

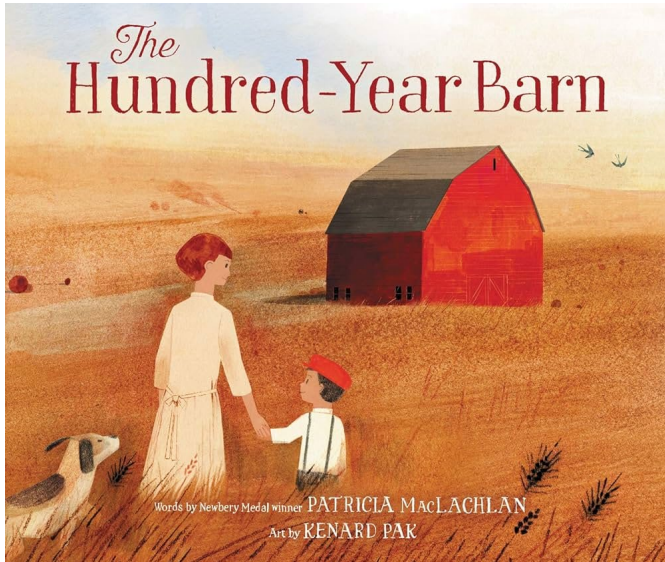


The Book Planter



Ag in the Classroom

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The Hundred Year Barn

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One hundred years ago, a little boy watched his family and community come together to build a grand red barn. This barn become his refuge and home—a place to play with friends and farm animals alike. As seasons passed, the barn weathered many storms. The boy left and returned a young man, to help on the farm and to care for the barn again. The barn has stood for one hundred years, and it will stand for a hundred more: a symbol of peace, stability, caring and community.

Discussion Questions

1. Jack's father loses his wedding band. Jack finds it but then it falls out of a hole in his pocket. Have you ever lost something that you never found again? How did it make you feel? Where does Jack ultimately find the ring many years later?
2. When the barn is finished, they celebrate with a special lunch and a photograph. Have you ever finished a big project? How did you celebrate?
3. The barn is much more than a home for farm animals and storage for farm equipment. What else happened in the hundred-year barn? If you had a barn, what would you do there?

Dig a Little Deeper – Research Questions

1. What was happening in North Carolina 100 years ago? Research events, politics, inventions, agriculture, pop culture, or anything else noteworthy. What about beyond North Carolina in the United States? Write a short essay about the events, or design a poster to showcase the events of 100 years ago.
2. In the book, the barn is painted red. What is the significance of red paint for barns? Why were barns always painted red? (see **Engage – Interest Approach**)

Engage – Interest Approach¹

1. Project a picture of a local barn or the [Traditional Barn Photo](#) onto a large screen. Ask students to identify what it is and the purpose of the building.

2. Make a list on the board of the students' ideas about how a barn is used.
3. Ask students what color they think of when they think of barns. Answers may vary. Ask students why they think so many barns are red? Explain that, a long time ago, red paint was the cheapest paint. Red paint contained rust, which gave the paint its red color and helped to prevent moss from growing on a wooden barn. Clarify that we see many different colored barns today, but some people still choose to paint them the traditional red color.
4. Explain to the students that they will be exploring the many purposes that barns can serve.

Activity One: Types of Barns¹

1. Discuss with students that barns serve many purposes for farmers. Ask the students what purposes they saw in the book *The Hundred Year Barn*. (*Barns can be used to shelter livestock, to produce a specific farm product, to store farm products and equipment, or for a combination of purposes.*)
2. Explain to students that one type of barn is a **livestock barn**. Livestock barns shelter animals and protect them from predators, diseases, bad weather, and extreme temperatures. Livestock barns are engineered to meet the needs of specific livestock—dairy cows, beef cattle, turkeys, chickens, sheep, pigs, etc. Access to feed, water, lighting, and fresh air, as well as waste management and sanitation, must be taken into consideration when designing a barn for livestock.
3. Have each student choose two types of livestock barns from the list below:
 - **Poultry Barn**
 - **Dairy Barn**
 - **Pig Barn**
 - **Horse Barn**
 - **Sheep Barn**
4. Create six stations/centers around the classroom. Each center should have a computer, laptop, smart phone, or tablet that is set up to show one of the following videos:
 - **Poultry Barn:** Raising Broilers Instead of Tobacco - <https://www.youtube.com/watch?v=SXHOvzjc-us>
 - **Dairy Barn:** Grayhouse Farms: a Dairy Built for Sustainability <https://www.youtube.com/watch?v=tD8O3oIP1Jc> (start at 3:00 minute mark)
 - **Pig Barn:** NC Pork Council VR - <https://vimeo.com/238446474>
 - **Horse Barn:** The Willing Equine - https://www.youtube.com/watch?v=miEChXU_sXg&t=14s
 - **Sheep Barn:** Sheep farming Sheep housing <https://www.youtube.com/watch?v=9--CMj1o8ng>
5. Provide each student with two [Barn Video Viewing Guides](#), one for each type of barn they chose. Explain to the students that they are going to view videos that provide information about the two different types of barns they chose. They will use their viewing guides to record their notes about the barns.

6. Have the students go to the center with the video about their first barn choice. At the center, the students should view the video and complete their first viewing guide together. Have the students repeat this step with their second barn choice.
7. After both viewing guides have been completed, provide each student with a [Venn Diagram](#). Have the students work independently to complete the graphic organizer by using the information from their viewing guides to compare and contrast the two types of barns they chose.

Activity 2: Hay Barn Engineering¹

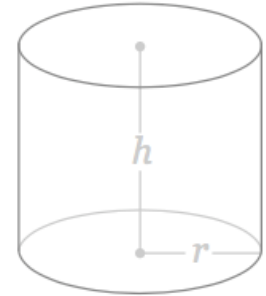
- Show students the video Hay Making at the Joseph Decuis Farm (<https://www.youtube.com/watch?v=Tu3XA2dLhF0>). Students can view the entire process of harvesting, baling, and stacking the hay or only the process of stacking hay bales starting at minute 10:22 and ending at minute 13:02.
- Lead a discussion about the benefits of storing hay bales inside a barn. Integrate the following points into the discussion. Storing hay in a barn:
 - maintains better hay quality
 - maximizes the nutritional value of the hay
 - exposes the hay to less moisture and sunlight
 - decreases the likeliness of spoilage
 - decreases hay waste
 - cuts costs
- Explain to the students that they will design and construct a model of a hay barn that will be used to store 4' x 4' round bales of hay. The tractor that will be used to stack the hay can only stack two bales high. The challenge is for the students to build a barn that maximizes the barn space to fit as much hay inside as possible. For the purposes of the models, 1 inch = 1 foot. During the engineering process, encourage students to measure the interior volume of their barns (length x width x height).
- Explain to the students that farmers are constrained by the amount of money they can spend on building materials to build a barn. The students will also be constrained by the amount of materials they can use to build their barn model.
- Allow students to work independently, as partners, or in small groups to design and construct their models. Provide each student, partnership, or group with the following materials:
 - 50 wooden craft sticks
 - 2 pieces of 9" x 12" construction paper
 - Craft glue
 - Tape
 - Ruler
 - Scissors
- To encourage critical thinking, have students consider the following questions before and after the barn models are completed:
 - How many sides does your barn have?



- Will you bring the hay through a side or end of the barn?
- Is your barn accessible to a tractor?
- Where is the best location for a barn?
- How many bales will you put in your barn?
- What type of materials would be used to build a real hay barn?
- Can your barn withstand strong winds, ice, and snow?
- When the barn models are completed, determine which barn can fit the most of the round hay bales stacked two bales high.

Extension:

- Have students calculate the approximate amount of hay that will fit inside their hay barn model. First, students will need to find their barn volume (length x width x height). Then they find the bale volume, which is the volume of a cylinder ($h \times \pi \times r^2$). They would then take the barn volume divided by the bale volume to get an approximate amount of hay that will fit in the barn.
- Have students design a barn that meets the needs of a specific farm animal. Students should consider the following questions when designing their livestock barn:
 - How will the animals access food?
 - How will the animals access water?
 - How will the animals access fresh air?
 - How will the animals receive the appropriate amount of light?
 - How will a proper temperature be maintained within the barn?
 - How will the barn be kept clean and sanitary?



Sources

1. <https://agclassroom.org/matrix/lesson/701/>

K-5 Subject Areas: English Language Arts, Math, Social Studies and Science

English Language Arts (Reading and Writing)

- RL.K.1 With prompting and support, ask and answer questions about key details in a text.
- RL.K.2 With prompting and support, identify the main topic and retell key details of a text.
- RL.K.3 With prompting and support, describe the connection between two individuals, events, ideas, or pieces of information in a text.
- RL.1.1 Ask and answer questions about key details in a text.
- RL.1.2 Identify the main topic and retell key details of a text.
- RL.1.3 Describe the connection between two individuals, events, ideas, or pieces of information in a text.
- RL.1.4 Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.
- RL.1.5 Know and use various text features to locate key facts or information in a text.
- RL.1.6 Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.
- RL.1.7 Use the illustrations and details in a text to describe its key ideas.
- RL.2.4 Determine the meaning of words and phrases in a text relevant to a grade 2 topic or subject area.
- RL.2.5 Know and use various text features to locate key facts or information in a text efficiently.
- RL.2.7 Explain how specific images contribute to and clarify a text.

- W.2.2 Write informative /explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section. a. With guidance and support from adults, organize information and ideas around a topic to plan and prepare to write. b. With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing.
- W.2.6 Recall information from experiences or gather information from provided sources to answer a question.
- RL.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.
- RL.3.2 Determine the main idea of a text; recount the key details and explain how they support the main idea.
- RL.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.
- RL.3.5 Use text features and search tools to locate information relevant to a given topic efficiently.
- RL.3.7 Use information gained from illustrations and the words in a text to demonstrate understanding of the text.
- W.3.5 Conduct short research projects that build knowledge about a topic.
- RL.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.
- RL.4.2 Determine the main idea of a text and explain how it is supported by key details; summarize the text.
- RL.4.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.
- RL.4.5 Describe the overall structure of events, ideas, concepts, or information in a text or part of a text.
- RL.4.7 Interpret information presented visually, orally, or quantitatively and explain how the information contributes to an understanding of the text in which it appears.
- W.4.5 Conduct short research projects that build knowledge through investigation of different aspects of a topic.
- RL.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
- RL.5.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.
- W.5.2 Write informative /explanatory texts to examine a topic and convey ideas and information clearly.
- W.5.3 Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

Math

- NC.2.MD.1 Measure the length of an object in standard units by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- NC.3.OA.3 Represent, interpret, and solve one-step problems involving multiplication and division. • Solve multiplication word problems with factors up to and including 10. Represent the problem using arrays, pictures, and/or equations with a symbol for the unknown number to represent the problem. • Solve division word problems with a divisor and quotient up to and including 10. Represent the problem using arrays, pictures, repeated subtraction and/or equations with a symbol for the unknown number to represent the problem.
- NC.3.OA.7 Demonstrate fluency with multiplication and division with factors, quotients and divisors up to and including 10.
- NC.4.MD.4 Represent and interpret data using whole numbers. • Collect data by asking a question that yields numerical data. • Make a representation of data and interpret data in a frequency table, scaled bar graph, and/or line plot. • Determine whether a survey question will yield categorical or numerical data.
- NC.4.OA.5 Generate and analyze a number or shape pattern that follows a given rule.
- NC.5.MD.5 Relate volume to the operations of multiplication and addition. • Find the volume of a rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths. • Build understanding of the volume formula for rectangular prisms with whole-number edge lengths in the context of solving problems. • Find volume of solid figures with one-digit dimensions composed of two non-overlapping rectangular prisms.

Social Studies

- K.G.2 Understand the interaction between humans and the environment.
- 1.H.1 Understand that history tells a story of how people and events changed society over time.
- 2.C.1 Understand how various cultures influence communities.
- 3.H.2 Use historical thinking skills to understand the context of events, people, and places.
- 4.E.1 Understand how economic decisions and resources affect the economy of North Carolina.
- 4.G.1 Understand the role geography has played in the development of North Carolina.
- 4.H.1 Understand the role of various people, events, and ideas in shaping North Carolina.
- 5.H.1 Analyze the chronology of key events in the United States.
- 5.H.2 Understand the role of prominent figures in shaping the United States.
- 5.G.1 Understand how human activity has and continues to shape the United States.
- 5.C&G.1 Understand the development, structure and function of government in the United States.

Science

- ESS.K.1 Understand change and observable patterns of weather that occur from day to day and throughout the year.
- LS.1.1 Understand characteristics of various environments and behaviors of humans that enable plants and animals to survive.
- ESS.2.1 Understand patterns of weather and factors that affect weather.
- LS.3.3 Understand how environmental factors aid in the survival of plants.
- LS.4.1 Understand the effects of environmental changes, adaptations and behaviors that enable animals (including humans) to survive in changing habitats.

Name _____

Date _____

Barn Video Viewing Guide

1. What type of barn was featured in the video you viewed? _____

2. What type of animal lives in the barn? _____

3. What is the purpose of the barn? _____

4. Describe the design of the barn. _____

5. Describe the special features of the barn. _____

6. How does the barn meet the needs of the animals that live there? _____



Name _____ Date _____

Venn Diagram

