



香港浸會大學附屬學校王錦輝中小學
Hong Kong Baptist University Affiliated School
Wong Kam Fai Secondary and Primary School

APPLY CROSS-GROUP COLLABORATION, COMPUTATIONAL
THINKING AND DESIGNING THINKING IN THEME-BASED
LEARNING

應用跨組協作，運算思維
及設計思維於主題式學習

LEARNING & TEACHING EXPO 2023

ABOUT US



WILLIAM FUNG

Head of IT in Education
ICL/ICT Panel Head



MICHAEL NG

Prefect of Studies &
Mathematics Panel Head



KITTY SO

ICL/ICT
Teacher

SHARING OVERVIEW

- **STEAM@HKBUAS and Design Thinking**
- **Maths Theme-based Learning**
- **Implementation of Grade 7 in 2022–2023**
- **Students' Work**
- **Look Forward 2023–24**
- **Q&A**



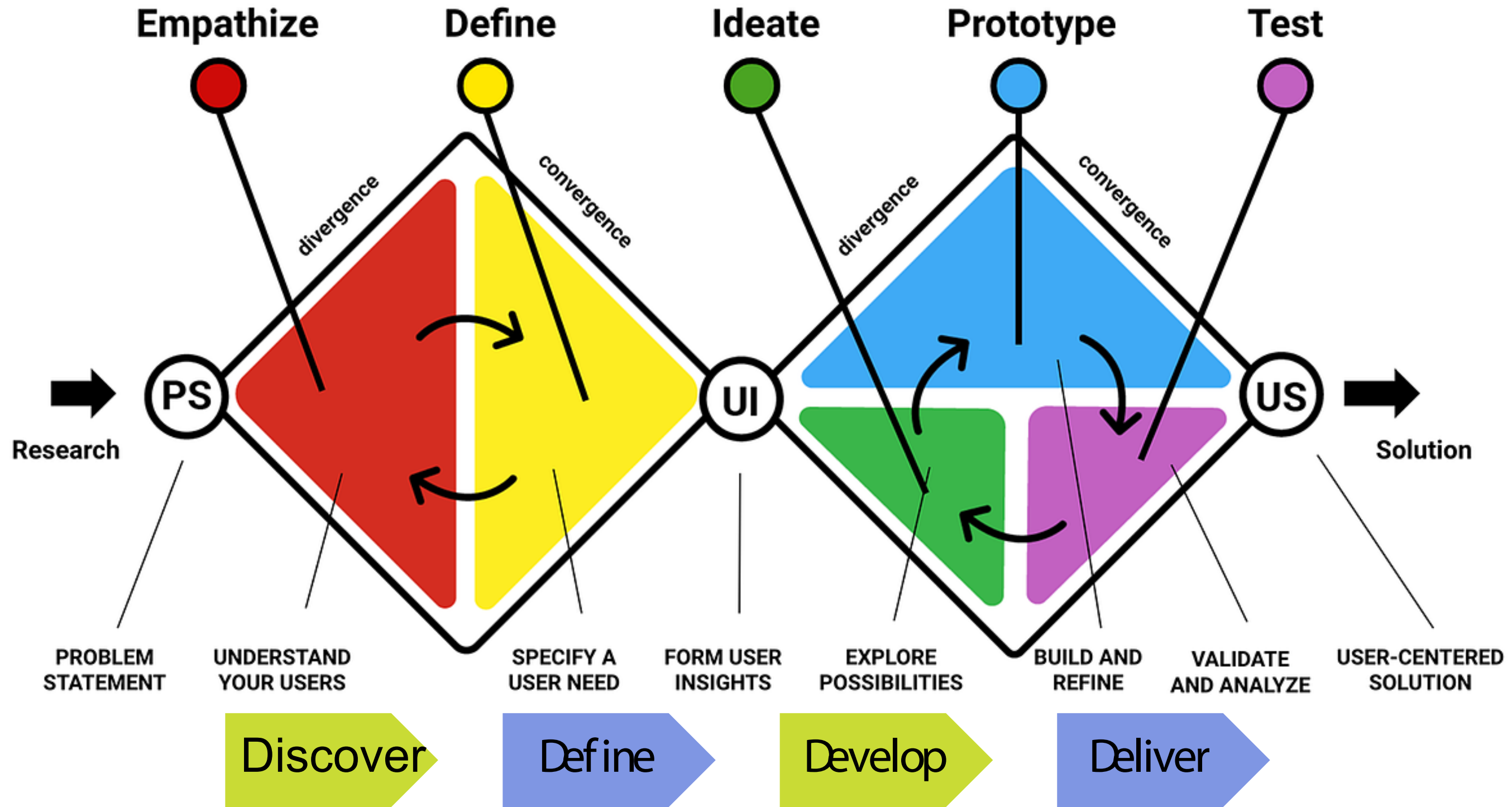
STEAM @ HKBUAS

- **Collaboration with ICL/ICT, Maths, Science and VA department**
- **Inter- / Intra-disciplinary project and activities**
- **STEAM Week**
- **Mathematics Department's activities from Grade 7-9**
- **Collaboration with ICL/ICT in Grade 7**



**STEAM
EDUCATION**

DESIGNING THINKING



DESIGNING THINKING

MODEL

- **5-stages**
 - **Empathize**
 - **Define**
 - **Ideate**
 - **Prototype**
 - **Testing**
- **Double Diamond**

IMPLEMENTATION

- **Run through the whole process in Grade 7 Theme-based Learning Project**
- **Use in designing other project tasks**
- **Use in Project-based Learning (PBL)**

THEME-BASED LEARNING

**An inter-disciplinary learning
journey.**





THEME-BASED LEARNING OBJECTIVES

1

**KNOWLEDGE
CONNECTION**

2

**PROBLEM
SOLVING**

3

CREATIVITY

4

COLLABORATION

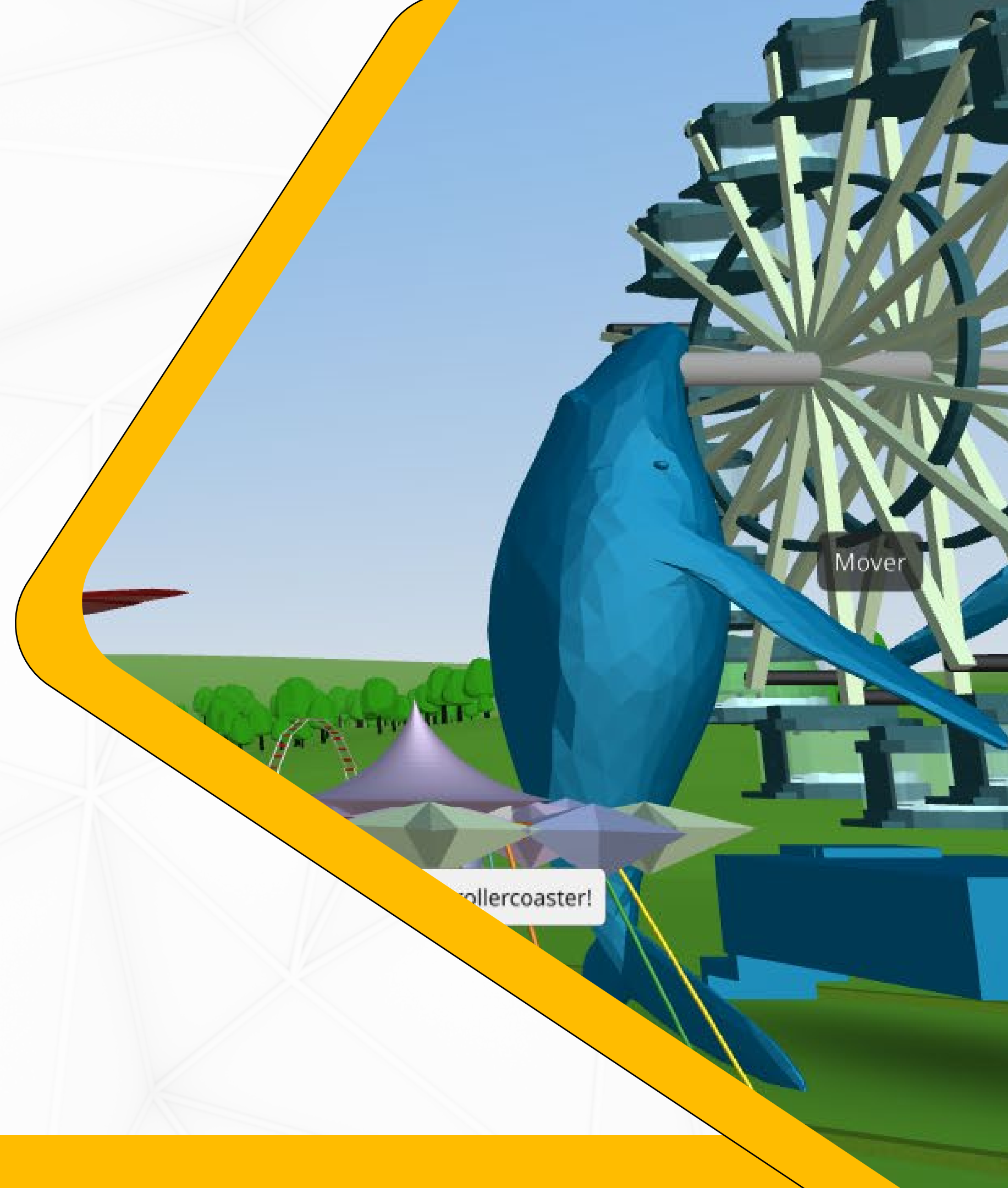
GRADE 7

THEME PARK DESIGN

Students make use of their knowledge in Maths and ICL to design some ride in a theme-park.

Related knowledge:

- **Points, lines & planes**
- **Shapes and spaces**
- **Area & Volume**
- **3D Modelling with Tinkercad**
- **VR with CoSpaces Edu**



GRADE 8

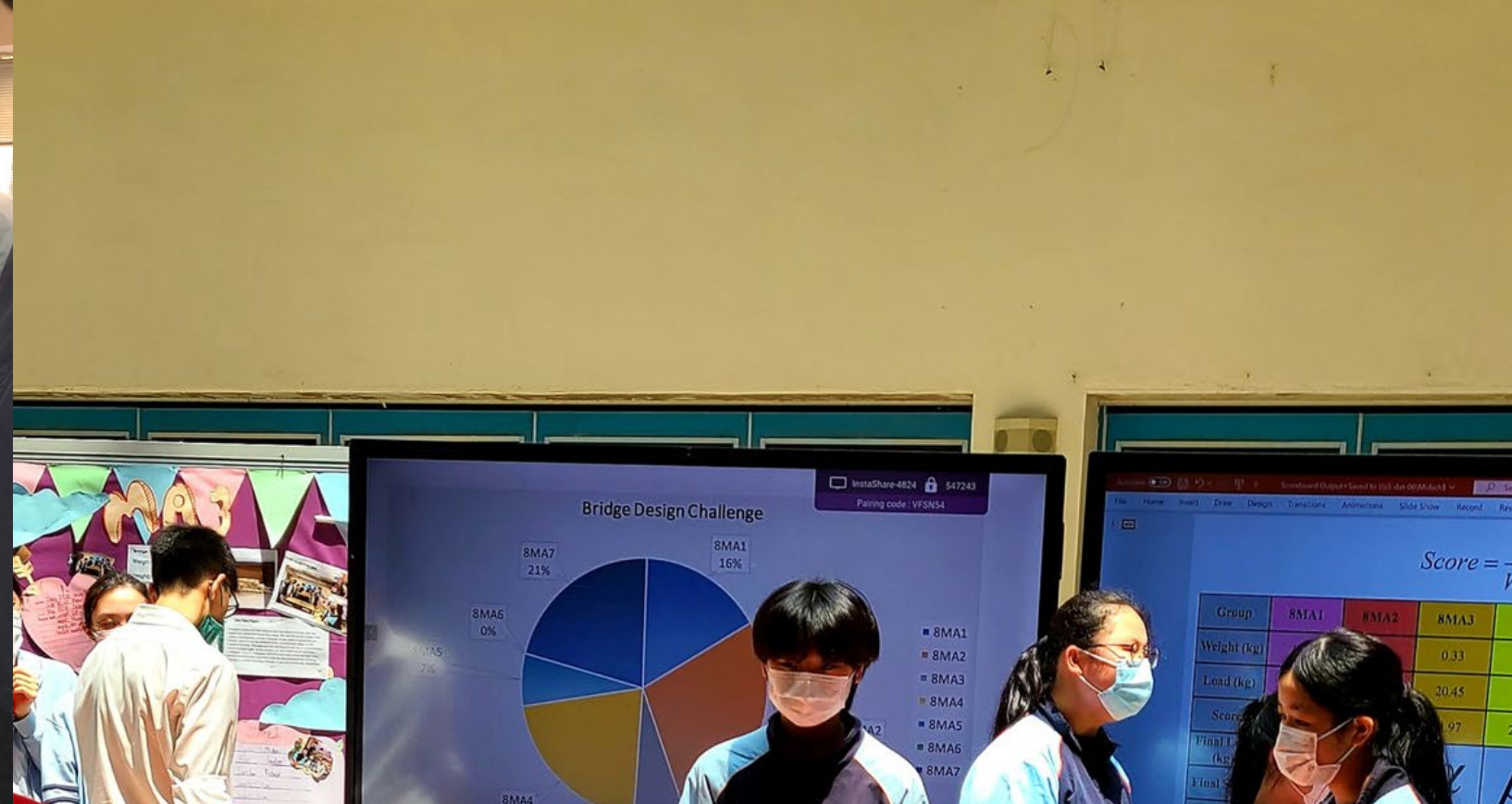
BRIDGE DESIGN CHALLENGE

Students make use of their knowledge in Maths and Physics to design a sustainable bridge.

Related knowledge:

- **Approximations and Errors in measurement**
- **Properties of Triangles**
- **Rate & Ratios – scale drawing**
- **Pythagoras Theorem**
- **Trigonometry**
- **Force & mass**
- **Gravity**





GRADE 9

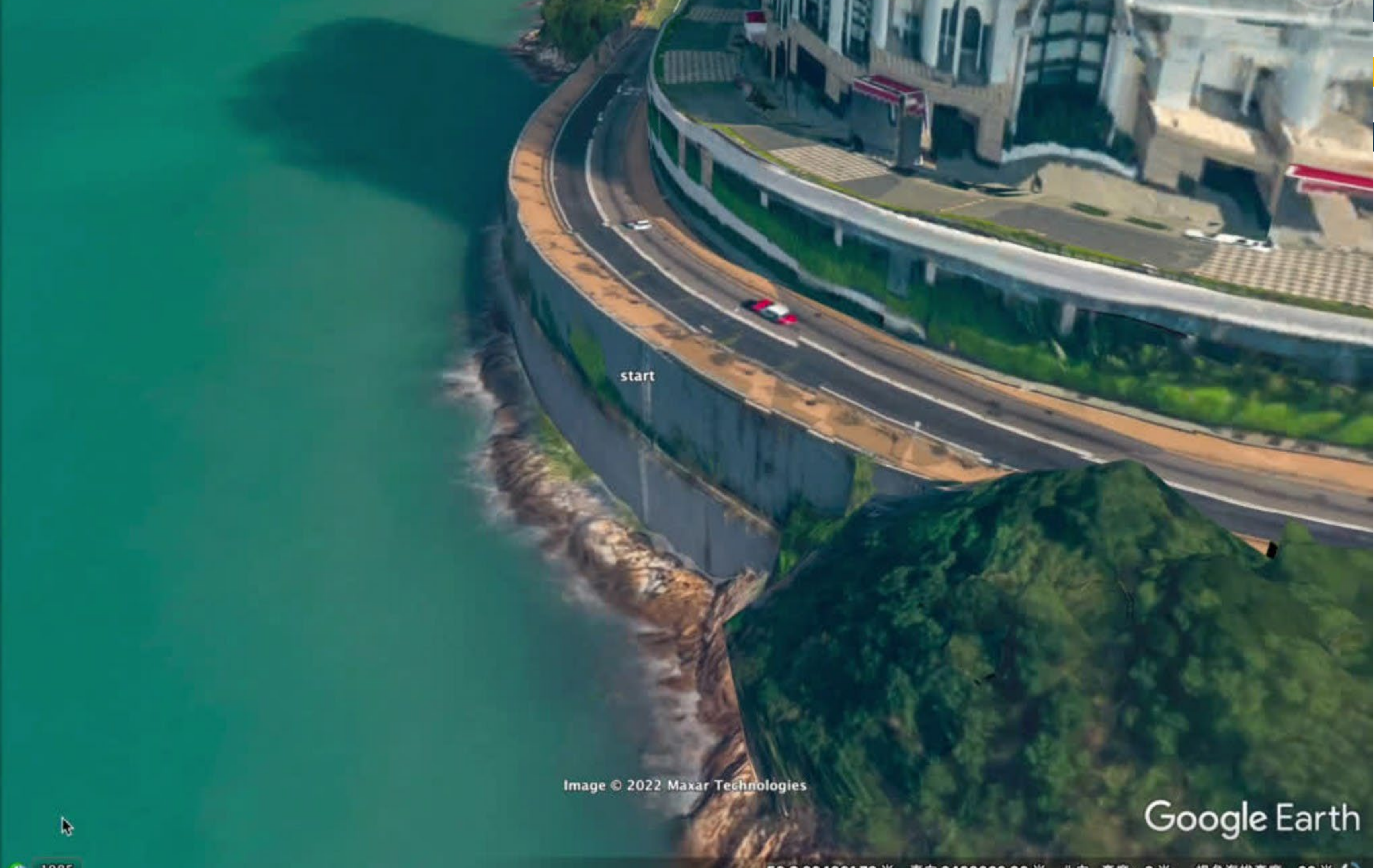
CAR RACING TRACK DESIGN

Students apply Maths knowledge to design a car racing track in Hong Kong.

Related knowledge:

- **Bearings**
- **Distance-time Graph**
- **Coordinate Geometry**
- **Map-reading**
- **Google Earth Pro**





start

Image © 2022 Maxar Technologies

Google Earth



23-24 MATHEMATICS THEME-BASED LEARNING





IMPLEMENTATION OF GRADE 7 IN 2022-2023

Mathematics X Information & Computer Literacy

Theme Park Design with
Tinkercad and CoSpaces Edu



OVERVIEW

Grouping

- **6 General Academic (GA) Groups in G7**
- **7-8 sub-groups in each GA Group**
- **Each sub-group has 4-5 students (assigned by teachers)**

Tasks

- **Each GA Group designs ONE theme park**
- **Each sub-group designs ONE gaming facility**



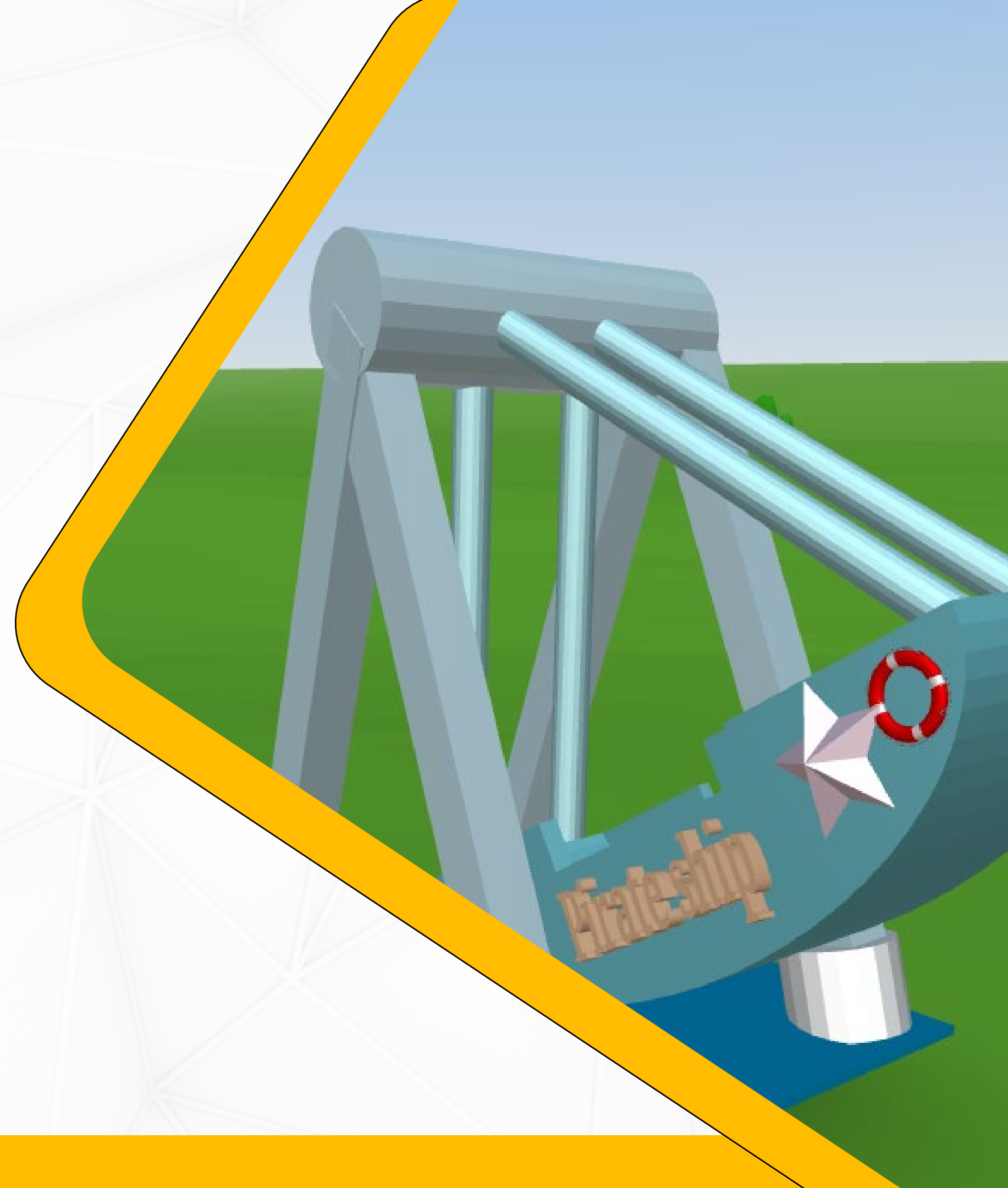
RELATED TOPICS

Mathematics

- **Points, lines & planes**
- **Shapes and spaces**
- **Area & Volume**

Information & Computer Literacy

- **3D Modelling with Tinkercad**
- **Virtual Reality with CoSpaces Edu**



TIMELINE OF THEME-BASED LEARNING

1

SEP - NOV

Research on theme parks and decide what gaming facilities the group would like to design.

2

JAN - MAR

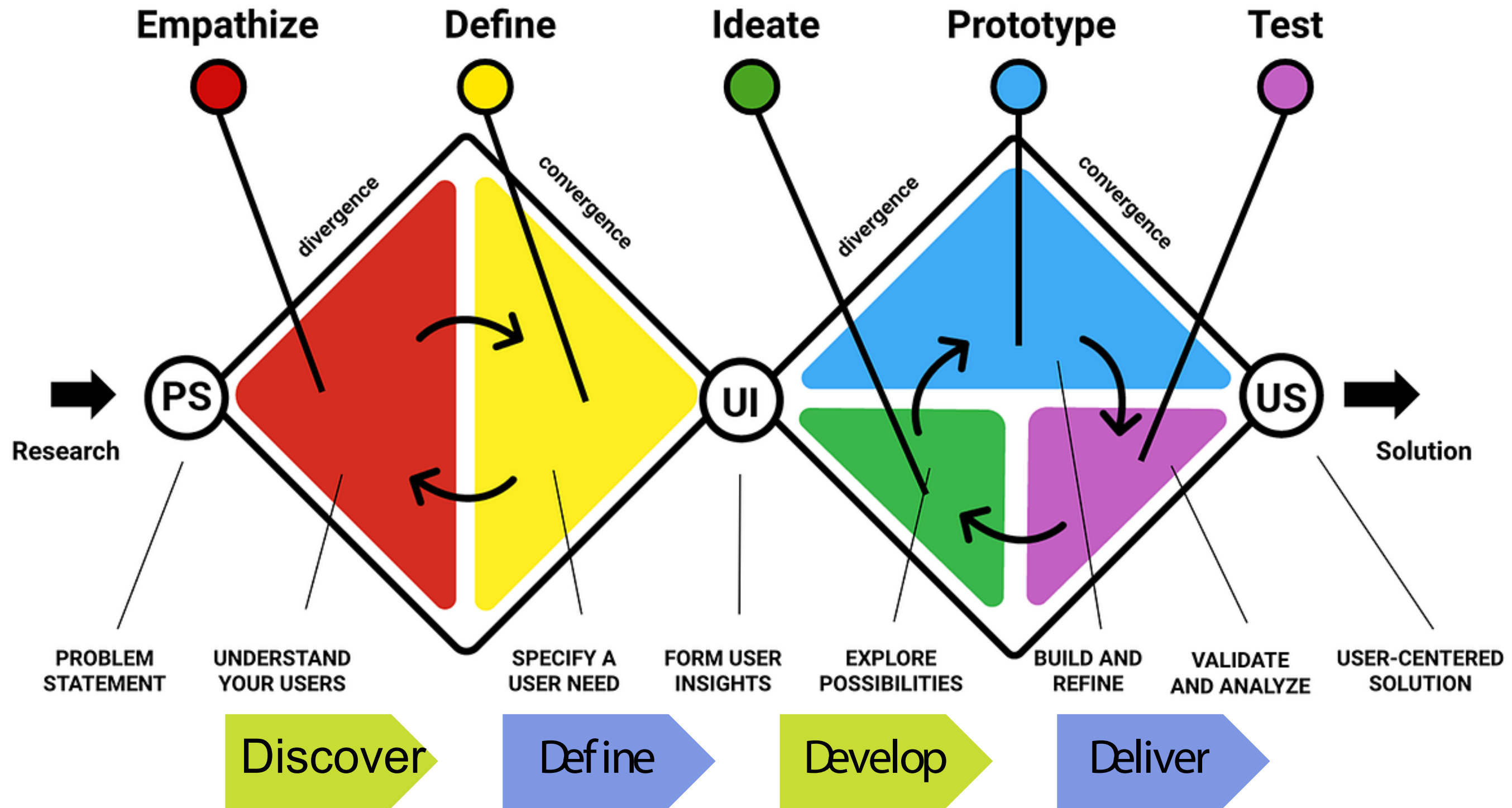
Design the outlook of the facilities using Tinkercad and brainstorm the movement of the facilities.

3

APR - MAY

Work on the movement of the facilities in CoSpaces Edu and combine them into a theme park

DESIGNING THINKING



EMPATHIZE

Understanding the Project

- **Introduce the overview of the project**
- **Brainstorm for gaming facilities in theme parks**

Brainstorming the Designs

- [Group] **Researching on theme parks**
- [Individual] **Drawing a gaming facility**



DEFINE

Specifying the Gaming Facilities

- **Teachers choose a facility for each sub-group**



IDEATE

Exploring the Design Details

- **Discuss and define the details of the facility**
 - **Define the size of the components**
 - **Define what shapes to be used**
- **Separate the facility into different components**
- **Allocate the components to each member**



PROTOTYPE

Prototyping with Tinkercad

- **Work on the individual components**
- **Combine the individual components to one facility using the sharing function on Tinkercad**



DEFINE

Specifying the Facility's Movements

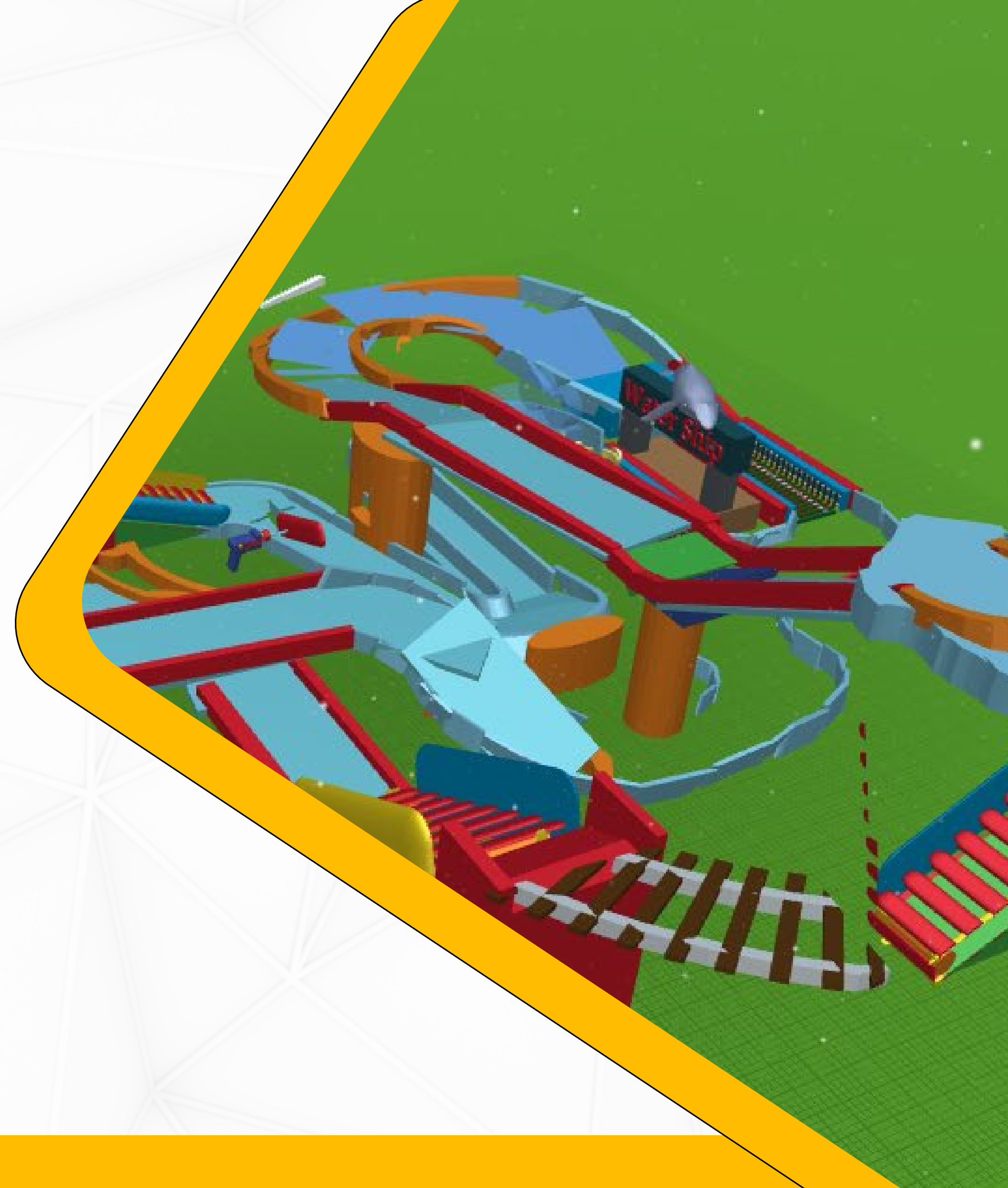
- **Consider the movements of the gaming facility**



IDEATE

Designing the Movement Details

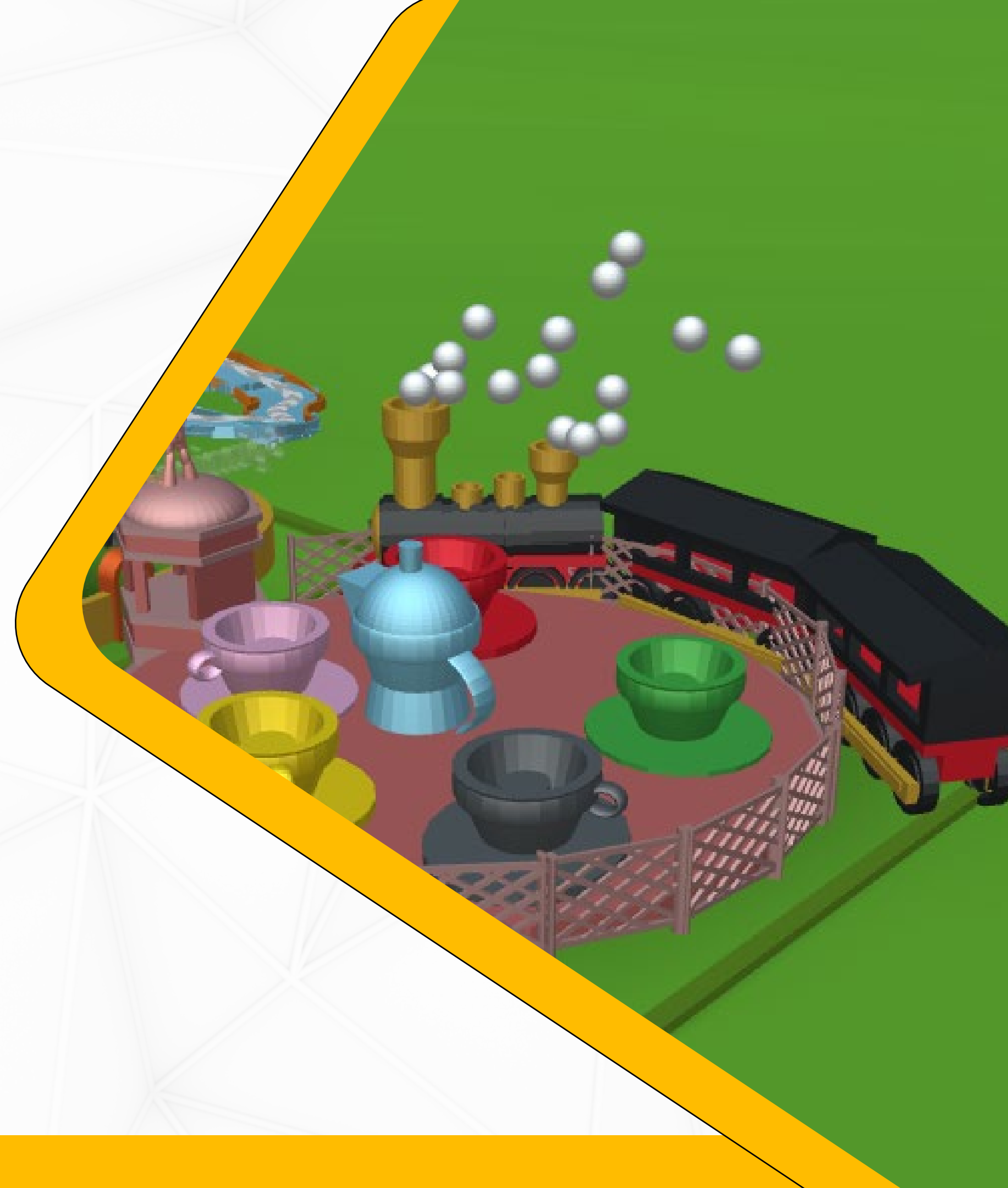
- **Discuss and define the movements of the gaming facility**
- **Explore the movements that can be used in CoSpaces Edu**
- **Separate the gaming facility into several parts**



PROTOTYPE

Prototyping with CoSpaces Edu

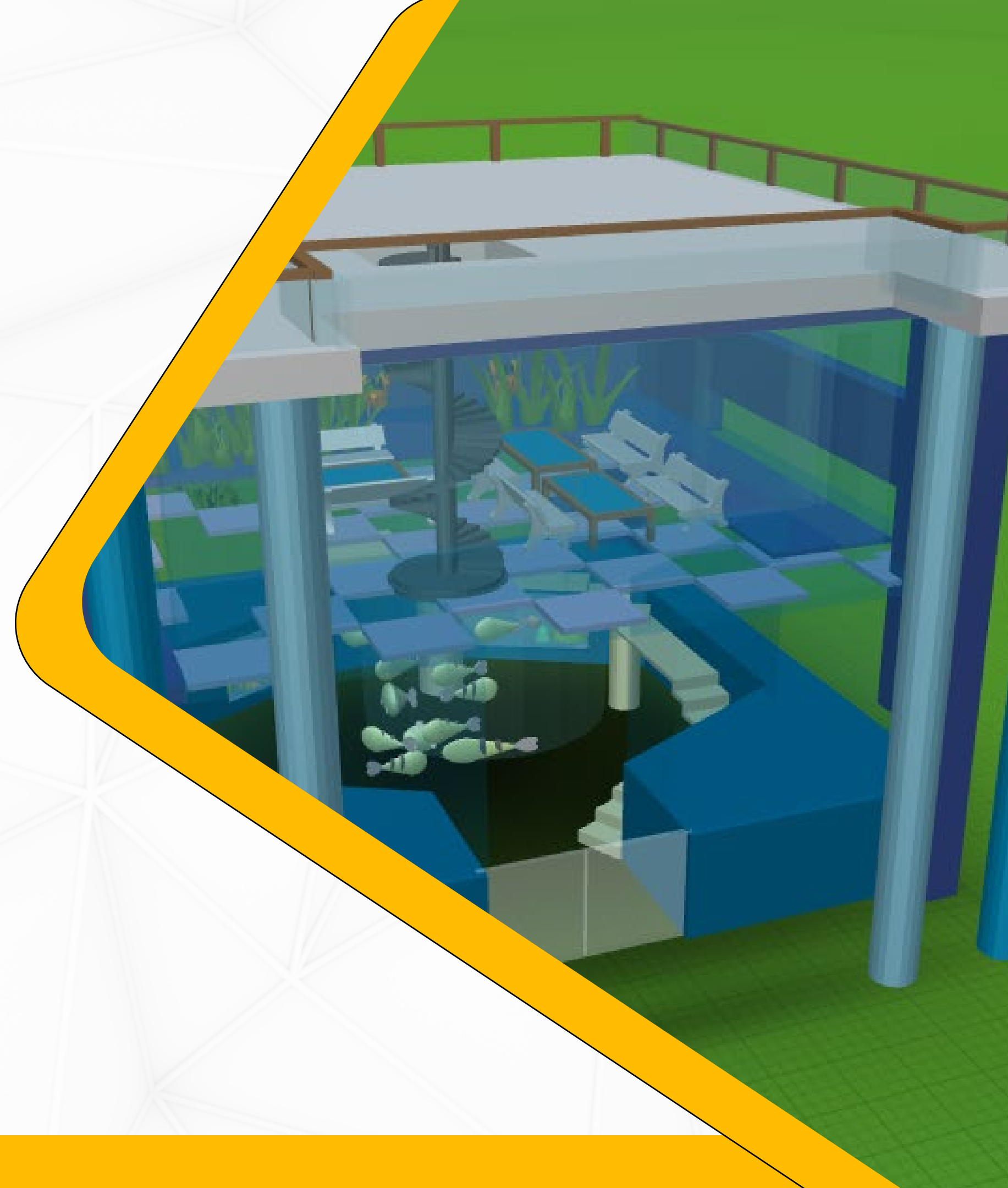
- **Work on the animation of gaming facility on CoSpaces Edu**
- **Place all gaming facilities into one CoSpaces environment to create the whole theme park**



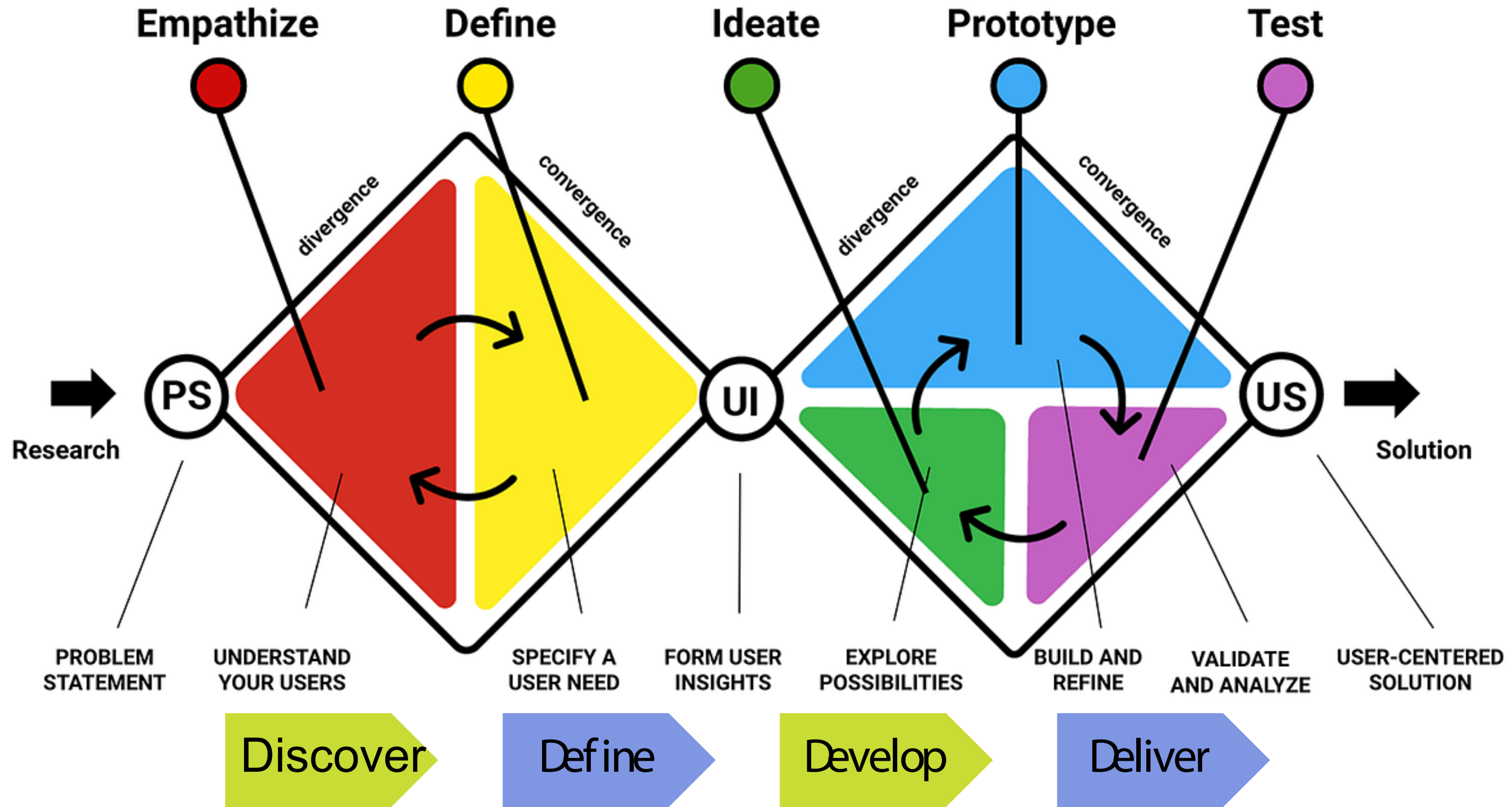
TEST

Testing with CoSpaces Edu

- **Test whether the animation works on CoSpaces properly**



DESIGNING THINKING



STUDENTS' WORK



[https://edu.cospaces.io/VPR-
JLS](https://edu.cospaces.io/VPR-JLS)



LOOK FORWARD

In 2023-24, we...



23-24 GRADE 7 ICL X IS STEAM PROJECT

Plant Monitoring System for *Alternanthera Bettzickiana* (錦綉莧)

)
In this project, students observe the growth of *Alternanthera Bettzickiana* with the help of a plant monitoring system, which will be created with the micro:bit.

In the plant monitoring system, students are required to keep the temperature, humidity level and soil moisture level constant with the use of some external sensors (i.e. temperature and humidity sensor and soil moisture sensor).





Q & A



THANK YOU