

## **Michigan Farm Bureau Ag in the Classroom - Connections to Michigan Content Standards**

### **4th GRADE LESSON – “Food and Fiber Products – Helping the Environment and You!”**

*Michigan Farm Bureau Promotion and Education Committee*

**This lesson meets the following science content standards for the elementary level:**

**Content Standard 1: Construct New Scientific and Personal Knowledge**

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- 1-1: Generate reasonable questions about the world based on observation.
- 1-2: Develop solutions to unfamiliar problems through reasoning, observation and/or experiment.
- 1-6: Construct charts and graphs and prepare summaries of observations.

**Content Standard 2: Reflect on the Nature, Adequacy and Connections Across Scientific Knowledge**

- 1-1: Develop an awareness of the need for evidence in making decisions scientifically.
- 1-3: Describe ways in which technology is used in everyday life.
- 1-4: Develop an awareness of sensitivity to the natural world.

**Content Standard 3: Use Scientific Knowledge from the Life Sciences in Real-World Contexts Standard 3: Use Scientific Knowledge from the Life Sciences in Real-World Contexts**

- 2-1: Compare and classify familiar organisms on the basis of observable physical characteristics.
- 5-2: Explain common patterns of interdependence and interrelationships of living things.
- 5-4: Design systems that encourage growing of particular plants or animals.
- 5-5: Describe positive and negative effects of humans on the environment.

**Content Standard 4: Use Scientific Knowledge from the Physical Sciences in Real-World Contexts Standard 4: Use Scientific Knowledge from the Physical Sciences in Real-World Contexts**

- 1-1: Classify common objects and substances according to observable attributes; color, size, shape, smell, hardness, texture, flexibility, length, weight, buoyancy, states of matter, or magnetic properties.
- 1-3: Identify properties of materials which make them useful.
- 2-1: Describe common physical changes in matter - size, shape, melting, freezing, dissolving.
- 2-2: Prepare mixtures and separate them into their component parts.

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**This lesson meets the following science content standards for the elementary level: (continued)**

**Content Standard 5: All students will explain how parts of an ecosystem are related and how they interact.**

- 1-1: Describe major features of the earth's surface.
- 1-6: Demonstrate means to recycle manufactured materials and a disposition toward recycling.
- 2-1: Describe how water exists on earth in three states.
- 2-2: Trace the path that rain water follows after it falls.
- 2-3: Identify sources of drinking water.
- 2-4: Describe uses of water.

**4TH GRADE LESSON**  
**"Food and Fiber Products - Helping the Environment and You!"**  
*Presented by*  
*Members of Michigan Farm Bureau*

<u>Materials/ Actions</u>	<u>Time Allotted</u>	
Students cover desk with newspaper	<b>2 min.</b>	<b>1. Introduce yourselves and show where you are from</b> (map or hand)
Pass out corn kernels to students	<b>10 min.</b>	<b>2. Pass out kernels of corn to all students.</b> <b>Ask:</b> <ol style="list-style-type: none"> <li>1. What is this?</li> <li>2. Why is it important?</li> <li>3. How is it used in our daily lives?</li> </ol>
List ideas on blackboard- Use bagged items		<p>As they brainstorm answers - one volunteer lists ideas on the board or chart. If answers slow down - pull an item from the kit to generate responses. Allow "think time".</p> <p>As list is completed, pull items from kit and match or add to list - be sure to tell how corn is in each product (after they guess).</p> <p>Note - product list attached.</p>

Look at cornstarch from bag  
Pass out a teaspoon of  
cornstarch to each student.  
Place on towel or newspaper.

**5 min.**

**3. Take out cornstarch as last product and pass out to students. Let them smell, taste and touch cornstarch.**

**Ask:**

1. What does it feel like?
2. What does it taste like?
3. What does it smell like?

**Explain:**

Cornstarch is a versatile corn product because it can be made into different "biodegradable" products.

Define "biodegradable" as a natural material that breaks down and returns to the soil. This is recycling.

Many years ago when the glaciers receded, they left the clear fresh water that makes up our Great Lakes as well as the many inland lakes that are found throughout Michigan. Because these are an important source of fresh water as well as a tourist attraction - it is very important that we protect the lakes from pollution, Ag-based products will help up do this.

**Pass out:**

-3 cups per group of students.  
-2 pieces of Styrofoam, corn based  
packing peanuts and shredded newspaper  
-3 stir sticks  
-1 lab sheet

**Fill** all 3 cups with an equal amount of water.

**2 min.**

**4. EXPERIMENT**

**Pass out materials for experiment.**

**Divide students into groups of 3.**

**Introduce experiment.**

**10 min.**

**5. Review experiment procedure with students - show how glasses of water have an equal amount of water.**

**Explain:**

To help you understand that Ag based products are different; we're going to have you do an experiment.

In your groups, you will be comparing Styrofoam packing peanuts; corn based packing peanuts and shredded newspaper.

All of these products are used to ship items from one place to another. You will be adding these materials to water and observing what happens.

This will show what might happen if these materials were accidentally dumped in the bay.

Collect wastewater.  
Collect cups, stir sticks to reuse.

While students measure corn pellets Styrofoam and newspaper. At signal the students add materials to cups and begin stirring. Make observation after 1 1/2 min. and again at 3 min. Student's write observations down while volunteer collects waste materials.

**Explain:**

Don't add your materials until the signal. Using your lab sheet, write predictions of what you think will happen to each material. When we say start, then add the materials to your water and stir until we say stop. Do experiment now! Then write one sentence about the experiment and put all your material into the pan we bring around.

What happened to the Styrofoam?  
What happened to the cornstarch pellets?  
What happened to the newspaper?  
Did stirring help?  
Which products are Ag-based? (corn and paper)  
What would happen if we left these products in water for several weeks?  
(newspaper would dissolve, Styrofoam would not change)

Share conclusion sentences with class. State what they saw and why. Talk about other Ag based products.

**5 min.**

Show cornstarch bags  
products

- 6. Each group reports back to class with one sentence about what happened. Discuss results and tie it to the discovery of corn's many uses - show industrial products made from corn.**

**5 min.**

Gallon jug of water - add 1-2 drops of  
of food coloring.

- 7. Talk about other "environmentally friendly" food and fiber products and show examples (see products in kits and commodity list).**

Wrap up demonstration.

**Explain:**

Farmers are careful to be good to the environment. We need to preserve our resources. One of the most important resources is water. Most of our planet is covered with water. Water found in freshwater lakes and rivers is an important drinking source for people and animals. Let me show you how limited our water supply is.

Show 1 gallon of water

Pour out 1/4 cup of water into plastic  
Cup (marked on cup)

Take 2 drops of water from 1/4 cup of water  
and put in student volunteer's hand

**Explain:**

This gallon of water represents all the water on earth.

This 1/4 cup of water represents glaciers, ice caps and all  
the freshwater in the world.

Could I have a student volunteer to hold out their hand to demonstrate just  
how little of the worlds water is available for us to use?

These 2 drops of water represent all the water in  
freshwater lakes and rivers that are available for people and animals to use.

**Explain:**

Water is an important resource and making biodegradable products from  
agriculture keeps the water clean.

Review the lesson focus: food and fiber products are friendly to the  
environment. They can be recycled to create useful products and they keep  
the land and water clean.

Thank students for their time and attention. Tell students  
they will receive a bag of materials they can take home to  
to show the experiment to their families and talk about  
what they learned.

**(For presenter information only)**

The water is in:

The oceans	97.2%
Glaciers/ice caps	2.0%
Groundwater	.62%
Freshwater lakes	.009% (like the bay)
Saltwater lakes	.008%
Atmosphere	.001% (rain/humidity)
All rivers	0001%

# COMPARISON OF PACKING MATERIALS

## 4<sup>th</sup> Grade

### Lab Sheet for Experiment

Name(s): \_\_\_\_\_  
\_\_\_\_\_

Date: \_\_\_\_\_

I. Observation about dry materials

Material A –

Material B –

Material C –

II. Prediction of what will happen:

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

III. Observations about materials after stirring (1½ min.):

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

IV. Conclusion (1 sentence please):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## LIST OF MICHIGAN GROWN COMMODITIES

This list is a partial representation of the more than 70 commercial agricultural products grown on Michigan farms. Most crops require well drained soils. Exceptions include blueberries, cranberries, and spearmint. All of which require organic soils and more moisture than other crops.

There is a minimal amount of waste in the processing of crops and livestock for consumption. Livestock is a good example of this. Bones and hooves from animals are used in piano keys, adhesive tape, collagen cold cream, bone china, photographic film and other products. Organs such as intestines are used for sausage casings, instrument strings, and surgical sutures. Unusable parts are composted and become organic matter that can be safely returned to the soil.

### Fruits/Vegetables

snap beans	potatoes
sweet corn	asparagus
blueberries	carrots
cranberries	grapes
apples	tomatoes
cherries	mushrooms
plums	peppers
apricots	pears
broccoli	strawberries
cauliflower	onions
squash	cantaloupes
cucumbers	celery
raspberries/blackberries	

### Field Crops

dry beans  
soybeans  
corn  
wheat and grains  
sugar beets  
mint  
hay  
oats  
rye  
barley

### Nursery/Floriculture

gladioli  
all potted plants (geraniums, poinsettias, other)  
bedding plants  
hanging baskets  
turf  
trees and shrubs  
cut flowers (roses, mums, other)  
dried flowers

### Trees

maple syrup  
Christmas trees  
forestry (paper, lumber, other)

### Poultry/Livestock/Dairy/Fiber

hogs  
sheep/lambs  
beef cattle  
dairy cows  
poultry  
aquaculture (fish)  
mink  
mohair  
wool  
milk and dairy products (butter, ice cream, etc.)  
eggs  
chicken/turkey  
veal calves  
llama  
ostrich

## List of Contacts for Corn-based Products:

- Golf Tees:** Gary Larrivee  
Terra Form  
P.O. Box 292  
Dalton, MA 01227  
(413) 684-9771
- For Additional Sources contact:  
Michigan Corn Growers Association  
12800 Escanaba Drive Suite B  
DeWitt, MI 48820  
(517) 668-2676  
[www.micorn.org](http://www.micorn.org)
- Packing Peanuts:** American Excelsior  
70 Cleveland Rd.  
Norwalk, OH 44857  
(800) 968-4375 ext. 226  
Fax: (419) 663-7169
- Plastic Tableware:** American Precision Plastics  
11060 Irma Drive  
Northglenn, CO 80233-3611  
(303) 457-2400
- Windshield Fluid:** Tom Meyer  
Acquainis Technologies  
12231 Manchester Road  
St. Louis, MO 63131  
(314) 822-4240
- Hydrosorb:** Steve Ayers  
Central Illinois Manufacturing Co.  
201 N. Champaign Street  
Bement, IL 61813  
(217) 678-2231  
(not corn-based)
- Biodegradable Pens:** Roatan International  
20 West 38th Street  
New York, NY 10018  
(212) 768-7538
- Biodegradable Bags:** Michigan Biotechnology Institute (MBI)  
3900 Collins Road  
Lansing, MI 48910  
(517) 336-4628 or  
(517) 336-4673

## 4<sup>th</sup> Grade Kit Packing List

### “Food and Fiber Products are Environmentally Friendly”

Based on 35 students per class

Each kit is designed for conducting 2 presentations

#### Kit materials needed

- ◆ 70 paper towel sheets (student clean-up)
- ◆ 70 small clear plastic cups (3 per group or 1 per child) – collect and reuse
- ◆ 45 pieces Styrofoam peanuts in baggies
- ◆ 45 pieces of corn peanuts in baggies
- ◆ 45 pieces of newspaper in baggies
- ◆ 35 stir sticks (rubber band and reuse)
- ◆ 1 milk jug
- ◆ 1 milk jug – cut down to collect waste water
- ◆ 1 plastic teaspoon
- ◆ 70 sheets newspaper to cover desks
- ◆ 1 trash bag for clean-up
- ◆ 70 lab sheets
- ◆ 1 bottle blue food coloring
- ◆ corn kernels (3 per student)
- ◆ assorted items made from corn (golf tees, pop, candy corn, cornmeal, etc.)
- ◆ cornstarch
- ◆ samples for industrial or alternative products from commodities – golf tees soystone, wool, etc.