Subject Integrative STEM: Wedges and Screws	**Grade Level** Preschool: age 5

Standards:

Science and Technology and Engineering Education PA Standards

- 3.2.PK.B1: Explore and describe motion of toys and objects.
- 3.2.PK.B7: Participate in simple investigations to answer a question or to test a prediction.

Math PA Standards

- 2.4.PK.A: Describe the process (es) (e.g., think aloud) related to problem solving situations.

PA Learning Standards for Early Childhood (constructing, organizing, and applying knowledge)

- AL.1 PK.A Explore and ask questions to seek meaningful information about a growing range of topics, ideas, and tasks.
- AL.1 PK.B Demonstrate a willingness to participate in new and challenging experiences.
- AL.2 PK.A Work toward completing a task, even if challenging, and despite interruptions.
- AL.2 PK.B Independently break simple tasks into steps and complete them one at a time.
- AL.2 PK.C Attempt to accomplish challenging tasks by employing familiar and new strategies as needed.
- AL.4 PK.C Attempt problem solving activities to achieve a positive outcome.

Reading, Writing, Speaking, and Listening PA Standards

- 1.4.PK.A: Write, dictate or illustrate to convey ideas for a specific purpose.
- 1.4 PK.B With prompting and support, draw/ dictate about one specific topic.
- 1.4.PK.B: Write, dictate, or illustrate to communicate information.
- 1.6.PK.A: Listen attentively and respond in conversation.
- 1.6.PK.B: Speak in simple sentences. Share experiences when asked.

Objectives:

- Students will be able to identify a wedge with 100% accuracy.

- Students will be able to identify a screw with 100% accuracy.
- Students will be able to draw an example of a wedge in their 'Simple Machines' flipbook with 100% accuracy.
- Students will be able to draw an example of a screw in their 'Simple Machines' flipbook with 100% accuracy.
- Students will be able to explain their drawing to a partner with 100% accuracy.

Materials:

- Simple Machine flipbooks
    - markers
- Book-*Cut, Chop, and Stop: a book about wedges*-Michael Dahl
    - pencils
    - books
    - paper
- Book-*Twist, Dig, and Drill: a book about screws*-Michael Dahl
- Slice of wood
    - screws (of three different sized screws, each is color coded)
    - screw drivers
    - nails
    - hammers
    - safety glasses
    - plastic set of screws, nails, hammers, screwdrivers
- Screw Recording Sheet (below)
- Poster paper
    - pencils

Lesson Activator (Set Purpose): Wedges

- Read *Cut, Chop, and Stop*, this book will start to get students thinking different types of wedges.
- Ask students questions throughout the book
    - I did not have access to the book, so I cannot make specific questions about it.
- We will make a quick classroom poster that has examples of wedges on it."
- "Now that we have read this book, and have seen some examples of what wedges can look like. Now we are going to work with some wedges."

Body of Lesson:

- “We are going to do an experiment with wedges”
    - the teacher will set up the lesson in the front of the class
        - place two thick books a few inches apart, then place a piece of paper in between pages of a two books, then get a pencil
- “First I am going to put the eraser side of this pencil on this paper and push down. What did you see happen?” (call on a few students)
- “Next, I am going to use the pointed and push down on the paper. What do you think is going to happen?” (call on a few students)
    - Then push on the paper with the pencil tip
    - “You were right, it would go through the paper. It went through the paper and separated the pieces.”
- Let the students explore wedges like the ones in the book in small stations, one of the stations the students can try hammering nails (wedges) into the block of wood or with the plastic version.

Lesson Activator (Set Purpose): Screws

- Read *Twist, Dig, and Drill*, this book will start to get students thinking different types of screws.
- Ask students questions throughout the book
    - I did not have access to the book, so I cannot make specific questions about it.
- “Screws are inclined planes that are wrapped around a cylinder or a cone.”
- “We will make a classroom poster that has examples of screws on it”
- “Now that we have read this book, and have seen some examples of what screws can look like. Now we are going to work with some screws.”

Body of Lesson:

- Screw Recording Sheet
    - The students will be in small groups.
    - In the small groups they will be predicting which screw will screw in in the least amount of turns.
    - There are 3 different sizes of screws, and the tops of them are color coded (See below).
    - The students will test out their prediction by screwing in each screw into their block of wood and recording how many turns it took.

    - After they finish they will know if their prediction is correct.
- Let the students explore screws like the ones in the book in small stations, one of the stations the students can try screwing screws into the block of wood.

Lesson Summarizer (Closure & Wrap-Around to Purpose):

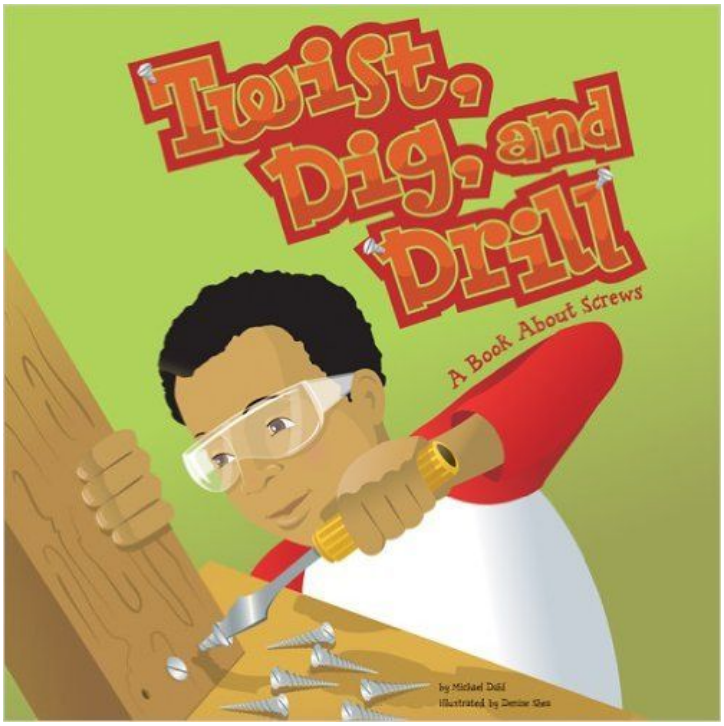
- Gather the students back for whole class talk: “We did an experiment today with screws, and we made some predictions. What were some of your predictions?” (call on a few students)
    - “After our experiment about screws, what have we found out?”
- “What we did today was work with wedges and screws. What types of machines are these? (call on a student) That is right, wedges and screws are examples of simple machines.”
- “We got to see today how wedges pull things apart and screws pull to things together.”
- “We made these posters showing examples of wedges and screws. We will hang the poster in the classroom as we work on more simple machines.”
- “Now let’s get out our ‘Simple Machine’ flip books and draw pictures of wedges and screws.”

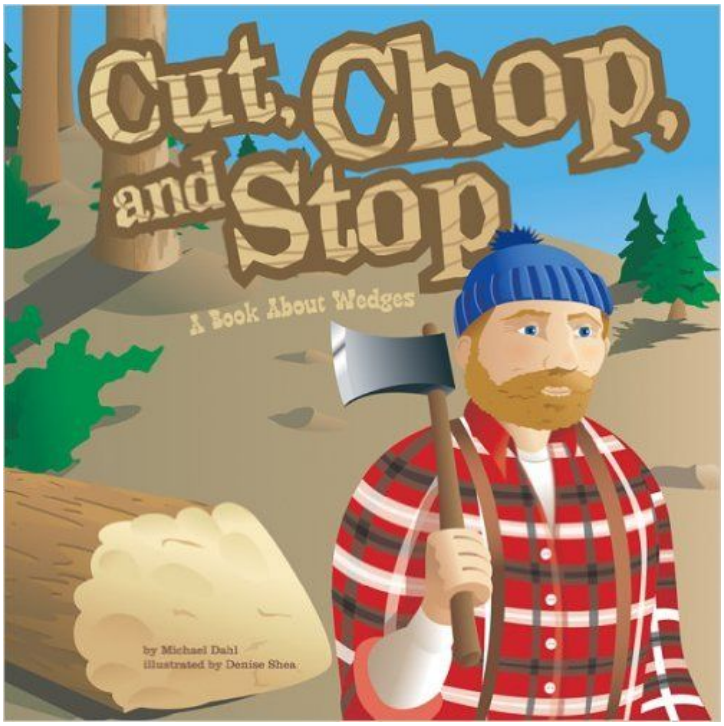
Formative or Summative Assessment of Student Learning:

- The students will draw pictures of inclined wedges and screws in their ‘Simple Machine’ flipbooks.
    - The teacher will observe the students drawings, and provide assistance and redirection when needed.
- They will do a pair and share at the carpet once they are done with their pictures.
    - The teacher will observe the students as they explain their pictures to their partner.
- The teacher will also observe the students throughout the lesson to provide assistance and redirection to the students. The teacher should also ask probing thoughtful questions about what the students are doing during the lesson.

References:

- Cut, Chop, and Stop: a book about wedges-Michael Dahl
- Twist, Dig, and Drill: a book about screws-Michael Dahl
- http://natalieudellsportfolio.weebly.com/pre-k-simple-machine-unit.html
- https://www.teacherspayteachers.com/Product/Simple-Machines-Screw-Lesson-Plan-Screw-Activity-636997


Twist, Pig, and Drill
A Book About Screws
by Michael Dahl
illustrated by Denise Shea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Name: _____

Screw Recording Sheet

Which screw will take fewer turns to drive into the wood?

Prediction:

_____
_____
_____
_____
_____
_____

Experiment:

Record how many turns it took to drive the screw into the wood.

Screw 1-blue	Screw 2-green	Screw 3-red