



Ramps and Pathways

Presenter

Laura Josephson



Ramps & Pathways

a constructivist
approach to
physics with
young children



About the Authors



Rheta De Vries:



Christina Sales


“ Our book ***Ramps & Pathways: A Constructivist Approach to Physics with Young Children*** describes how children learn about force and motion at a practical level so later they can better understand these science ideas at a conceptual level.”

From 2001 to 2007, they were part of a team who developed and implemented a demonstration of constructivist education at Freeburg School in Waterloo, Iowa.



How did it begin?

- The story begins in the 1970's with collaboration with Constance Kamii and teachers at the University of Illinois Chicago's Child Care Center.
- They drew from Piaget's work idea of physical-knowledge activities.
- By the 1990's experiments with physical-knowledge activities began.
- It wasn't until 2001-2007 a team of teachers and specialists developed and implemented a demonstration of constructivist education. Ramps and Pathways was part of the science program.



What made them create this curriculum?

- After years of working with professional in science education it became obvious that ramps and pathways engage children in investigations.
- These investigations involve force and motion and foster the development of science inquiry skills as well as being lots of **FUN!**
- **Children and Teachers are learning about the physics of motion!**



Constructivism

- Philosophy of learning founded on the premise that, by reflecting on our experiences, we construct our own understanding of the world we live in. Each of us generates our own “rules” and “mental models,” which we use to make sense of our experiences. Learning, therefore, is simply the process of adjusting our mental models to accommodate new experiences.

How does Ramps and Pathways relate to Constructivism and Piaget?

- According to Piaget, equilibrium is the place where children are comfortable and everything is right with their world. When children engage in activities that provide opportunities for them to experience contradictions to their expectations it causes disequilibrium, or discomfort. If children are truly interested in solving the problem, this disequilibrium creates a desire, or need, to return to equilibrium (Piaget, 1975/1985). According to Piaget, we act only when we are momentarily disequilibrated. The mental action that takes place between disequilibrium and arriving at equilibrium is the construction of knowledge (learning).



Relation with Constructivism and Ramps and Pathways

- Young Children play with the inclines which leads to investigating (trying out new ideas and varying actions.)
- INQUIRY!!!
- As changes are made, new inquiries occur and additional changes are made.
- Knowledge is being acquired....



Video....Part I

Review: What does a Ramps and Pathways classroom look like?

- Simplicity!
 - Cove Moldings
 - Marbles
 - Unit Blocks



Materials in Detail

- Common material found in many supply stores ($1\frac{3}{4}$ width and varying lengths 1, 2, 3, feet sections)
- Most classrooms need 18 of each length...
- Marbles of different sizes move easily down cove ramps
- Variations of other materials to explore can be spools, egg shaped objects, spheres with bumps and blocks.

Placement of Ramps and Pathways

- Block center



Let's Talk about Space!

- This is the biggest issue.
- Once children start building they want more and more space.
 - Hallways
 - Lunch rooms
 - Outdoor spaces
 - Conference rooms
 - Imaginations pose no limits



Time

- Introduction: MESS AROUND TIME before lessons or instructions
- Time is needed to revisit ideas and strategize



10 Steps to Guide Implementation

“These are interpretations of Piaget’s general ideas about how children think and learn best.”

1. Teachers need to be familiar with classroom materials to understand how to grow learning.

- Teachers first need to experiment with the ramps and pathways to fully understand the learning involved.
- This will insure proper facilitation of the material with young learners.
- Being familiar with classroom material can broaden the whole experience.

Video #2



2. Inspire children's interest by having an introduction

- How do you introduce new materials? This is vital for the success of a lesson.
- This can be done at activity time, small group instruction, large group instruction or when the teacher engages in an activity during free place/choice time.
- There should be a time to discuss safe ways to use the materials. The authors caution teachers of children who still mouth objects to use only large marbles and other objects that will not go down a choke tube.





3. Create Proper Classroom set-ups that inspire!

- It could take more than one day to create a complex ramp structure, and the structure may be left overnight.
- If space is not dedicated, take a photo, have the children draw their structure. This gives a sense of permanence.





4. All children need to try out their ideas.

- This includes wrong ideas that won't work. The teacher needs to let the child figure out "what is happening."
- Children will gain a motivational level to confront their wrong ideas and be motivated to modify them. "Error Informed Experimentation"



Movie #3 After Principal 5






5. Observe to assess and understand.

- We need to observe our children to understand how and what they are doing to learn and grow.
- Questions posed to children that have been observed will more than likely follow a child's train of thought and promote progress.
- “What can you change so you don't have to push your marble?”
- Use Anecdotal, Checklists, running record...






6. Intervene with questions and comments to encourage thinking.

- “Constructing mental relationships”
- This can make a difference in a child abandoning an activity or continuing to experiment.
- **Ask for predictions:** What do you think will happen?
- **Suggest new possibilities:** “Do you think you can...”
- **Help children realize what they do:** “How did you do that?”
“Can you show Michael how you did that.”
- **Provide different examples when a conclusion contains misconceptions:** “Marbles can only go down ramps. How can they go up?”
- **Encourage wonder about physical causes:** “Why did the marble on this ramp go further than the other?”





7. Do not pursue if a child does not respond to intervention.

- Sometimes teachers and children have different agendas.
- If what you need to teach is important revisit it another time.
- Flexibility is key in Early Learning.



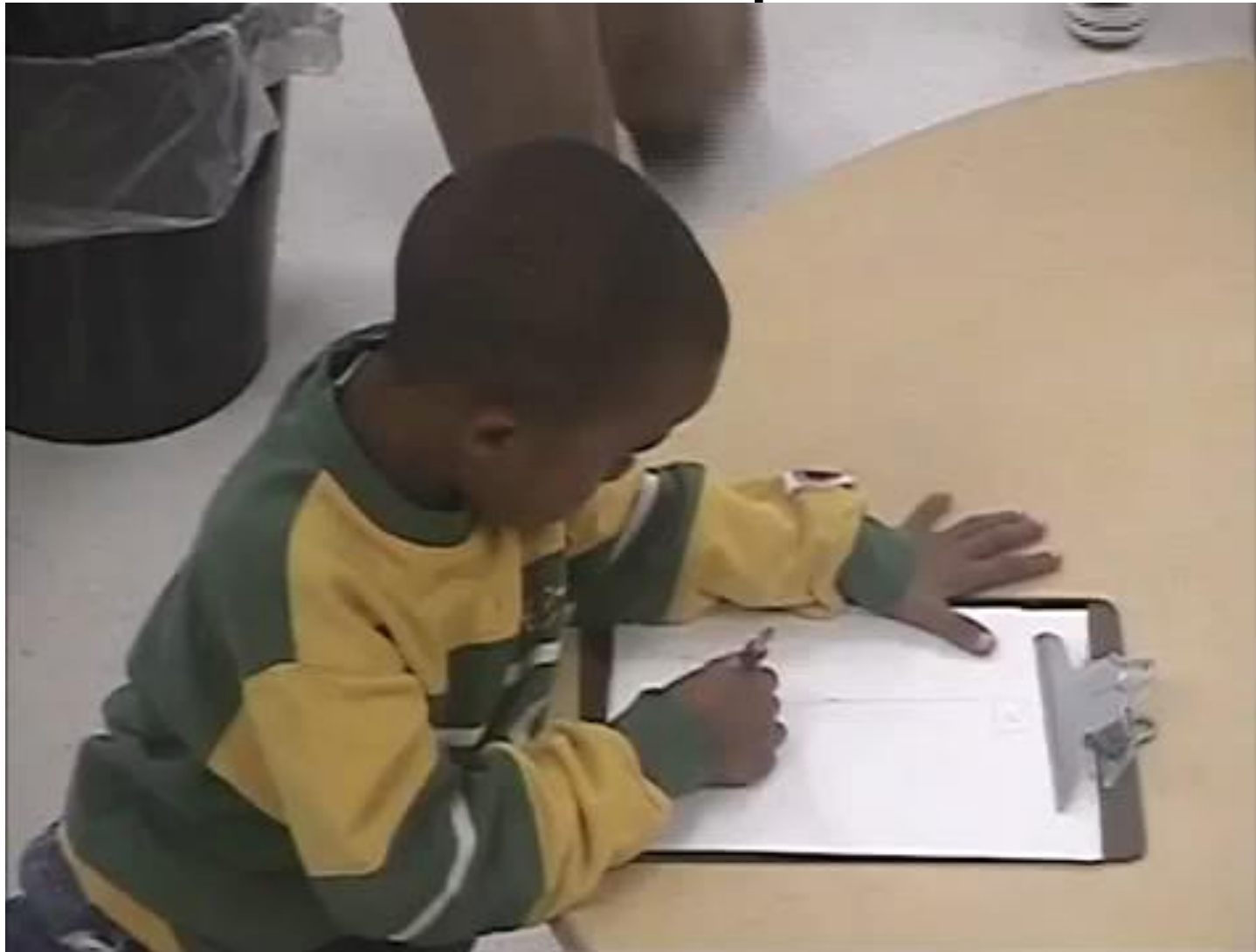


8. Support children's work....

- Photographs (By the teacher and children)
- Scrapbooks or Journals
- Drawings
- Webbing ideas or generating list of to do..



Movie #4 – Principal 9 and 10





9. Integration in the Curriculum

- Ramps and Pathways is an opportunity to encourage math, Language Arts/Literacy, social studies and art.
- Math: Geometry, measurement, numbers and time.
- Language/Literacy: Encourages conversations about their work. Teacher assisted writing which enables print to come alive. Inventive spelling, new vocabulary, etc.
- Social Studies: thinking about the “real-world.” Looking at ramps in the community. Researching ramps on-line, etc.
- Art: Developing sculptures, learning about architecture, etc.





10. Encourage social interaction.

- Cooperative interactions is at the heart of constructivism.
- Encourage the move from parralle play into cooperative play. “Can I role my marble onto your ramp?”
- This will eventually lead into collaborative planning.
- Foster “learning how to work together”



Florida Early Learning and Developmental Standards

- Physical: Gross and Fine motor, Self- help and visual development.
- Social/Emotional: self-regulation, self-concept,
- Language and Communication: Listening and understanding, communicating and speaking, early reading and early writing.
- Cognitive: Exploration and discovery, concept development and memory, problem-solving and creative expression.



Conclusion/ Let's Play