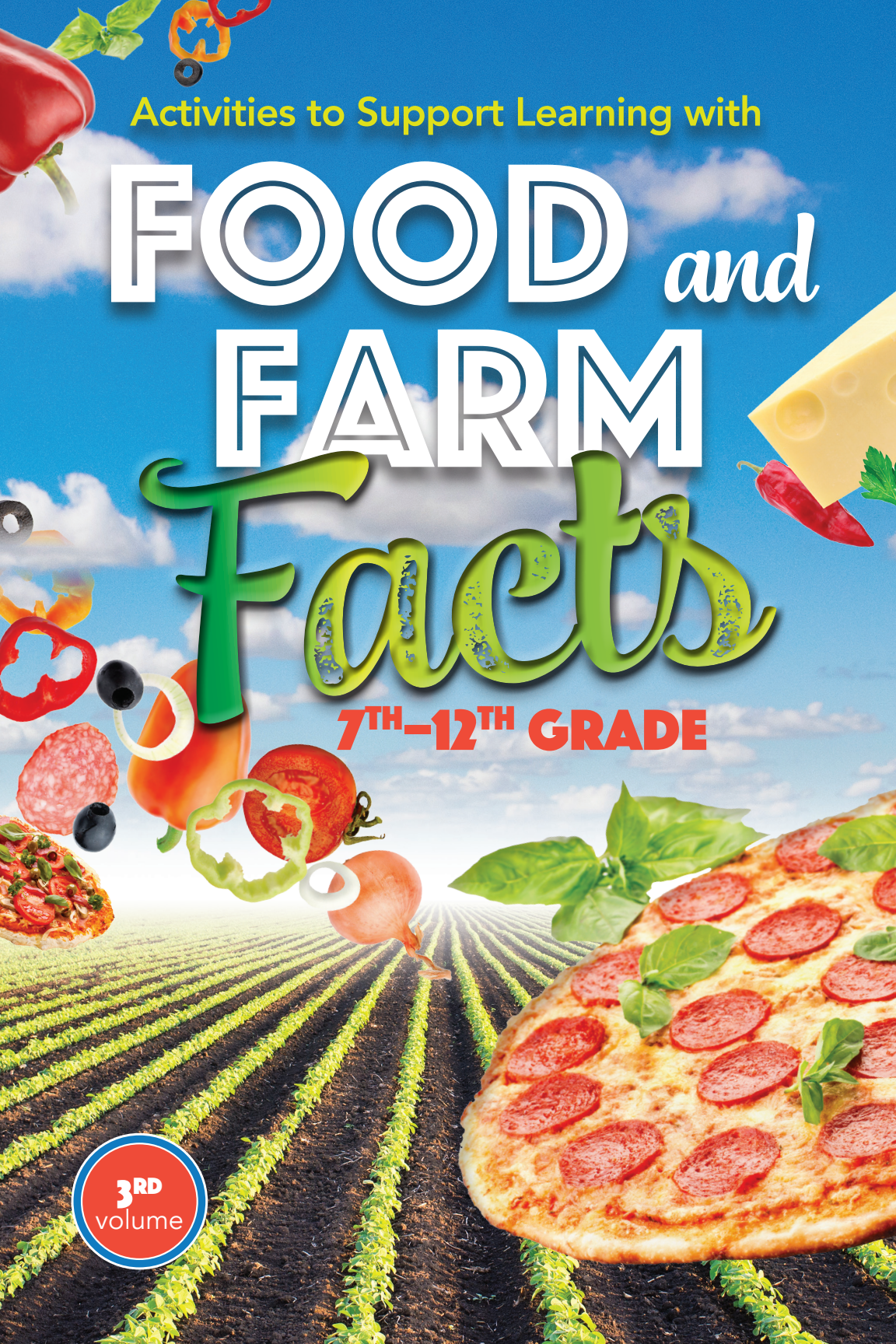
Activities to Support Learning with

FOOD and FARM Facts

7TH–12TH GRADE



3RD volume

25 minutes

MATH

Food and Farm Facts Section: **MODERN FARMERS**

Farmers FEED US

Students use words to describe the meaning and application of the "How Many People Does One Farm Feed?" graphs from *Food and Farm Facts*.

Standards: Interpreting Functions

Materials:

- An overhead version or a printout for each student of the "How Many People Does One Farm Feed?" graphs from *Food and Farm Facts* (page 10)

Activity Sequence:

1. Ask students to write down their hypothesis on the following: Currently, how many people does one farm feed per year? Also make hypotheses for how many in the following years: 1940, 1980 and 2000.
2. Project an image of the "How Many People Does One Farm Feed" graphs or hand out a copy to each student.
3. Assign students to small groups (two to four) and announce that each group will work together to report (verbally or on paper) the following:
   a. A description of the graph.
   b. The current trend in the data and what that means in our everyday lives.
   c. What farmers are doing to get these results.

Discussion:

- What about the data surprised you? What would you have predicted?
- Knowing each U.S. farm feeds 165 people each year, how many farmers does your town/city, county and state rely on? How many farmers would it have taken to feed the same amount of people in 1940?
- Did you know that by 2050, farmers will need to grow about 70 percent more food than they do now? If the amount of land we farm isn't increasing, how will farmers accomplish this?

Learn More!

Discover the relationship between agriculture, food, fiber and energy in the free *Addressing Misconceptions* tool available at www.agfoundation.org/resources/addressing-misconceptions

45-60 minutes

MATH

Food and Farm Facts Section: **PRODUCTION**

Production INFOGRAPHICS

Students use online tools to create an original infographic to represent national production data.

Standards: Statistics and Probability

Materials:

- *Food and Farm Facts* (pages 22–31)
- Create a generic account and get some practice with an online infographic design tool of your choice (i.e., http://infogr.am/ and http://visual.ly/)
- Computer with internet access for students

Activity Sequence:

1. Ask students to select three statistics, or a set of statistics, found in the Production section of *Food and Farm Facts*.
2. Discuss infographics: What are they? What is their purpose? What steps should be taken before attempting to create one?
3. Provide login information for the online design tool and briefly demonstrate how to take existing data and turn it into an infographic.
4. Allow students the chance to practice and ask questions about the tool.
5. Ask each student to choose one of the stats (or list of stats) from their list and represent it using the infographic tool.

Discussion:

- What things did you have to think through in order to create your infographic?
- What other graphic representations could you have used to represent your data (i.e., different graph or chart types)?
- Why did you choose the method you chose versus other options?
- How does the statistic you chose affect your life?

Learn More!

Find out how apples turn to applesauce and about the energy required to produce our food with free lesson plans available at http://www.agfoundation.org/resources/energy-resources.

30 minutes

MATH

Food and Farm Facts Section: **TRADE AND ECONOMICS**

The Cost OF FOOD

Students compare how the price of crops impacts the price of food.

Standards: Statistics and Probability

Materials:

- *Food and Farm Facts* (page 18)
- For each student, a copy of the USDA National Agricultural Statistics Service data on the average price received for wheat found here: https://www.nass.usda.gov/Charts_and_Maps/Agricultural_Prices/pricewh.php
- For each student, a copy of the Bureau of Labor Statistics average price data for whole wheat bread found here: http://data.bls.gov/timeseries/APU0000702212?data_tool=XGtable
- Computer (with spreadsheet application) access for each student

Activity Sequence:

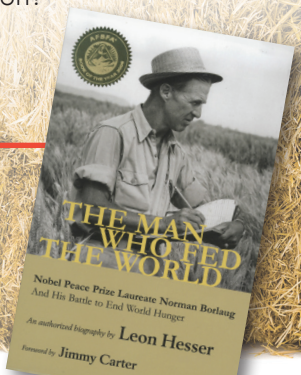
1. Ask students to predict how much the price of bread in the store is related to the price a farmer receives for his/her wheat: a lot, some or not much.
2. Pass out sheets from the materials list, one of each per student.
3. Have students create a data set for the average April prices for both wheat and bread for the years 2007–2017 and represent this data on a line.
4. Ask students to analyze the two representations and compare the results to their earlier prediction about the relationship between the price of bread and the price received for wheat.
5. Optional: Have the students calculate the average cost of the wheat as a percentage of the price of a loaf of bread, assuming that one bushel of wheat is used in 90 loaves of bread.

Discussion:

- Why does the price of wheat fluctuate? What other factors might influence how much the store charges for bread?
- How does this affect the average person?

Learn More!

Get your copy of *The Man Who Fed the World* at dmsfulfillment.com/FarmBureau



30 minutes

SCIENCE

Food and Farm Facts Section: **PRODUCTION**

The Power OF PLASMIDS

Students create a model of a plasmid, small circular DNA molecules used to transfer and replicate genes through biotechnology.

Standards: Inheritance and Variation of Traits

Materials:

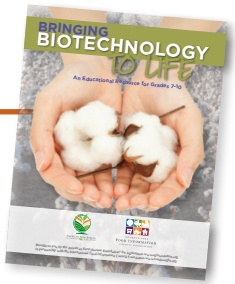
- *Food and Farm Facts* (page 22)
- Full-size pipe cleaner of a single color (one per student)
- 2-inch pipe cleaner of a different color (one per student)
- Whiteboard and markers

Activity Sequence:

1. Distribute copies of page 22. Have students independently read and underline any new or interesting information. Share as a class.
2. Reinforce that biotechnology is a collection of technologies. One technology used in biotechnology is the use of plasmid vectors.
3. Provide background information: Plasmids are small, circular DNA found in bacterial cells. Plasmids are great tools in the biotechnology toolbox because they can be used to move any gene that is inserted into the plasmid. They are used to quickly make copies of a gene. Researchers can insert foreign DNA into the plasmid. This is incredibly helpful when researchers need to replicate a trait, like pest or disease resistance, that can't be achieved through advanced breeding.
4. Let's make a plasmid! Give each student a full-size pipe cleaner. Instruct students to make a circle by twisting the ends together.
5. Researchers use restriction enzymes to recognize a specific sequence of nucleotide base pairs in the plasmid. When the restriction enzyme reads this "code," it is able to open the plasmid at a specific location. Have students open the circular model.
6. Researchers can then insert foreign DNA into the plasmid. Give each student a small section (2-inch length) of a different colored pipe cleaner. Have students twist this into their plasmid, closing the circle.
7. As this plasmid replicates (makes copies), it will include the new DNA.
8. Challenge students to wear this plasmid as a bracelet and use it to tell others about the fascinating tools of biotechnology.

Discussion:

- Prior to this activity, what was your perception of biotechnology? How did that change after doing this activity?
- What do you find surprising or interesting about the use of biotechnology in food production?



Learn More!

Check out *Bringing Biotechnology to Life*, an educator guide for middle school and high school available at www.agfoundation.org.

30 minutes

SCIENCE

Food and Farm Facts Section: **ENVIRONMENT**

Save THE SOIL!

Students research management practices to prevent soil erosion and the other ecological benefits.

Standards: Earth and Human Activity

Materials:

- *Food and Farm Facts* (pages 20–21)
- Paper
- Colored pencils/markers
- Access to the internet

Activity Sequence:

1. Have students review pages 20–21 in *Food and Farm Facts*. Direct them to choose an erosion management practice:
   a. Grazing
   b. Contour farming
   c. Crop rotations
   d. Conservation tillage
   e. Cover crops
2. Have students research their topic and create a short comic explaining how their practice prevents erosion.
3. Have at least one student share his or her comic aloud for each of the management practice areas.
4. Have a class discussion about the other benefits of preventing soil erosion.

Discussion:

- Have farmers always managed the soil properly?
- What causes erosion? Why is it bad?
- What are the incentives for a farmer to improve the health of the soil? Are there other benefits to maintaining healthy soil?

Learn More!

Grazing cattle can contribute to proper soil health. Discover more about beef with the *True Beef: Pasture to Plate Educator Guide* available at http://www.agfoundation.org/on-the-farm/learn-about-beef.

ENGLISH LANGUAGE ARTS

45 minutes

Food and Farm Facts Section: **CONSUMERS**

Let's Talk FARMERS

Students write a journal entry or narrative from the perspective of a modern-day farmer.

Standards: Text Types and Purposes

Materials:

- Copy for each student or an overhead of the "Social Media Connects Farmers and Consumers" page in *Food and Farm Facts* (page 8)
- Access to information about farmers in one or more of the following ways:
  - Current edition of *Food and Farm Facts*
  - Newspapers ("Capital Press" is a great resource)
  - Magazines ("Farm Journal," "Agri-leader," "Agriculture Monthly")
  - Digital versions of items listed above
  - Online access to farming blogs and/or Twitter feeds
  - The video and written profiles about farmers on http://www.fooddialogues.com/

Activity Sequence:

1. Display or distribute copies of the "Social Media Connects Farmers and Consumers" page in *Food and Farm Facts* (page 8).
2. Start the discussion of farming as a career and lifestyle using the Discussion prompts below.
3. Ask students to write a blog entry written from the perspective of a farmer or rancher.
4. Show students the resources (see Materials list above) they have available for the assignment and provide a time frame for the assignment.

Discussion:

- What do you think of when you hear the words "farmer" or "rancher"?
- In what ways do we rely on farmers and ranchers?
- What are some of the challenges farmers face in their industry?
- What are some of the ways they adapt to those challenges?

Learn More!

Facebook @Foundation4Ag,
Twitter @AgFoundation,
Pinterest @AgFoundation

30 minutes

ENGLISH LANGUAGE ARTS

Food and Farm Facts Section: **CONSUMERS AND PRODUCTION**

Survey SOUNDOFF

Students differentiate between fact and opinion when discussing "hot topics" such as biotechnology or alternative energy.

Standards: Integration of Knowledge and Ideas

Materials:

- *Food and Farm Facts* (page 6, 22, and 29)
- Surveys (two per student)
- Pencils

Activity Sequence:

1. Have students complete a short survey about their perception related to a topic found in *Food and Farm Facts*. Here are three suggested areas of focus and sample survey questions:
   a. Antibiotics (page 6)
      i. I generally think antibiotics are: good, bad, I don't know
      ii. Antibiotics can help animals: agree, disagree
      iii. Antibiotics should be banned: agree, disagree
   b. Biotechnology (page 22):
      i. I generally think biotechnology is: good, bad, I don't know
      ii. Biotechnology can help the environment: agree, disagree
      iii. Biotechnology can improve conditions for starving people: agree, disagree
   c. Alternative Energy (page 29):
      i. I generally think renewable energy is: good, bad, I don't know
      ii. I can identify at least two forms of renewable energy: yes, no
      iii. We should all switch to 100% renewable energy: agree, disagree
2. Discuss the difference between fact and opinion. Using the internet, have students search for opinion-based articles about the selected topic.
3. Find the page in *Food and Farm Facts* corresponding to your selected topic. After reading that page, have students compare/contrast the information presented in the opinion article and *Food and Farm Facts* text.
4. Re-take survey. Have a discussion on how students' perceptions of the topic may or may not have changed through each stage of activity.

Discussion:

- How can we tell the difference between fact and opinion articles?
- Did your perception of this topic change through this activity? How?
- How do you think this relates to society's view of different agricultural topics?
- What can we do to help ensure people are informed with the facts and not just opinions?

1 hour

HEALTH

Food and Farm Facts Section: **CONSUMERS**

Role REVERSAL

Students create educational materials that can be used to teach elementary school students about MyPlate.

Standards: Using Communication Skills to Promote Health

Materials:

- *Food and Farm Facts* (page 9)
- For Video: video camera, tablet with video recording capabilities, etc.
- For Game: paper, cardstock, colored pencils, markers, tokens, etc.
- For Poster: paper, colored pencils, markers, etc.
- For PowerPoint/Prezi: PowerPoint program, computer with Internet access

Activity Sequence:

1. Explain to students they will become the teacher today! Review page 9 of *Food and Farm Facts*.
2. Divide students into working groups of two to five.
3. Using the information presented in *Food and Farm Facts*, have students create a learning tool to teach elementary school students about the health topics discussed.

   Students will choose one of these options to teach the lesson:

   a. Record a video
   b. Make up a jingle/rhyme
   c. Come up with a game
   d. Design a poster
   e. Create a PowerPoint/Prezi
4. Practice teaching elementary students by presenting teaching tool to class.

Discussion:

- Why is it important to educate elementary school students about healthy eating habits?
- Challenge: Have students go to an elementary classroom to use their learning tools to teach younger students.

Learn More!

Check out *Operation Share Our Story* at www.myamericanfarm.org/outreach and get a free toolkit of resources to help you tell the story of food and fiber production.

My American Farm

30 minutes

HEALTH

Food and Farm Facts Section: **CONSUMERS**

Stay Healthy, STAY SAFE

Students create an informational brochure for populations who are especially susceptible to foodborne illnesses.

Standards: Using Communication Skills to Promote Health

Materials:

- *Food and Farm Facts* (page 9)
- Paper
- Colored pencils/markers
- Access to the internet

Activity Sequence:

1. Have students choose a population at risk and have them design an informational brochure, including recommendations for avoiding foodborne illnesses, for an individual in that population: https://www.foodsafety.gov/risk/index.html.
   a. Cancer patients
   b. Children under the age of 5
   c. Diabetes patients
   d. HIV/AIDS patients
   e. Older adults
   f. Persons with autoimmune diseases
   g. Pregnant women
2. Have students share their brochure with a partner.
3. Discuss the major findings for each population at risk.
4. Practice teaching elementary students by presenting teaching tool to class.

Discussion:

- What were the similarities and differences amongst the recommendations?
- What were the main culprits of foodborne illnesses?

Learn More!

Learn more with *Food Science Fun*
www.myamericanfarm.org

My American Farm PRESENTS FOOD SCIENCE FUN! STUDENT WORKSHOP SERIES

SOCIAL SCIENCE

30 minutes

Food and Farm Facts Section: **CONSUMERS**

Country COMPARISON

Students compare how geographical, political and economic factors affect the cost of food in countries worldwide.

Standards: Role of Price in Market System and Markets — Price and Quality Determination

Materials:

- *Food and Farm Facts* (page 5)
- Computer with internet access for each student

Activity Sequence:

1. Review page 5 of *Food and Farm Facts*.
2. Assign each student a country.
3. Have students review the cost of food associated with their country, and then research that country to identify the geographical, political and economic factors that might contribute to the cost of food.
4. Have students prepare a presentation, poster or multi-media report to share what they have learned in their research.

Discussion:

- What factors affect the cost of food worldwide?
- How does the cost of food affect quality of life?
- What role do education and aid organizations play in helping others where the cost of food is high?

Learn More!

Learn more about agriculture with our *Dive in! Exploring the Science of Water and Food Production* resource available at http://www.agfoundation.org

15 minutes

SOCIAL SCIENCE

Food and Farm Facts Section: **MODERN FARMER**

The Influence of GEOGRAPHIC FEATURES on Agriculture

Students use the USDA's CropScape data to see how geographic features influence agriculture.

Standards: The World in Spatial Terms

Materials:

- *Food and Farm Facts* (page 11)
- Computer access for each student OR groups of up to three students
- Student access to http://nassgeodata.gmu.edu/CropScape/

Activity Sequence:

1. Display the "See What Farmers and Ranchers Grow" Page. Ask students to select one of the commodity groupings (such as "Hay and Silage") to work with later.
2. Have students access http://nassgeodata.gmu.edu/CropScape/.
3. Point out the menu on the left side of the screen. There is a "Layers" tab as well as a "Legend" tab. Tell students that in the "Layers" tab, they must make sure the most recent year is selected. Then, have them toggle to the "Legend" tab so they can see the crops represented.
4. Ask students to click on the map of the United States from the top tool bar. Have students select their home state or a state assigned by you. (This might have to be adjusted depending on the commodity group the students chose.)
5. Ask students to click on the bar chart button from the top toolbar. Have students mark the commodities they chose in Step 2.
6. From the map displayed, ask students to answer the Discussion questions.

Discussion:

- What do you notice about the crops that are grown along rivers, lakes and oceans?
- What blank spots (areas with no crops) do you see? What do those areas represent?
- What other geologic features (mountains, ravines, hills, etc.) do you see and how do they affect which crops are grown?

Learn More!

Help a younger family member brush up on their U.S. geography knowledge by playing *Ag Across America* on www.MyAmericanFarm.org.

30 minutes

SOCIAL SCIENCE

Food and Farm Facts Section: **TRADE AND ECONOMICS**

Career CRAZE

Students create a list identifying careers related to bringing food from a field to our plates.

Standards: Career Development Awareness

Materials:

- *Food and Farm Facts* (pages 18-19)
- Paper and writing utensil (two per group)
- Chalkboard, whiteboard or paper large enough for the class to see

Activity Sequence:

1. As a class, share and discuss the meaning of the information on pages 18-19.
2. Break students into small groups (four to five people).
3. Have groups title one paper "off-farm" and the other "on-farm." Direct groups to think to list different industries involved in both categories.
4. Next, have students list as many careers as they can under each industry.
5. Compile a complete class list by having students write the careers they came up with on the classroom whiteboard (ask students to only add items that are not yet listed by other classmates).
6. Pose the discussion questions below.

Discussion:

- Prior to this activity, had you ever thought about where the money you spend on food goes? What would you have guessed?
- What do you find surprising or interesting about the data?
- Given the list of careers compiled, how many of you know at least one person whose career involves some agriculture?
- Write down three of the careers listed that sound interesting to you. What kind of training or education do you think they require? List some company names that might employ people in those positions. What would be some items on their typical to-do lists?

Learn More!

Test your knowledge about agriculture careers with the *When I Grow up: Discover Ag Careers* resource available at www.agfoundation.org.

Standards Referenced

Next Generation Science Standards

Earth and Human Activity

- **(HS-ESS3-1):** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

Inheritance and Variation of Traits

- **(HS-LS1-3-2):** Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication and/or (3) mutations caused by environmental factors.

National Health Education Standards — American Cancer Society

Using Communication Skills to Promote Health (NPH-H.9-12..5): Students will demonstrate the ability to use interpersonal communication skills to enhance health.

Common Core State Standards for Math

Statistics and Probability: S-ID Interpreting Categorical and Quantitative Data: Summarize, represent and interpret data on a single count or measurement variable

- S-ID Interpret linear models
  - S-ID-1: Represent data with plots on the real number line (dot plots, histograms and box plots).
  - S-ID-2: Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
  - S-ID-7: Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
  - S-ID-9: Distinguish between correlation and causation.
- S-IC Making Inferences and Justifying Conclusions
  - Understand and evaluate random processes underlying statistical experiments.

Standards Referenced

Functions: Interpreting Functions

- F-IF-4: Interpret functions that arise in applications in terms of context.

Common Core Standards for English Language Arts

- Text Types and Purposes
  - Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences.
- Integration of Knowledge and Ideas
  - Analyze how two or more authors writing about the same topic shape their presentations of key information by emphasizing different evidence or advancing different interpretations of facts.

National Social Studies and History Standards — National Council for Social Studies

Markets — Price and Quality Determination (NSS-ED.9-12.7): Markets exist when buyers and sellers interact. This interaction determines market prices and thereby allocates scarce goods and services.

Role of Price in Market System (NSS-ED.9-12.8): Prices send signals and provide incentives to buyers and sellers. When supply or demand changes, market prices adjust, affecting incentives.

NSS-G.K-12.1 The World in Spatial Terms: Understand how to use maps and other geographic representations, tools and technologies to acquire, process and report information from a spatial perspective.

Career Development (Asca: American School Counselor Association National Standards For Students)

Develop Career Awareness (C:A1)

- C:A1.2: Learn about the variety of traditional and nontraditional occupations.

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AE-FFF71217-001-001