Lesson Plan: Forces and Motion in Action	**Subject Areas**: Science and ADST

Objectives:

Through play, students will ideate and create an object from a box that utilizes one of the principles of forces and motion that have been already covered in the unit.

This lesson develops creativity because it encourages divergent thinking, which is a key element of creativity. By supporting students to practice divergent thinking, I am supporting the development of their creativity.

Essential Questions:

- What is it?
- How does it demonstrate forces and/or motion?
- How did you make it?

Know:

- effects of pushes/pulls on movement
- effects of size, shape, and materials on movement

Understand:

- The motion of objects depends on their properties
- Skills can be developed through play

Do:

- Demonstrate curiosity and a sense of wonder about the world
- Transfer and apply learning to new situations
- Generate and introduce new or refined ideas when problem solving
- Use trial and error to make changes, solve problems, or incorporate new ideas from self or others
- Safely manipulate materials
- Demonstrate their product and tell the story of designing and making their product

Lesson Scope and Sequence:

- T uses guided mindfulness practice to access prior learning. During the practice, T asks the class to “make a picture” in their heads of things we’ve learned about forces and motion.
- Students do “Think-Pair-Share” to discuss what they envisioned during mindfulness practice.

- T reads “Not a Box” by Antoinette Portis
- T points students’ attention to the pile of boxes in the corner of the room. Challenges students to lay out all the boxes in the middle of the room. Then the group does a mini gallery walk to observe the variety of boxes available. Explain that we will be building something that uses force or motion. Brainstorm some examples of what they might make with the class (review some of the principles already covered: pulley, lever, push, pull, etc.). Quick safety review and reminder about the task.
- Students get to work independently or with a partner on planning and building their objects.
- T circulates, asks questions, supports as needed.
- T may stop the class periodically to bring the group’s attention to specific ideas or methods (like mini-lessons to scaffold if the group needs it). T may also show individual children other children’s process to support learning.
- Class takes breaks for meals and recesses as needed- this is a daylong project.
- After lunch, the class comes back together and the teacher does temperature check on everyone’s process.
- As students “finish”, T asks questions about their project, and guides revision through review of the essential questions
- Students are encouraged to revise their work and self-evaluate when they are done (volunteers and teacher to support)
- Clean up supplies and leave projects out for the next day’s presentations.

(the next day)

- Gallery walk of student’s work
- Students take turns presenting their work to the class
- Invite big buddies to come and see our work

Scaffolding:

Prior to this lesson, we have learned about forces and motion, building safely with the tools, and working collaboratively. That learning was much of the scaffolding for this activity. During the activity, students will have access to materials from prior lessons (books, posters, drawings, building blocks) to assist them if they need it. Also, T and volunteers will be available to support individual learners as needed. The only really new concept being covered in this lesson is to design and build with such an open-ended task. T will offer more ideas, examples, support and guidelines for those who need it.

This lesson was designed to be accessible for all students, so I have not made particular notes about ELL students or SPED. Anyone with fine motor or sensory needs would be supported by having specific materials prepped for them to be able to participate fully and would be partnered up with a peer or EA depending on needs.

Assessment:

T will make observational notes and take pictures/video to document learning.

*** see rubrics below ***

Preparation:
Prior to the lesson, prepare materials by piling up boxes in a corner of the room and laying out all other materials so they are accessible to students. Try to illicit support from one or two parent volunteers or staff to assist students with their ideation and creation.

Materials:

- 75-100 boxes of various sizes (1/3 small, 1/3 medium, 1/3 large)
- Variety of tapes (masking, duct, washi, etc)
- Hot glue guns
- Makedo cardboard tools cutters/saws/screws (students already have practice using these) (every school should have 2 of these: https://www.make.do/products/invent-7)
- Markers, crayons
- Construction paper
- Loose sheets/ pieces of cardboard
- String, rope, thread
- Book: "Not a Box"

Rubric for assessing students' meeting the objectives of the lesson: ("I can…")

Developing	Proficient	Exceeding	Teacher Notes
Talk about one or two aspects of the effects of pushes and pulls on movement	Describe the effects of pushes and pulls on movement	Make connections to other areas as they relate to pushes and pulls	
Use templates/other's ideas to design and create an object that connects to my learning	Design and create an object that demonstrates my learning	Design and create an object that demonstrates connections between my learning and new ideas	

Get help to use the materials and tools safely	Safely manipulate materials and tools	Support others to use materials and tools safely	
Allow others to see my work	Share my work with my peers	Demonstrate connections between my work and the topic for my peers	

Rubric for assessing students' development of creativity: ("I can…")

Developing	Proficient	Exceeding	Teacher Notes
Ask for help when I get stuck	Use one method to problem solve	Use a variety of methods to problem solve	
Use a template or other's ideas to help me design my object	Generate or identify new ideas when designing my object	Independently revise and elaborate design to exceed building criteria	
Create and object that moves on one plain	Apply my learning to create an object that uses forces or motion	Create something unique that employs forces or motion	
Use one or two items in a predictable way	Apply divergent thinking to my project (ie: it's no longer a box)	Use a variety of materials, ideas and processes to create project	