

Moving Agriculture to the Classroom

Module Lesson Plans



The **BIG** Book Of Dairy

BIG BOOK OF WATER

How will people use water in your town today?



BIG BOOK OF BEEF

THE BIG BOOK OF WHEAT



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BEEF MODULE

MOVING AGRICULTURE TO THE CLASSROOM



BIG BOOK OF BEEF



 **Idaho
Farm Bureau**
The Voice of Idaho Agriculture

IDAHO FARM BUREAU



PROMOTION & EDUCATION

BEEF MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Module: Beef

Objectives: After Completion of this module, students will be able to:

1. Understand the life cycle of beef cattle
2. Understand the importance of cows.
3. Discuss where beef comes from.
4. Understand how ranchers take care of their animals
5. Understand how livestock can help with fire prevention
6. Have a basic understanding of the importance of beef byproducts

Instruction Time: 20 minutes

Resources:

Materials Provided:

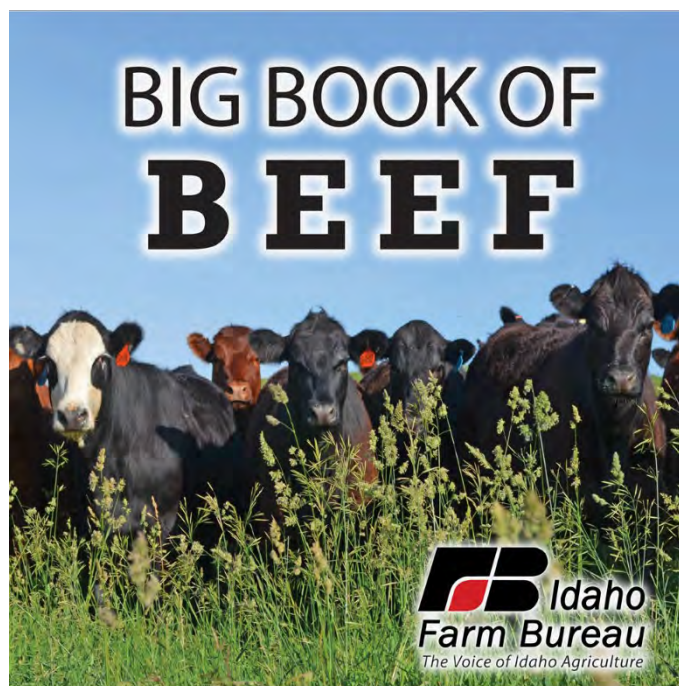
- Big Book of Water
- Easel

Materials needed:

Teaching Strategies (Content Delivery):

Objective 1: Understand what everything cattle and other livestock are used for. The teacher is encouraged to ask questions of the class to identify these facts. Set up the easel and place the Big Book of Beef on the easel, and have the students sit in front of the easel on the ground.

- **Cover Page-Big Book of Beef**
 - Turn the cover page (May have a student come up and help turn the page.)



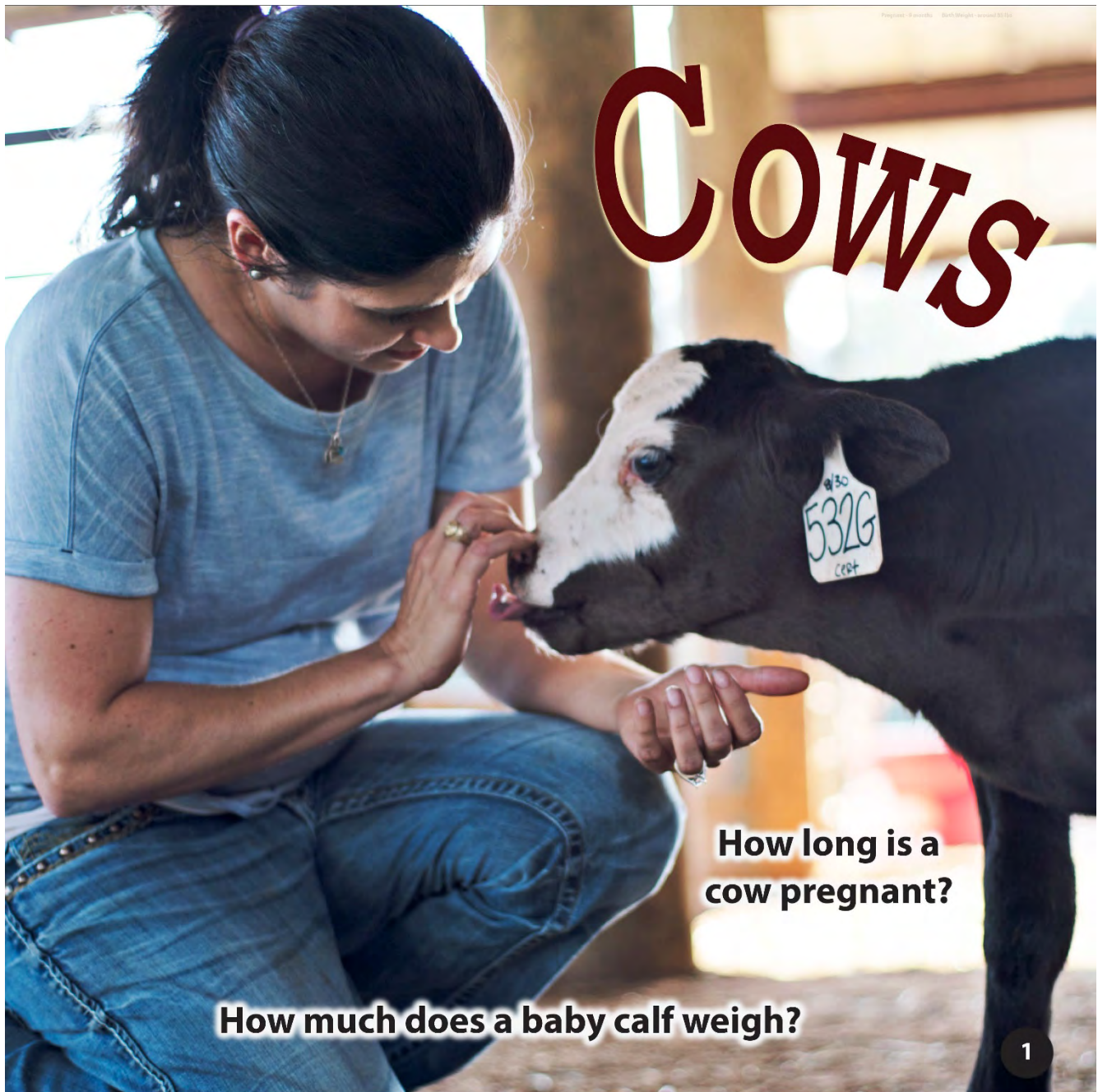
BEEF MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 2: discuss the birth of a calf.

- Page 1- Cows



- **How long is a cow pregnant?**
 - 9 months (like a human)
- **How much does a baby calf weigh?**
 - 85 pounds or between 60-100 pounds

BEEF MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 3: Show how ranchers take care of their animals

- Page 2- Health & Identification



- **Who helps take care of the cows?**
 - Rancher, cowboys, and veterinarians
- **Why do ranchers brand, vaccinate, and tag?**
 - Brands- keep the cows in the correct herd
- Vaccinations help calves from getting sick
- Tags help keep calves with their mothers.



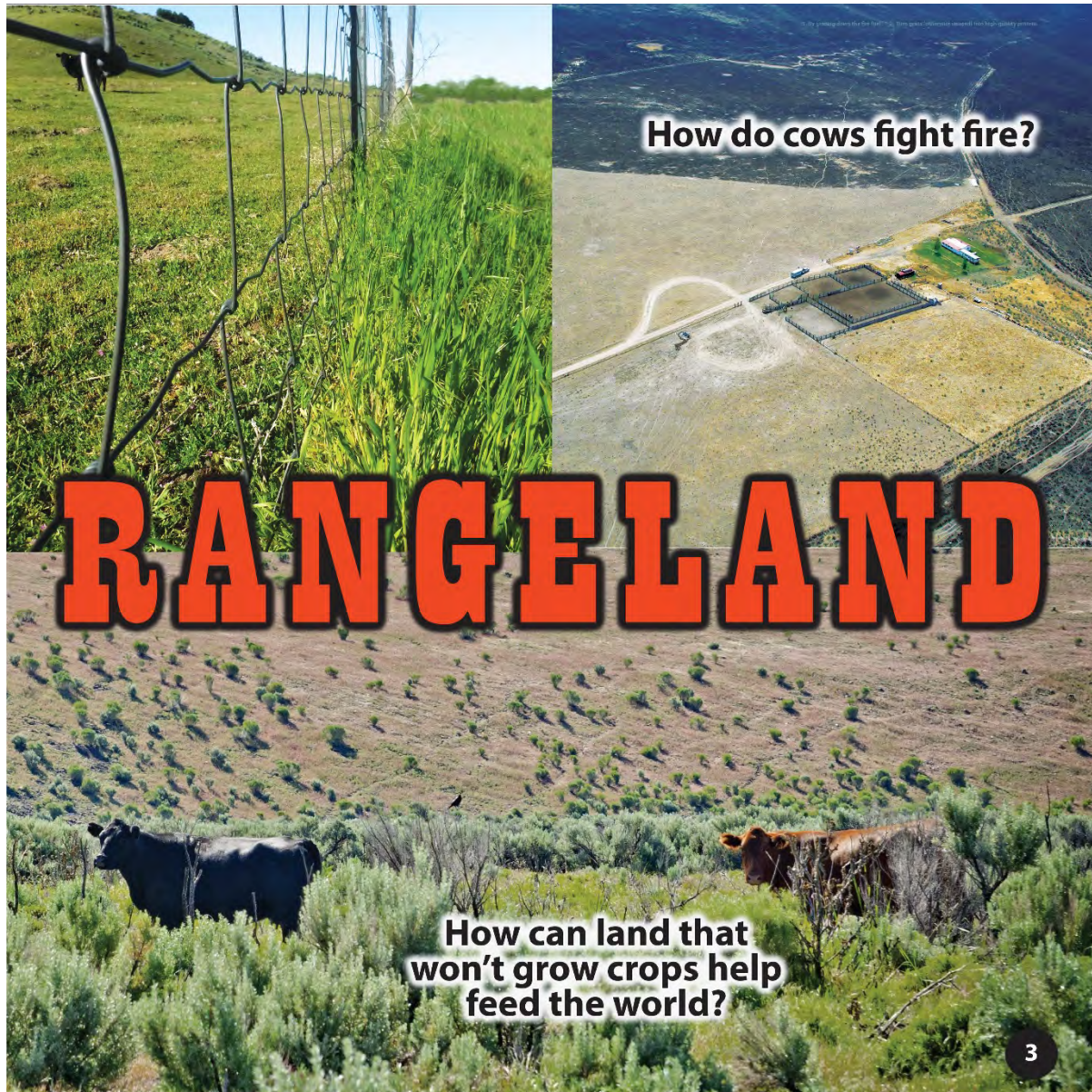
BEEF MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 4: Why do cattle spend some of their time on the range?

- Page 3-Rangeland



- **Point out the two sides of the fence in the top left. One has been grazed and one has not when those fields dry up which will be more likely to burn?**
- **How do cows fight fire?**
 - Livestock can help fight fire by eating vegetation that would otherwise become fire fuel.
- **How can land that won't grow crops help feed the world?**
 - There are many areas of the world where crops can't be grown but livestock can utilize the forage in these areas and create protein.

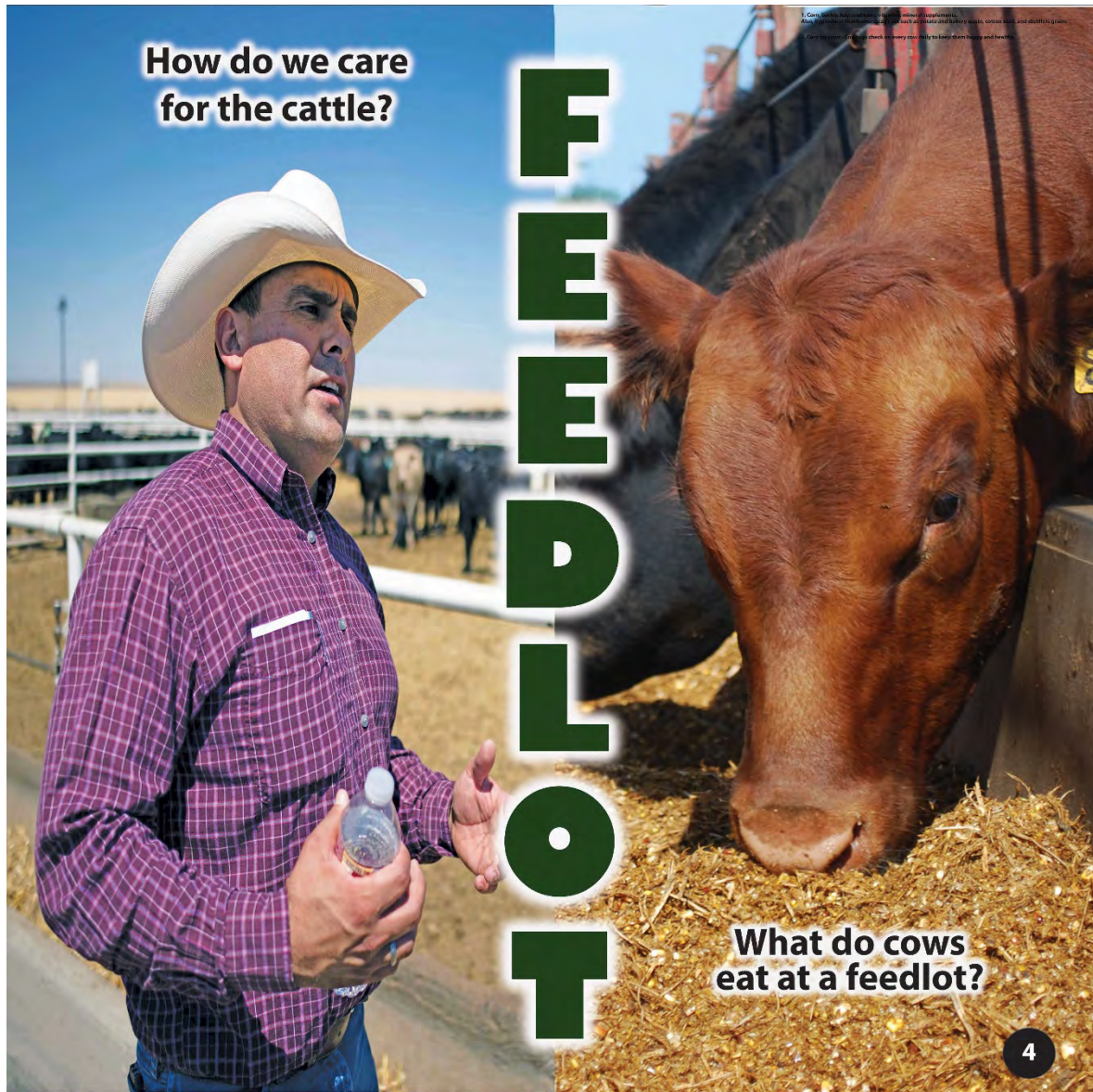
BEEF MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 5: Show how animals are cared for and kept healthy

- Page 4- Feedlot



- **How do we care for the cattle?**
 - Feedlots have cowboys who look at all the cows every single day.
 - Cows are given medicine if they are sick.
 - They are also kept comfortable with lots of food and water.
- **What do cows eat at a feedlot?**
 - Hay, corn, barley, soybean, vitamins, mineral supplements
 - Also, byproducts that humans can't eat such as potato and bakery waste, cotton seed, distillers' grains, and sugar beets pellets.
 - Most animals eat better than we do. All their meals are specially selected to help them be healthy.

BEEF MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Page 5- Processing for Food

PROCESSING FOR FOOD

CHUCK **RIB** **SHORT LOIN** **SIRLOIN** **ROUND**
BRISKET **SHANK** **PLATE** **FLANK**

How many pounds of beef can an average cow produce?

If quarter pound hamburgers were served for lunch, how many students could one cow feed?

5

- Point out the names of the commercial cuts to see if any of the students have ever heard of those cuts.
- How many pounds of beef can an average cow produce?
 - around 440 pounds of beef from each cow.
- If quarter pound hamburgers were served for lunch, how many students could one cow feed?
 - 1760 (this is a math problem if the students have been taught fractions, and multiplication)



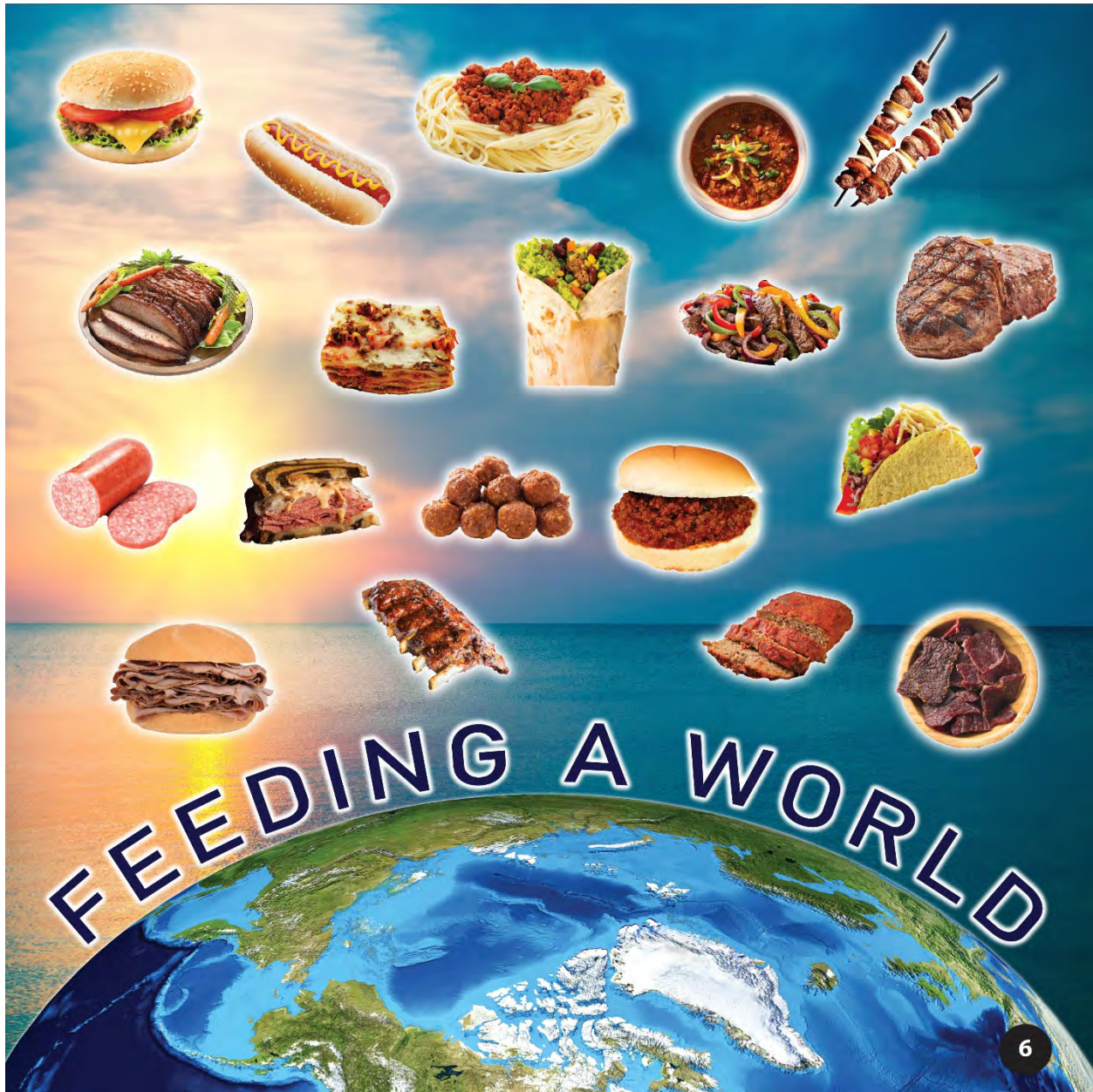
BEEF MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 6: Show all the delicious food made from beef.

- Page 6- Feeding the World



- Have students name their favorite beef meal.

BEEF MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 7: show that cows are way more than beef

- **Page 7- Byproducts**

Hair

1. Air filters
2. Brushes
3. Felt
4. Insulation
5. plaster
6. textiles

Skin

1. Gelatin
2. Flavorings
3. emery boards
4. Sheetrock
5. Wallpaper
6. Adhesives
7. Medicines
8. Candles
9. Confectionary

Brain

1. Anti aging cream
2. Medicines

Internal Organs

1. Instruments strings
2. Tennis racquet strings
3. Hormones
4. Enzymes
5. Vitamins
6. Other medical materials

Bones

1. Refined sugar
2. Charcoal
3. Fertilizer
4. Glass

Blood

1. Pasta
2. imitation eggs
3. Cake mixes
4. Dyes and inks
5. Adhesives
6. Minerals
7. Medicines
8. Laboratory research materials

Milk

1. Adhesives
2. Plastics
3. Cosmetics
4. Medicines

Fat

1. Chewing gum
2. Candles
3. Detergents
4. Fabric softener
5. Deodorant
6. Shaving cream
7. Perfume
8. Pet food
9. Cosmetics
10. Creams and lotions
11. Crayons
12. Paint
13. Oils and lubricants
14. Biodiesel
15. Plastics
16. Waterproofing agents
17. Cement
18. Ceramics
19. Chalk
20. Explosives
21. Fireworks
22. Matches
23. Fertilizer
24. Antifreeze
25. Insulation
26. Linoleum
27. Rubber
28. Textiles
29. Medicines

Manure Fertilizer

1. Nitrogen
2. Phosphorous

Hooves/ Horns

1. Adhesives
2. Plastics
3. pet food
4. Plant food
5. Shampoo and conditioner
6. Emery boards
7. Lamination
8. Wallpaper
9. Plywood

- **Work the student through the lists to show everything that we get from cows that isn't meat.**
 - Sports equipment, shoes, tires, fertilizer, medicine, cement, makeup, tape, gum, shampoo, glass, and fireworks just to name a few.



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DAIRY MODULE

MOVING AGRICULTURE TO THE CLASSROOM



The BIG Book Of Dairy

IDAHO FARM BUREAU



PROMOTION & EDUCATION

DAIRY MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Module: Dairy

Objectives: After Completion of this module, students will be able to:

1. Understand how milk is produced
2. Have a current knowledge of the importance of the Dairy Industry in Idaho.
3. Milk Maggie the cow
4. Make butter or Ice Cream

Instruction Time: 50-60 minutes

Resources:

Materials Provided:

- Maggie the cow.
- Big Book of Dairy
- 2-Aluminum Easels
- Instructions on the process to make butter
- Instructions on the process to make Ice Cream
- Plastic cups and lids to make the Butter in
- Plastic baggies to make Ice Cream

Materials needed:

- Water
- For Ice Cream: Cream $\frac{1}{2}$ and $\frac{1}{2}$, Vanilla, Ice, Rock Salt
- For Butter: Heavy Cream
- Round Ritz Crackers for butter. Optional
- Hand Sanitizer

Teaching Strategies (Content Delivery):

Objective 1: Identify the basic steps in which Milk is produced. The teacher is encouraged to ask questions of the class to identify these facts. Place Maggie in front of the group to encourage participation. Set up both easels side by side and place the Big Book of Dairy on the easel on the right when looking at it from the front. (*Time: 15-20 minutes for objectives 1 and 2*).

- Cover Page-Big Book of Dairy. Turn the cover page to the opposite easel. (May have a student come up and help turn the page.)

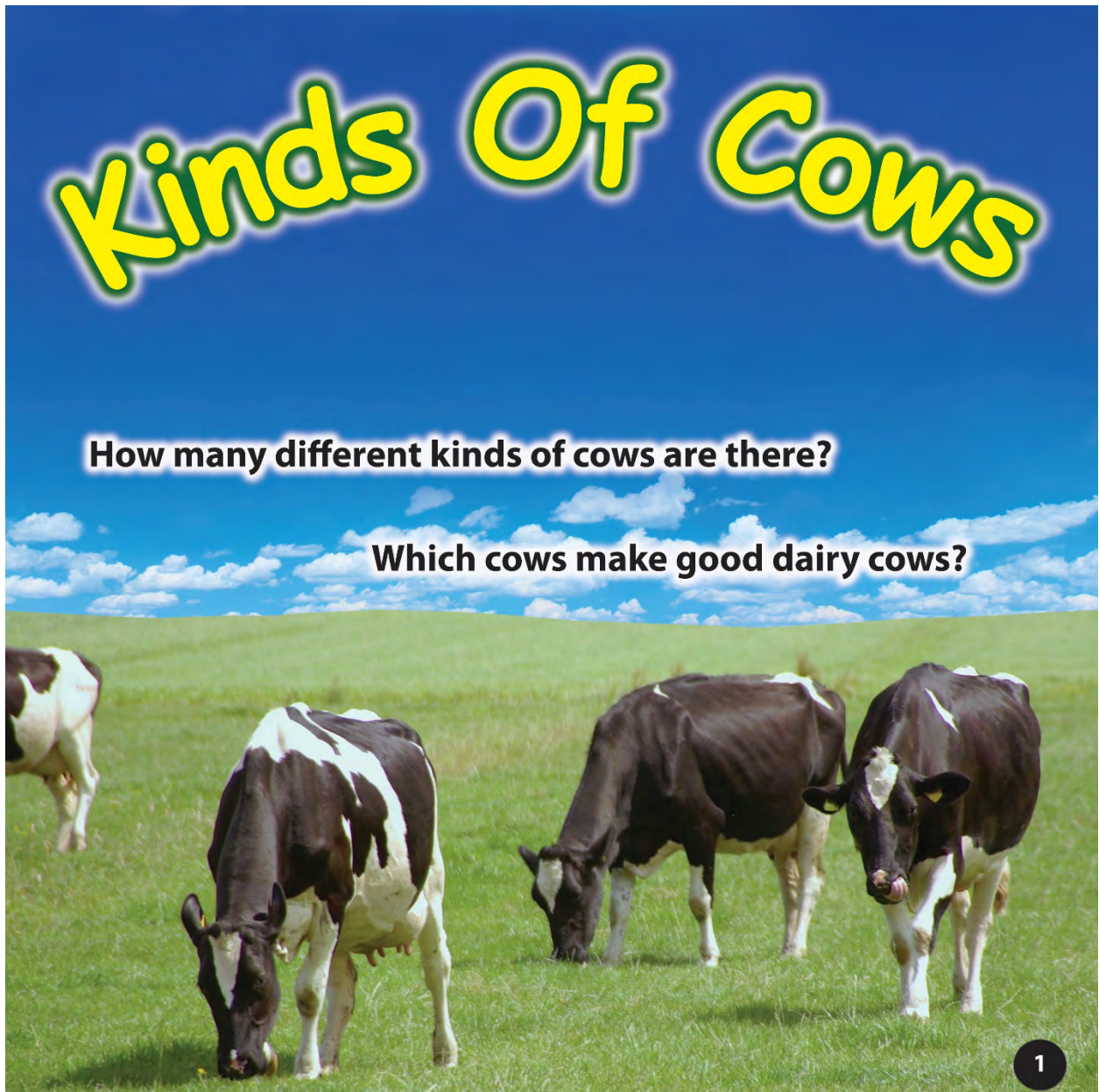


DAIRY MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Page 1-Kinds of Cows



- **How many different kinds of cows are there?**
 - There are basically two types of cows-Beef and Dairy. Beef we use for meat and dairy for milk. There are hundreds of breeds of cattle
- **Which cows make good dairy cows?**
 - There are many breeds of dairy cows. (Holstein, Jersey, Guernsey, Brown Swiss, and Milking Shorthorn are the most common breeds of dairy cows) Maggie or Molly is a Holstein. Holsteins are black and white or sometimes red and white. Holsteins are noted for their ability to produce large amounts of milk.

DAIRY MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Page 2-Feeding Time



- **How many pounds of food does a cow eat in a day?**
 - Maggie eats about 20-30 pounds of grain each day.
 - Maggie eats about 30-35 pounds of hay each day.
- **Gallons of Water?**
 - Maggie drinks about 35 gallons of water each day. This will vary depending on the season and type of feed they are eating. If the feed is really dry they will need to drink more.
- **What do cows like to eat?**
 - Hay, Grass, Grain, Corn, Silage, etc.



- Page 3-Animal Care



- **What do cows need to be comfortable?**
 - Straw or sand to lie on. Loafing shed to keep the rain and snow off or to keep the sun off. A dairy farmer will clean their stalls and pens to keep them clean.
- **Who helps take care of the animals?**
 - The dairy farmer will take care of the animals themselves and/or hire someone to care for the animals. Sometimes a dairy cow will get sick and need to be doctored. If the dairy farmer can't figure out what medicine to give the cow, they can call a veterinarian to come and doctor the cow.

DAIRY MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Page 4-Milking

Milking

How do you get milk out of a cow?

How much milk can a cow produce in one day?

4

- **How do you get milk out of a cow?**
 - For a cow to produce milk she must first have a calf. Once she has a calf then she can be milked. The calf is bottle fed. The cow can then be milked by hand or put a milking machine on the udder. Before you attach the milking machine you would clean each teat. Then you would attach the milkers. It takes about 7-10 minutes for the milkers to milk a cow. While the cow is being milked they get to eat grain. When the cow is done being milked they are let back out of the barn.
- **How much milk can a cow produce in a day?**
 - Cows must be milked at least 2 times a day. Some dairies milk their cows 3 to 4 times per day. Each cow produces between 7 and 9 gallons of milk a day. That is between 60 and 100 pounds of milk. That can be made into 2.6 pounds of butter or 6-7 pounds of cheese.



DAIRY MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Page 5-Transporting

Transporting

Where does milk go before going to the store?

How many products can you name that come from milk?

5

- **Where does milk go before going to the store?**
 - Once the milk is taken out of the cow, it is then put into a refrigerated tank where it is stored until a milk truck picks it up. The milk truck transports the milk to a plant to be processed into many different dairy products.
- **How many products can you name that come from milk?**
 - Cheese, Swiss Cheese, Yogurt, Sour Cream, Ice Cream, Cream Cheese, Cottage Cheese, Chocolate Milk, etc.



DAIRY MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Page 6-Milk Products



- This page has pictures of dairy products.



DAIRY MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Page 7-Back Page



- **When does the dairy close down for the day?**
 - Dairy farmers don't get to take vacations for Christmas, birthdays, or other holidays unless they hire someone to work for them. Cow must be milked everyday all year round. Most dairies milk around the clock and only have a half hour to an hour to clean the milking parlor.

DAIRY MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 2: (Optional-If time allows) Teach students the importance of Dairy industry in Idaho

- Idaho has 574,000 milk cows
- Milk production cash receipts has surpassed Potatoes as Idaho's most valued crop
- Idaho is ranked 3rd in the US in milk production
- Idaho is ranked 3rd in the US in Cheese production

Objective 3: Milk Maggie. (*Time: 10-15 minutes*)

- Bring each student one at a time up to the cow and allow them to milk Maggie. Maggie needs to have water, about 1gallon, poured into bucket and plugged in in order to recirculate milk. If more than a gallon is put in the bucket, the water will leak onto the floor. Have the students use hand sanitizer after they are done milking the cow.

Objective 4: Make Ice cream or Butter (*Time: 15-20 minutes*)

- Making Butter
 - You can make butter from cream within 5 minutes. Students will learn where butter comes from, a little bit of science, and gain first-hand experience in making some.
- Pre-instructions:
 - It takes less time if the cream is about room temperature. This helps to start the process of changing the cream into butter. You can still make butter with cream taken directly from the refrigerator, but it will take longer for it to turn into butter. Also, it will have less of the taste butter normally has.
 - Set out the small plastic Dixie cups. Fill the cup about 1/3 full with heavy whipping cream. (If you fill it to full there is not enough room for the heavy whipping cream to be shook and won't make butter). Snap the lid securely into place. Wrap the closed cup with a paper towel.
- Butter making rules
 - Do not squeeze the container
 - Do not open the container. When you have a lump of butter that you can see ... wait. The teacher will open the container and drain the butter when everyone is done.
 - Everyone will shake their containers at the same time. Do not start until everyone is ready.
- Begin
 - Pass out the containers and have the student shake them.
 - Have the students recite a chant, sing a song or discuss the science while they are shaking.
 - If your cream is at room temperature, it will take less than 5 minutes to make the butter.
 - The teacher or helpers should drain and replace the lids on all containers.
 - Have the students sit at tables. Pass round ritz crackers.
 - Students can dip the cracker into the container to get the butter on each cracker (salted and unsalted) and have a taste test.



DAIRY MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Most kids know that milk comes from cows. But perhaps they don't know that butter is made from milk. When cows are freshly milked, the cream separates from the liquid. The cream floats to the top and is skimmed off. It is this cream that butter is made from. In our experiment, we use store bought cream.
- Discuss how cows help us. Brainstorm and make a list of dairy products (milk, cheese, yogurt, ice cream, sour cream, and butter). You could also include food items that have a lot of dairy products in them (pudding, mac & cheese, etc.)
- Discuss how butter is made. The cream contains many fat cells. Bacteria in the cream eat away at the lining or membrane of the fat cells, weakening them and forming Lactic Acid. This Lactic Acid causes the fat to crystallize and form sharp edges which helps the butter clump together.
- Shaking and sloshing the cream against the sides, top, and bottom of the container burst more of these fat cell membranes and cause the fat to separate from the liquid and clump together. The more you shake, the more the fat clumps together.

You may notice that your finished homemade butter may not be as yellow as store bought butter. (Some butter manufacturers add yellow coloring to their butter.) The yellow coloring in organic butter depends on the diet of the cow which the cream came from. Cows eat grass for food. Grass contains Carotene which gives butter its yellow color. So, if your butter has a deep yellow color, then the cow ate lots green of grass



ICE CREAM IN A BAG

MOVING AGRICULTURE TO THE CLASSROOM



Ice Cream in a Bag

Supplies:

- Sealable Plastic Bags: sandwich and gallon
- Cream (Half & Half, you could also use milk) (1/2 cup)
- Sugar (1 tablespoon)
- Vanilla (1/4 teaspoon)
- Ice
- Rock Salt

Procedure:

1. Divide students into pairs.
2. Each student received a sandwich bag and a gallon size bag.
3. Place **½ cup cream, 1 tablespoon sugar and ¼ teaspoon vanilla** in the sandwich bag. Press air out of the bag and seal it securely.
4. Fill the gallon size bag with ice cubes. Add **¼ cup rock salt** (table salt will work but not as well)
5. Place the smaller bag into the larger bag and seal up the whole thing.
6. Knead the bags for about 5 minutes or until ice cream forms.
7. If the mixture is till soupy after 5 minutes, the temperature may not be cold enough. Drain the excess water, add more salt and ice, and knead until firm.
8. Now the best part, eating up all that hard work.

Makes about 1 scoop of ice cream.

Who invented ice cream?

- Legend has it that the Roman emperor, Nero, discovered ice cream. Runners brought snow from the mountains to make the first ice cream. In 1846, Nancy Johnson invented the hand-cranked ice cream churn and ice cream surged in popularity. Then, in 1904, ice cream cones were invented at the St. Louis World Exposition. An ice cream vendor ran out of dishes and improvised by rolling up some waffles to make cones.

What does the salt do?

- Just like we use salt on icy roads in the winter, salt mixed with ice in this case also causes the ice to melt. When salt comes into contact with ice, the freezing point of the ice is lowered. Water will normally freeze at 32 degrees F. A 10% salt solution freezes at 20 degrees F, and a 20% solution freezes at 2 degrees F. By lowering the temperature at which ice is frozen, we are able to create an environment in which the milk mixture can freeze at a temperature below 32 degrees F into ice cream.



EARTH AS AN APPLE

MOVING AGRICULTURE TO THE CLASSROOM



IDAHO FARM BUREAU



PROMOTION & EDUCATION

EARTH AS AN APPLE

MOVING AGRICULTURE TO THE CLASSROOM



**Idaho Farm Bureau adapted this lesson plan from other various Earth As An Apple Lesson Plans.*

Module: Earth as an Apple

Objectives: After completion of this module, students will be able to:

1. See how much of the earth is available for farming
2. Have knowledge of urban expansion and growing population
3. New ways to grow food (urban ag, vertical farming, GMO, aquaculture, Precision ag)
4. Eat some apples

Instruction time: 20

Materials provided:

- Earth as an apple
- Instructions on process
- Easel

Materials needed:

- Apples
- Hand sanitizer
- Knife

Teaching Strategies:

Objective 1: How much of the earth is available for farming.

1. Hold apple up and “this apple represents our planet earth”
2. Cut apple into quarters. Hold up $\frac{3}{4}$ in one hand. Ask class what do these $\frac{3}{4}$ represent?
3. WATER – $\frac{3}{4}$ of the earth is covered in water: oceans, lakes, and rivers
4. $\frac{1}{4}$ of the planet is land.
5. Cut the “land” $\frac{1}{4}$ in half. Hold one of the pieces. This represents uninhabitable land. (polar regions, deserts, swamps, and rocky or high mountains)
6. The other $\frac{1}{8}$ is habitable land, where people can live.
7. Cut $\frac{1}{8}$ into 4 equal pieces. Hold up 3 of the 4. “these $\frac{3}{32}$ represent land people can live on but not grow food. Some of the land was never able to grow crops because it was too rocky, wet, steep, cold, or has soil that was too poor to grow crops. Some of it was arable but isn’t any longer because it has been developed into cities, houses, or highways. Other land has been turned into parks, nature preserves or public lands.
8. The final $\frac{1}{32}$ has the potential to grow the food needed to feed all the people of the earth.
9. Carefully peel the $\frac{1}{32}$ this tiny bit represents the topsoil.



EARTH AS AN APPLE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 2: urban expansion and growing population

1 billion	1804	
2 billion	1927	123 years
3 billion	1960	33 years
4 billion	1974	14 years
5 billion	1987	13 years
6 billion	1999	12 years
7 billion	2011	12 years
8 billion	????	????

- Where do all these people live? Where will the next billion live?
- How big is a billion?
 - 1 billion dimes stacked would reach 830 miles (Pocatello to Disneyland)
 - 1 billion seconds = 32 years
 - 1 billion minutes = 1900 years ago

Objective 3: other options for feeding the world.

- People can grow food in new ways using new technology. In cities, in water, and the conventional way with new technology. All are the correct answer, and all will be needed in the future to feed the world.

EARTH AS AN APPLE



MOVING AGRICULTURE TO THE CLASSROOM

Objective 4: eat your apple and be happy - apple facts

- US grows the second most apples in world. Idaho is 10th in apple production in america
- 1774 – 1845 Johnny apple seed planted apples all over Ohio and Indiana teaching people about apples and care for orchards
- Farmers and ranchers make up less than 2% of the US population One U.S. farm feeds 168 people
- The U.S. share of the world production:

Corn	36%
Soybeans	34%
Beef	19%
Milk	16%
Cotton	14%
Wheat	8%
Apples	7%

- Precision agriculture is used by about 60% of farmers and ranchers
 - GPS and auto steering work together to help farmers identify exactly where to plant seed, how many, how much pesticide or fertilizer and much more.

- Idaho national ranking:

Potatoes	1
Austrian winter peas	1
Barley	2
Alfalfa hay	2
Sugar beets	2
Prunes and Plums	3
Hops	3
Mint	3
Trout	1
Milk	3
Cheese	3

- Idaho produces 185 commodities from 24,400 farms and ranches.
- If Idahoans had to eat all we produced. Every day we would have to eat:

195 slices of bread
49 potatoes
2 onions
2 lbs. of cheese or 42 glasses of milk
1.5 lbs. of beef 3 cups of beans and more.



WATER MODULE

MOVING AGRICULTURE TO THE CLASSROOM



BIG BOOK OF WATER

**How will people use water
in your town today?**



IDAHO FARM BUREAU



PROMOTION & EDUCATION

WATER MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Module: Water

Objectives: After Completion of this module, students will be able to:

1. Understand what water is used for.
2. Understand the importance of water.
3. Discuss where water comes from.
4. Discuss the purposes of man-made reservoirs.
5. Understand how water gets from reservoirs to crop fields.
6. Understand how water gets from an aquifer to various locations.
7. Have a basic understanding of the importance of water to the future of Idaho citizens and communities.

Instruction Time: 40-50 minutes

Resources:

Materials Provided:

- Rolling Water Module
- Big Book of Water
- 2-Easels

Materials needed:

- Distilled Water-1 ½ gallons

Teaching Strategies (Content Delivery):

Objective 1: Understand what water is used for. The teacher is encouraged to ask questions of the class to identify these facts. Set up both easels side by side and place the Big Book of Water on the easel on the right when looking at it from the front. **(Do not have the water module to where the kids can look at it while looking at the book. Only fill the reservoir under the case to the fill line with distilled water.)**

WATER MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- **Cover Page-Big Book of Water**



- **What are the different uses of water?**
 - Answers can include: drinking, bathing, cooking, watering plants/lawns, animals, fishing, water-skiing, etc.
- Turn the cover page to the opposite easel. (May have a student come up and help turn the page.)



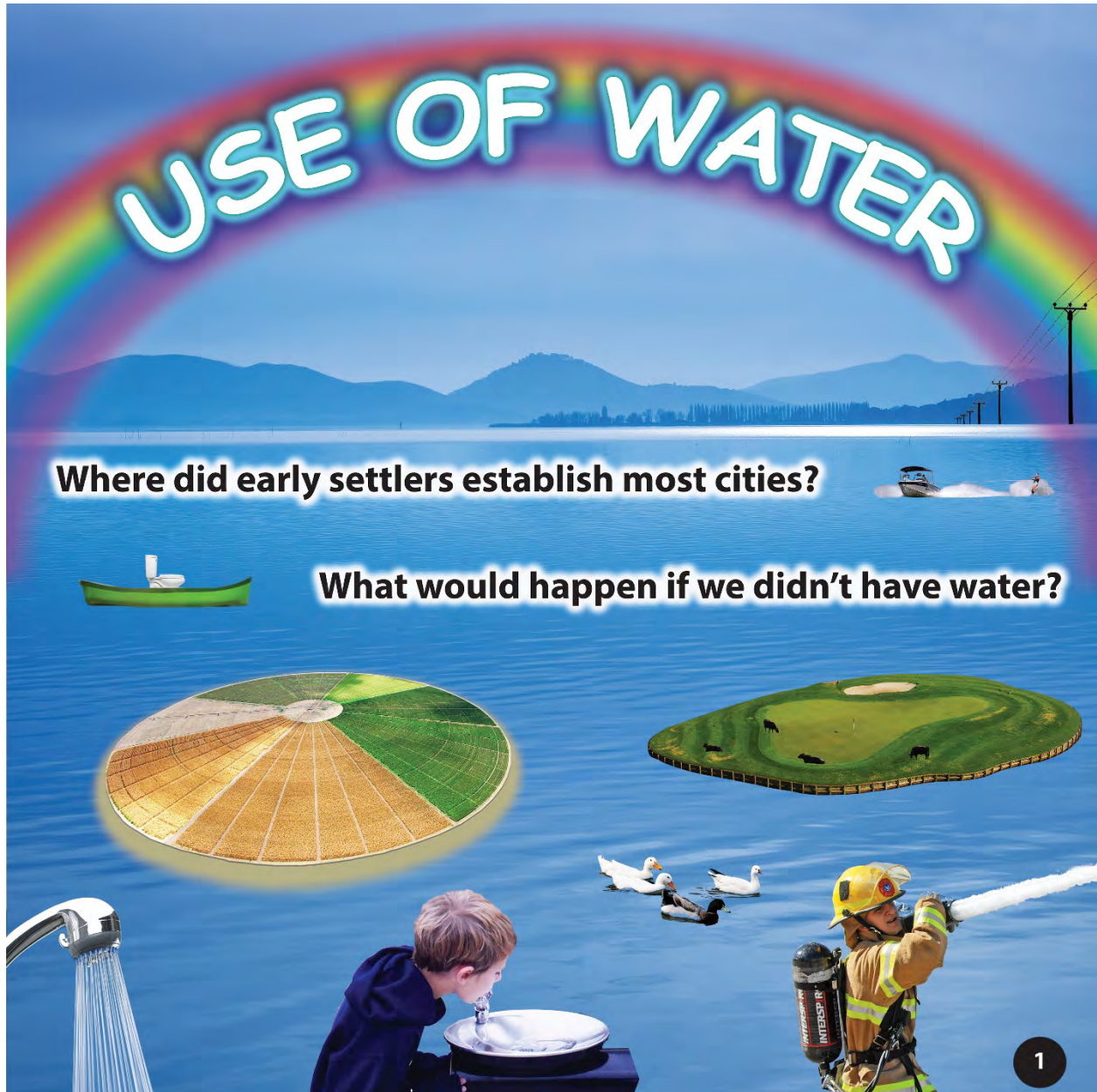
WATER MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 2: Understand the importance of water.

- Page 1-Use of Water



- **What are some occupations that need water?**
 - Fire fighter, farmer, navy, hydrologist, power generation, etc.
- **What would happen if we didn't have water?**
 - Food wouldn't grow, no showers, nothing to drink, die, etc.



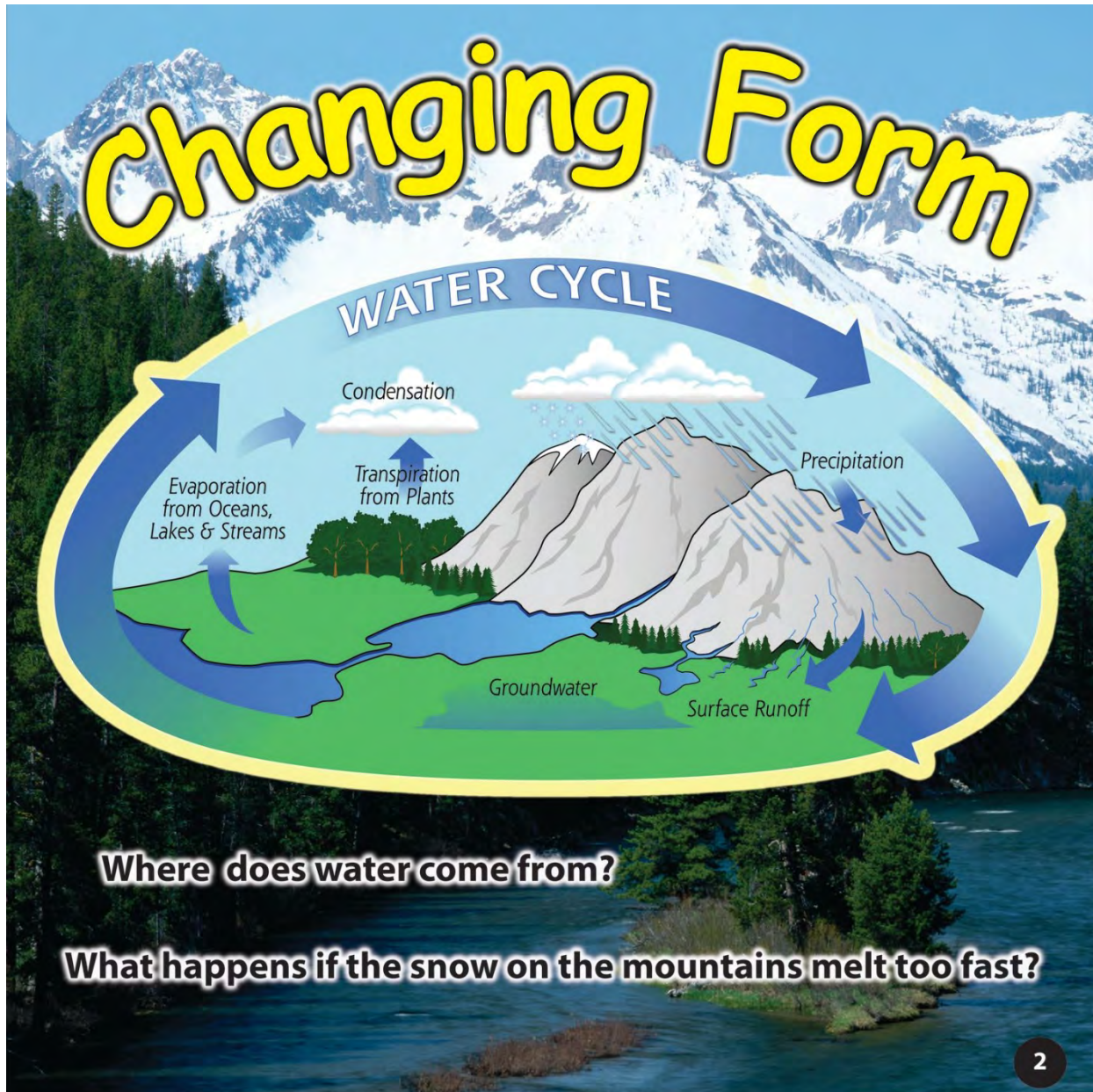
WATER MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 3: Discuss where water comes from.

- Page 2-Changing Form



Where does water come from?

What happens if the snow on the mountains melt too fast?

- **Where does water come from?**
 - Discuss the water cycle.
 - Clouds carry moisture over land. Rains or snows depending on temperature. If cold snow lands on mountains. Snow accumulates. As temperature rises snow begins to melt in the spring. Water runs down off the mountains into streams, rivers, and lakes.
- **What happens if the snow on the mountains melts to fast?**
 - If the snow melts to fast the streams, rivers, and lakes can flood.



WATER MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 4: Discuss the purposes of man-made reservoirs.

- Page 3-Extremes



- **Where were most cities developed in the old days?**
 - Along rivers for water and transportation. People didn't have pumps to get water far away from rivers to take care of animals and crops so they built towns close to rivers. Flooding can occur if snow melts too fast.
- **What happens if the summer has little to no rain?**
 - Crops, lawns, golf courses, can dry up and die. The crops that have been planted need to be watered till they are harvested. Without rain they will die. Animals can die as well.
- **What can we do to help these situations?**
 - Communities built reservoirs/dams to hold water for storage and flood control.

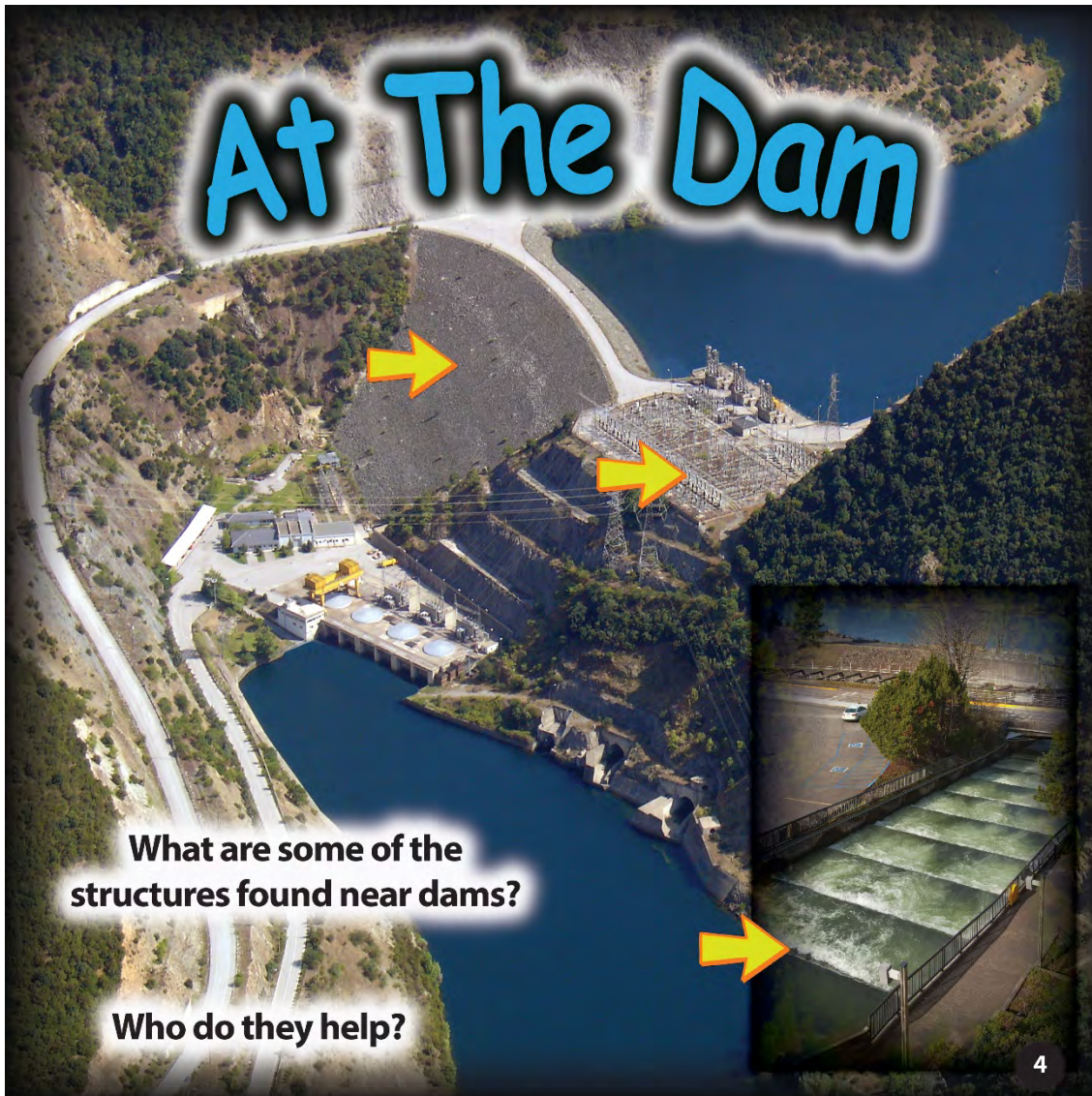
Have the group then go to the water module. Turn the water module on. You can discuss water melting out of the mountains too fast and adjust the valves to flood the town. **If the reservoir under the module is filled past the fill line it will not work properly.** Let it flood the town. Then have the group go back and sit down in front of the book and discuss page 4.

WATER MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Page 4-At The Dam



- **What are some of the structures found near dams?**
 - The dam
 - Spill way
 - Fish Ladder
 - Hydro-electric turbines
- **Who do they help?**
 - The dam-hold back water for storage, recreation, etc.
 - Spill way-used to allow water past for flood control and raising and lowering the level of the reservoir.
 - Fish Ladder-allows fish to return upstream to spawn.
 - Hydro-electric turbines-electrical generation for supplying towns and cities with electricity.



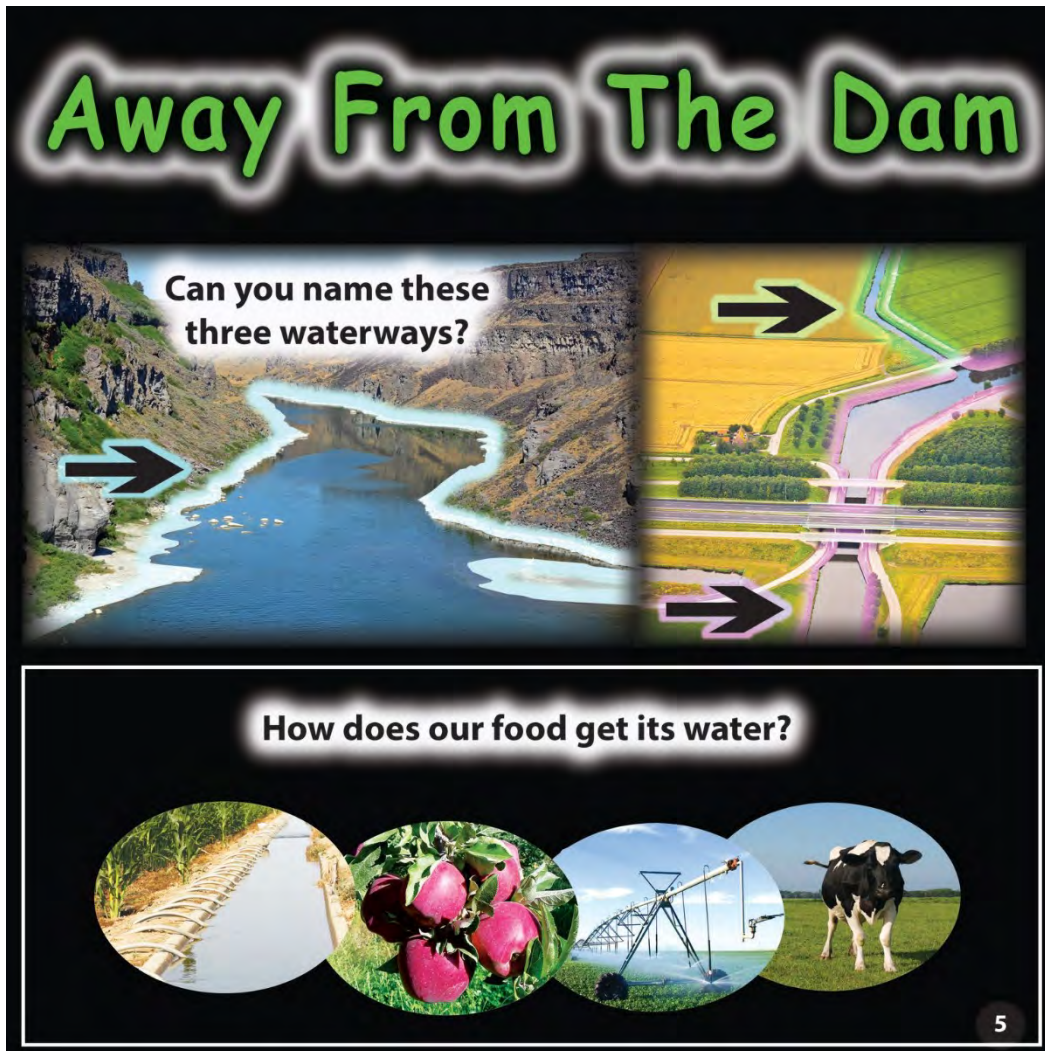
WATER MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 5: Understand how water gets from reservoirs to crop fields.

- Page 5-Away From The Dam



- **Can you name these three waterways?**
 - River-blue outline
 - Canal-pink outline (man-made)
 - Ditch-greenish-yellow outline (man-made)
- **How does our food get its water?**
 - Water flows from reservoirs through rivers to man-made canals and then into man-made ditches to fields to water crops. Crops in the fields then take up water through their roots. Many fields are far away from rivers or canals and have to get water from pivots that get their water from underground.

Have the group then go to the water module. Turn the water module on. You can discuss the parts of the dam. The dam, reservoir, spillway, fish ladder, hydro-electric turbines. Then have the group go back and sit down in front of the book and discuss page 6.

WATER MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 6: Understand how water gets from an aquifer to various locations.

- Page 6-A Giant Lake Hidden In Idaho

**A GIANT LAKE
HIDDEN IN IDAHO**

What do people do if they live far from rivers?

**What is the underground
lake called under Idaho?**

**How does the water go in and
how does it come out?**

6

The graphic features a topographic map of Idaho on the left, with a large blue area representing a hidden lake. To the right is a glass of orange juice with a red straw. The background is a light blue sky with white clouds. The number '6' is in a small black circle at the bottom right of the graphic.

- **What do people do if they live far from rivers?**
 - They have to drill wells and pump water to homes and fields.
- **What is the underground lake under Idaho called?**
 - The underground lake is called an aquifer. It is like a giant rock sponge underground.
- **How does the water go in and how does it come out?**
 - The water goes into the aquifer through people flood irrigating, through soaking through the ground, some spots in rivers disappear and the water goes underground.
 - The water comes out of the aquifer through wells pumping the water out. It is like putting a straw in a glass and sucking the water out. If we just keep sucking the water out and never putting any back in what will happen.
 - The water naturally comes out of the aquifer at a place called Thousand Springs around the Twin Falls area on the Snake River

WATER MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 7: Have a basic understanding of the importance of water to the future of Idaho citizens and communities.

- Page 7-Water In The News

WATER in the NEWS

What water topics will be discussed in your future?

Idaho Farm Bureau
The Voice of Idaho Agriculture

7

- **What water topics will be discussed in your future?**
 - You can talk about water calls, future growth, how it affects agriculture, water curtailments, etc. Each area has its own water problems and challenges. Help the students and teachers realized this isn't just a problem for farmers and ranchers. Everyone needs water to survive. This will continue to be a big issue for all Idaho residents.



WHEAT MODULE

MOVING AGRICULTURE TO THE CLASSROOM



THE BIG BOOK OF WHEAT



IDAHO FARM BUREAU



PROMOTION & EDUCATION

WHEAT MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Module: Wheat

Objectives: After Completion of this module, students will be able to:

1. Identify the basic steps in which wheat is planted, grown, harvested, and processed.
2. Identify food products that are made from wheat.
3. Grind wheat kernels into flour.
4. Mix and observe whole wheat flour made into pancakes.

Instruction Time: 50-60 minutes

Resources:

Materials Provided:

- Giant Book of Wheat
- Oversized Easel
- Bucket of Whole Wheat
- Hand Wheat Grinders (2 students/grinder)
- Paper Bowls (1 bowl/grinder)
- 2 Mixing Bowls
- Mixing Utensil
- Bag of Krustez Pancake Mix
- Electric Pancake Griddle
- Pancake Turner
- Paper Plates
- Plastic Forks and Knives

Materials needed:

- Water
- Syrup or Jam
- Butter
- Hand Sanitizer
- *Note: this activity is not gluten free. Plan accordingly for students that are gluten intolerant.*

Teaching Strategies (Content Delivery):

Objective 1: Identify the basic steps in which wheat is planted, grown, harvested, and processed.

(Time: 15 minutes for objectives 1 and 2)

- Place the *Giant Book of Wheat* on the easel. Open the *Giant Book of Wheat* to the first page that says "Planting".

WHEAT MODULE

MOVING AGRICULTURE TO THE CLASSROOM



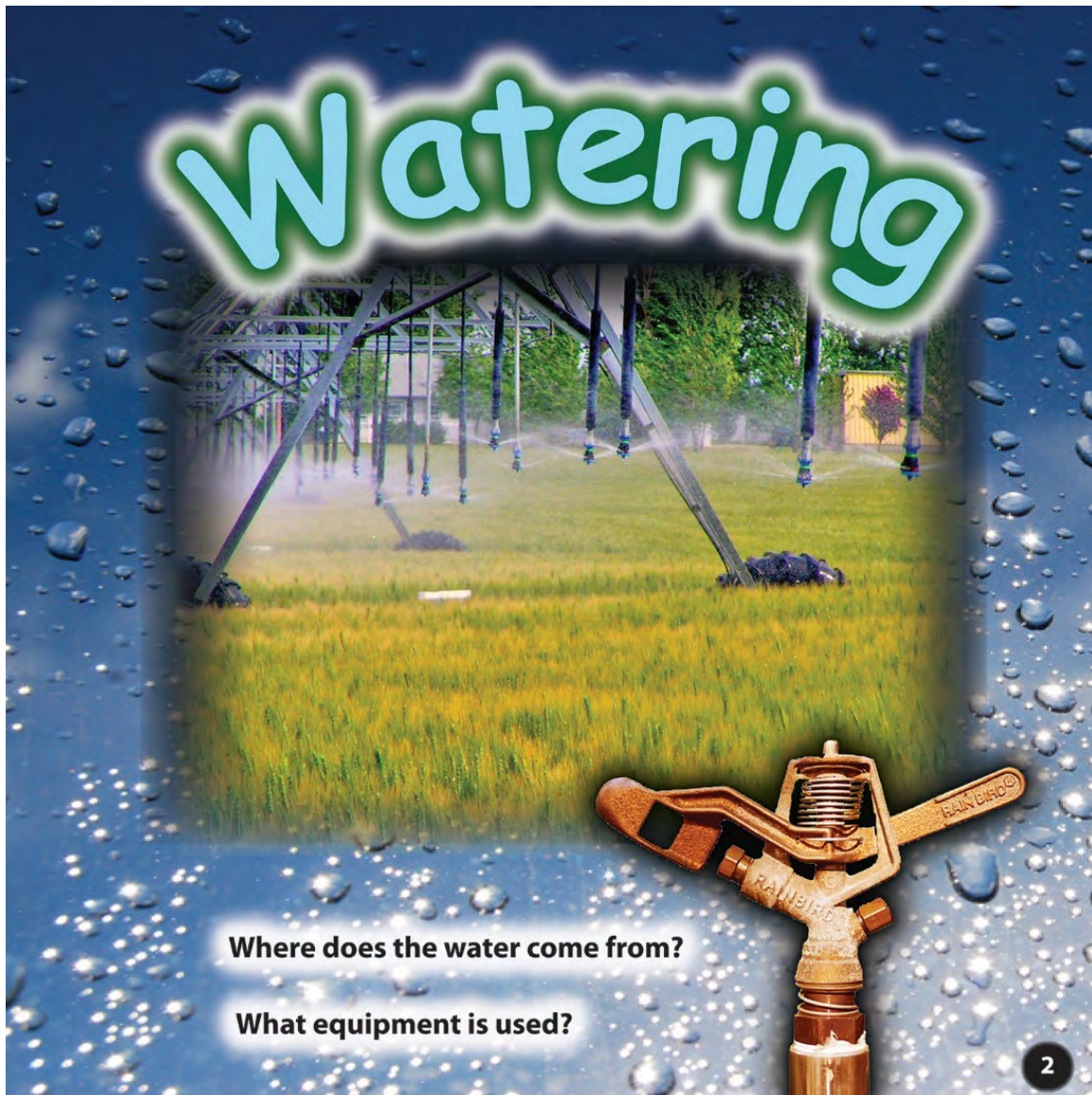
- Read the question **“What machinery is used?”**
 - *Take student responses. Responses could include: tractors pull plows to turn the soil, then they would disc the soil to break up the dirt clods. Then the farmer would put the wheat seed into grain planters that put the seed into the soil. The tractors and equipment can be large or small.*
- Read the question **“When is wheat planted?”**
 - *Take student responses. Responses could include: There are two types of wheat; winter and spring wheat. Winter wheat is planted and starts growing in the fall. It then lays dormant under the snow until spring. In the spring, when it starts to warm up, the wheat begins to grow. Spring wheat is planted in the spring.*

WHEAT MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- The second page is “Watering”.



- Read the question **“Where does the water come from?”**
 - *Take student responses. Responses may vary depending on region as follows: About 50% of wheat is dry-land farmed and the other 50% is irrigated. Dry-land farming is where the wheat is planted and then the only water it receives is from rain. Irrigated wheat is watered in many different methods.*
- Read the question **“What equipment is used?”**
 - *Take student responses. Responses may include: flood irrigation is done with siphon tubes. Pivots put on water through sprinklers as it turns in a circle around the field. Some wheat fields are watered with hand or wheel line sprinklers that must be moved by hand.*

WHEAT MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Turn to the third page “Growing”.



- Read the question **“What do wheat plants need to grow?”**
 - *Take student responses. Responses may include: water, sunlight, and nutrients. As the wheat kernel sprouts it starts to develop roots and leaves. Plants take in water and nutrients through their roots. Nutrients include things from the soil such as potassium, phosphorus, and nitrogen. These are major elements that wheat needs to grow. Farmers will add potassium, phosphorus, and nitrogen to their fields in the form of fertilizer. Just like humans need food, water, and vitamins to grow, so do plants. Plants also take in sunlight and carbon dioxide through their leaves. Water, CO₂, and sunlight are used in the process of photosynthesis. The process of photosynthesis produces sugars and oxygen. The plant uses the sugars to grow and gives off the oxygen that we breathe.*
- Read the question **“How long does it take?”**
 - *Take student responses. Responses could include: Winter wheat will be planted and start growing in the fall and then go dormant through the winter. It will start growing again in the spring. Spring wheat will be planted in the spring. Most all wheat will be harvested from the middle of July to the middle/end of August. Roughly that is about 4 to 5 months for spring wheat.*

WHEAT MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- The fourth page is “Harvesting”.



- Read the question **“How do farmers get the wheat off of the plant?”**
 - Take student responses. *Responses could include: Farmers drive combines through the field. The header on the combine cuts the wheat and puts it into the large storage area in the back. When the combine gets full the farmer then takes transfers the wheat to a grain truck or semi. The chaff or the left over straw is then kicked out the bottom of the combine back onto the field.*
- Read the question **“Where does the wheat go after it leaves the field?”**
 - Take student responses. *Responses could include: Big semi-trucks or ten-wheelers haul the grain to storage bins or silos, where it is stored until it is needed at a processing plant. The grain is then reloaded onto trucks and hauled to processing plants to be ground into flour.*

WHEAT MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 2: Identify food products that are made from wheat.

- Turn to the fifth and sixth pages “Time To Eat!!!”



WHEAT MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Ask the question “What do all of these things have in common?” All of these things have wheat in them.



WHEAT MODULE

MOVING AGRICULTURE TO THE CLASSROOM



- Turn to the last page with the picture of the baby calf.

.....and finally, where does a nice straw bed
come from?



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The Voice of Idaho Agriculture

- The stem of the wheat plant is called straw. Straw can be baled just like hay and then be can be used for dry bedding for animals such as this baby calf.



WHEAT MODULE

MOVING AGRICULTURE TO THE CLASSROOM



Objective 3: Grind wheat kernels into flour. *(Time: 7-10 minutes)*

- Before starting the activity, discuss the importance of having clean hands when preparing food to keep from spreading germs and getting sick. Squirt hand sanitizer on each students hands before starting the activity.
- Divide the students into groups of 2.
- Give each group a wheat grinder and help them attach the grinder to a sturdy table or desk.
- Open the bucket of wheat and scoop out about 1/3 cup of wheat kernels.
- Pour a third cup of wheat into each of the groups' wheat grinder.
- Have the each group place the paper bowl under the wheat grinder to catch the flour.
- Each student should take a turn turning the handle to grind the wheat. *(Note: The tighter the screw is turned in on the handle, the finer the flour will be ground. If needed the group can pour their bowl back into the grinder and tighten the handle and grind it again to make the flour finer.)*
- Only 2 cups of flour will be needed for one batch of pancakes (One batch will make approximately 26-30, 4-inch pancakes). Make sure to use the flour that you feel is most sanitary. If students have put their hands into the flour it could cause spreading of germs. Teacher discretion is advised.
- *Note: plug in and turn on griddles to 325-350 degrees about 5-10 minutes before you are ready to cook. This will make ensure the griddles are hot when the mix is ready.*
- Put the unused flour off to the side.

Objective 4: Mix and observe whole wheat flour made into pancakes. *(Time: 15-20 minutes)*

- Have a student measure out 2 cups of Krustez Pancake mix into a bowl.
- Have a student measure out 2 cups of the ground wheat flour into the same bowl.
- Have a student mix the contents together.
- Add 3 cups of water to the mix.
- Stir until lumps are gone. *(Note: may have to add more water until desired consistency.)*
- Using a measuring cup, pour desired amount onto the electric griddle. Make as many pancakes as desired. Using the pancake turner, flip the pancakes over when they are ready. *(Note: if more pancakes are needed, mix another batch as explained above.)*
- Turn off and unplug the electric griddles.
- Have students eat the pancake with syrup or jam.
- Have students help clean up.



TRICKS OF THE TRADE

MOVING AGRICULTURE TO THE CLASSROOM



Setting Up The MAC With a School

- Depending on your county and number of volunteers, we suggest a one day approach. Try to target say 2nd and 3rd grade and do the wheat with 2nd grade and the dairy with 3rd grade. You will need about 2 to 3 volunteers for each module. Each rotation will take 30-45 minutes each. At the end of the day you will have gotten through both grades and next year you can come back and do the same. Now last year's 2nd graders are in 3rd grade and will get the dairy module. You will also not burn out volunteers by trying to do grades k-6 all at one time.
- Try to get the modules set up in a gym or cafeteria and have the students rotate to you. It is hard and time consuming to move the modules from classroom to classroom.
- Remember-this is a free program to the schools. You are volunteers. You can set how this should look in your county and schools. The schools are not in charge.
- Having trouble getting volunteers? You may try teaming up with a local FFA chapter and use their members to help put on the MAC program.

Dairy Module

Maggie

- Before plugging Maggie in, make sure the red handled valve is perpendicular with the pipe. This will keep from dumping water onto the floor.
- When filling Maggie, pour about 1 gallon of water into the bucket. If you fill more than 1 gallon, water will leak out of the reservoir and onto the floor. It is important to know if she was drained before you put water in.
- To drain Maggie, make sure you are outside and turn the red handled valve parallel with the pipe. Plug Maggie in and the water should drain out. If no water comes out, she probably was drained. Make sure you turn the red handled valve perpendicular with the pipe when you are done.
- If it is cold and she wasn't drained the water will freeze in the hoses and pump.
- Ask the school how wide the door openings are. Maggie is about 33" at her base and some schools may have to take out the center partition to get her through the door.

Making Butter

- When making butter, set the heavy whipping cream out of the fridge early to get it to room temperature. It will shake into butter in 5-7 minutes if it is at room temperature. If it is straight out of the fridge it may take up to 20 minutes or more.
- A quart of heavy whipping cream will fill about 55-60 containers if only filled about 1/3 of the way full.
- Only fill the containers about 1/3 full. This allows enough room to shake the heavy whipping cream into butter.
- Once the container is full and the lid snapped on, wrap the container in a paper towel before handing it to the student to shake. This will help when it leaks.
- Use Round Ritz like crackers for eating the butter. The round cracker will fit into the container and doesn't break like a soda cracker does. You will not need any knives to spread the butter by using a round cracker as well.



TRICKS OF THE TRADE

MOVING AGRICULTURE TO THE CLASSROOM



Wheat Module

- Pour only about 1/3 of a cup of wheat into the grinders. Then if they get spilled you are not cleaning up or wasting as much.
- Have 2 or 3 students per grinder and have them count 5 to 10 turns of the handle as they grind.
- If you have limited time for the wheat module you can pre-mix a batch of pancake batter and make the pancakes as you are grinding the wheat. Then when they are done grinding you can take their flour and mix into another batch and show them. This will speed things up if you need.
- Plug the griddles into the surge protectors provided. They will trip breakers so try to plug one griddle to an outlet by itself and the other griddle to its own outlet preferably on another wall.
- Have a volunteer or a teacher pour the syrup onto the pancake to ensure you have enough syrup.

Water Module

- The water module is designed for 5th grade and up. It may work with 4th graders.
- The water module is not in the trailer and will need to be scheduled with your regional manager.
- It is fairly fragile and must be strapped correctly in the trailer when transporting or it will break.
- Do not allow students to touch the inside of the water module. Trees and building will break off.



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When does the dairy close down for the day?



WATER in the NEWS

What water topics will be discussed in your future?

Idaho Farm Bureau
The Voice of Idaho Agriculture



BYPRODUCTS

Hair

1. Conditioner
2. Shampoo
3. Hair gel
4. Hair spray
5. Hair cream
6. Hair oil
7. Hair wax
8. Hair pomade

Skin

1. Cosmetics
2. Flavored
3. Sweetener
4. Vitamin
5. Protein
6. Calcium
7. Carotene
8. Cellulose

Brain

1. Milk
2. Vitamins

Internal Organs

1. Milk
2. Vitamins
3. Iron
4. Calcium
5. Protein
6. Cellulose

Bones

1. Milk
2. Calcium
3. Protein
4. Cellulose

Manure Fertilizer

1. Nitrogen
2. Phosphorus

Blood

1. Plasma
2. Red blood cells
3. White blood cells
4. Platelets
5. Hemoglobin
6. Vitamin
7. Protein
8. Cellulose

Milk

1. Cheese
2. Butter
3. Ice cream
4. Yogurt
5. Sour cream
6. Cream
7. Milk powder
8. Milk solids

Fat

1. Cholesterol
2. Vitamins
3. Carotene
4. Protein
5. Calcium
6. Phosphorus
7. Iron
8. Cellulose
9. Cellulose
10. Cellulose
11. Cellulose
12. Cellulose
13. Cellulose
14. Cellulose
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26. Cellulose
27. Cellulose
28. Cellulose

.....and finally, where does a nice straw bed come from?



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