

# Math+Making & Computational Participation with CoSpaces

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## Presentation

In this presentation, you are invited to learn more about **Math+Making** activities and **Computational Participation** (Kafai, 2016) activities. Moreover, you will have an opportunity to explore a new virtual tool, CoSpaces Edu, and a lesson plan which provides an idea of how to use patterns while creating a virtual garden in CoSpaces Edu.

CoSpaces Edu is a "mixed reality" platform that allows learners to invent, build, and interact with virtual worlds through visual block-based programming called CoBlocks. CoSpaces Edu is a promising tool for student learning due to its open-endedness and rich curricular possibilities. Students can collaborate, share, and remix while gaining fundamental coding knowledge and designing virtual 3D spaces.

Little Gardeners is a series of activities in CoSpaces that allows learners to plan and design a flower garden by using repeating and growing patterns and considering design issues. Students will follow a series of scaffolded steps that help students move from concrete representations to coded translations of movements. Students will also discuss the criteria for creating flower gardens, determine the rule for various patterns, find missing elements, have opportunities to discuss international gardens and translate patterns to landscape the flower garden.

While  is planting , what does he need to do to plant the full square?

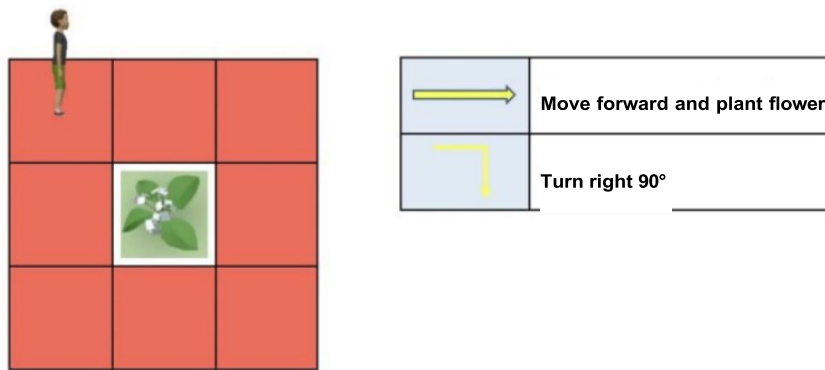


Fig 1. Students will create Alan's movements using directional language and arrows on paper before moving into CoSpaces to translate his movements into code.

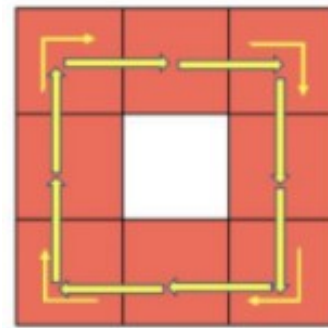


Fig 2. How students might represent Alan's movements on grid paper.

## Questions for Discussion

- What is "Computational Participation"?
- Why are skills related to computational participation important in modern classrooms?
- Why do you think making is important when developing mathematics competency?
- How can educators effectively use VR and AR

## Key Ideas

- Students will identify and describe repeating and growing elements and operations in a variety of patterns, including patterns found in real-life contexts
- Applying math to real-world situations can help contextualize its concrete applications in our lives
- Creativity in math can promote learner engagement

## Resource Links

### Little Gardeners

- [Lesson Plan](#)
- [CoSpaces Edu "Little Gardeners" Activity](#)

### References

Kafai, Y.B. (2016). From computational thinking to computational participation in K–12 Education. *Communications of the ACM*, 59 (8).

### Visual examples of gardens

- [Gardens of Château de Villandry, France](#)
- [Keukenhof Gardens in Lisse, Netherlands](#)
- [Image of a desert-type garden in St. George, Utah](#)
- [Nong Nooch Botanical Gardens in Na Chom Thian, Thailand](#)

### CoSpaces Teacher Resources

- [Getting started with CoSpaces](#)
- [CoSpaces Pro Guide](#)



An image from the "Little Gardeners" activity, featuring 4 gardens in a growing pattern created in CoSpaces.