

Cereal Bowl Science

& Other Investigations With the Newspaper



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CEREAL BOWL SCIENCE

& Other Investigations With the Newspaper

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Whether students realize it or not, they loosely apply the scientific method throughout a typical school day. From the simple act of transferring force from their hands to close a door (Newton's third law) to empowering fluid dynamics to send water through pipes to wet a toothbrush or rinse soapy hands, students benefit from scientific exploration.

This Newspaper In Education (NIE) curriculum guide, "Cereal Bowl Science and Other Investigations With the Newspaper," invites teachers and parents to help students look more closely at the science behind everyday activities.

The material is divided into five modules that open with commonplace activities experienced during a school day. Each activity includes an experiment that employs the scientific method steps of investigation, specifically:

1. Observe
2. Predict
3. Experiment
4. Find a solution
5. Communicate results

The five modules are:

1. Cereal Story (everyday physical science)
2. Fog Delay (everyday earth science)
3. Eye Spy (everyday life science)
4. Tech Trek (everyday science and technology)
5. Get Reading, Get Recycling ... GROW! (environmental science and personal social perspective enhancement)

Each module primarily meets one branch of science taught in U.S. primary and secondary schools. Branches covered are physical science, including chemistry; earth science; science and technology; life science; and personal and social perspectives. Links to national education standards preface each module.

Three NIE lessons follow each experiment. They can be accomplished with either a print or a digital (electronic edition, website) newspaper. Each module includes a glossary of terms.

LEARNING STANDARDS FOR INVESTIGATION NO. 1

Grades K-4

NS.K-4.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

NS.K-4.2 PHYSICAL SCIENCE

- Properties of objects and materials
- Position and motion of objects

NS.K-4.7 HISTORY OF NATURE AND SCIENCE

- Science as a human endeavor

Grades 5-8

NS.5-8.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.5-8.2 PHYSICAL SCIENCE

- Motions and forces
- Transfer of energy

NS.5-8.4 EARTH AND SPACE SCIENCE

- Structure of the earth system

NS.5-8.6 PERSONAL AND SOCIAL PERSPECTIVES

- Science and technology in society

NS.5-8.7 HISTORY AND NATURE OF SCIENCE

- Science as a human endeavor
- Nature of science
- History of science

Grades 9-12

NS.9-12.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.9-12.2 PHYSICAL SCIENCE

- Structure and properties of matter
- Chemical reactions
- Motions and forces
- Interactions of energy and matter

NS.9-12.4 EARTH AND SPACE SCIENCE

- Energy in the earth system

NS.9-12.7 HISTORY AND NATURE OF SCIENCE

- Science as a human endeavor
- Nature of scientific knowledge
- Historical perspectives

Source: Center for Science, Mathematics and Engineering Education (CSMEE)

INVESTIGATION NO. 1: CEREAL STORY

Featuring everyday physical science

One of the first things a smart student does every morning is eat breakfast. If cereal is on the menu, you can enjoy a little physical science with your cornflakes and milk.

Every experiment requires certain tools or equipment. These simple tools are needed to turn your breakfast table into a science lab:

- any shaped cold cereal, such as Cheerios, Mini-Wheats, Chex or Kix
- cereal bowl
- milk
- spoon

Sound familiar? That's because you use them every day for breakfast. But this time you will use them to consider the start of your day as a scientist.



The Experiment

Fill your bowl with milk. Place a single piece of cereal in the milk. Do you see how its weight makes a dent in the milk's surface? The piece of cereal is less dense than the milk. The cereal is buoyant in the milk. Buoyancy is what keeps ships in the ocean afloat.

Now add another piece of cereal to the milk. Give the milk a good stir and watch the movement of the two pieces of cereal. Where do they end up when the milk stops spinning?

Do the pieces seem attracted to each other? Or are they far apart, clinging to the edge of the bowl?

Either way, movements of the cereal are caused more by the shape, or geometry, of the milk's surface than by any force of attraction between cereal pieces. Liquid molecules at the surface experience a strong inward pull from those beneath them, but only a weak outward pull from air molecules above. As a result, the liquid – in this case, the milk – caves slightly.

The milk near the edge of the bowl acts differently, curving to form what scientists call a meniscus. A meniscus curves either upward (concave) or downward (convex), depending on the makeup (properties) of the liquid. The meniscus of milk in a cereal bowl is concave.

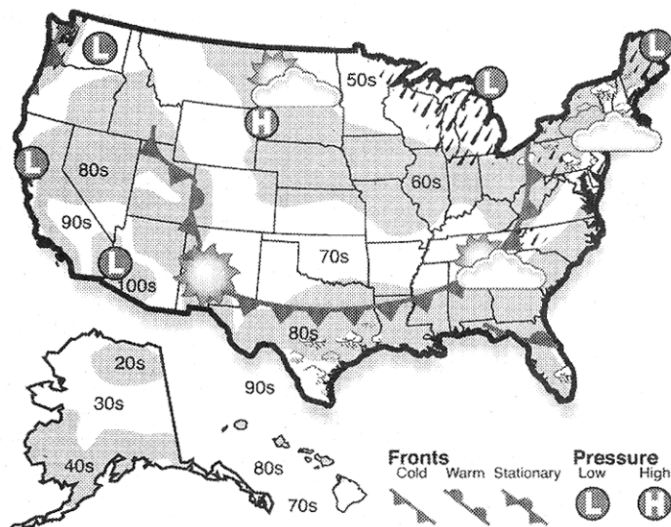
If the cereal sticks together in the middle, it's because of the slight depression in the middle of the milk's surface. If your cereal seems to stick to the side of the bowl, it's because the cereal floats upward along the curve of the meniscus.

Now pour the rest of your breakfast cereal into the milk, eat a big spoonful and open your newspaper.

NIE Physical Science Links

1. Do you know that without physical science, you could never get out of bed in the morning? When your body pushes down on the mattress, you move yourself up. This is an example of Sir Isaac Newton's third law of motion: "For every action, there is an equal and opposite reaction." Find the comics in today's newspaper. Are any of the comic-strip characters using that law?
2. Physical characteristics of land affect local climate. Look at the weather forecast in today's newspaper. It may look like the one pictured below.

TODAY'S NATIONAL HIGHS Weather Underground for AP



Deep Low Tracks Through Northeast

A strong low pressure system will sweep through the Northeast, providing rain. Cooler temperatures are expected in the Northern Plains, while warm temperatures will continue in the Southwest. A low will approach the Northwest late in the day.

Once you have found the national weather map for today, go online to search for a topographic map of the nation – for example, visit <http://msrmaps.com>. Compare weather patterns across the country. What landforms and bodies of water may affect the weather today? Do you know why? Discuss your ideas with other students.

Many people rely on physical science every day to keep their jobs. For instance, when a magician pulls a tablecloth off a dinner table covered with dishes but doesn't break anything, he or she is making use of Newton's first law of motion and the concept of inertia. The first law

states that an object at rest will remain at rest, and an object in motion will remain in motion at a constant velocity unless or until outside forces act upon it.

3. Look through today's newspaper and find a classified ad for a job that requires knowledge of the following physical science principles. Write down the job title and explain why you selected that job.

- Conservation of mass (the total mass of an isolated system is unchanged by interaction of its parts): _____

- Newton's third law of motion (when one object exerts a force on another, the second object exerts on the first a force equal in magnitude but opposite in direction): _____

- Law of definite proportions (a given chemical compound always contains the same elements in the same fixed proportion by weight): _____

Glossary of Terms

Physical science: any of the sciences, such as physics, chemistry, astronomy and geology, that analyze the nature and properties of energy and nonliving matter.

Inertia: a property of matter that causes it to resist changes in velocity (speed and/or direction).

Newton: Sir Isaac Newton (1642-1727), an English mathematician and physicist remembered for developing calculus, the law of gravitation and the three laws of motion.

Concept: an idea or thought.

Exert: to put forth or use energetically; to put into action or use.

Magnitude: greatness of size or amount.

Chemical compound: a pure substance composed of two or more elements or ingredients in definite proportion by weight.

Mass: the quantity of matter as determined from its weight (physics).

Topographic: the relief features or surface configuration of an area.

LEARNING STANDARDS FOR INVESTIGATION NO. 2

Grades K-4

NS.K-4.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

NS.K-4.4 EARTH AND SPACE SCIENCE

- Properties of earth materials
- Changes in earth and sky

NS.K-4.6 PERSONAL AND SOCIAL PERSPECTIVES

- Types of resources
- Changes in environments
- Science and technology in local challenges

NS.K-4.7 HISTORY OF NATURE AND SCIENCE

- Science as a human endeavor

Grades 5-8

NS.5-8.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.5-8.4 EARTH AND SPACE SCIENCE

- Structure of the earth system
- Earth's history

NS.5-8.6 PERSONAL AND SOCIAL PERSPECTIVES

- Populations, resources and environments
- Natural hazards

NS.5-8.7 HISTORY AND NATURE OF SCIENCE

- Science as a human endeavor
- Nature of science

Grades 9-12

NS.9-12.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.9-12.4 EARTH AND SPACE SCIENCE

- Energy in the earth system

NS.9-12.6 PERSONAL AND SOCIAL PERSPECTIVES

- Science and technology in local, national and global challenges

NS.9-12.7 HISTORY AND NATURE OF SCIENCE

- Science as a human endeavor
- Nature of scientific knowledge

Source: Center for Science, Mathematics and Engineering Education (CSMEE)

INVESTIGATION NO. 2: FOG DELAY

Featuring everyday earth science

Close your eyes and imagine that your alarm clock has just started ringing, chirping or beeping. You groan and pull the covers over your head, wishing for just another hour or two of beautiful, beautiful sleep. You sigh and climb out of bed, glancing at the window on your way to the shower.

And you see a miracle. A thick, dense fog drifts outside, so thick that school has been delayed.

But you know that the fog isn't really a miracle. Fog is a dense cloud of water droplets that occurs close to the ground instead of in the sky. While you were sleeping, the night air was probably clear, cool and calm. The ground released heat absorbed during the day into the air.

All air contains a certain amount of water vapor, and warm air holds more moisture than cool air does. As the ground temperature lowered, it cooled the air above so much that water vapor condensed into droplets of liquid water, determining the dew point.

Try a simple experiment to find dew point temperature. You will need:

- A 16-ounce or larger empty metal soup or juice can with one end removed
- a thermometer
- room-temperature water
- crushed ice



The Experiment

Fill the can with about three-fourths of the water. Place the thermometer in the water and measure its temperature. Leave the thermometer in the water so you can read it as you slowly stir in a little ice. Watch the temperature fall. At some point, water will start to condense on the outside of the metal can. The temperature at which this happens is the dew point.

The next time you hear a radio or television announcer include your school in fog delays, you can better appreciate the earth science that allows you to sleep in. Even better, you can read the morning newspaper before the school bus arrives.

NIE Earth Science Links

1. Earth science is the study of the earth and its origin, structure and physical processes. Select two developing stories from the world news section of your newspaper. The datelines should be from very different parts of the world, but the situations should be similar. Follow the stories for one week. Research the “earth science” – the land forms, weather, etc. – of each location. How are people in each region behaving? Do you think the physical characteristics and processes are affecting their behavior?
2. Humidity is the amount of moisture in the air. Warm air holds more moisture than cool air. Look at this week’s weather forecast in your newspaper. Note the day with the highest projected daytime temperature for the week and the day with the lowest. Which day is likely to be more humid?
3. Earth’s surface is extremely varied and constantly changing. Depending on where you live in the world, you may look out your window and see mountains, rolling hills or relatively flat plains. Look through the “Help Wanted” advertisements in your newspaper’s classified advertising section. What jobs are available in your area that require knowledge of the physical structure and processes of your region? What is the “earth science” of your part of the world, and what jobs are common there?

Glossary of Terms

Dew point: the temperature at which air cannot store more moisture.

Humidity: the amount of water vapor in the air.

Dateline: a phrase at the start of a newspaper article that gives the place where the article originated (and sometimes the date).

LEARNING STANDARDS FOR INVESTIGATION NO. 3

Grades K-4

NS.K-4.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

NS.K-4.3 LIFE SCIENCE

- The characteristics of organisms
- Life cycles of organisms
- Organisms and environments

NS.K-4.6 PERSONAL AND SOCIAL PERSPECTIVES

- Types of resources
- Science and technology in local challenges

NS.K-4.7 HISTORY OF NATURE AND SCIENCE

- Science as a human endeavor

Grades 5-8

NS.5-8.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.5-8.3 LIFE SCIENCE

- Structure and function in living systems
- Regulation and behavior
- Diversity and adaptations of organisms

NS.5-8.6 PERSONAL AND SOCIAL PERSPECTIVES

- Populations, resources and environments

NS.5-8.7 HISTORY AND NATURE OF SCIENCE

- Science as a human endeavor
- Nature of science

Grades 9-12

NS.9-12.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.9-12.3 LIFE SCIENCE

- Biological evolution
- Interdependence of organisms
- Behavior of organisms

NS.9-12.6 PERSONAL AND SOCIAL PERSPECTIVES

- Personal and community health
- Science and technology in local, national and global challenges

NS.9-12.7 HISTORY AND NATURE OF SCIENCE

- Science as a human endeavor
- Nature of scientific knowledge

Source: Center for Science, Mathematics and Engineering Education (CSMEE)

INVESTIGATION NO. 3: EYE SPY

Featuring everyday life science

In 1880, the first halftone photograph appeared in a New York City newspaper, The Daily Graphic. This photograph was in black and white, so only black ink was needed for printing. Today, most newspapers feature at least a few color photographs. Can you imagine how many colors of ink must be housed at a newspaper to print those photographs? How many different colors do you think are required to print a color page in your newspaper?

Let's find out. If you have used paints in art class, you know colors can be combined to make other colors: blue and yellow make green; red and blue make purple; red and yellow make orange. So if the newspaper has red, blue and yellow, which are known as the primary colors, the press also can print green, purple and orange.

But what about brown, gray, white and different shades of all of the above? That's a lot of ink. Let's discover exactly how many colors of ink are needed to print just one color photograph in your newspaper. You will need:

- a page of your newspaper featuring at least one color photograph
- a strong magnifying lens



The Experiment

Select one color photograph from your newspaper page. Study it carefully and list all the colors you can see with the naked eye.

Now look much more closely. Place the magnifier directly on top of the photograph. Do you see very small dots? How many colors of ink are actually printed there?

Your newspaper does not print all colors, such as skin tones, sand or rocks. Instead, the press combines magenta, cyan, yellow and black inks to make all the colors needed. These four are called process colors. By printing dots of these four colors, slightly skewed from each other, newspaper press operators create an optical illusion of more than 3,000 colors.

White areas in a photograph are just the absence of ink. We see an optical illusion because our brain misreads signals from our eye, which tells you that you are seeing every color of the rainbow.

NIE Life Science Links

1. Humans must exercise and eat properly to maintain good health. The U.S. Department of Agriculture (USDA) has developed guidelines for doing both. You can study these when you visit www.mypyramid.gov. In your newspaper, find recipes and photos of foods that fit into each food group. Cut or print them out and use them to reproduce your own “My Pyramid” collage, following the USDA’s MyPyramid chart. The website also includes information about physical activity. Cut or print out articles and photographs of physical activity and frame your pyramid with those. But be realistic. Include only exercises and activities that you can do personally.
2. All living things need food, water, air and shelter, the basics of their habitats. But what meets those basic requirements differs for every type of living thing. A fish’s needs are extremely different from yours. Create a “Home Wanted” classified ad for a living thing other than a human. Be creative, but include all basic requirements needed for that creature.
3. Botany is the scientific study of plants. Whether you realize it or not, you rely on the work of botanists every day. As you read today’s newspaper, note all news articles involving use of some botanical material or loss of plant life (for instance, battling wildfires). Look at the display ads and note all goods and services that rely on some kind of plant for materials, medicines, etc.
4. Test your reflexes. How many boxes can you find in your newspaper’s classified ad section in five seconds?

Glossary of Terms

Life science: Any of several branches of science – such as biology, medicine, anthropology or ecology – that deal with living organisms and their organization, life processes and relationships to each other and their environments.

Halftone: A process in which varied shades are created by photographing an image through a screen to break up the image’s continuous tones into tiny, closely spaced dots and then using the resulting print to produce an engraved metal plate. The plate is then used to reproduce the original image by letterpress or offset printing.

Optical illusion: A visually perceived image that is deceptive or misleading.

Habitat: The environment in which an animal or a plant normally lives or grows.

LEARNING STANDARDS FOR INVESTIGATION NO. 4

Grades K-4

NS.K-4.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

NS.K-4.5 SCIENCE AND TECHNOLOGY

- Abilities of technological design
- Understanding about science and technology
- Abilities to distinguish between natural objects and objects made by humans

NS.K-4.6 PERSONAL AND SOCIAL PERSPECTIVES

- Science and technology in local challenges

NS.K-4.7 HISTORY OF NATURE AND SCIENCE

- Science as a human endeavor

Grades 5-8

NS.5-8.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.5-8.5 SCIENCE AND TECHNOLOGY

- Abilities of technological design
- Understandings about science and technology

NS.5-8.6 PERSONAL AND SOCIAL PERSPECTIVES

- Science and technology in society

NS.5-8.7 HISTORY AND NATURE OF SCIENCE

- Science as a human endeavor
- Nature of science

Grades 9-12

NS.9-12.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.9-12.5 SCIENCE AND TECHNOLOGY

- Abilities of technological design
- Understandings about science and technology

NS.9-12.6 PERSONAL AND SOCIAL PERSPECTIVES

- Science and technology in local, national and global challenges

NS.9-12.7 HISTORY AND NATURE OF SCIENCE

- Science as a human endeavor
- Nature of scientific knowledge
- Historical perspectives

Source: Center for Science, Mathematics, and Engineering Education (CSMEE)

INVESTIGATION NO. 4: TECH TREK

Featuring everyday science and technology

The basic everyday routine of students really hasn't changed much in 50 years. You get up, go to school and return home to complete homework. But tools you use to do the job have changed tremendously.

These days, households are often equipped with multiple televisions, CD and DVD players, computers and cell phones. What isn't accessible at home is usually available at a friend's house or a public library. The result is a sort of technological saturation. Technology has become so commonplace that it's almost invisible.

No matter how advanced computers and other forms of technology become, we should never use them as a substitute for our own basic thinking processes. Every day, you use tools developed by people a long time ago. From the chair that you are sitting on to the wheels of your bicycle, you rely on both simple and advanced technologies.

Let's get back to basics with a simple problem-solving experiment using the newspaper as construction material. You will need:

- one friend or family member
- one print edition of your newspaper
- one roll of masking tape
- two small stuffed animals (for example, Beanie Babies)
- a table fan
- a tape measure or yardstick
- a watch or clock that displays seconds

The Experiment

Using newspaper and masking tape, construct the tallest tower possible. Challenge a friend or family member to build another tower using the same materials. Each tower must be able to hold a stuffed animal as high above the ground as possible with no support from either of you.

Once the towers are built, measured for height with the stuffed animals sitting at the very top, direct the fan at one tower and turn its speed gradually from low to high. The tower must be able to withstand a side force of wind. Subject the other tower to the same test. Give points for height, strength, number of seconds or minutes that a tower can be subjected to wind, etc.

NIE Technology Links

1. It's important to play safely. This includes knowing the environment in which you will be playing. Communication technology can help you plan for all types of outdoor environmental conditions. Imagine planning for a canoe trip on a nearby

river. You must have normal water levels for a safe float. Follow the weather forecast for the week in your newspaper. Sometimes, you may read that temperature combined with wind will make the outside feel colder. This “wind chill factor” must be considered so you can dress properly. Now, log on to www.usgs.gov, the U.S. Geological Survey website, which can advise you of hazards that may exist, including real-time data about water levels on your river. If rain is in your forecast, note conditions recorded at <http://waterdata.usgs.gov> and check back on the day of your canoe trip to see whether water levels remain safe.

2. How do you get to school each morning? Do you walk, ride with a parent or friend, or use mass transportation such as a school bus? As you read through today’s regional or local news section in your newspaper, list each form of transportation mentioned or pictured. Are any listed that you have never taken? Using your list, interview your grandparent or another senior citizen in your community and note how many of these transportation modes existed when he or she was your age. Ask how he or she traveled to school each day.
3. The business section of your newspaper covers new technologies and how they affect our economy and way of life. Advances in technology are often featured there. Some are featured in the international and world news section. These include the photograph and cutline (caption) below that appeared in many newspapers on Saturday, Nov. 28, 2009.



Associated Press

Space shuttle Atlantis landed Friday at Kennedy Space Center in Cape Canaveral, Fla. Atlantis returned its seven astronauts to Earth to end an 11-day flight that resupplied the International Space Station.

Although the National Aeronautic and Space Administration's space shuttle missions have continued since April 1981, nearly every takeoff and landing result in big headlines. Why do you think that is?

Over the next several days, find two examples of new technology featured in your newspaper's business section and two others featured in the world or national news. Why are those selected in world news of greater interest to readers?

Glossary of Terms

Saturation: The condition of being full to or beyond satisfaction.

Wind chill factor: An estimated measurement of the cooling effect of air and wind, especially when applied to loss of body heat from exposed skin.

Cutline: A brief explanation of the illustration, drawing or photograph with which it appears. Also called caption.

LEARNING STANDARDS FOR INVESTIGATION NO. 5

Grades K-4

NS.K-4.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

NS.K-4.3 LIFE SCIENCE

- Organisms and environments

NS.K-4.6 PERSONAL AND SOCIAL PERSPECTIVES

- Personal health
- Types of resource

NS.K-4.7 HISTORY OF NATURE AND SCIENCE

- Science as a human endeavor

Grades 5-8

NS.5-8.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.5-8.3 LIFE SCIENCE

- Structure and function in living systems
- Diversity and adaptations of organisms

NS.5-8.6 PERSONAL AND SOCIAL PERSPECTIVES

- Personal health
- Populations, resources and environments
- Risks and benefits

NS.5-8.7 HISTORY AND NATURE OF SCIENCE

- Science as a human endeavor
- Nature of science

Grades 9-12

NS.9-12.1 SCIENCE AS INQUIRY

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

NS.9-12.3 LIFE SCIENCE

- Interdependence of organisms

NS.9-12.6 PERSONAL AND SOCIAL PERSPECTIVES

- Personal and community health
- Natural resources
- Environmental quality

NS.9-12.7 HISTORY AND NATURE OF SCIENCE

- Science as a human endeavor
- Nature of scientific knowledge

Source: Center for Science, Mathematics and Engineering Education (CSMEE)

INVESTIGATION NO. 5: Get Reading, Get Recycling ... GROW!

Featuring environmental science and personal social perspective enhancement

Maintaining a garden is a great way to get both vegetables and physical exercise. Gardening offers as effective a workout as most common exercise programs and requires some of the same elements: stretching, balance, repetition, movement and even weight training. Frequent gardeners burn calories but do not stress their bodies as much as they would while running or performing aerobics.

In addition, few life lessons are as important as planting a seed in sweet-smelling soil and witnessing the miracle of birth as the first leaves unfold. Almost any vegetable seed can sprout and grow in a container. Here's how to get started, using a print newspaper to create a seed pot. You will need:

- a piece of newspaper 1 foot square
- scissors
- seed starter mix or sterilized potting soil
- a selection of seeds

Visit http://en.wikipedia.org/wiki/Origami_techniques for basic folding instructions. Follow the folding steps on the next page to make your seed pot.

Fill two-thirds of the pot with seed starter mix or sterilized potting soil. Plant seed at the depth indicated on the seed packet. Add water until just damp. Once the seed has sprouted, the seedling may be planted in the garden, pot and all. The newspaper will act as a temporary weed block, help the plant's roots stay moist and eventually biodegrade.



The Experiment

Plant two newspaper-potted seedlings directly in your garden's soil. Use no chemicals to prevent weeds. Instead, place one layer of newspaper over the ground directly around the seedlings.

At least 10 feet away, but in the same type of soil, remove two seedlings from their newspaper pots and plant them directly into the garden plot. Use a chemical herbicide to block weeds but apply it only once, just as you applied only one layer of newspaper.

Predict how often you will need to weed around each pair of seedlings, their growth rate, plant health, etc. Record your observations as the seedlings grow and compare the results of your predictions.

NIE Environmental Science Links

1. Find and study a photograph in your newspaper of a new business, residence or housing development. What steps are being taken to check soil erosion by wind or water? Look around your community and note what steps are being taken to retain and protect soil.
2. Look through the classified ad section this week and list all "Help Wanted" ads for careers working with the environment. Include those for alternative energy workers. Now visit www.bls.gov/oco/home.htm and search for environmental

careers. What is the employment outlook for careers in environmental science? Can you find these careers in the employment section of the classified ads in your newspaper?

3. By tunneling, worms improve garden and farmland soil structure, bringing in oxygen, draining water and creating space for plant roots. Earthworms pull partly decomposed organic material from the soil for a good feast. The organic matter is then broken down further in the earthworm before being excreted as worm castings. The soil's microorganisms easily convert these into nutrients taken up by developing plants. Earthworms' burrowing action helps to improve aeration, moisture retention and water penetration. Use a print newspaper to create your own worm farm and table scraps. You can even add hair clippings!

You will need:

- a Styrofoam cooler with small ventilation holes in the lid
- one cup of soil
- enough well-shredded newspaper to fill the cooler two to three inches deep
- table scraps – finely crushed eggshells, used tea bags, fruits and vegetables, *but no meat or fat*
- a handful of red worms, found online or at a bait shop

Presoak the newspaper to provide the right amount of moisture for your farm. The newspaper should be damp, not dripping, when put in the cooler. Place all other materials in the cooler, mix gently by hand or with a large spoon and close the lid tightly. Locate the farm in a cool, dry place such as a basement.

Turn the top layer with a garden fork or barbecue tongs every two or three weeks. You will know the mixture is working when the newspaper and table scraps start to disappear and worm castings appear. Replenish these newspaper and scraps as needed.

Give your farm about a month to begin reproducing more worms to add to your garden. For more about worm farms, visit www.environment.nsw.gov.au/downtoearth/worm.htm.

Glossary of Terms:

Biodegrade: To break down naturally.

Erosion: Wearing away of the Earth's surface.

Retain: To keep or hold in a particular place or condition.

Alternative energy: A form of energy derived from a source that does not use up natural resources or harm the environment.

Employment outlook: The chance of a person landing a job in a certain field; may include how many jobs are available and needed in a certain field.

Decomposed: Broken down or disintegrated by rot.

Organic: Of, relating to or derived from living organisms.

Aeration: To supply with air or expose to circulation of air.