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What are the barriers and opportunities using Augmented Reality for Primary Science Education?

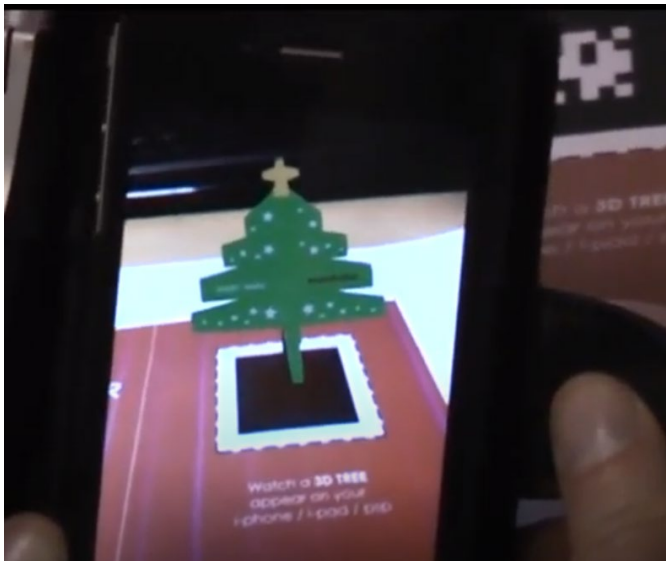
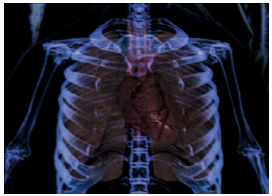
Backstage Academy Symposium 23 09 22

Warren Fearn


Senior Lecturer, York St John University
Ph.D. Student, University of York.

Ned Griffiths

MA Virtual and Augmented Reality Graduate
Research Assistant, York St John University



ARGON (Ar)

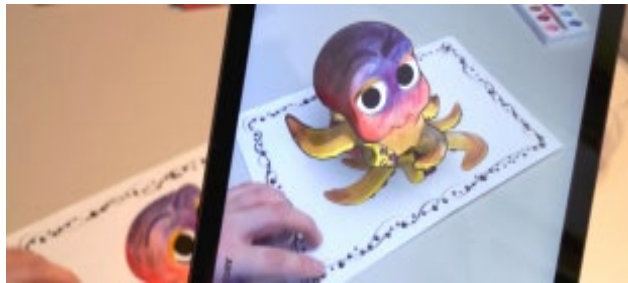
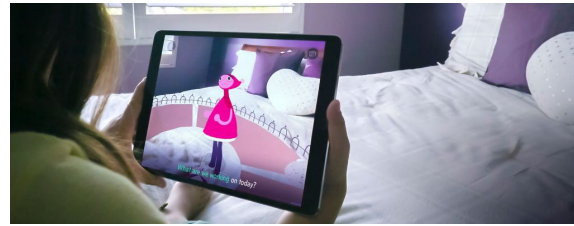


Point your iPhone, iPod Touch or iPad at the marker to view a 3D hologram

• Discovered:	1894
• Atomic Number:	18
• Atomic Weight:	39.948
• Density At 0 C:	101.325 kPa
• Wetting Point:	-189.35 C
• Freezing Point:	-189.2 C

Argon (symbol Ar) is a colorless and odorless gas, makes up 0.93% of our planet's atmosphere. This makes it the third most abundant element in our atmosphere after nitrogen and oxygen. It is a noble or 'inert' gas, found in group 18, period 3 of the periodic table which does not react with other elements under normal conditions.

Uses: You can find Argon used in light bulbs, lasers, double glazing for home and even scuba dry suits!

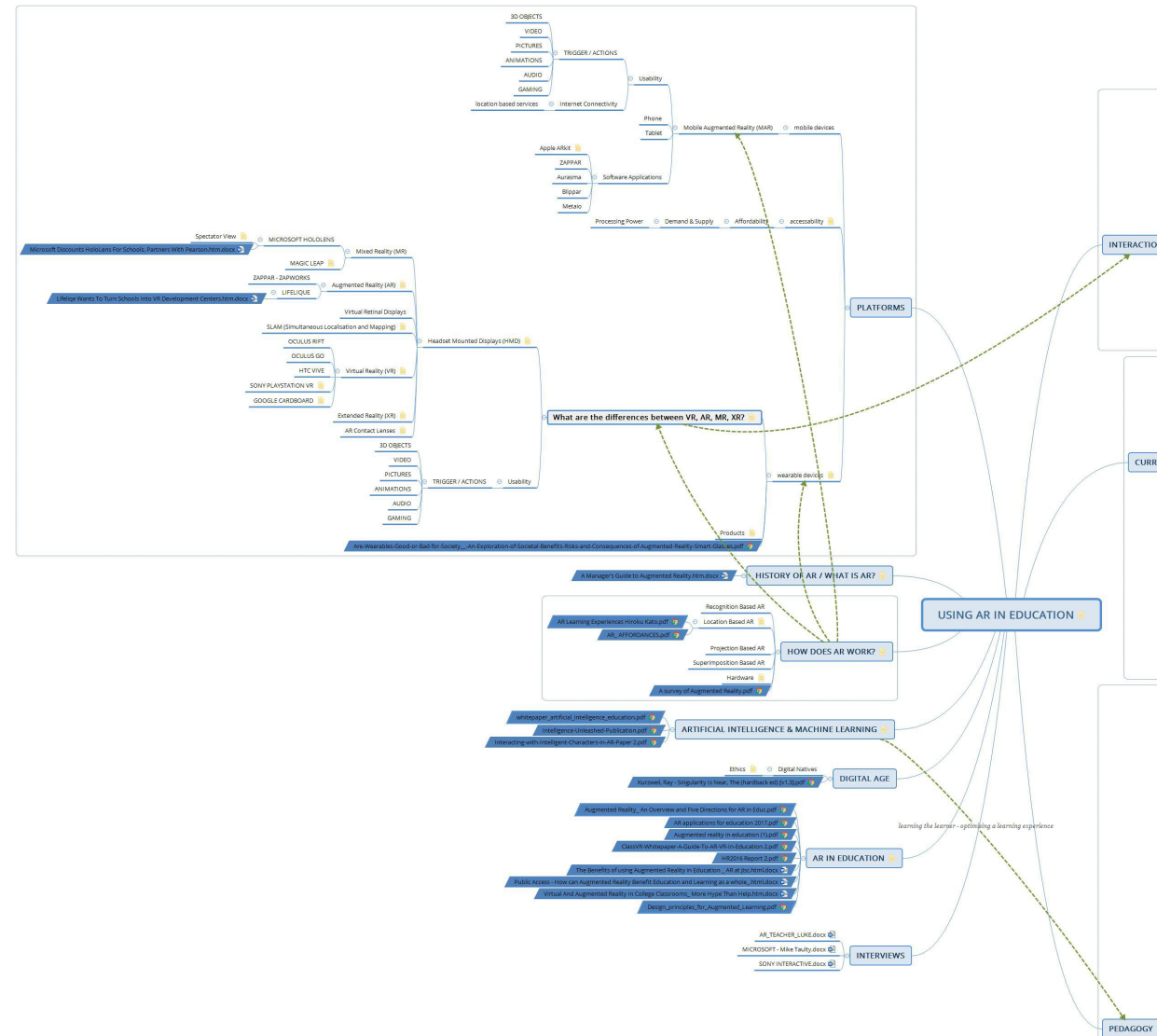


AR in Education

- (Akçayir, Akçayir, 2017; Wang, et al., 2017; Radu, 2014; Yuen, Yaoyuneyong, Johnson, 2011), suggest educators and designers need to collaborate in terms of creating sound pedagogy to develop AR applications that maximise on learning outcomes.
- A study by Silva et al. (2019) found that although educators did recognise the potential of AR, the adoption of such technologies within mainstream schools is rare.
- (Kerawalla, Woolward, Luckin, 2006; Bistaman, Idrus, Rashid, 2018) specifically demonstrate AR provides a positive impact on a teaching and learning experience for primary science education.

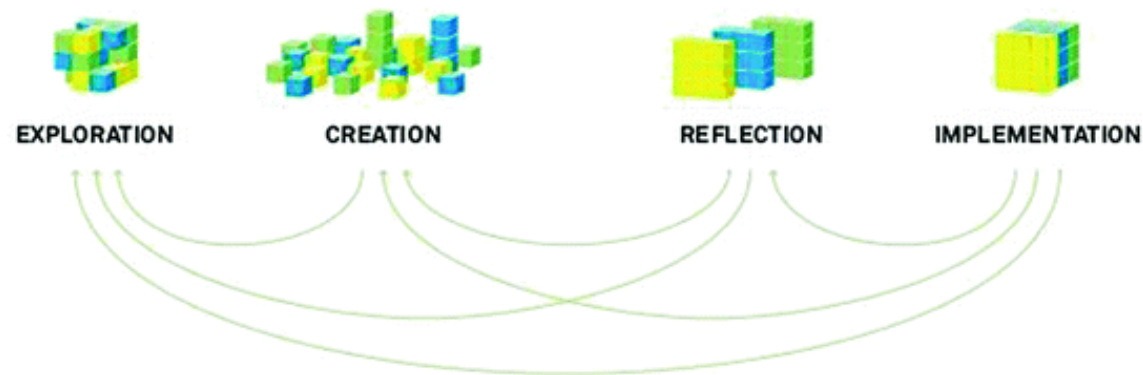
Primary Education: Science

- (Wellcome Trust, 2017) that primary teachers within the UK education system are now only managing to devote on average 1 hour and 24 minutes per week in teaching science.
- Ofsted warned that science “has clearly been downgraded in some primary schools” since the key stage 2 science test was scrapped in 2009.



5 Principles of Service Design

Service Design Thinking Process



Stickdorn, Hormess, Lawrence and Schneider (2018)
This is Service Design Thinking

1. User Centred

Experiences are customer focused.

2. Co Creative

All stakeholders are part of the process.

3. Sequencing

The service should be visualized as a sequence of interrelated actions.

4. Evidencing

The service should be visualized in terms of physical artefacts.

5. Holistic

The entire environment of a service should be considered.

Stakeholders



Nicky Waller

Primary Science Advisory
Teacher at CIEC (Centre for
Industry Education
Collaboration)
University of York



Dean Finnegan

Animation Lead,
Character Rigging
Ubisoft
Sydney



Dr Yang Lu

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Tim Moat

Director of Communications
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Science Academy Leader
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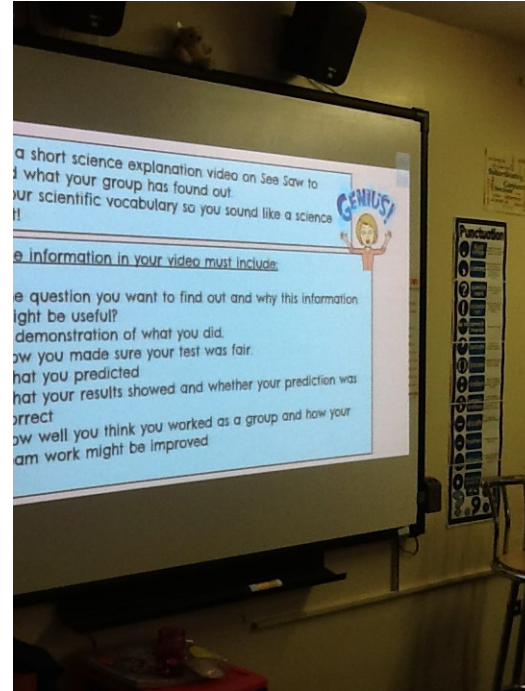
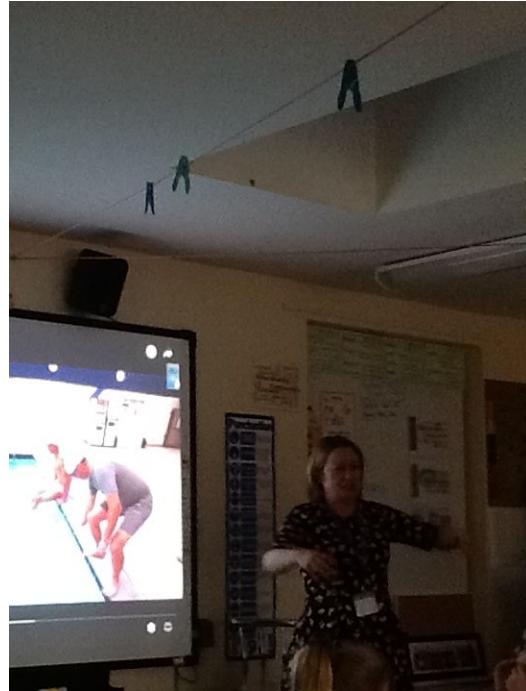
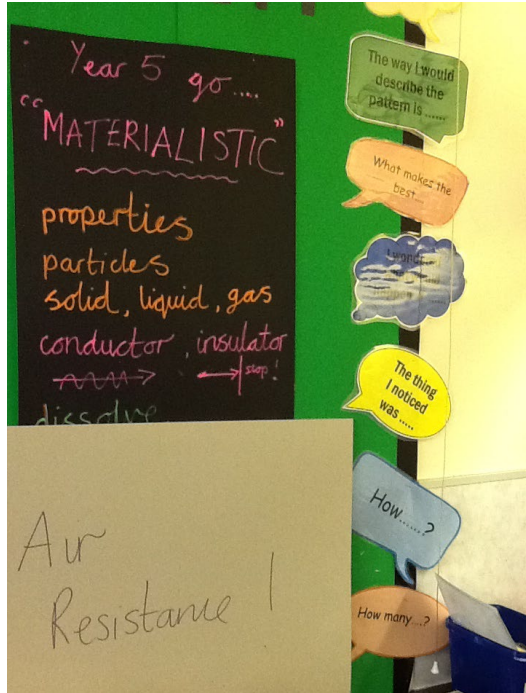


Ebor Academy Trust

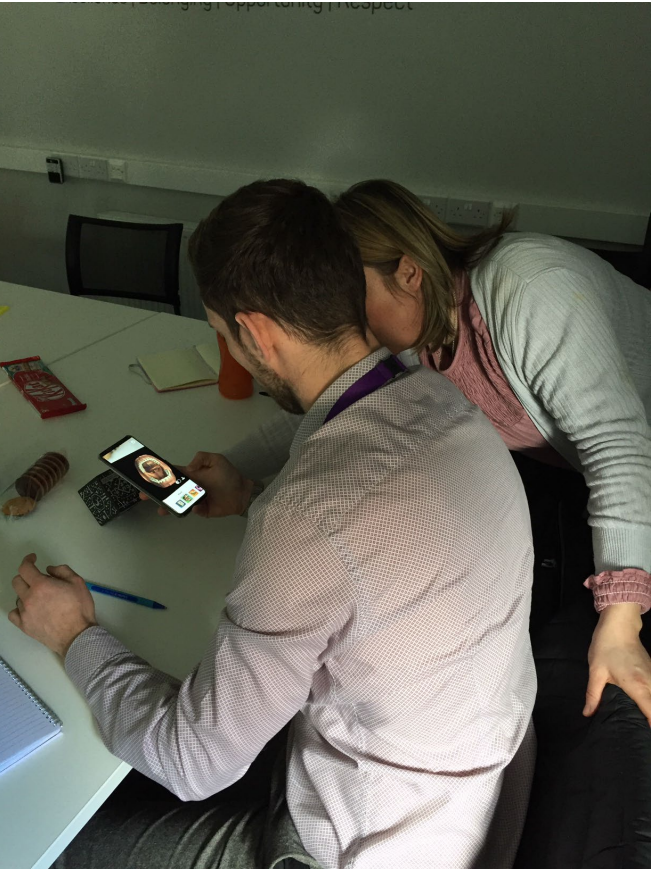
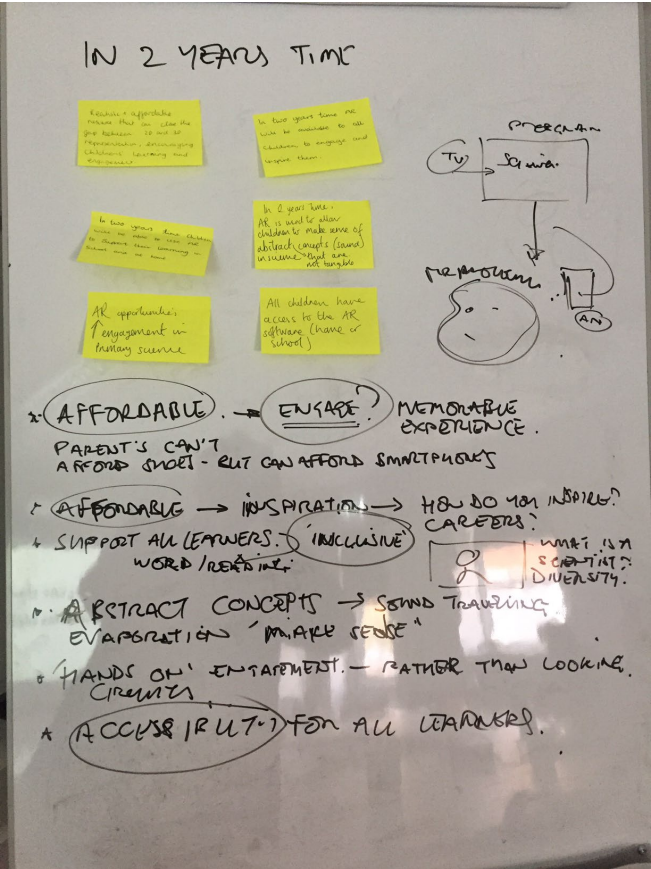
Pupils - Keystage 2



Exploration: Classroom Observations



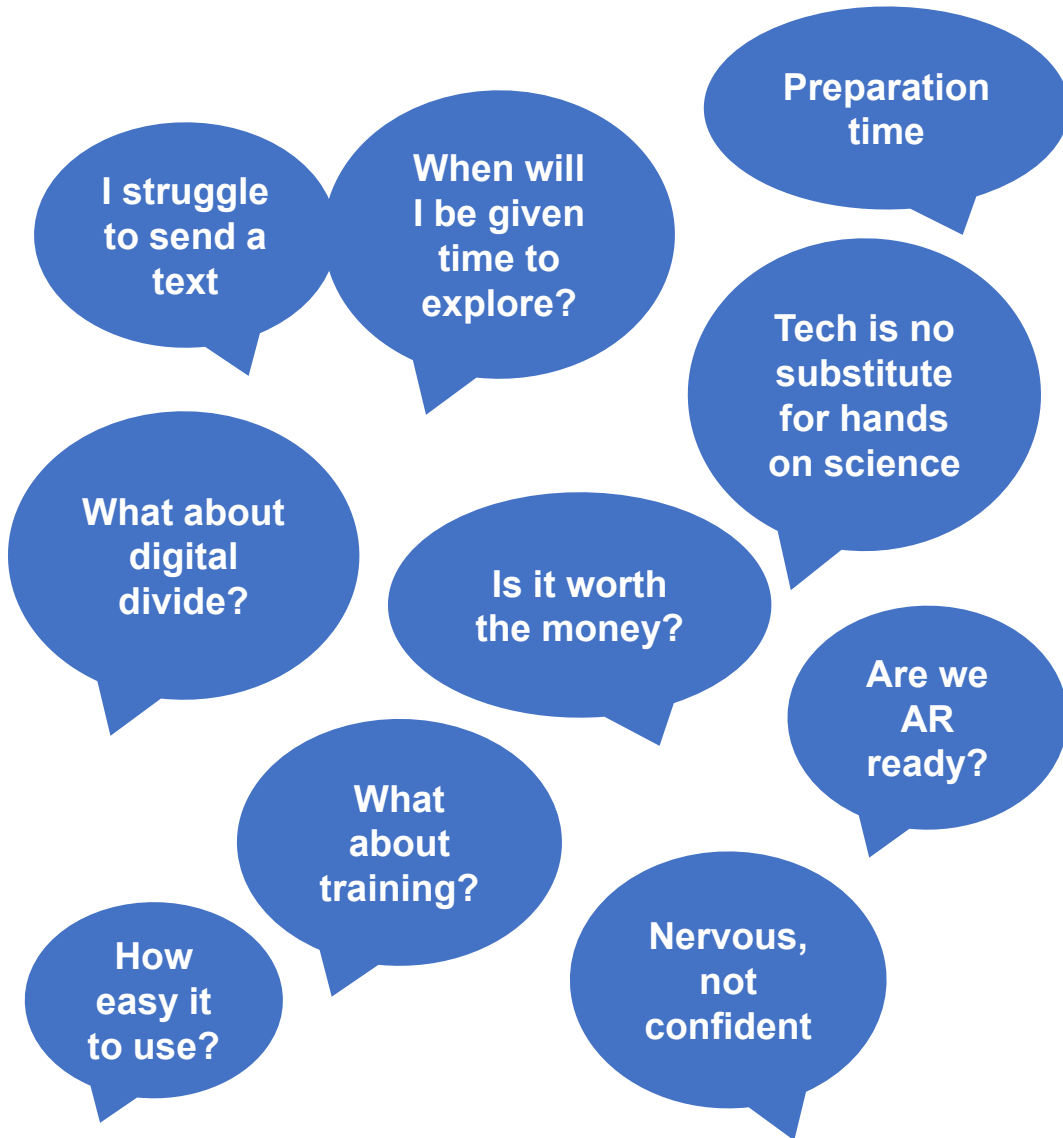
Exploration: Focus Groups / Design Sprints



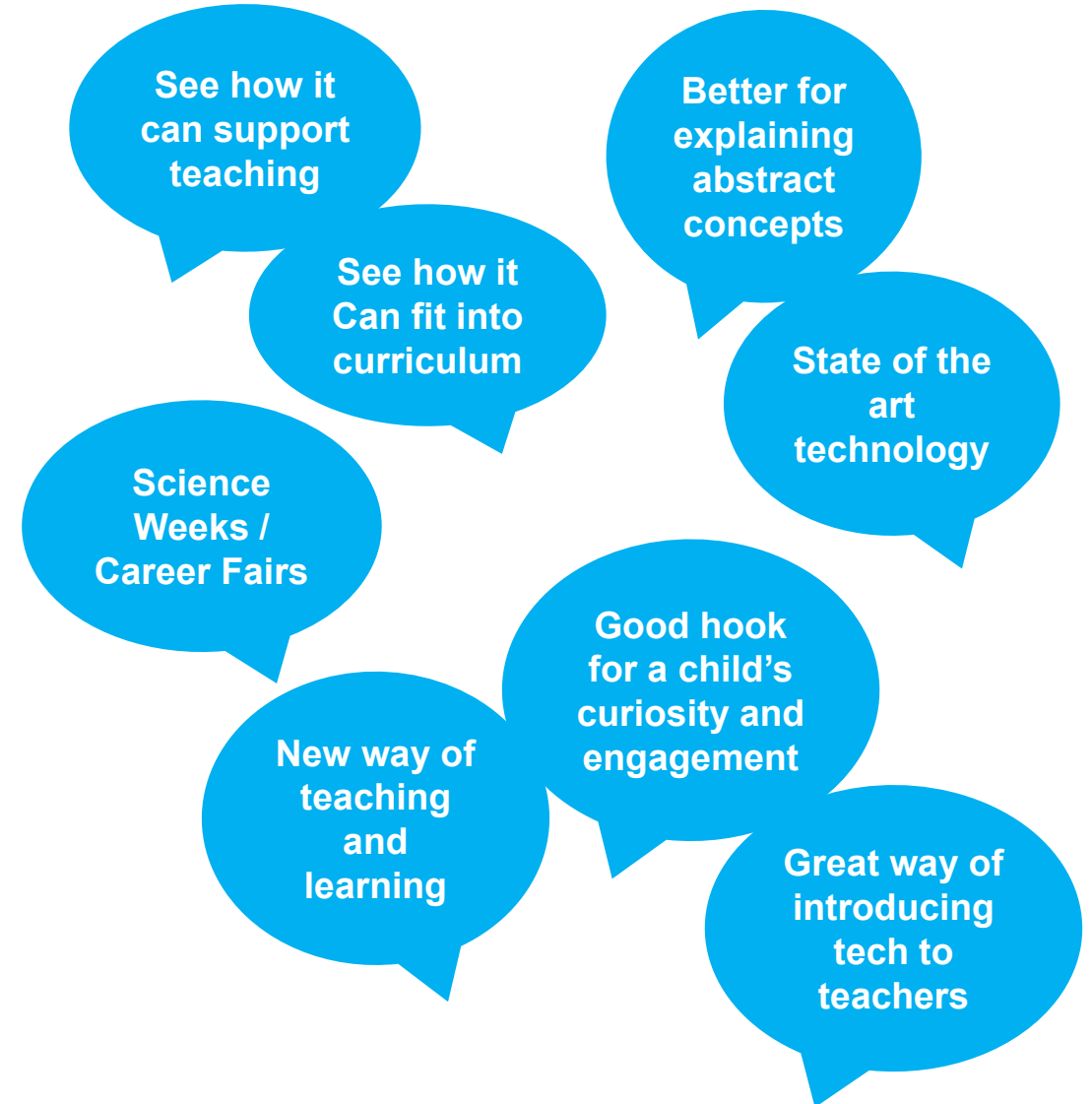
Exploration: Empathy Canvas Maps



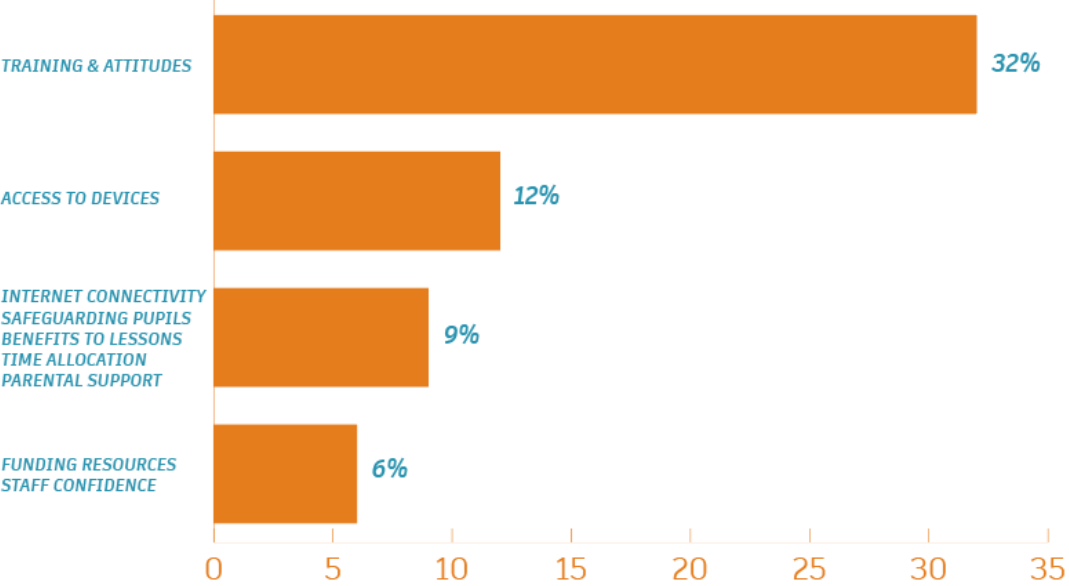
Exploration:
Empathy Canvas Map (Challenges)



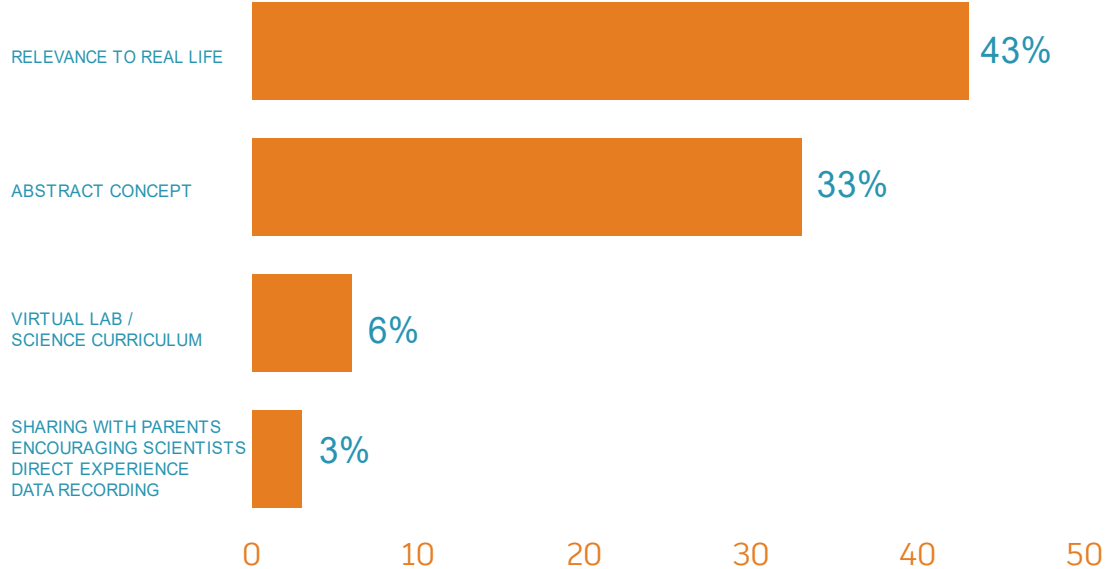
Empathy Canvas Map (Benefits)



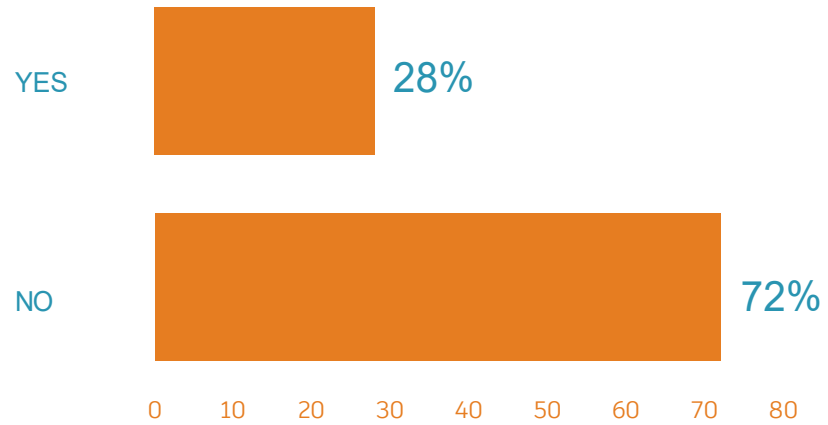
Exploration: Empathy Canvas Maps (Challenges)



Empathy Canvas Maps (Benefits)



Exploration: Summary

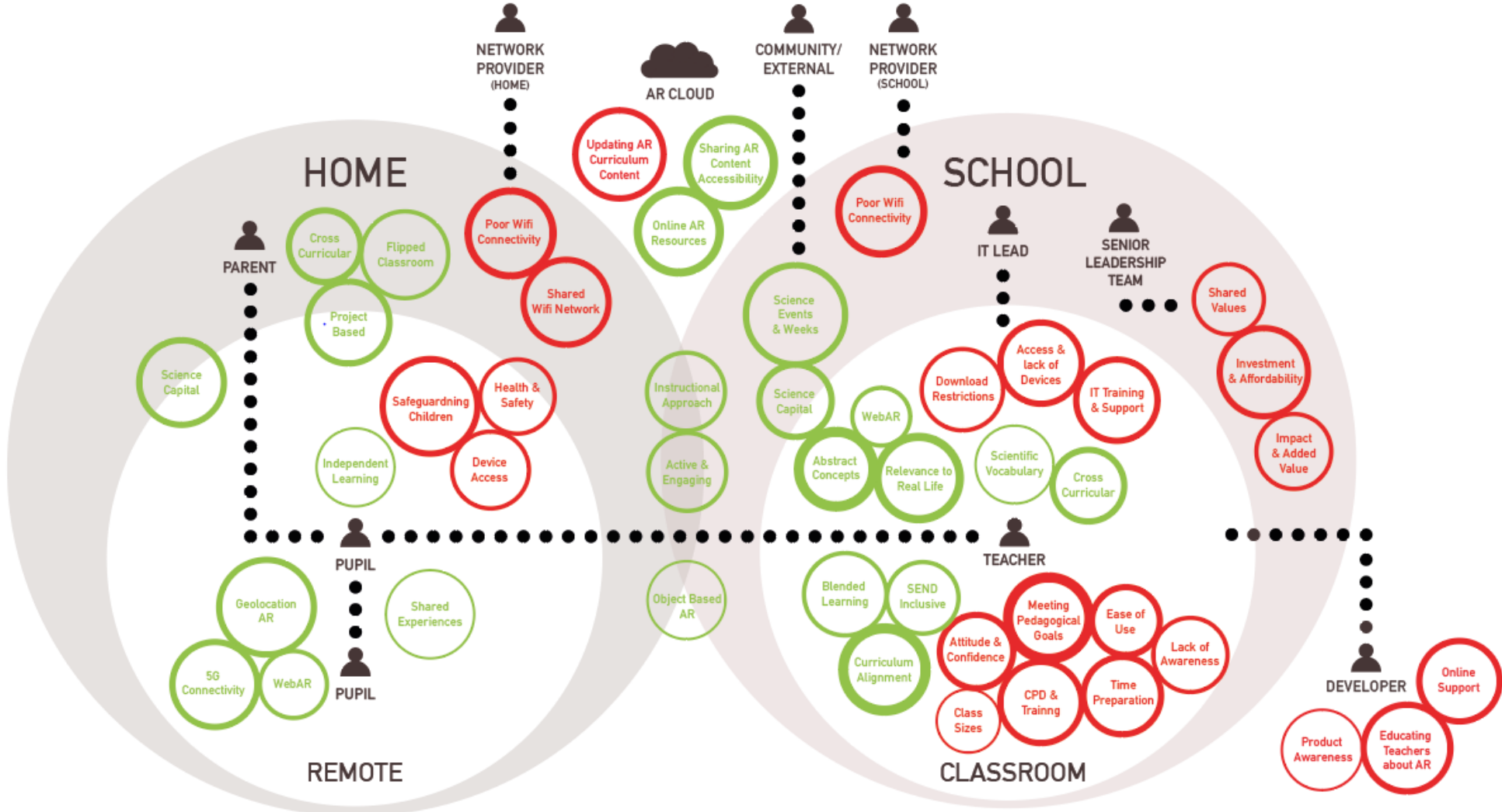


Affordability & Investment
Attitude & Confidence
IT Infrastructure
Time Preparation
CPD & Training
Inclusive

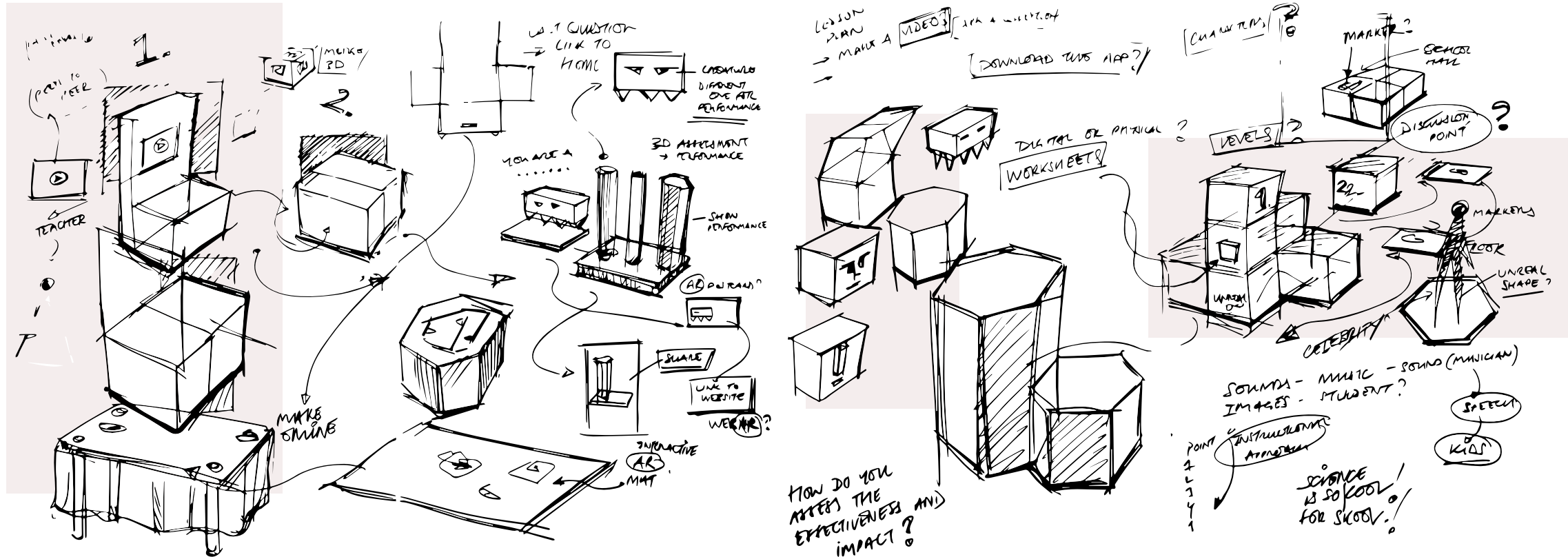
Curriculum Alignment
Cross Curriculum (STEM)
Connecting Science to Real Life
Science Capital

Exploration: Augmented Reality Service

KEY:



Creation: Concept Work

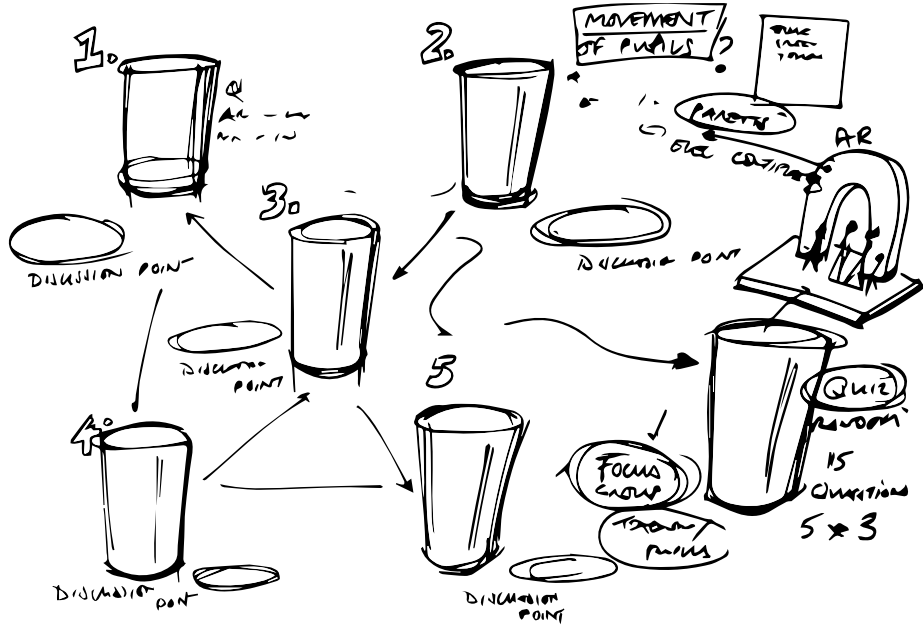


Science Event / Science Capital / Introduction in AR / Change Content (Cloud based) / Image Recognition / Time Preparation / Deep Dive / Active Learning / Group Work / Accessibility

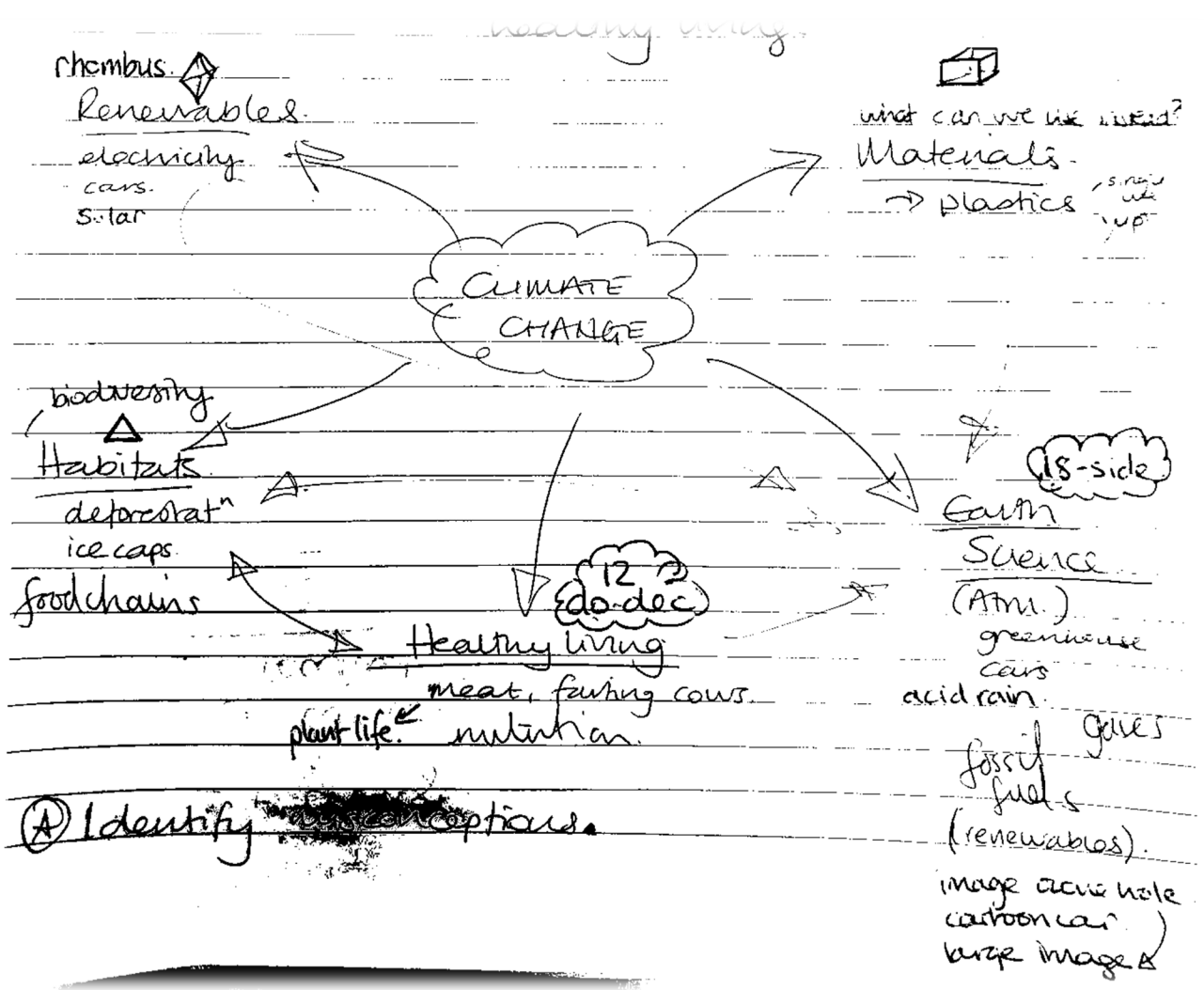
Creation:
Concept Work



Creation: Customer Journey Mapping

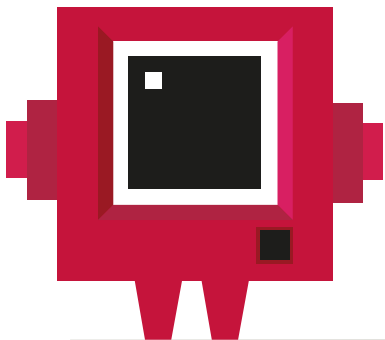


- 5 Stations:**
1. Questions
 2. Discussion Point
 3. Video
 4. AR Experience
 5. AR Interactive
 6. Reflection
 7. Quiz



Ⓐ Identify ~~conceptions~~ ~~conceptions~~

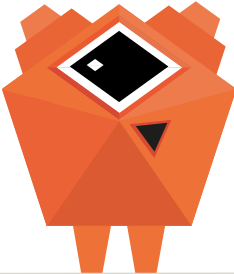
Creation:
Character Design



HEX



TETA



IOO

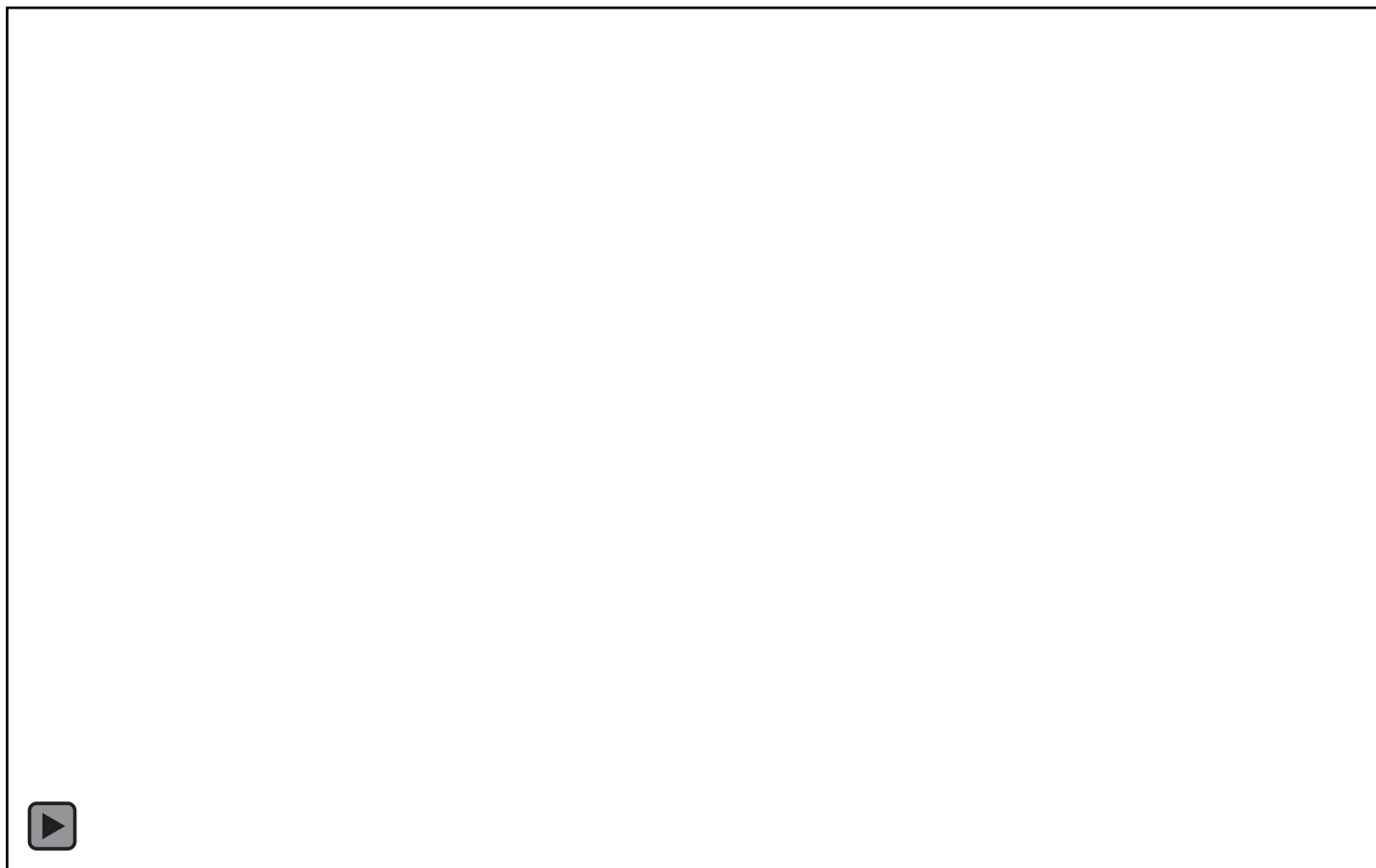


How do you reduce, recycle, in school and at home?

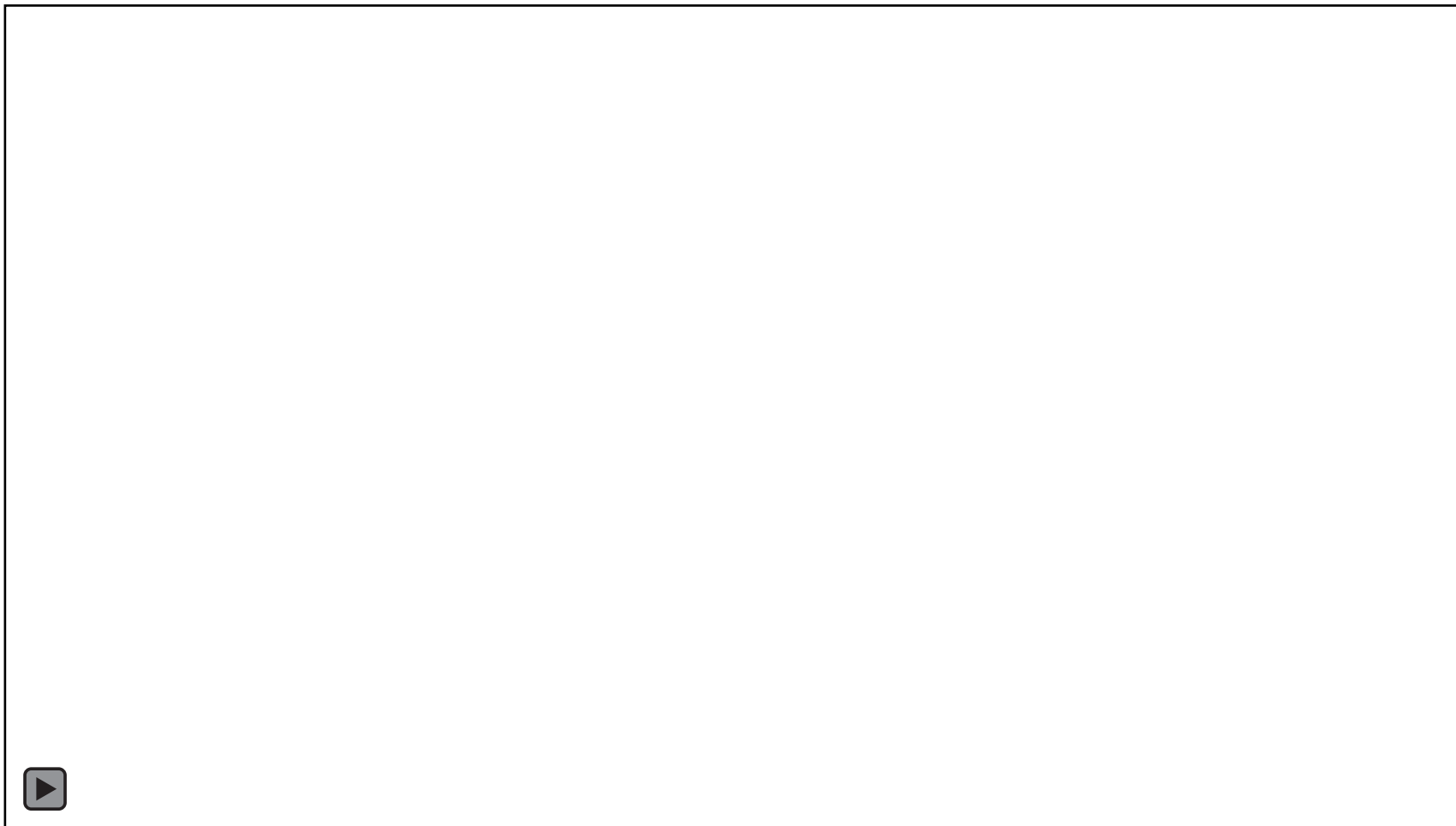
What types of materials do we use in our everyday lives?

Why does reduce, recycle, help the environment?

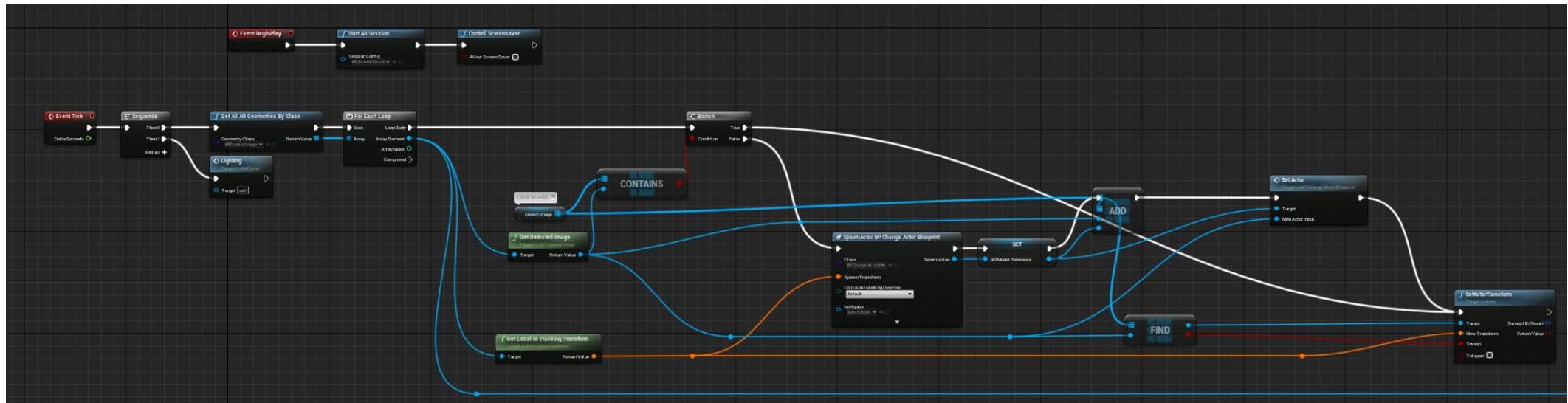
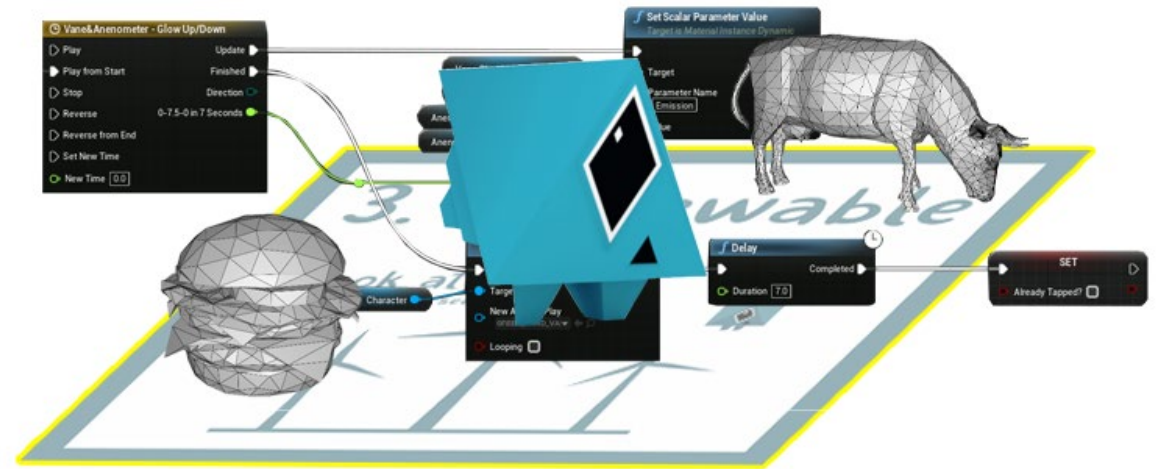
Creation:
Character Design



Creation:
Character Design



Creation: Mechanics (Blueprint)



Creation: Storyboarding

3.

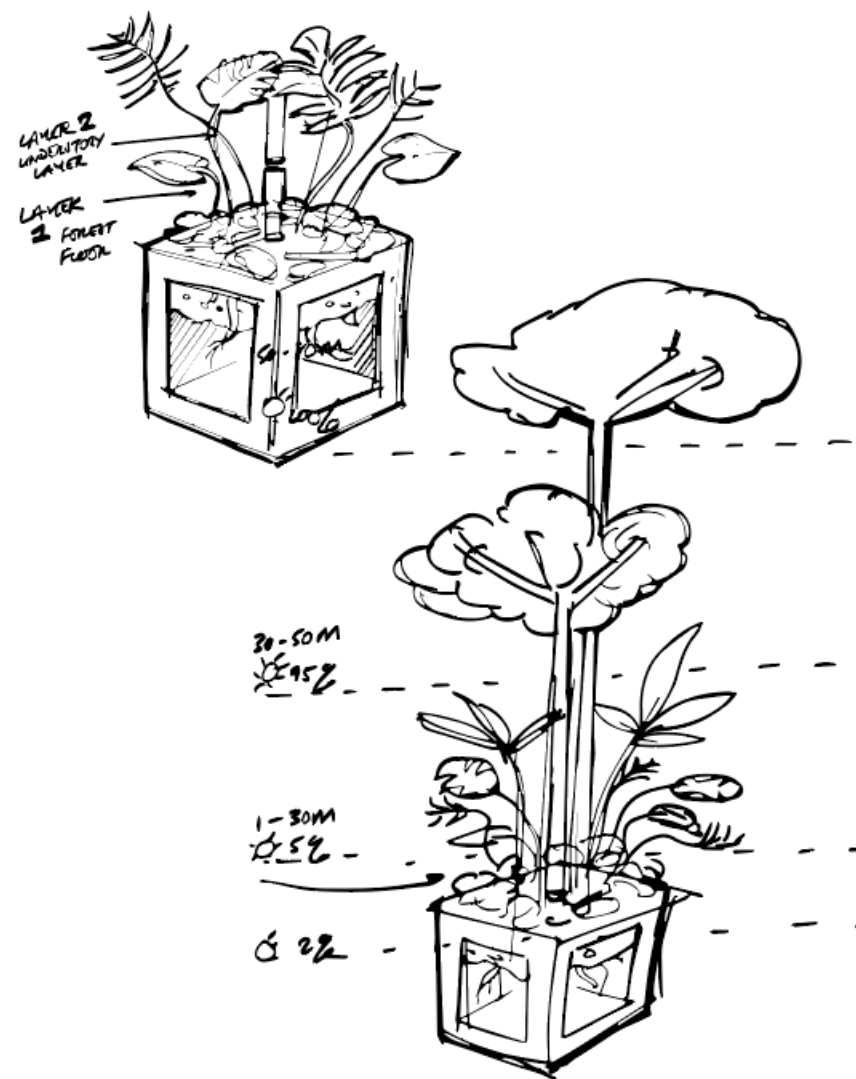
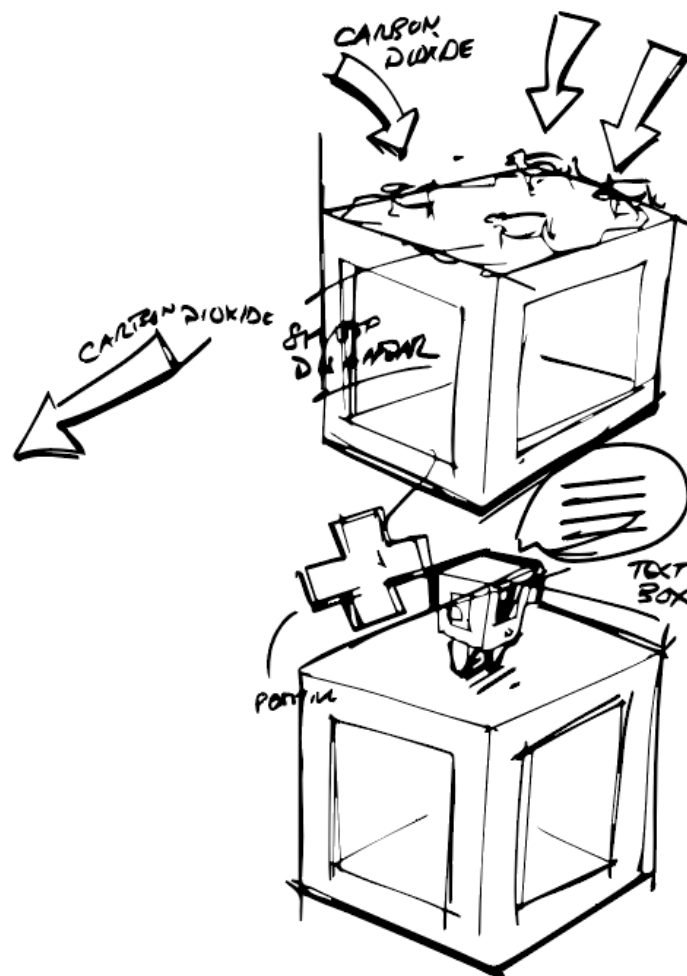
Narration:

(12 Seconds) Located above the forest floor is the understory layer. Small shrubs and trees can grow here.
FRAMES 1525 - 1825 Understory plants often produce flowers that are large and easy to see.

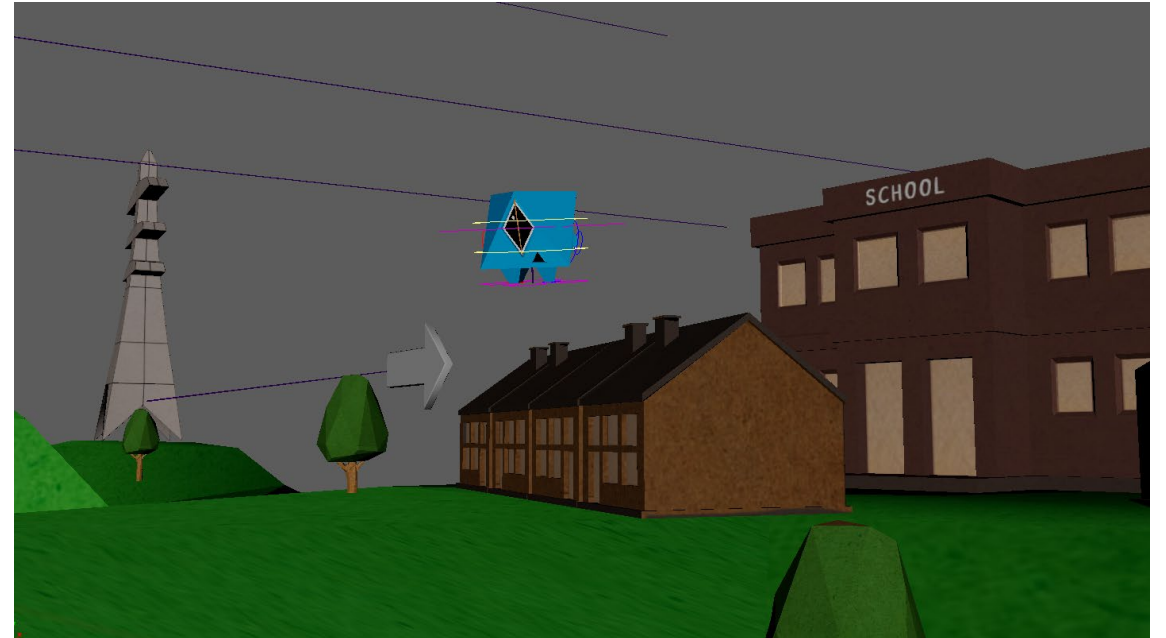
(Animate the visibility of each layer)

(12 Seconds) The canopy layer forms a dense network of leaves and branches as a roof over the two remaining layers. With so much food available, more animals live in the canopy than any other layer in the rainforest.

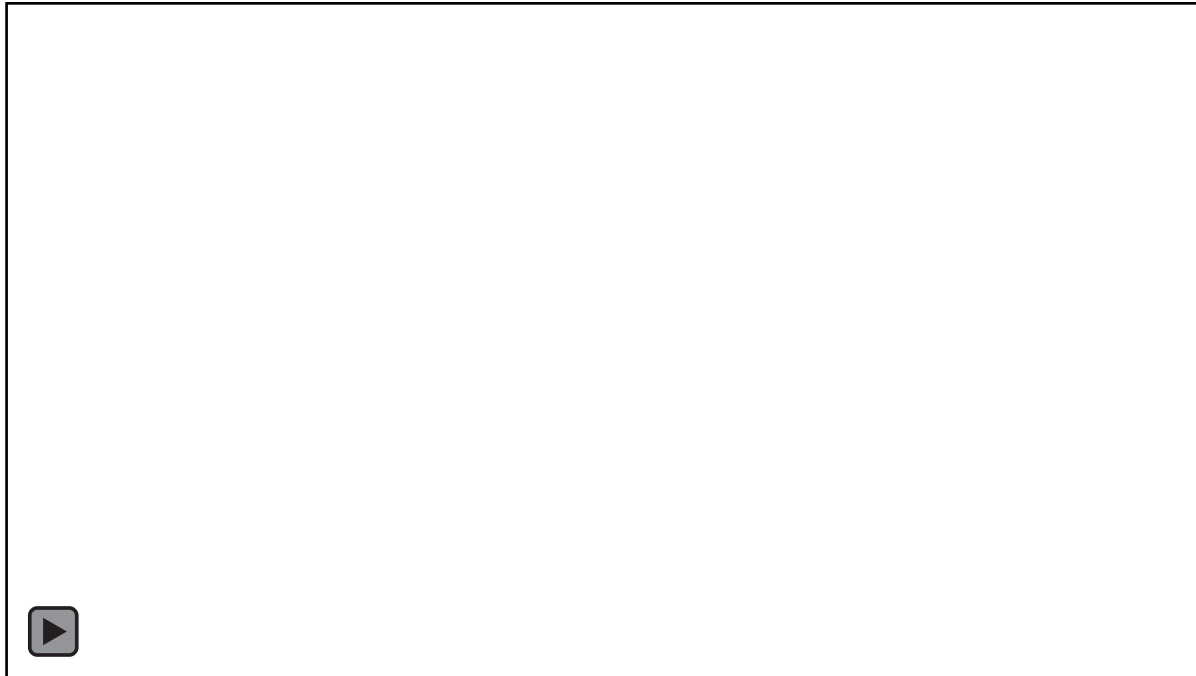
(11 Seconds) The top layer of the rainforest is the emergent layer, where trees can grow up to 60 metres tall due to larger amounts of sunlight. Here, you will find living bats, butterflies and awaiting predators such as hawks and eagles.



Creation:
Mechanics



Creation:
Mechanics



Thank you.

Contact Details

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