Unit 06: Simple Machines

Content Area: **English Language Arts**
Course(s):
Time Period: **Trimester 2**
Length: **4-6 Weeks**
Status: **Published**

Brief Summary of Unit

This unit is designed to introduce and explore various simple machines, including inclined planes, levers, screws, pulleys, wedges, and wheel and axle. The study encourages hands-on discovery and investigation through a variety of activities, discussions, and real-world observations. Children will learn about how simple machines operate, their uses, and who works with them. Family involvement is encouraged through contributions of household items and cooking activities

Essential Questions

• What do we know about simple machines? What do we want to find out?

• What does this feel like? (Share a feely box with a small simple machine.)

• What is something heavy?

• How do you use this simple machine? (Show tongs.)

• Is this a simple machine? (Show a machine that is not a simple machine.)

• What do you want to find out about simple machines?

• How do inclined planes help us move things?

• How can you move this box? (Show a heavy box.)

• What can we use to make an inclined plane?

• What is something that rolls?

• Where did you see an inclined plane today?

• Which of these is an inclined plane you play on? (Show pictures of different inclined planes including a slide and a ramp at a skate park.)

• How are levers used?

• What is this? (Show a picture of a seesaw.)

• Which of these is a lever? (Show tongs and another item that is not a lever.)

• What is this used for? (Show a lemon squeezer.)

• Which of these is heavier? (Show two items on a balance scale.)

• Can you tear the paper on this line? (Provide a piece of paper with a straight line down the middle.)

• How do screws hold things together?

• How can you hold these things together? (Display two pieces of pegboard.)

• Is this a screw? (Display a nail.)

• What do you want to find out on our site visit?

• What comes next in the pattern? (Stamp different screw heads into play dough or clay.)

• Can you open and close these bottles?

• What are other types of simple machines? How do people use them?

• What shape is this? (Display a wheel of a pulley.)

• Is this a simple machine? (Show an image of a kitchen knife.)

• How is this used? (Show an image of a roller skate.)

• What will we see on our walk today?

• Who works with simple machines?

• What would you like to ask the visitor?

• What do these items have in common? (Show a picture of skates, a bicycle, and a slide.)

• How many wheels are on this bike?

• Which simple machine can lift this? (Display a heavy object such as a container of blocks.)

• What would you like to show our guests tomorrow at the celebration?

• What was your favorite part of the study?

Enduring Understandings

• The definition of simple machines

• Different types of simple machines: inclined plane, lever, screw, pulley, wedge, wheel and axle

• How inclined planes help move things by reducing the force needed

• How levers are used to lift, move, or apply force

• The function of screws in holding things together and their components like threads

• The concepts of load, force, angle, friction, surface, fulcrum, balance, and different parts of machines like threads and pitch

• How people in various professions use simple machines in their work

• Complex machines are made up of simple machines

Students Will Know

Vocabulary:

• Force

• Simple machine

• Inclined plane

• Lever

• Screw

• Pulley

• Wedge

• Wheel and axle

• Operate

• Manual

• Investigate

• Load

• Tilt

• Angle

• Friction

• Surface

• Fulcrum

• Tongs

- Chef
- Balance
- Tools
- Nut
- Bolt
- Nail
- Threads
- Pitch
- Rotate
- Words related to tools and equipment at a tire shop (e.g., lift, wrench, lug nut)
- Screw drive
- Words related to types of screwdrivers
- Diameter
- Cable
- Blade
- Skate
- Energy
- Work
- Complex machines
- Mechanic
- Haul

Students Will Be Skilled At

- Exploring and identifying simple machines from collections and in the classroom
- Discussing and sharing what they know and want to find out about simple machines through shared writing
- Manipulating handheld simple machines and exploring their operation

• Observing and identifying inclined planes in the community (e.g., skate parks, slides)

• Creating inclined planes using various materials

• Exploring the concept of friction by adding texture to inclined planes

• Using balance scales to compare weight

• Balancing levers with a moving fulcrum

• Identifying levers in everyday objects like tongs, lemon squeezers, scissors, hole punchers, and staplers

• Exploring screws, nuts, and bolts and how they hold things together

• Distinguishing between screws and nails

• Opening and closing screw-top bottles

• Constructing and using simple pulley systems

• Recognizing the uses of wedges (e.g., knives) and wheels (e.g., roller skates)

• Taking apart complex machines to see the simple machines within them

• Interacting with visitors who work with simple machines (e.g., chefs, carpenters, movers, delivery workers, roller skaters)

• Participating in group games and movement activities that reinforce concepts (e.g., "Heavy & Light," "People Patterns," "Crazy Compounds," "Come Play With Me," "Complex Machines")

Evidence/Performance Tasks

• Discussion and Shared Writing: Daily discussions and collaborative writing on charts reflecting what they know, what they want to find out, and what they learned about simple machines

• Question of the Day: Responses to daily questions about simple machines, their properties, and uses

• Discovery and Exploration: Children's engagement with simple machines in interest areas, outdoor experiences, and small group activities

• Site Visits: Participation in visits to local skate parks, tire shops, and bicycle shops, and subsequent discussions about observations

• "Wow! Experiences": Engagement with special visitors (chefs, carpenters, movers, roller skaters) and their demonstrations of simple machines in use

• Final Celebration of Learning: Children displaying their investigations and sharing their learning with families and guests

Learning Plan

• Exploring the Topic (Day 1-5)

Large Group: Songs ("I've Got a Friend"), Discussions and Shared Writing ("What Do We Know About Simple Machines?"), Movement ("Let's Do a Hand Dance," "Hop the Circle"), Games ("Clap the Beat," "Syllable Stroll")

Read-Aloud: Don't Say a Word, Mamá and other fiction/nonfiction book

Small Group Options: "Treasure Hunt," "Where's the Beanbag?," "Sink or Float?," "Let's Go Fishing," "Walk a Letter," "Stick Letters," "Action Patterns," "Pots & Pans Band," "Marble Mat," "Fishing Trip"

• Investigation 1: How do inclined planes help us move things? (Day 1-5)

Large Group: Games ("Heavy & Light," "Listen For Your Name"), Songs ("Abby Had an Anteater," "Clap a Friend's Name"), Movement ("Action Counting"), Discussions and Shared Writing ("Exploring Inclined Planes," "Inclined Planes in the Neighborhood," "Long and Short Inclined Planes," "Surface of Inclined Planes," "Site Visit to the Skate Park")

Small Group Options: "I'm Thinking of a Shape," "Buried Shapes," "How Many in the Scoop?," "More or Fewer Towers," "Silly Names," "Tongue Twisters," "Can You Find It?," "We're Going on an Adventure," "Patterns Under Cover," "Perler Patterns"

• Investigation 2: How are levers used? (Day 1-5)

Large Group: Games ("People Patterns," "My Name, Too!," "Time's Up!," "1, 2, 3, What Do I See?"), Movement ("The Name Dance"), Discussions and Shared Writing ("Exploring Levers," "Putting Two Levers Together," "Visitor Who is a Chef," "Balance with a Moving Fulcrum," "Paper and Levers")

Read-Aloud: Counting books, alphabet books, Owen

Small Group Options: "Photo Writing," "Author & Illustrator," "Mixing Paints," "Cutting With Scissors," "Number Cards," "Ping-Pong Pick-Up," "Asking Questions," "That's How You Do It!," "Patterns," "Picture Patterns

• Investigation 3: How do screws hold things together? (Day 1-5)

Large Group: Games ("Crazy Compounds"), Rhymes ("Ticky Ricky," "Riddle Dee Dee"), Songs ("Dinky Doo," "Wind-Up Robots," "We Like Clapping"), Discussions and Shared Writing ("Exploring Screws," "Why Do Screws Have Threads?," "Site Visit to a Tire Shop," "Heads of Screws," "Screw Top Bottles")

Read-Aloud: Highlights High Five Bilingüe™, ¡Para ti!/For You!, Owen, Lola Loves Stories

Small Group Options: "Straw Shapes," "The Farmer Builds a Fence," "Alphabet Books," "Jumping Beans," "My Shadow and I," "Geoboards," "Bigger Than, Smaller Than, Equal To," "Pendulum Power," "What's for Snack?," "Roll-Ups"

• Investigation 4: What are other types of simple machines? How do people use them? (Day 1-4)

Large Group: Games ("Come Play With Me," "Number Lineup"), Songs ("Two Plump Armadillos"), Movement ("Counting Calisthenics"), Discussions and Shared Writing ("Exploring Pulleys," "Visitor Who Uses Wedges in the Kitchen," "Roller Skating Visitor," "Simple Machines in our Neighborhood")

Read-Aloud: My Neighbors and Their Simple Machines, Featherless

Small Group Options: "Alphabet Cards," "Textured Letters," "Play Dough," "Biscuits," "Stepping Stones," "We're Going on an Adventure," "Writing Poems," "Simple Machines Poems"

• Investigation 5: Who works with simple machines? (Day 1-4)

Large Group: Songs ("This Old Man"), Movements ("Silly Dance," "Away I Go"), Rhymes ("Riddle Dee Dee"), Discussions and Shared Writing ("Visitor Who is a Carpenter," "Complex Machines," "Site Visit to a Bicycle Shop," "Visitor Who is a Delivery Worker or Mover")

Read-Aloud: Counting books, books featuring people who work with simple machines, Featherless, Highlights High Five Bilingüe™, Vamos a leer/Let's Read

Small Group Options: "Memory Games," "What's Missing?," "Did You Ever See …?," "Simple Machine Riddles," "Oobleck," "Bicycle Shop Hop," "Character Feelings," "Where Are My Feelings?"

Materials

• Simple Machines: Collections of simple machines, handheld simple machines (e.g., lemon squeezer, tongs, tweezers, screw-top bottles, scissors, hole punchers, staplers), specific simple machines for demonstration (e.g., inclined planes, flat boards, blocks, levers, balance scales, screws, nuts, bolts, nails, pegboard, pulleys, wheels, roller skates)

• Writing and Charting: "What We Know About Simple Machines" charts, "What Do We Want to Find Out About Simple Machines?" charts, chart paper, pencils, markers, clipboards, paper

• Books: Books featuring simple machines, fiction and nonfiction books, children's books lists (e.g., Don't Say a Word, Mamá, My Neighbors and Their Simple Machines, Owen, Featherless, Lola Loves Stories,

• Art & Discovery: Pictures of simple machines, camera, feely box, items for sink or float, treasure items, paint, paintbrushes, clay, woodworking materials

• Construction & Manipulatives: Large cardboard boxes, smooth wood/flat surfaces, blocks, sand, fabric, carpet samples, interlocking cubes, attribute blocks, geometric solids, drinking straws, pipe cleaners, elastic bands/rope, geoboards, geobands, building blocks, plastic links, yarn, counters, Perler beads, pegboards

• Cooking/Food Related: Lemons, lemon squeezer, sugar, cups, pitcher, mixing spoon, ingredients for salsa, vegetable soup, biscuits, play dough

• Games & Movement Props: Mighty Minutes cards (specific numbers mentioned throughout), beanbags, basket/tub, masking tape, alphabet cards, action cards, numeral cards, dry erase board and marker, fishing

poles, fish cards, paper clips, bells, ping pong balls, water for water table, tennis balls, nylon stockings, broom/mop, cardboard tubes, small classroom items

• Dramatic Play: Materials to create a tire shop, bicycle props, moving equipment, boxes

Standards

I. Social/Emotional Development

- Standard 0.1: Children demonstrate self-confidence.

0.1.1 Express individuality by making independent decisions.

0.1.2 Express ideas for activities and initiate discussions.

0.1.3 Actively engage in activities and interactions with teachers and peers.

- Standard 0.2: Children demonstrate self-direction.

0.2.1 Make independent choices and plans from a broad range of diverse interest centers.

0.2.2 Demonstrate self-help skills.

0.2.3 Move through classroom routines and activities with minimal teacher direction and transition easily from one activity to the next.

- Standard 0.3: Children identify and express feelings.

0.3.1 Recognize and describe a wide range of feelings, including sadness, anger, fear, and happiness.

- Standard 0.4: Children exhibit positive interactions with other children and adults.

0.4.1 Engage appropriately with peers and teachers in classroom activities.

0.4.2 Demonstrate socially acceptable behavior for teachers and peers.

0.4.6 Demonstrate verbal or nonverbal problem-solving skills without being aggressive.

II. Language Arts Literacy

- Standard 1.1: Children participate in conversations and discussions.

1.1.1 Engage in conversations about familiar topics.

1.1.2 Ask and answer questions related to the topic.

- Standard 1.2: Children comprehend and use new vocabulary.

1.2.1 Use new vocabulary related to the topic.

1.2.2 Understand and follow multi-step directions.

- Standard 1.3: Children express themselves through and develop an appreciation of dramatic play and storytelling.

1.3.1 Play roles observed through life experiences.

1.3.3 Participate with others in dramatic play, negotiating roles and setting up scenarios using costumes and props.

- Standard 1.4: Children demonstrate emergent reading skills.

1.4.1 Show interest in books and print materials.

- Standard 1.5: Children demonstrate emergent writing skills.

1.5.1 Use drawing and writing to express ideas.

III. Mathematics

- Standard 3.1: Children use numbers and counting.

3.1.1 Count with understanding and recognize how many are in a set.

- Standard 3.2: Children identify and describe shapes.

3.2.1 Identify and describe two- and three-dimensional shapes.

3.2.2 Understand and use positional words.

- Standard 3.3: Children compare and measure.

3.3.1 Compare and order objects by length, size, weight.

3.3.2 Use non-standard units to measure.

- Standard 3.4: Children sort and classify objects.

3.4.1 Sort and classify objects based on one or more attributes.

- Standard 3.5: Children recognize and create patterns.

3.5.1 Recognize and extend simple patterns.

IV. Science

- Standard 4.1: Children explore and investigate the natural and physical world.

4.1.1 Observe and describe objects and events.

4.1.2 Ask questions about observations.

4.1.3 Conduct simple investigations to answer questions.

4.1.4 Make predictions and test them.

- Standard 4.2: Children understand properties of objects and materials.

4.2.1 Identify and describe properties of objects.

4.2.2 Explore how objects can be changed.

- Standard 4.3: Children understand basic concepts of force and motion.

4.3.1 Explore different ways objects move.

4.3.2 Understand that forces cause changes in motion.

- Standard 4.4: Children understand concepts related to structures and engineering.

4.4.1 Explore how structures are built and designed.

4.4.2 Use tools and materials to design and build.

V. Health, Safety, and Physical Education

- Standard 2.2: Children demonstrate large motor skills.

2.2.1 Demonstrate locomotor skills.

2.2.2 Demonstrate non-locomotor skills.

2.2.3 Demonstrate manipulative skills.

- Standard 2.3: Children demonstrate small motor skills.

2.3.1 Develop eye-hand coordination.

2.3.2 Demonstrate fine motor skills.

VI. Visual and Performing Arts

- Standard 5.1: Children express themselves through and develop an appreciation of dramatic play and storytelling.

5.1.3 Participate with others in dramatic play, negotiating roles and setting up scenarios using costumes and props.

- Standard 5.2: Children express themselves through and develop an appreciation of the visual arts.

5.2.1 Create two- and three-dimensional works of art while exploring color, line, shape, form, texture, and space.

VII. Social Studies, Family, and Life Skills

- Standard 6.3: Children understand their community.

6.3.1 Explore and identify places and people in their community.

6.3.2 Understand the roles of community helpers.

- Standard 6.4: Children demonstrate problem-solving skills.

6.4.1 Identify a problem and generate possible solutions.

6.4.2 Use materials and resources to solve problems.

VIII. Technology

- Standard 8.1: Children use technology tools for learning and communication.

8.1.1 Explore and use various technological tools.

Suggested Strategies for Modifications

Using a variety of hands-on activities, movement, small group options, visual activities, along with discussions to support diverse learners and learning styles. Students experience hands-on exploration of technology and materials that provide multiple entry points for learners.

This link includes content specific accommodations and modification for all populations:

https://docs.google.com/spreadsheets/d/1fmQ5llgX1HZdIPa7duX33pfmonGDoVFag9eE2DpbLfM/edit?usp=sharing