

Driving Teddy — Across, Over, Up and Down!

Overview

This lesson plan presents a complex problem with multiple goals and constraints. Children will need to think and plan, and then build a contraption that does 3 different things. They will first think and plan on paper. Then share their plans with team members, and combine their ideas into a possible solution. Then they will build the contraption they designed, evaluate it, and make modifications as needed.

Level: Advanced

Age Group: Grades 3 to 5

Main Goal: Collaborating with a peer group, design and build a contraption that will work to meet several functional needs. Evaluate the results of their construction and improve it if needed.

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.
- Let them make “mistakes” and problem solve together. (Celebrate mistakes as opportunities to improve their design!)
- 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
- One Teddy Bear or other stuffed animal (about 12 inches tall)

- Tape to mark off a “river” on the floor (two parallel strips of tape, about 6 feet apart, with additional space to build on each side)
- Pencils and paper for each student

Getting started:

“Today you are going to design and build contraption for this teddy bear to do 3 things: 1) lift an object off the floor to put into the contraption; 2) help the bear drive across the room to the river; and 3) get across this river without sinking or getting wet. Work with your group to design a contraption that can do these 3 things. (Write these 3 requirements on the WhiteBoard or chart paper.) First, use the paper and pencils to draw your ideas about what the contraption should look like and how it will do these 3 things. Share with your group, and then decide which ideas to use. Then build your contraption, and see how it works!”

Optional:

- Show a video or share books on design before beginning to help inspire.
- Offer this lesson plan as a large group project so it involves deep research. Different small groups can do different aspects of the challenge.
- Map out an obstacle course for the contraptions, creating a narrative for the teddy bear’s mission. This provides an opportunity to transform the classroom and engage in large-scale collaborative thinking.

While play is underway:

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

Possible comments:

- Tell me about what you have in mind for your contraption? How will you design a contraption that will get across the room, get across the river, and lift something into it?
- That’s an interesting idea! How can you do that?
- Ask children to talk about experiences from their own lives.
- Would you like one of your friends to help you do that?
- I see something that you made that rolls/floats/goes up and down! How does it work?
- Can your contraption roll? Cross the river? Lift something?
- Can you think of any way to fix that problem? Can you think of a solution? Can you try a different way?

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.

- Goal
- Design
- Build
- Solve Problems
- Transport
- Propel
- Lift/Lower
- Teamwork

What to look for:

- Watch for children's collaborations in their thinking and construction. Offer encouraging words about working together to build something.
- Some children may enjoy playing with the animal figures while building. Allow pretend play to unfold. It could help provoke children's ideas about their Rigamajig!
- 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 children use when communicating with you or other children about their construction process. 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?
- Ask what could be the first step (or the next step) in making what they want, and what each of them can do to contribute.

- Reinforce that any kind of construction is OK, it's whatever they want to do!
- Ask what could be the first step (or the next step) in constructing what they want, and what each of them can do to contribute.
- Building something and then ask children to join you in the exploration. 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:

- Children can make a drawing of what they built and how it works.
- Take photos of the construction(s), if the children seem interested in recording what they did with a photo. (Make a stop motion video of the children's construction process.)
- Ask children to draw a series of pictures about how they made their construction (show the process, from beginning to end.) Ask them to write a caption for each picture, describing what was going on.
- Clean up time: Encourage children to put the Rigamajig pieces away in a neat and orderly way.
- If children are unable to finish a construction during a play session, offer the opportunity to leave the pieces together and finish building next time.
- Lead discussions with children, one-on-one, small groups, whole class group, or between classrooms in schools, reflecting about their experiences. Examples:
 - Share something about what you made today with Rigamajig (tell about, show drawings, and/or read that you wrote; project drawings on the smartboard)
 - How did you think about what to make?
 - Did you work with other kids? Who? What did each of you do?
 - I noticed when you were building you changed your plan. What did you change and why did you change it? What did you discover as you were building?
 - I see that you had a problem getting your crane to go up and down. What did you do to solve that problem?
 - Would you like to work on (your construction) some more next time? What else would you like to do with it? What are your ideas for next time? What other problems could you solve using Rigamajig?

- Arrange for each group to share what they did with the whole class or with another classroom, giving each child an opportunity to demonstrate or talk about their design and building process.

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