

PHYSICAL SCIENCE

2nd GRADE

FUN WITH SIMPLE MACHINES

RATIONALE FOR ADVENTURE

Students will learn about simple machines, cooperating as a class to complete a task, encouraging fellow classmates and building simple machines

GEORGIA STATE STANDARD

GSE 2nd Grade curriculum map, Forces at Work, Energy transfer, developing and using models, obtaining, evaluating and communicating information

SOUTH CAROLINA STATE STANDARDS

Science and Engineering Concepts - Crosscutting Concepts – Students investigate and explain causal relationships and the mechanisms by which they are mediated. Events have causes, some simple, some multifaceted and complex. Students can test simple machines across given contexts to predict and explain cause and effect

PS2: Motion & Stability: Forces and Interactions

TAKEAWAYS FOR STUDENTS

- Learning about simple machines
- Cooperating as a class to complete a task
- Encouraging fellow classmates
- building using simple machines

ADVENTURE REQUIREMENTS

- Learn about simple machines: wedge, screw and lever
- Gather rocks from the field and woods to use in demonstration and return them
- Build a shelf out of wood and found objects on our hike for displaying nature finds (nothing that is living can be collected)
- Use the terminology (fulcrum, effort arm, load arm, and force multiplier) correctly

PREPARATION AND MATERIALS NEEDED

- 2 pre cut wood pieces per student (5/4" x 6" x 8")
- 2 screws per student
- 1 screwdriver per pair of students
- Ziplock bag for collection
- 5 gal bucket for collection of rocks
- Shovel
- Low branch of a tree
- Rope
- Long, strong branch found on hike or 2x4 if none is found

- Glue guns for teachers to help students glue on the found objects
- Badminton set
- Block of wood with a nail in it
- Hammer

OPENING

- Note that students will focus on being considerate in the outdoors.

TALK TIME

- Introduce the 3 simple machines, the lever, the screw, and the wedge and tell them they will be working with them and learning about how to make work easier. –
- They will be constructing a small display shelf using a simple machine and taking a hike to find objects in nature to use for the project.
- Explain that stretches prepare students physically for hikes and other physical activities. Remind everyone in the class of the rules of safe hiking

EDUCATIONAL EXCURSION INSTRUCTIONAL MATERIALS WORKSHOP

- Talk about safely using a hammer and screwdriver

ACTIVITIES

Activity 1: Teach the Key Concepts of Levers information from the sheet using a seesaw as an example since the kids have a high probability that they have been on one. Tell them we will be using a lever to make a job easy. Use a badminton racket and birdie to show that our wrist and arm can be a lever to make something move with force.

Reflection: Ask them to tell what they learned about levers. Have them demonstrate the use of the lever by making the birdie move forward with the racket. (They take turns)

Activity 2: Go on a hike to gather rocks for experiment and gather natural items for shelf (in baggies)

Reflection: Did students only gather dead materials, nothing live?

Activity 3: Do lever demonstration with bucket of rocks and long branch or long piece of wood Build bird feeder and decorate

Reflection: Ask students what the effort arm, load arm, fulcrum and force multiplier are.

Activity 4: Introduce the wedge and screw simple machines. Have them use a shovel to demonstrate the wedge and level being used together. They will replace the soil right where they dug it.

Demonstrate a wedge that is a nail, and have them pound in a nail partway into a block of wood, then use a hammer (lever) to pull it out. They can take turns.

Reflection: Ask them if they realized how we use simple machines all the time and don't even realize it.

Activity 5: Bring students back to porch area and hand out the wood, 3 screws and screwdrivers. Talk about how the screw is also a simple machine and how they will use this simple machine to build a small

display shelf. They will use the pre-drilled holes to screw the 2 pieces together and use the found objects to glue them to the top half of the shelf (the teacher will help with the use of the glue gun so no one gets burnt.) Then they can take the shelves home and hang or put on a counter to use when they are out in nature in the future and have cool nature finds to display.

Reflection: When you have this in your home, you'll have a reminder of using a simple machine to build something.

SONG TIME YouTube "Simple Machines" by David Newman

INSTRUCTIONAL AIDS

Song sheet with lyrics for "Simple Machines"

Attachment – Key Concepts of Levers

Simple Machines by David Newman

Simple Machines

make work easier to do.

Use a wedge or a lever

Or a pulley, or a screw;

A wheel and axle,

Or an inclined plane;

They're all simple machines

Simple machines.

A wedge starts wide, but is

Pointed at the end.

A lever's like the seesaw

that you ride on with a friend.

A pulley is a wheel with a rope

That goes around.

Whenever there is work to do,

You know what will be found...

Oh, simple machines make work

Easier to do.

Use a pulley or a lever,

A wedge or a screw;

A wheel or an axle

Or an inclined plane;

They're all simple machines

Simple machines.

An inclined plane helps you
move things up and down.

A wheel and axle helps things
Move or turn around.

A screw is like a screw...(duh!)

Or like the lid of a jar.

Without simple machines

We couldn't get too far.

Oh, simple machines make work

Easier to do.

Use a pulley or a lever,

A wedge or a screw;

A wheel or an axle

Or an inclined plane;

They're all simple machines

Simple machines.

Oh, simple machines make work

Easier to do.

Use a pulley or a lever,

A wedge or a screw;

A wheel or an axle

Or an inclined plane;

They're all simple machines

Simple machines.