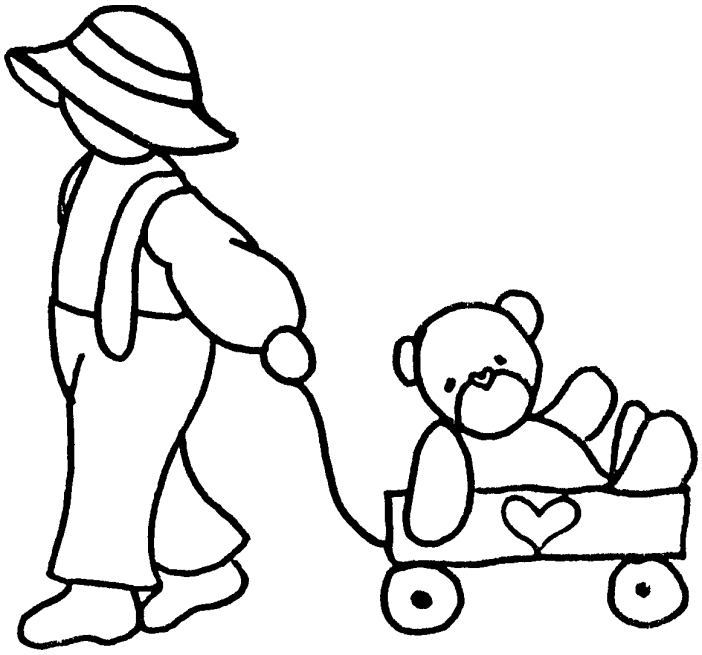
Applied Science

Our Technological World

KINDERGARTEN

TECHNOLOGY



3 WEEKS
LESSON PLANS AND
ACTIVITIES

SCIENCE AND MATH
OVERVIEW OF KINDERGARTEN

SCIENCE AND MATH

WEEK 1.
PRE: *Describing and comparing nests, birds, and eggs.*
LAB: *Describing different shapes.*
POST: *Exploring shapes in nature.*
WEEK 2.
PRE: *Distinguishing different senses.*
LAB: *Discovering how to use the senses to find new things.*
POST: *Describing how senses feel.*
WEEK 3.
PRE: *Discovering components of the microworld.*
LAB: *Comparing a microscope to a hand lens.*
POST: *Identifying tools that help us observe.*

PHYSICS

WEEK 4.
PRE: *Deriving information from an observation.*
LAB: *Discovering changes in the night sky.*
POST: *Describing interactions of the physical world.*
WEEK 5.
PRE: *Exploring magnetism.*
LAB: *Discovering which objects repel or attract each other.*
POST: *Discovering how electricity is made.*

TECHNOLOGY

WEEK 6.
PRE: *Discovering technology.*
LAB: *Exploring different simple machines.*
POST: *Exploring how machines help people work.*
WEEK 7.
PRE: *Exploring inventions.*
LAB: *Discovering how to invent.*
POST: *Exploring how inventions may not be useful.*

BUILT ENVIRONMENT

WEEK 8.
PRE: *Recognizing the difference between artificial and natural.*
LAB: *Classifying objects in the classroom.*
POST: *Exploring living requirements of an environment.*

APPLIED SCIENCE - TECHNOLOGY (KA)

PRE LAB

Students use a worksheet to explore tools.

OBJECTIVES:

1. Exploring different tools.
2. Discovering technology.

VOCABULARY:

machine
physics
society
technology

MATERIALS:

tools (hammer, screw driver, pliers) (ask janitor at school)
worksheet

BACKGROUND:

Physics explains how the world works. Technology is using knowledge to improve society. Many tools and machines are created to help humans work easier. Without tools and machines our society would progress very slowly. When caveman lived, there were very few tools. They couldn't cut with scissors or sew with a sewing machine because tools had not been invented. Children today cannot think about living without television, much less the many machines we depend upon.

A simple machine is a term used in mechanics (a branch of physics) to describe fundamental devices that help do work more effectively. The basic simple machines are wheel and axle (to make thinks move); a lever (to help make work easier); and a wedge (to help direct energy to be more efficiently). Tools use the principles of simple machines. Simple machines could very well be the first technology ever invented by humans.

PROCEDURE:

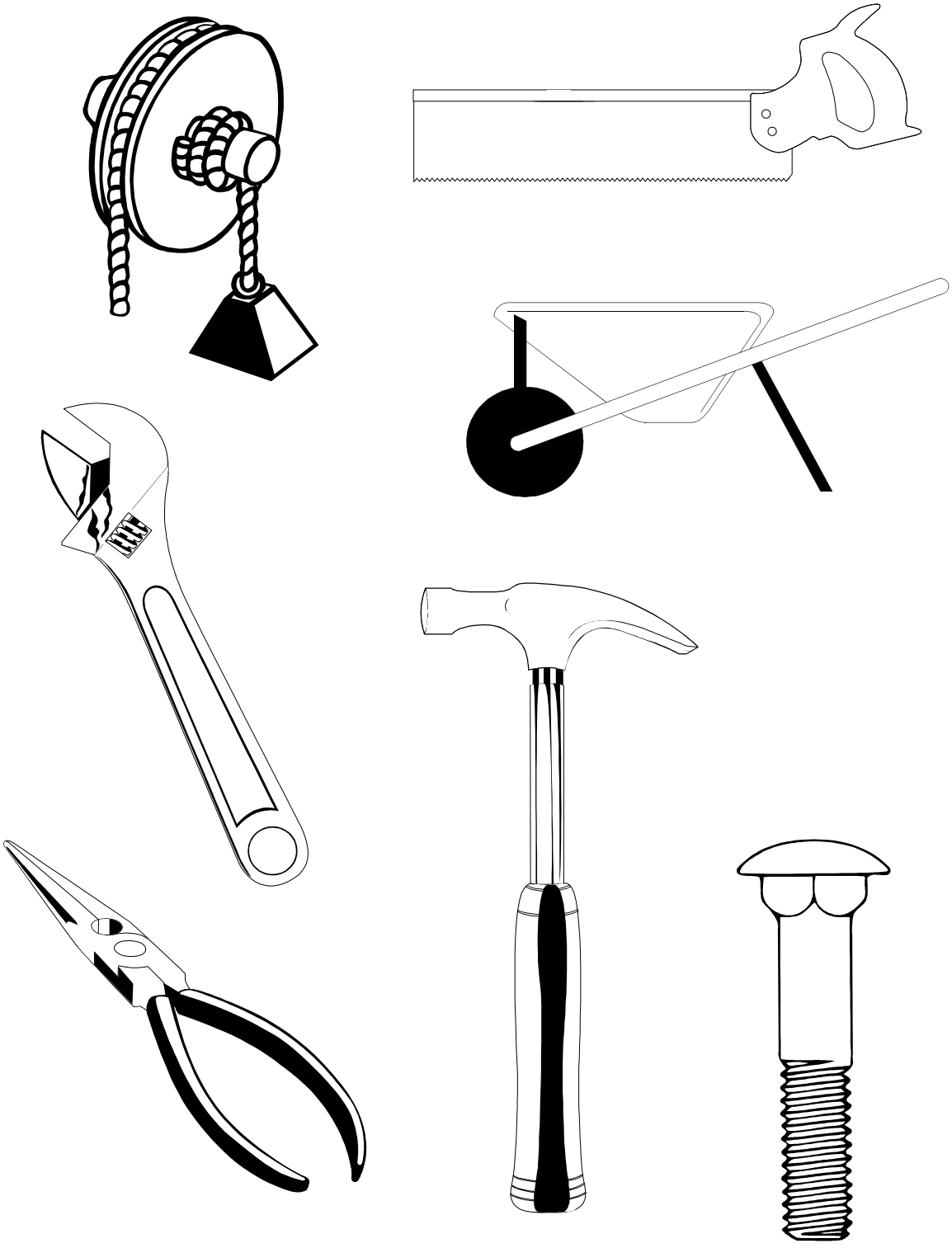
1. This exercise introduces students to simple machines. Show your students any tools you might have. If there is a janitor at your school, have the janitor illustrate all the tools they use to help make their job easier.

2. Use the worksheet to illustrate examples of tools that help make work easier. Simple machines were invented to make life easier. Students do not have to understand how or what simple machines are. The focus is to exposure them to new words and the

association of words with an object.

WHEELBARROW - makes moving heavy objects easier, move faster
WRENCH - lever, can direct energy to tighten or loosen screws or nuts
SHOVEL - a lever and wedge that directs your body to pick up soil
PULLEY - helps to lift objects
RAMP - helps lift large objects
PLIER - helps open and close objects easily
HAMMER - the portion that helps remove nails is a lever
SCREW - helps to secure objects

APPLIED SCIENCE - TECHNOLOGY (KA) PRE



APPLIED SCIENCE - TECHNOLOGY (KA)

LAB

Students discover simple machines.

OBJECTIVES:

1. Exploring different simple machines.
2. Comparing different machines.

VOCABULARY:

axle
gear
lever
pulley
wedge
wheel

MATERIALS:

Applied Science - Technology (KA) or
lever-type nutcracker
apple peeler
eggbeaters
nuts
firm small or medium apples
tubs of water with soap

BACKGROUND:

A lever can help move heavy objects by using weight effectively. A see-saw is a lever that helps you pick up another person of the same or greater weight. A wheel and axle work together to make objects move easily. A car, bicycle, and motorcycle all use wheels and axles. A gear helps distribute energy and moves objects. Many machines such as cars, lawn mowers, and bicycles have gears. Students will be most familiar with the gears on a bike. A pulley helps lift and move difficult objects. Examples include two pulleys on a clothes-line or big cranes that lift large objects. A wedge helps to concentrate energy. If a logger wants to cut a log, an axe is used.

PROCEDURE:

1. Discuss different machines that use simple machines. Students have learned some basic words to help them describe how a simple machine works. Go over the vocabulary list and show or discuss examples of each of the simple machines.

2. In your module is a nutcracker (lever), an apple peeler (lever), and an egg beater (wheel and axle plus gear). Show each of the machines to the students and slowly go over the function of each of the machines. In this exercise the students should look at several ways that these mechanisms work.

3. This activity works best if you have adults at each area demonstrating the different simple machines. Have the students examine and experiment with each machine except for the apple peeler.

Station 1. APPLE PEELER. Have the children guess what is going to happen to the apple when the apple peeler is used. Go over the parts of the apple (skin, core, meat) as you cut the apple skin away from the meat. The apple peeler is used as a lever to cut the apple. The blade however, is shaped as a wedge. Give each child a sample of the apple to test.

Station 2. NUTCRACKER. Have the children try and figure out how the nutcracker works. You may want to demonstrate if they are frustrated. Let them eat the nuts as a reward for learning that the nutcracker is a lever.

Station 3. EGGBEATER. Have the children try and make the eggbeater work in a tub of soap water. Emphasize that they are using gears to make the eggbeater move. Students love this activity, so prepare for a mess!

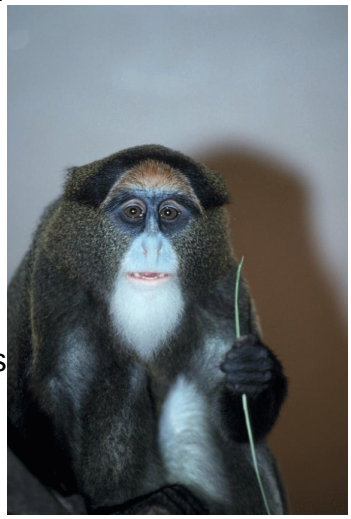
APPLIED SCIENCE - TECHNOLOGY (KA)

POST LAB

Students listen to a story about other organisms that use tools.

OBJECTIVES:

1. Discovering how other organisms live without tools.
2. Exploring how machines help people work.



VOCABULARY:

tool
machine

MATERIALS:

An Elephant Never Forgets its Snorkel by L. Evans (Crown)

BACKGROUND:

Children take tools and gadgets for granted because they are familiar objects in our society. They rarely think about what humans would do without them. Ask children if animals use tools? Make several mental pictures for the students such as a dog or cat that uses a can opener, or a horse that rides a bicycle. Children might chuckle, but you want the students to think about what do animals use to carry, break, or move things?

Early humans had to use twigs and stones as their tools to cut and move. Round stones and sticks allowed humans to move heavy objects. Certain rocks like obsidian could be faceted into cutting tools. Other rocks could be carved to grind corn and grain into meal. Humans had the ability to evolve tools that helped them to create new construction that other animals could not.

PROCEDURE:

1. Animals use their natural shape to help develop strategies to cope with the natural world. Use the book, *An Elephant Never Forgets its Snorkel* to illustrate how animals accomplish naturally what humans need to use tools or gadgets. You probably do not want to read the text to the children, but the illustrations help get the point across to the students. Use the information to help you understand.

2. Below are examples of how to emphasize these gadgets using the illustrations in the book.

a. A human uses a snorkel to breathe underwater, but an elephant "snorkels" with

its trunk.

b. Humans wear a rain coat to stay dry but ducks have waterproof feathers by using their body's oil.

c. Humans built homes and high-rise buildings by using machines. African ants construct a home by making "cement" from their saliva.

d. Humans protect their eyes by using sunglasses, a polar bear's eye "closes" down automatically when the sun gets too bright.

3. Have a discussion on how they think different tools were created. This session could be a wild side into how young children think things were invented.

APPLIED SCIENCES - TECHNOLOGY (KB)

PRE LAB

Students are read a book and discuss inventions.

OBJECTIVE:

1. Exploring inventions.
2. Comparing Benjamin Franklin Bunny to Benjamin Franklin.

VOCABULARY:

creative
experiment
invention
science

MATERIALS:

Icky, Sticky Gloop by Morgan Matthes (Troll)

BACKGROUND:

Science and inventions are similar but different. Inventions find ways to use scientific principles in our everyday life. Today, most scientists require college degrees and laboratories to work in; but inventors just need a creative mind and an ambition to create or make an object more efficient. Emphasize that our society progresses technologically by INVENTIONS not by scientific discoveries. An inventor is able to take science and make it usable. Many scientists are also inventors; and many inventors are also scientists. In human history many scientific breakthroughs were made long before someone found a use for it. Students in kindergarten should begin to distinguish between science and inventions.

Benjamin Franklin is a good example of a famous person who was an inventor. He was a person who always thought of ways to make life better for people. He invented a stove, electricity, binoculars, and many other useful items. Mr. Franklin had very little scientific training, but he was curious about how to make things work better, or saw a need and invented something that filled that need. Explain that Benjamin Franklin was also a key figure in obtaining our freedom from England during the Revolutionary War.

PROCEDURE:

1. Students will probably relate more to the experiments of Benjamin Franklin Bunny. Tell students that the bunnies' name comes from Benjamin Franklin, not the other way around.

2. Mr. Bunny is trying to find a new glue. As you read the book, go over Ben Franklin Bunny's reasoning. He won't stop until he finds the right glue. You can use this book to show that experiments don't always work; but that doesn't mean that you have to give up.

3. Inventions are usually created because there is a need. Ben Franklin Bunny is an inventor because he is very creative and he likes to experiment. Tell students they can invent also, but ask their parents first!

4. This book or a similar story will help students think about the hands-on lab, which have the students develop their own glue.

5. As an added treat for students, have them look at the "magic" substance at your desk. Make this mixture prior to class. Mix corn starch (200 ml) and water (50 ml) and stir. If you have never worked with corn starch before, experiment prior to class. The mixture that you make is very mysterious. It looks like a liquid yet you can pick it up. If you keep rolling it, the substance will stay solid. Once you stop, it acts like a liquid. Have the students look at it and play with it. This substance looks like glue, but does not work as a glue....just a mess that Benjamin Franklin Bunny would think up!

APPLIED SCIENCES - TECHNOLOGY (KB)

LAB

Students experiment with flour and water to make glue.

OBJECTIVE:

1. Experimenting with different types of glue.
2. Discovering how to invent.

VOCABULARY:

experiment
flour
glue
paper mache

MATERIALS:

flour
water
bowls (Cool Whip or margarine tubs)
measuring spoons
corn starch
newspaper
meat tray from market

BACKGROUND:

Students today are familiar with glue in a bottle. However, they may not realize that their grandparents probably made glue by mixing flour and water. The mixture is also used to make paper mache.

PROCEDURE:

1. In this experiment, give students a glass of water and about 100 ml of flour. Tell them that they have to figure out how many spoons full of water and flour will make a good glue. Don't give them much more instructions than that, except for procedures on keeping their work space clean.

2. Newspaper or meat tray are good for students to do their experiment on. They will need some paper to stick together to see if their glue is a success. Discuss what they discovered about the perfect mixture of flour and water.

3. Have the students make paper mache from their invention. Make the glue

mixture a little wetter, and then show them how paper mache is made.

4. Cut strips of newspaper about 2 cm wide and 10 cm long. Dip one strip at a time in the glue mixture. Make sure the glue mixture completely covers the paper strip.

5. Take the paper strip and put it on a can. Completely surround the can with paper strips and glue, and let dry. When it is dry, students can paint with water color or temper paints.

APPLIED SCIENCES - TECHNOLOGY (KB)

POST LAB

Students are read a literature book about how inventions can be used or abused by people.

OBJECTIVE:

1. Exploring how inventions may not be useful.
2. Discovering how "wanting" something is not always the right thing.

VOCABULARY:

invention
magic
magician

MATERIALS:

Barthlomew and the Oobleck by Dr. Seuss
starch mixture from Pre Lab

BACKGROUND:

Bartholomew and the Oobleck is a story about a king who wanted to have something fall from the sky that was "his." He complained to Bartholomew, his page, that he wanted the magicians to invent something for him.

The king is happy with the new invention of Oobleck until he realizes that the Oobleck is not good for his kingdom. It is Bartholomew who convinces the king the only way to stop the mess is for the king to admit it was his own fault that this happened.

PROCEDURE:

1. After you read the story, discuss what this strange substance could be. It is definitely a strange substance that comes from the sky. If you put a little green food coloring in your starch mixture, you have some oobleck!

2. The moral to the story is that "not every invention helps people, inventors must be careful!"