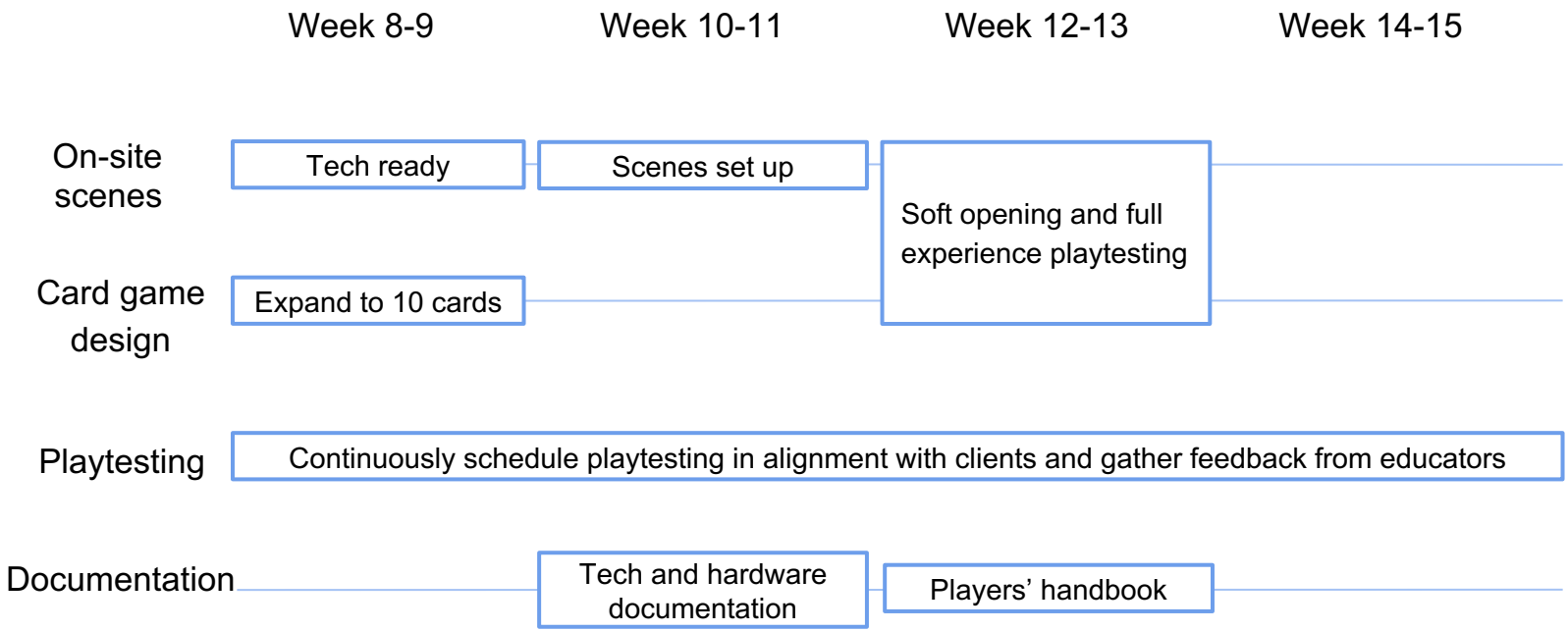
Playtesting - Feedback from educators

“This would be a great experience for kids **to learn the science concept** and also unlock the possibilities of **what technology can do**.”

“Kids definitely enjoyed this. Liked the overall duration of the activity. I think a **single instructor can lead this.**”

Future Direction

Next Steps and Schedule



Summary

- **A Rain Garden digital experience using AR technology**
- Target Users：
  - School educator and 3-5 grade students
- Goal:
  - Support STEM education using the rain garden as an example
  - Empower students to observe, learn and embrace the AR tech
- Two independent experiences:
  - On-site spot exploring
  - Indoor card experience

Thank you! Questions？