

**INITIATIVE/
RESOURCEFULNESS**

Week 2

Initiative

Taking the lead in order to solve a problem and/or to make progress

Resourcefulness

Finding and using the necessary supplies and resources to solve a problem and/or reach a goal

Objectives

Initiative/Resourcefulness Week 2

General Objectives

- To learn about the character trait of Initiative/Resourcefulness
- To learn about levers, inclined planes, wedges, and screws
- To learn to be resourceful while working

Specific Objectives

- To use levers to lift heavy objects
- To discover the best type of lever to use with differing loads
- To calculate the mechanical advantage (older)
- To group scissors stapler, nutcracker, etc. into different types of levers
- To explain the three types of levers using only a ruler and a block
- To find levers in the house
- To find inclined planes around and on the house
- To drive around town to find ramps
- To make a car ramp and to change its elevation for match-box cars
- To research how the Egyptians used inclined planes to build the Pyramids
- To find screws and bolts around the house and learn about their uses.
- To learn about the different tools needed to tighten and loosen bolts
- To study the wedge and its many uses in the home
- To learn about wedges in cookie cutters and knives
- To make a paraffin block print
- To discuss weapons that use the wedge

Alert

Initiative/Resourcefulness Week 2

For Week 4

- 3 lemons, 2' wire, LED light, (optional - Alligator clips, and volt meter). See YouTube
- Lemon Battery experiment

Weekly Supplies

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- Broom stick and brick or something to lift 15 (p.32)
- Yardstick, coat hanger, twig, cardboard, wire, etc. 18 (p.32)
- Sawhorse and 2x4x8' 20-22 (p.33)
- Calculator, pencil and paper 41 (p.36) (Older)
- Scissors, stapler, nutcracker, fork, garden shovel, etc. 24 (p.33)
- Ruler and book 25 (p.34)
- Clip earring, paper cutter, wheelbarrow, bottle opener, etc. 26 (p.34)
- Scale, piano, or toilet 27-28 (p.34) and 38 (p.35)
- Tennis, fishing, golf equipment, etc 56 (p.38)
- Child's wagon and board or cardboard 30-37 (p.35)
- Matchbox cars and ramp 48 (p.37)
- Ladder and 2 sawhorses 53 (p.37)
- Assorted screws, machine screws, wood screws, lag screws, drywall screws, etc. 56 (p.38)
- Toilet/paper towel tubes and biscuit dough tubes 59 (p.38) ⁵

Bible Verse

Initiative/Resourcefulness Week 2

All hard work brings a profit, but mere talk leads only to poverty.

Prov. 10:23

Discovery Learning

Initiative/Resourcefulness Week 2

- This entire 7 week unit is going to focus on discovery learning, not just giving information from parent to child
- Discovery learning demands:
 - Time to play with materials
 - Observing how devices work
 - Thinking about how to use what is known to solve problems on what is unknown.

Train Initiative

Initiative/Resourcefulness Week 2

The \$1.00 Game

- Identify something that is out of place.
- Secretly slide a dollar bill under the object and see how long it takes for someone to take the initiative to pick the book and put it away. Helpers keep the money.
- Do more items get picked up? But . . . don't let them pick things up to look for money and not put them away, (that is called greed, not initiative!).

The Eagle Eye Award

- Praise and reward those who pitch in on their own initiative with Eagle Eye Award from ribbon and eagle drawn on cardboard disc.
- Give reward of overnight friend or movie.

Focus Books

Initiative/Resourcefulness Week 2

A *The Way Things Work* by David Macaulay

Any books on simple machines

My Side of the Mountain by Jean George

Video

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Swiss Family Robinson by Walt Disney

Websites

Initiative/Resourcefulness Week 2

- http://en.wikipedia.org/wiki/Rube_goldberg
(Rube Goldberg bio and cartoon)
- http://en.wikipedia.org/wiki/Rube_goldberg
(College machine - cute)
- <http://library.thinkquest.org/CR0210120/Types%20of%20Levers.html> (Class of levers)
- <http://www.boltdepot.com/Fastener-Information/Printable-Tools/Type-Chart.pdf>
(Chart of Screws and Bolts)
- http://curiousinventor.com/guides/Metal_Working/Screws#wood_sheet_drywall (Chart of Screws and Bolts)

Writing Assignment

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Y-M-O Write one invention or device in your home, then give a presentation on why this invention is the most helpful.

Vocabulary

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General

Simple machine (6)

Work (force X distance)

Force

Friction

Gravity

Weight

Mechanical advantage

Vocabulary

Initiative/Resourcefulness Week 2

Levers

Lever

Fulcrum (Pivot point)

Effort (Force arm)

Resistance force (Load
arm, weight)

Hydraulic cylinder

Inclined plane and Wedge

Ramp

Slope (grade)

Steep vs gentle slope

Screw

Parts of screw:

Thread

Pitch

Head

Flat

Round

Oval

Pan

Hex

Screw drivers:

Slotted head

Phillips

Square

Torx

Hex head

Bolt and nut

Timeline Characters

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Archimedes

Map Study

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NONE

Activities

Initiative/Resourcefulness Week 2

Monday: Experiment with Levers

- 15 (p.32) Try lifting your father using broom and brick.
- 16 (p.32) Experiment lifting objects by moving fulcrum.
- 17 (p.32) Hypothesize on what is needed to lift a heavy load.
- 18 (p.32) Experiment with different types of levers.
- 20 (p.33) Make a see-saw using a sawhorse and board.
- 21 (p.33) Experiment with different weights of children on see-saw changing their distance from fulcrum.
- 22 (p.33) Experiment with see-saw varying the load and force arm.
- 23 (p.33) Discuss Archimedes move the earth with lever.
- 41 (p.36) Calculate the mechanical advantage using formulas. (Optional older)

Activities (cont'd 2)

Initiative/Resourcefulness Week 2

Tuesday: Kinds of Levers

24 (p.33) Group scissors, stapler, nutcracker, fork, garden shovel, etc. according to types of levers.

25 (p.34) Using a ruler and a block, explain the 3 classes of levers.

26 (p.33) Find levers in the house and classify.

27-28 (p.34), 38 (p.35) Explain levers in a bathroom scale, piano, OR toilet. (Older)

30-37 (p.35) Pick one or more levers to use and tell what kind it is.

Types of Levers

Initiative/Resourcefulness Week 2

F- R- E

1st Class (F)

- Fulcrum in the middle
- Effort is on one end
- Resistance on other end

2nd Class (R)

- Resistance force (load) in the middle
- Effort force on one end
- Fulcrum on other end

3rd Class (E)

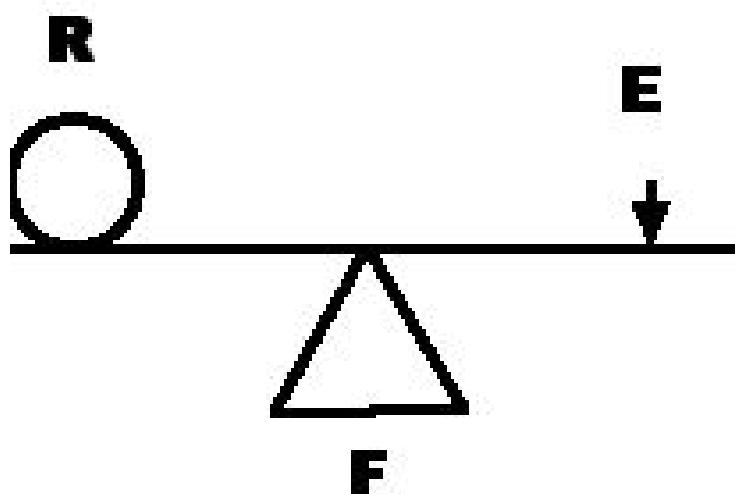
- Effort force in the middle
- Resistance force on one end
- Fulcrum on other end

Class One Lever

Initiative/Resourcefulness Week 2

Class 1 - The fulcrum is in the middle and the effort is on one end and the resistance is on the other end. See lifting a barrel below.

R = Resistance E = Effort F = Fulcrum

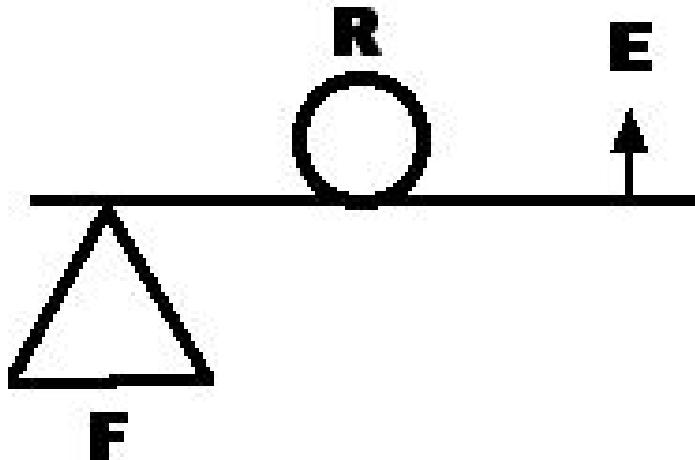


Class Two Lever

Initiative/Resourcefulness Week 2

Class 2 - The resistance force is in the middle between the effort force and the fulcrum. See rolling a barrel down a ramp below.

R = Resistance E = Effort F = Fulcrum



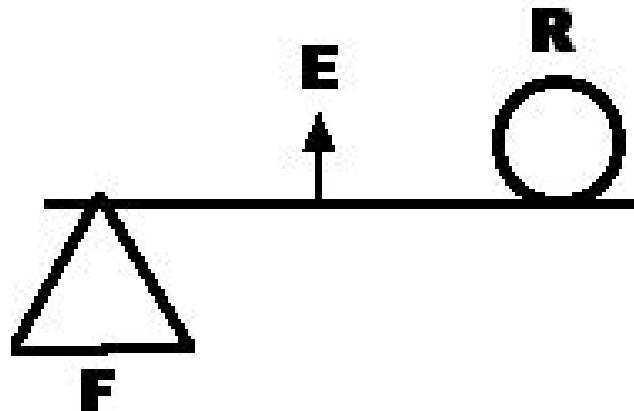
Class Three Lever

Initiative/Resourcefulness Week 2

Class 3 - The effort force is in the middle between the resistance force and the fulcrum.

See rolling a barrel down a ramp below.

R = Resistance E = Effort F = Fulcrum



Activities (cont'd 3)

Initiative/Resourcefulness Week 2

Wednesday: Inclined Plane

- 44 (p.36) Look for inclined planes around the house.
- 45 (p.36) Drive around town looking for ramps.
- 47 (p.37) Drag, lift, then roll a wagon up a stairway and evaluate.
- 48 (p.37) Make a car ramp and tilt it at different angles to see how match-box cars are affected.
- 50 (p.37) Calculate mechanical advantage of inclined plane. (Older)
- 51 (p.37) Examine your house roof for inclined planes.
- 52 (p.37) Try different slopes of stairs for ease of climbing.
- 53 (p.37) Climb a ladder at different angles and evaluate effort.
- 58 (p.38) Create an inclined plane around a pencil.
- 59 (p.38) Locate spiral inclined planes in toilet/paper towel rolls.
- Research how Egyptians used inclined planes to build pyramids²³.

Activities (cont'd 4)

Initiative/Resourcefulness Week 2

Thursday: Screw

- 56 (p.38) Find screws around your home.
- 57 (p.38) Cut a circle of paper into a spiral.
- 62 (p.38) Compare screws of different pitches or thread widths.
- 64 (p.38) Remove cork from bottle without/with corkscrew.
- 67 (p.38) Look for different kinds of screws.
- 68 (p.39) Contrast screws points, threads, and heads.
- 72 (p.39) Practice tightening screws.
- 73 (p.39) Learn the different kinds of screwdrivers.
- 65 (p.38) Read about Archimedes screw.

Bolt vs Screw

Initiative/Resourcefulness Week 2

What's the difference between a bolt and a screw?

Screws and bolts differ in terms of how they are installed:

- If you turn the head it's a screw
- If you turn a nut it's a bolt

Machinery's Handbook

Kinds of Screws

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Sheet metal screw

Wood screw

Dry-wall screw

Sheet Metal vs Wood Screw

Initiative/Resourcefulness Week 2

What is the difference between sheet metal screw and a wood screw?

- Sheet metal screws are threaded the entire shaft vs wood screws are threaded 2/3's the shaft.
- Sheet metal screws are made from tougher metal.
- Sheet metal screws have more threads at a more gentle slope vs wood screws that have less threads at a steeper angle.
- Sheet metal screws can be used in wood, but wood screws cannot be used in sheet metal.

Screw Heads By Shape

Initiative/Resourcefulness Week 2

Flat

Round

Oval

Pan

Hex

http://curiousinventor.com/guides/Metal_Working/Screws#wood_sheet_drywall

Screw Heads By Drives

Initiative/Resourcefulness Week 2

Slotted	-
Phillips	+
Square	□
Torx	*
Hex	◆

Activities (cont'd 5)

Initiative/Resourcefulness Week 2

Friday: Wedges

- 74 (p.39) Look for wedges in your home.
- 75 (p.39) Chop wood using different a wedge. (Older)
- 76 (p.39) Make cookies using a cookie cutter.
- 77 (p.39) Learn the different kinds of knives and uses.
- 78 (p.39) Determine whether a dull/sharp wedge best.
- 79 (p.39) Learn to sharpen a knife.
- 81 (p.39) Make a paraffin block print OR...
- 82 (p.39) Sculpt plaster Paris using chisel/hammer OR...
- 84 (p.40) Take apart a pencil sharpener.
- 83 (p.40) Sew and note needle spreading fabric threads.
- 85 (p.40) Make a design on wood using a hand drill.
- 86 (p.40) Discuss which weapons use the wedge.

Different Kinds of Knives

Initiative/Resourcefulness Week 2

Chef's knife

Bread knife

Paring knife

Carving knife

Boning knife

Permission Slip

Permission Coupon

Free pass to skip one activity
or other assignment
(Feel free to copy as often as needed)

Permission Coupon

Free pass to skip one activity
or other assignment
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Field Trips

Initiative/Resourcefulness Week 2

**Scavenger hunt for
simple machines at
home, hardware
store, Home Depot
or Lowes**

Suggestions for Dad

Initiative/Resourcefulness Week 2

- Take over and teach all you know!!!!!!!
- Take the kids on a scavenging hunt for simple machines.
- Watch several YouTube pieces on Rube Goldberg Inventions
- Help the kids set up a Rube Goldberg “Invention” remember to guide and suggest but not taking over
- Tip: If you can't keep your hands off, make your own Goldberg Invention, but help the kids make theirs as well.

Focus of the Week

Initiative/Resourcefulness Week 2

- Learning about the character trait of Initiative/Resourcefulness
- Learning about levers, inclined planes, wedges, and screws
- Learning to be resourceful while working
- Using levers to lift heavy objects
- Discovering the best type of lever to use with differing loads
- Calculating the mechanical advantage
- Grouping scissors stapler, nutcracker, etc. into different types of levers
- Explaining the three types of levers using only a ruler and a block
- Finding levers in the house
- Finding inclined planes around and on the house
- Driving around town to find ramps
- Making a car ramp and to change its elevation for match-box cars
- Researching how the Egyptians used inclined planes to build the Pyramids
- Finding screws and bolts around the house and learning about their uses.
- Learning about the different tools needed to tighten and loosen bolts
- Studying the wedge and its many uses in the home
- Learning about wedges in cookie cutters and knives
- Making a paraffin block print
- Discussing weapons that use the wedge

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Thanks,
Wade and Jessica Hulcy