

Inclined Planes and Ramps

Overview

This plan introduces skills of collaboration, and problem solving

Level: Intermediate

Age Group: 3-5

Time: 90 minutes

Main Goal: Collaboration, problem solving

Guiding and supporting play:

- Observe, observe, observe!
- Allow children to explore their own Rigamajig play ideas. There is no set formula for “right” or “wrong” outcomes.
- Children may produce a variety of Rigamajig ideas to meet the basic objectives of the lesson plan. No two creations or play sessions are alike. Be comfortable with letting children’s play evolve.
- There are no mistakes, let them explore and problem solve.
- Resist the urge to “fix” things for children and to show or tell children how to do things. Observe, and pay attention to children’s ideas and actions. Support play in ways that focus children on their own ideas. Ask about what students are planning to do, what they are making, and what they can change to make their Rigamajig work better?
- Discover insights into children’s creative thinking, and foster creativity!

Materials needed:

- Rigamajig Basic Builder Kit

Getting started:

This is a great project challenge to do after investigation and definition of an inclined plane or ramp. First, have a discussion or read books to have context for their creations. Always review the group-defined rules to encourage positive collaboration.

While play is underway:

Observe with an interested and supportive attitude and, as needed, encourage problem solving thinking, creativity, collaboration, discussion, and questions.

- Challenges for Students

- In groups of 2 to 4, each group should come up with a group name. This encourages camaraderie and makes it easier (and more fun) to address the groups. Students will work together to build and use an inclined plane/ramp to move a gallon jug of water from the ground to a pre-determined height.
- Distribute parts of the Rigamajig kit equally and ask the students to build an inclined plane/ramp to help them move small objects from the floor to a table. They are practicing for the gallon jug.
- Give time for brainstorming and sharing of building ideas for an inclined plane/ramp. Provide paper and pencils for groups want to draw out their ideas.
- Once ramps are built, make the lifting of the jugs into an event. Perhaps one group at a time goes, and the other students cheer.
- Ask students to share about their lifting i.e. was it easy, hard, heavy etc.
- Teacher will document with pictures and record comments that they notice while building.

Vocabulary

Post some of the following words on a White Board, SmartBoard, sheet of chart paper or have the students make their vocabulary lists or posters of the key words. Encourage children's use of these words as they design and build. Encourage children to label the physical components of their creations.

- Planes
- Ramps
- Angle
- Goal
- Design
- Solve Problem
- Evaluate
- Teamwork

What to look for:

- Watch for children’s collaborations in their thinking and construction. Offer encouraging words about working together to build something.
- Pay particular attention to how children go about their construction process. Do they seem to have a specific goal? Or, do they seem more focused on learning about the properties of the materials and different things they can do with them?
- Pay attention to the language. What do their words reveal about their knowledge of objects, physical processes, design, and/or social collaboration?
- When children indicate they accomplished something, give them a chance to demonstrate their construction and how it works, and share with other children.

What if the children “stall”?

- Sit with the group and ask them to discuss their ideas for what to build. Can they agree on something?
- Reinforce that any kind of construction is OK, it’s whatever they want to do!
- Pick up a few pieces and put them together for children to see. Don’t be afraid to model taking a risk, exploring, or changing an initial idea.

Wrapping up & reflecting:

- Gallery Walk:
 - Here, each group visits each ramp site and is given the space to talk about what they created, how they created it, and what was challenging and easy about building. If it was difficult, what would they do differently in the future?
- Optional Language Arts Extension:
 - Ask the students to write an individual reflection in a “simple machines journal” that keeps track of their projects. This can be a drawing that is labeled, sentences, photographs; anything that the class/child decides to use as their documentation of their experience and creations. The format should be determined by the person facilitating the explorations. Reflection and keeping a record encourages true scientific behavior and is another skill that emerges from these lessons.
- Follow-up Questions:
 - What are you (were you) curious about?
 - What makes good collaboration?

- Tell us about a problem you encountered and how you and your group members solved it?
- Tell us about a problem you encountered and your group's solution.
- Create drawings and descriptions or photographs and descriptions of work, including step by step as preferred
- Share and present work, include discuss about how and why construction decisions were made

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With the help our Captain of Play and Learning Ngina Johnson, we've put together a few project plans to get you started.