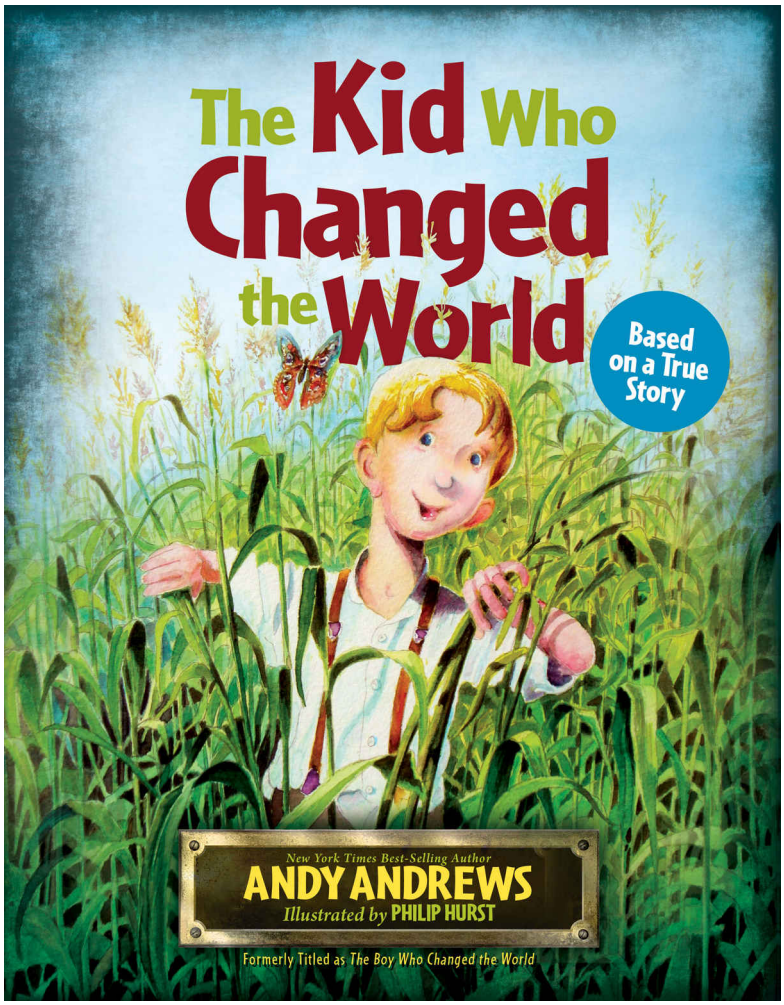
Indiana Agriculture in the Classroom

An educational outreach program of Indiana Farm Bureau, Inc.

2017 Book of the Year



Educator Guide

Additional lessons and activities available at inaitc.org

AGRICULTURE IN THE CLASSROOM

Who is Indiana Agriculture in the Classroom?

Ag in the Classroom is a grassroots agricultural outreach program for school children in grades Pre-K through 12, facilitated by Indiana Farm Bureau and coordinated nationwide by the United States Department of Agriculture. This program helps kids understand where the food they eat is grown and how important farmers are to their daily lives.

Each year, registered volunteers all across Indiana visit classrooms to teach more than 60,000 students about agriculture through in-class lessons, hands-on activities, educational events, on-farm experiences and field trips.

The Indiana Ag in the Classroom program offers standards-based lessons and materials, many free of charge, to schools, community groups, and other non-profit organizations that wish to integrate agriculture into their curriculum.

Our Mission

To increase agricultural literacy through K-12 education.

Our Vision:

Agriculture is valued by all.

We believe:

- Increased understanding of agriculture allows individuals to make informed choices about nutrition and health for themselves and family.
- Informed citizens will be able to participate in establishing the policies that will support a competitive agricultural industry in this country and abroad. (agday.org)
- Beginning in pre-kindergarten and continuing through 12th grade, all students should receive some standards-based education about farming and agriculture outside of agricultural education courses.
- Agricultural literacy includes an understanding of agriculture's history and current economic, social and environmental significance to all Americans. This understanding includes some knowledge of food and fiber production, processing and domestic and international marketing. (agday.org)
- An agriculturally literate person is defined as "*one who understands and can communicate the source and value of agriculture as it affects our quality of life*." (NAITC)

Book of the Year Ag Literacy Program

Program Purpose:

To increase understanding, build awareness and develop a positive public perception of Indiana agriculture through education.

Student Goals:

- Understand how food, fiber and renewable resource products are produced and by whom.
- Realize that science plays an important role in our food supply and that the scientific advancements in food production are safe, proven and necessary.
- Acknowledge and consider career opportunities in the agriculture, food, fiber and renewable resource industries. (agday.org)

What is Agricultural Literacy?

A person who understands and can communicate the source and value of agriculture as it affects our quality of life. (National Agricultural Literacy Logic Model, 2013)

The Importance of Ag Literacy

- An increased knowledge of agriculture and nutrition allows individuals to make informed personal choices about diet and health.
- Informed citizens will be able to participate in establishing the policies that will support a competitive agricultural industry in this country and abroad.
- Agriculture is too important a topic to be taught only to the small percentage of students considering careers in agriculture and pursuing vocational agricultural studies.
- Agricultural literacy includes an understanding of historical and current economic, social and environmental issues that affect all Americans. This understanding includes being knowledgeable about food and fiber production, processing and domestic and international marketing.
- Employment opportunities abound in agriculture. Career choices include:
    - farm production
    - agribusiness management and marketing
    - agricultural research and engineering
    - food science
    - processing and retailing
    - banking
    - education
    - landscape architecture
    - urban planning
    - energy
    - and other fields.

Who was Norman Borlaug?
Born on a farm in Iowa in 1914, Norman Borlaug was an American agricultural scientist, plant pathologist, and winner of the Nobel Prize for Peace in 1970. He is widely known as the "Father of the Green Revolution." His research helped lay the groundwork for technological advances in agriculture to fight world hunger. He is credited with saving more than two billion lives in all parts of the world.

- Encyclopedia Britannica: Norman Borlaug
- Forbes: Norman Borlaug
- Crop Science Society: Norman Borlaug Bio

Who was Henry Wallace?
Henry Wallace served as the 33rd Vice President of the United States under Franklin D. Roosevelt. Secretary of Agriculture in the Harding administration, Henry Wallace shaped agriculture policies. An agricultural expert, he experimented with higher-yielding corn varieties.

- Encyclopedia Britannica: Henry Wallace
- Iowa State University: Henry Wallace

Who was George Washington Carver?
Dr. George Washington Carver was an agricultural scientist who researched and developed more than 300 uses for peanuts by separating the fats, oils, gums, resins and sugars. Examples of his work include chili sauce, shampoo, shaving cream and glue. He also studied and developed 88 products made from sweet potatoes. Dr. Carver promoted the idea of what he called a "victory garden" to ease food shortages during World War II.

- Encyclopedia Britannica: George-Washington-Carver
- National Agricultural Library: George Washington Carver
- American Chemical Society: George Washington Carver
- LiveScience.com: George Washington Carver
- George Washington Carver Museum and Cultural Center in Austin, TX

How are Norman Borlaug, Henry Wallace and George Washington Carver connected?

- AgBioWorld.org - Borlaug Connection
- Iowa State Extension: The Borlaug Chain

The Kid Who Changed the World Academic Standards

2nd Grade

Social Studies

2.1.3 Identify individuals who had a positive impact on the local community.

2.3.3 Compare neighborhoods in your community and explain how physical features of the community affect people living there.

2.3.6 Identify and describe cultural or human features on a map using map symbols.

Reading:

2.RL.4.1 Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.

2.RL.2.1 Ask and answer questions (e.g., who was the story about; why did an event happen; where did the story happen) to demonstrate understanding of main idea and key details in a text.

Life Science:

2.LS.3 Classify living organisms according to variations in specific physical features (i.e. body coverings, appendages) and describe how those features may provide an advantage for survival in different environments.

3rd Grade:

Social Studies

3.2.5 Explain the importance of being a responsible citizen* of your community, the state and the nation. Identify people in your community and the state who exhibit the characteristics of good citizenship*. Example: Being respectful, trustworthy, practicing tolerance and working with others to solve problems (Civics and Government).

3.3.9 Describe how climate and the physical characteristics of a region affect the vegetation and animal life living there.

Reading: Literature

3.RN.2.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

Life Science

3.LS.1 Analyze evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.

The Kid Who Changed the World Academic Standards

4th Grade:

Social Studies

4.1.9 Give examples of Indiana's increasing agricultural, industrial, political and business development in the nineteenth century. (The Civil War Era and Later Development: 1850 to 1900)

4.1.12 Describe the transformation of Indiana through immigration and through developments in agriculture, industry and transportation. (Growth & Development: 1900 to 1950)

4.2.2 Describe individual rights, such as freedom of speech, freedom of religion and the right to public education, which people have under Article I of Indiana's Constitution. (Civics and Government: Foundations of Government)

4.3.2 Estimate distances between two places on a map when referring to relative locations.

4.3.4 Map and describe the physical regions of Indiana and identify major natural resources and crop regions.

4.3.7 Explain the effect of the Earth/sun relationship on the climate of Indiana.

4.RN.2.3 Explain the relationships between events, procedures, ideas, or concepts in an historical, scientific, or technical text, based on specific information in the text. (Reading: Nonfiction – Key Ideas and Textual Support)

Life Science:

4.LS.1 Observe, analyze, and interpret how offspring are very much, but not exactly, like their parents or one another. Describe how these differences in physical characteristics among individuals in a population may be advantageous for survival and reproduction

The Kid Who Changed the World Reading Guide

1. **Q: Where did Norman live?**
   A: On a farm in Iowa.

2. **Q: As Norman looked out at the endless rows of corn he wondered "What would it be like to be hungry all the time?" Can someone describe what they feel like when they skip breakfast or don't get enough to eat for lunch?**
   A: (student answers will vary)

3. **Q: Do you know that some people don't have enough food to eat and are always hungry? What are some reasons people around the world don't have food to eat?**
   A: Student answers will vary.
   - Don't have money to buy food
   - Mom and/or dad don't have a job or lost a job and can't afford food.
   - Don't have a car or other transportation to get to the store
   - Don't know how to cook
   - Natural disasters or weather issues like droughts
   - Public assistance programs don't exists
   - War or fighting

4. **Q: What are "special seeds"?**
   A: Mr. Wallace would like Norman to cross breed different wheat varieties to create one that will naturally resist diseases and have high yields.

Educator Tip: Use the example of different breeds of dogs as a way to explain that there are different varieties of wheat, corn, rice, soybeans, etc. Each plant variety (or breed) has different characteristics just like different breeds of dogs have different characteristics. For example: Great Danes are extremely tall and large dogs while a Chihuahua is very short and petite. Some breeds of dogs have large litters of 7+ puppies such as Labrador Retrievers and others have small litters or even just one puppy as is the case of miniature breeds or those in the Terrier family.

5. **Q: What is a "Super Plant"?**
   A: A "Super Plant" is a plant that grows from the "special seeds".

6. **Q: What does Mr. Wallace want these "super plants" to do?**
   A: Feed more people than a regular plant. Increase how much food grows on one plant, also known as yield.

7. **Q: What type of special seeds did Norman create?**
   A: Corn, wheat and rice.

8. **Q: Why did Norman have to travel to faraway places to develop the special seeds and super plants?**
   A: Norman had to travel to faraway places (Mexico) because that is where the people where having trouble with growing food.

   The farmers in Mexico were having trouble growing food because the climate wasn't good for growing crops and because the plants were sick with a disease called rust.

9. **Q: How many people did Norman save from starving around the world?**
   A: Two billion

10. **Q: What did Henry's father do as a job?**
    A: He was a professor (of dairy sciences at Iowa State University).

11. **Q: When Henry grew up, what was his very important job?**
    A: Henry was Secretary of Agriculture and then the Vice President of the United States.
    - As Secretary of Agriculture Henry created a research farm in Mexico in hopes of developing plants that could grow in harsh climates.
    - The boy who started our story, Norman, worked at this farm for Henry when he grew up and was an adult.

12. **Q: What advice did George's neighbor Mrs. McLloyd give to him?**
    A: "..little things can make a big difference. Everything you do matters. Every action you take, even small things, can change the world."

13. **Q: What did George do when he grew up?**
    A: George became a teacher and an inventor.
    - George was an agricultural scientist like Norman and Henry.

14. **Q: How many things did George invent from the peanut? The sweet potato?**
    A: 266 things from peanuts and 88 from sweet potatoes
    - We call those by-products

15. **Q: What ideas does young Susan have for the wood she is pulling nails out of?**

A: To reuse it for something like patching the chicken coop or building a playhouse.

- Farmers have a long history of using reclaimed and used materials on their farms to build and repair shelters for livestock and grain storage.

Note: George Washington Carver was born to slaves. His father was reportedly killed in a wagon accident and he and his mother and siblings were kidnapped from the Carver farm during the Civil War. Slavery is an ugly part of American history, but it is a part of it. The important, and inspirational part of George's life, is that he revolutionized Southern agriculture as one of the first chemurgists and is recognized around the world for his contributions to agricultural chemistry.

Looking back with a modern perspective, the most impressive and inspiring piece of Dr. Carver's life is the enormous amount of prejudice he overcame, the struggles he battled through and the unprecedented achievements he made in a post Civil War America as an African American born a slave but achieved a college degree. In fact, he earned multiple degrees including a Bachelor of Science, Masters of Science, Doctor of Science, and Doctorate of Science. Despite the circumstances of his life, he was reportedly a humble, sincere, spiritual and kind-hearted man whose only intention was to make the world a better place for all mankind.

During George's story in *The Kid Who Changed the World*, there are a couple of references to God. From all reports, George Washington Carver was a very spiritual man and relied heavily on his faith to get through his daily struggles, which were numerous. If approached with a question about the inclusion of God in the story, relay the information above and ask the student(s) what they do when they are struggling with a problem at home or school. Who do they go to for help? Some people rely on their faith. In George's case God is mentioned because it was a significant part of his life.

Dictionary

Source: National Agriculture in the Classroom Curriculum Matrix

agriculture: the science, art, or practice of cultivating the soil, producing crops, and raising livestock and in varying degrees the preparation and marketing of the resulting products.

bio-based: material or product derived from biological or renewable resources

by-product: something produced in an industrial or biological process in addition to the principal product

career: an occupation undertaken for a significant period of a person's life and with opportunities for progress; generally a profession requiring special training

commodity: a raw material or primary agricultural product that is bought and sold on a large scale

crops: plants that farmers grow for fuel and fiber, such as corn or soybeans

farmer: a person who grows crops or raises livestock as a job

farming: the production of food and fiber derived from plants and animals. Farmers must understand economics, business, mathematics, and the science involved in getting their crops and animals to market. The science involved in agriculture includes the knowledge of ecosystems, soil, water, weather, chemistry, and plant and animal biology.

food: Made from the raw products taken from the farm. Some products, like corn, may be consumed in their raw state or processed into an entirely different product like corn chips, soda, peanut butter, detergents, or medicines. Other raw farm products require processing to make them more palatable and digestible before they can be eaten. Wheat, for example, is the most important grain in the United States. We would have to eat hundreds of raw wheat seeds to get the same nutrition we can get more easily from processing the wheat into flour and then baking bread. Bread is a more palatable way to eat wheat. The food industry centers around the processing and distribution of food.

genetic engineering: the process of manually adding DNA to an organism with the goal of adding one or more new traits not already found in that organism

genetically modified organism (GMO): any organism developed through a process in which a copy of a desired gene or section of genetic material from one organism is placed in another organism

Related Lessons and Activities

Search the National Agriculture in the Classroom Curriculum Matrix for these great resources! www.agclassroom.org/teacher/matrix/
or click on the title of each if viewing online.

Wheat Germ DNA
Students learn about DNA by extracting it from wheat germ. Students also connect the topic with a reading activity using a book about Norman Borlaug called, *The Boy Who Changed the World*.

Nuts About Peanuts!
Students label the parts of a peanut plant on a diagram, follow step-by-step instructions to plant a peanut, and use a chart to record the growth of peanut plants.

Where Does It Come From?
Students will explore the connection between geography, climate, and the type of agriculture in an area by reading background information and census data about the agricultural commodities beef, potatoes, apples, wheat, corn, and milk.

My Farm Web
Students use the visual representation of a web to explore the role of agriculture in their daily lives and understand how most of the necessities of life can be traced back to the farm.

Agriculture Pays
Students will recognize that agricultural careers are interconnected and that agriculture influences many parts of their daily lives.

From Soybeans to Car Parts
Students learn about soybeans and investigate the collaborative work of an agricultural scientist and engineer who found new uses for an agriculture product (soybeans). This lesson can be used as an opportunity to discuss careers in science and engineering, bio-based products, and the use of renewable resources.

Suggested Reading

A Picture Book of George Washington Carver by David. A. Adler
An easy-to-read biography that may be used for reading aloud. The informative text gives students a solid introduction to one of America's most important scientists. The book also touches on slavery and racial prejudice along with scientific contributions.

A Pocketful of Goobers by Barbara Mitchell
A Pocketful of Goobers teaches about the scientific efforts of George Washington Carver. Learn about his life and about his production of more than 300 uses for the peanut.

George Washington Carver: Agriculture Pioneer by Stephanie Macceca
Born into slavery, George Washington Carver worked hard, earned a university graduate degree, and eventually became a world-famous expert on plants. By experimenting with peanuts and other plants, he learned how to make many useful products from them. Carver taught students and farmers how to grow plants without damaging the soil.

In the Garden with Dr. Carver by Susan Grigsby
Sally is a young girl living in rural Alabama in the early 1900s, a time when people were struggling to grow food in soil that had been depleted by years of cotton production. One day, Dr. George Washington Carver shows up to help. He teaches them how to restore the soil nutrients. He even prepares a delicious lunch made of plants, including "chicken" made from peanuts. Susan Grigsby's warm story shines new light on an African American scientist who was ahead of his time.

Spill the Beans and Pass the Peanuts by Meredith Sayles Hughes
This book highlights legumes, especially peanuts and beans. Learn the history, agricultural production, and processing of these food crops. You also will find recipes and cooking methods used around the world.

The Man Who Fed the World by Leon Hesser
Dr. Norman Borlaug, one of the world's greatest heroes, is the most highly-decorated individual of our time. He is credited with saving over a billion people from starvation. Dr. Borlaug is only one of five people in history to win the Nobel Peace Prize, the Presidential Medal of Freedom and the Congressional Gold Medal. In addition, Dr. Borlaug received the Padma Vibhushan, the highest civilian award the government of India can present to a non-citizen.

English Language Arts Enrichment

Taken from The Kid Who Changed the World Reader's Guide. www.andyandrews.com

1. If you had an idea that could potentially change the world, what would be your first step?

2. Do you think you have the ability to be anything you want to be? Are your chances better or worse than anyone else's? Explain your answer.

3. The story explains that Henry Wallace learned as much about plants as he could. This ultimately allowed him to become the U.S. Secretary of Agriculture. Do you think it's necessary to teach and train ourselves to be who we want to be?

Social Studies: Geography Enrichment

1. Norman, George, Henry and Susan all lived in the state of Iowa. Using a map, calculate the distance from Indiana's state capitol to Iowa's state capital.

   Indiana's State Capitol: _____

   Iowa's State Capitol: _____

   Distance: _____

2. What college did George Washington Carver attend in Iowa?

The college George attended is located in Ames, Iowa. It is known as a land grants university. Land grant universities focus on teaching agriculture, science, military science and engineering. Indiana's land-grant university is Purdue University and is located in West Lafayette.

3. Using a map, calculate the distance between Purdue University and Iowa State University.

4. Describe the best route to take if traveling by car.

5. Given its location, what type of climate does Iowa have compared to Indiana? How does their climate affect what type of food crops can be grown there?

6. In what region of the United States are Iowa and Indiana located?

7. Norman had to travel to "faraway places" to make special seeds. What characteristics about Indiana make it a good place to grow plants for food, also called crops?

8. Norman researched three crops while in Mexico. Corn, wheat and rice. Hoosier farmers can grow corn and wheat in our climate and soil types. Using the chart below color in the counties on the map provided that grow the most, corn and wheat. Don't forget to color in your key.

2015 Corn Rankings		**2015 Wheat Rankings**		**2015 Soybean Rankings**	
County	**Rank**	**County**	**Rank**	**County**	**Rank**
Orange	1	Montgomery	1	Warren	1
Posey	2	Bartholomew	2	Decatur	2
Franklin	3	Jennings	3	Posey	3
Fayette	4	Shelby	4	Benton	4
Warren	5	Fayette	5	Fayette	5
Lawrence	6	Boone	6	Franklin	6
Decatur	7	Hendricks	7	Rush	7
Gibson	8	Carroll	8	Union	8
Montgomery	9	Tipton	9	Gibson	9
Daviess	10	Parke	10	Putnam	10

9. Draw in the four major interstates that "cross" in Indianapolis.

10. Identify the three major rivers that are located in Indiana. Where are they in relationship to the counties that grow a lot of corn and wheat?

10. Do the counties that produce a lot of food also have large cities? Explain.

Key:

Top 10 Corn	
Top 10 Wheat	
Top 10 Corn & Wheat	