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1

Agenda

- Engineering Design Cycles for Children
- Including all Children in STEM Activities
- Activity Demonstration ideas
- Q and A



2

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Children *need* and *use* Critical Thinking Skills To Solve Problems

3







Engineering Design For Young Students with and without delays and disabilities

5



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7

Including all Children in STEM Activities

- UDL strategies (multiple means of representation, expression and engagement) support all learners
- Accessible environments help all children to participate
- A common flexible curriculum allows all students to work towards similar goals
- Focus on process and and not content goals and standards

Early	Childho	od UDL	Plannin	g Sheet	- 1	T	10
	Representation (What they are		Action & Expression (How they		Engagement (Why do children want		
	learning?)		learn & show what they know?)		to participate & be engaged?)		
	Materials	Multi-sensory	Activities	Multi-Modal	Environment	Preferences	
in contrar.							

8

Early Childhood U Age group: Todefors (All) - UDL suggestion for all stud have other needs, such as fine or	DL Planning Sheet: Teacher: Ms. 3 lefts who need additional scaf gross motor challenges	Toddlers (Sample) Activity: Mod e folding (Name) - UDL suggestion p	plevations ered toward specific studient ban	and or strength/read (Other) = UC	1. suggestion for children who	
		UDL au	idelines			
Repros	Representation		Action and expression (Move do they leave and show what they know?)		Engagement (Why do they want to participate and he engaged?)	
Materials	Multisensory opportunities	Activities	Multimodal	Environment	Proforences	
bofference size blocks (AM) thermoni piceus block (DAN) bofference kinds of blocks (AM) Electronic version of book firm, Assivit Anity book (AM) Additional capits al book for mading conter (AM) derine agheider (DAN) facture agheider (DAN) piceus (DAN) pice	Boothe Boots (Fame) Somerey pounde blocks (Tam) Grays for task (Other) Tamer (Jussia)	more child bold individually (Usual) more child tell ocher child boo to baild uning sandt. (Dim) differ men a tasaher anprot (Dia) thead for this acciling and thatang shif (Al) Provide hallog sometic ar hande one-hand physical motor band physical physical kay asimuth/ watabably (Com. Reine) Nedde kay asimuth/ watabably (Com. Reine)	Bracking (AU) Finetas (AU) Video (AU) Shore solit are adult a visib the datas (Tany, 3-box analy or valous a Smoker: Cautadag a video) (AU) (AU) Provide programs antersce strips with possible anssaers and matching picture symbols (Sther)	Individual moterial sets (mo sech child (Desite) dische child (Desite) dische child (Desite) (Desite, All) Lasge black ans ar table workspaces (All) Picture directions for clossing (Tan) Desite, Construction of clossing (Tan) Desite (Desite) de une construction of the soater table (Desite)	Choice of building materimits (AR) Choice of A screenment aptions (AR) contring manipulatives and number symbols (AR)	

UDL Key Questions for STEM Activities



- Are you providing several different materials of the same type to explore the concept? (e.g. several different thickness of balls, several different sizes and textures of balls)
- Do children have several opportunities to try and repeat the activity?
 Are children able to use more than one sense to explore the activity or concept?
- A re you using media to document the children' learning? Are you showing the children' the pictures and recalling the activities?
 Are the materials accessible with scaffolds based on the mobility of the children?
- Are you incorporating preferred items, reinforcers, or adults to support the child?
 Are you asking the child to complete the activities when they are well rested and fed?
 Bo children have the necessary supports for communication about the activity?
 Is the environment set up with limited distractions and choices?

- Is the environment set up with limited distractions and choices?
 Is the environment set up with limited distractions and choices?
 Are you using multiple modes of assessment to assess the product, process, and thinking skill development, such as photos, checklists, and discussion with the child?

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•Literacy-Based Lessons

Infant

- Toddler
- Preschool



11

Let's be flexible....



Overview for Flexib	le Thinking Lesson
What is the goal of the activity?	React to a problem - seeks to achieve a specific goal
Materials:	What will Fit? By Grace Lin Basket Various items for the basket/container that fit and don't fit
Read the book together and make a "will it fit" game.	Read the book. Have a basket or bucket or pan, with different kinds of objects such as play foods. Ask babies what will fit in their basket. Is it too big? Is it too small? Is it just right?
Wonder and ask questions:	What food can we fit in this basket? Does this one fit or is it too big? Can we fit more than one in there?
Extend and Modify the Experience	Extend this activity by looking for opportunities to talk with infants about trying different things as they play to encourage curiosity and the ability t find alternative solutions to problems.
Follow the infant's lead	Younger infants can explore the items and watch you put items into the basket. Older babies can fill the basket while you narrate their efforts to test what fits, describing items as too big, too small, or just right.





Overview for Collaborative Thinking Lesson Problem-solving focus skill: Collaborative Thinking



Book: Whole Whale by Karen Yin
 Tape Measure
 Lots of people (call in some friends/family members)
 •Chart paper and markers

Learning objectives for this particular experience: Materials needed:

Motivating engineering problem:

Focus of this particular learning experience:

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Non-standard measurement tools





17

Let's get curious...

Flotsam by David Wiesner



Overview for Curious Thinking Lesson 🚽

Problem-solving focus skill:	Curious Thinking			
Motivating engineering problem:	The evocative illustrations in the book Flotsam by David Wiesner depict a wonderous ocean world that blur the boundaries between reality and fantasy. Children are invited to consider how a floating city growing on the shell of a sea turtle might be an interesting place to live and wonder how to build it.			
Focus of this particular learning experience:	This lesson is focused on building a prototype of a floating city, as if on the back of a turtle shell. Children will create the city using recycled materials and test whether their city floats.			
Learning objectives for this particular experience:	 Children will plan and pursue the task of constructing a floating city. Children will plan and pursue their own goals for constructing and testing their designs. 			
Materials needed:	 Book: Flotsam by David Wiesner Styrofoam bail cut in half Recycled materials/loose parts such as paper towel tubes, bottle caps, lids, scrap paper, etc. Giue or tape Water table or large plastic bin filled with water Camera 			

19



20

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Next Generation Science Standards (NGSS) for Pre-K to Kindergarten

K-2-ETS1-1 Engineering Design

 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2 Engineering Design

 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

