TEXAS FARM BUREAU®

Select R' Us

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Length of Lesson: Four, 45-minute class periods

Audience: 7th Grade Science Students

TEKS:
Science
7.2 (C) Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers
7.3 (A) Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student
7.3 (B) Use models to represent aspects of the natural world
7.3 (C) Identify advantages and limitations of models such as size, scale, properties, and materials
7.11 (B) Explain variation within a population or species by comparing external features, behaviors, or physiology of organisms that enhance their survival such as migration, hibernation, or storage of food in a bulb
7.11 (C) Identify some changes in genetic traits that have occurred over several generations through natural selection and selective breeding such as the Galapagos Medium Ground Finch (Geospiza fortis) or domestic animals and hybrid plants

National Agricultural Literacy Outcome:

- Theme 2: Plants and Animals for Food, Fiber, and Energy (Middle School Grades 6-8) T2.6-8.b. Explain the role of ethics in the production and management of food, fiber (fabric or clothing), and energy sources.
- Theme 4: Science, Technology, Engineering, & Mathematics (Middle School Grades 6-8) T4.6-8.b. Describe how biological processes influence and are leveraged in agricultural production and processing (e.g., photosynthesis, fermentation, cell division, heredity/genetics, nitrogen fixation).

Lesson Objective:

1. Identify changes in genetic traits that have occurred over several generations of selective breeding.

Lesson Overview:

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Students will pick a crop or livestock they would like to improve. Students will research characteristics and purpose of the crop or livestock they picked and come up with a way to improve it through selective breeding. When students are done researching, they will create an ad for a catalogue similar to what farmers and ranchers use in real life to purchase seeds or animals.

Lesson Details:

1. Have students pick a crop or animal for the project.
    - Decide if students can pick any crop or animal for this project or if you want to limit what they can pick.
        - For example, you might choose to limit it to dogs, sheep, tomatoes, roses, chickens, corn, and cows.
        - If you choose to limit the types of crops or animals, write each organism on a piece of paper, and have students draw from a bucket. It is recommended to have at least three students assigned to each organism per class.
2. Once students select or are assigned an organism, they will need a Chromebook or other device to research and record their findings on the Select R' Us Research worksheet (below).
    - For characteristics, students will need to research color, age to maturity, how much sunlight and water are needed (there are more examples in the "Creating an Ad in the Catalog" section below).
    - For SPED students, teachers can provide a list of websites of catalogs they could use to help find and research different crops and livestock. **Note: See a list of websites at the end of this lesson.*
3. Next students need to think how they want to improve the organism that they selected or were assigned. This is where they can get creative.
    - Students can choose to use one or more additional crops or livestock to create their new breed. They will need to answer the questions in the worksheet. Encourage students to use their imagination when filling out characteristics they want and do not want to see.
        - Student Examples: One student created tomatoes that cured cancer and another student created rainbow sheep (the student said both sheep were heterozygous for rainbow color when she bred the two sheep). Another student developed chickens that had really large breasts to feed more people with just one chicken.
    - Students need to name their new breed and list the characteristics on their paper.
    - Students also need to show how they plan to selectively breed the crop or livestock. Have students either create a pedigree chart showing selective breeding or write, in complete sentences, how they will be selectively breeding.

4. Once students complete the research section, they will create an ad for the catalog. Let students know that in the real world, farmers and ranchers can request a catalog from a business and look at what crops or livestock they can purchase. There are a lot of chicken hatcheries and seed companies that have their catalogs online if you want to show an example to the class. View an example here: https://www.mcmurrayhatchery.com/ameraucana_bantams.html
    - To create the ad, students must follow the design template (below). **Note: It is suggested that the teacher provide a large sheet of paper to each student to create their ad.*
5. Once everyone is done, have students stand up and tell the class about their livestock or plant. Then, have students place their ads around the room where each class member votes for the best ad, most creative breed, and most useful to the public.
6. At the end of lesson, facilitate a class discussion. It is suggested that this class discussion be used as a way for teachers to provide enhanced understanding and to clear up misconceptions that students might have. Suggested questions for the discussion:
    - What was the hardest part of this activity?
    - Is selective breeding easy or difficult? Why?
    - Was the crop or livestock you drew a model?
    - What are some pros and cons of this model?
    - Could we model this differently?

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Name: _____

Select R' Us

Congratulations! You have been hired by Select R' Us to work as a genetic engineer. Your first assignment is to develop a new crop or livestock that farmers will want to use.

You will select one crop or livestock that you would like to improve and research what it is used for. Once you have completed your research, you can begin engineering your crop or livestock and creating a catalog. Beware there are other employees that might be working on the same thing as you. Farmers will decide what to use based on your catalog.

Remember, at Select R' Us we do not create monsters. We select organisms with the best traits to create the best organism to meet the needs of farmers and ranchers to produce a healthy and abundant food supply.

Objective: Identify changes in genetic traits that have occurred over several generations of selective breeding.

Materials:

- Chromebook or another available device
- Select R' Us worksheet
- Blank sheet of paper
- Colored pencils or markers

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Research

1. What crop or livestock are you wanting to create or enhance?

2. List characteristics of the crop or livestock you are creating (age to maturity, weight, hot or cold climate, etc.)

3. What is the purpose?

4. What other breeds will you be using to improve your current crop or livestock?

5. List characteristics of those breeds you want to see in your new animal or crop.

6. List characteristics of those breeds you **DO NOT** want to see in your new animal or crop.

7. How will you create this new crop or livestock? Create a pedigree chart or describe how you will use selective breeding to improve the breed. (Will you breed one time or multiple, will you use more than one breed, etc…)

8. What will the name of your new crop or livestock be?

9. What are the characteristics?

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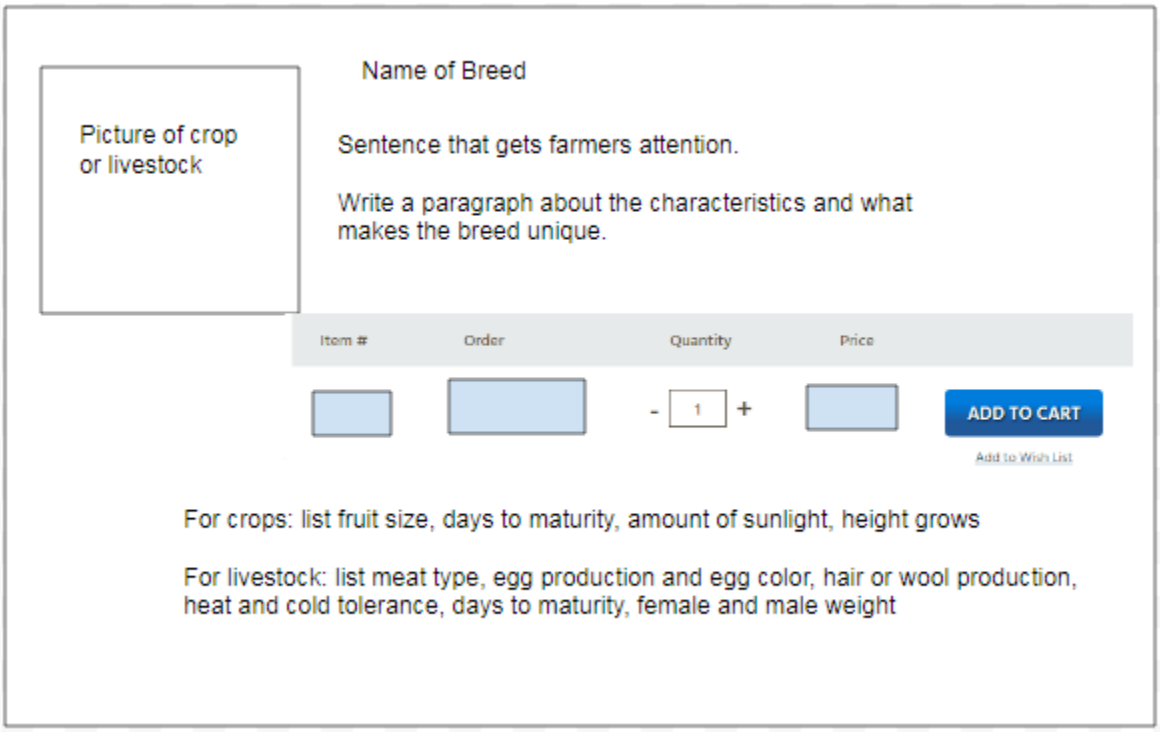
Creating an Ad in the Catalog

Our catalog is viewed by farmers and ranchers all over the world, who are looking for the best crop or livestock to purchase. You will need to use your research above or continue researching to complete the ad for the catalog. You will need to use a separate sheet of paper and follow the template below to complete your ad.



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Think About It

1. Do you think selective breeding is easy or hard? Explain your answer.

2. If your selective breeding project was being done in the real world, how long do you think it would take to create your breed?

3. If your selective breeding project was being done in the real world, do you think you might see some negative characteristics? If so, what do you think farmers will do?

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Rubric

	Advance (8)	Proficient (6)	Nearing Proficient (4)	Novice (2)
Research	Organism is exceptionally researched, extremely detailed, and accurate	Organism is well-researched in details	A few details are provided about the Organism	Little to no details are provided about the Organism
New Breed	Demonstrates thorough and extensive knowledge that genetic traits change over several generations due to selective breeding.	Demonstrates a correct understanding that genetic traits change over several generations due to selective breeding.	Includes some minor misconceptions that genetic traits change over several generations due to selective breeding.	Includes major misconceptions that genetic traits change over several generations due to selective breeding.
Questions	Demonstrates extensive knowledge of the topic by responding accurately to all questions.	Demonstrates knowledge of the topic by responding accurately to most questions.	Demonstrates some knowledge of the topic by responding accurately to some questions.	Demonstrates incomplete knowledge of the topic by responding accurately to a few questions or responding inaccurately to most questions.
Catalogue Ad	Catalogue shows a large amount of original thought. Ideas are creative, neat and easy to understand.	Catalogue shows some original thought, is neat and easy to understand.	Catalogue shows some original thought but is either messy or hard to understand.	Catalogue uses other people's idea, is messy or hard to understand

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Select R Us

Write 1 organism name for each category.

Best Ad _____

Most Creative Organism _____

Most Useful to the Public _____

Select R Us

Write 1 organism name for each category.

Best Ad _____

Most Creative Organism _____

Most Useful to the Public _____

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Catalog Websites (Examples)

Corn:

https://www.wideopeneats.com/types-of-corn/

https://www.growingproduce.com/vegetables/9-must-have-sweet-corn-varieties/

https://www.ufseeds.com/product-category/vegetables/corn-seed/sweet-corn-type/

https://www.victoryseeds.com/corn_dent.html

https://harvesttotable.com/corn_varieties_best_bets_and_e/

https://www.rareseeds.com/store/vegetables/corn/

Cattle:

http://afs.okstate.edu/breeds/cattle/

Tomato:

https://www.naturefresh.ca/products/tomatoes/

https://bonnieplants.com/gardening/the-basics-of-tomato-flavor/

https://www.johnnyseeds.com/growers-library/vegetables/common-tomato-pests-diseases-disorders-overview.html

Dogs:

http://www.dogbreedslist.info/toy-dog-breeds/

https://www.akc.org/dog-breeds/toy/

https://www.akc.org/dog-breeds/smallest-dog-breeds/

https://www.akc.org/dog-breeds/

https://www.akc.org/dog-breeds/best-guard-dogs/

Chickens:

https://www.mcmurrayhatchery.com/ameraucana_bantams.html

https://www.h2ouse.org/largest-chicken-breed/

https://www.purelypoultry.com/dual-purpose-breeds-c-154_247.html

Wool:

http://www.sheep101.info/201/breedselection.htm

https://modernfarmer.com/2013/12/sheep-find-sheep-dreams/

https://ahdc.vet.cornell.edu/programs/NYSCHAP/docs/SheepBreeds.pdf

https://countrysidenetwork.com/daily/livestock/sheep/sheep-breeds-what-to-know-for-breed-choice/

http://www.raisingsheep.net/dual-purpose-breeds.html

Roses:

https://www.thespruce.com/types-of-roses-4069722

https://www.serenataflowers.com/pollennation/flowers-last-longest/

http://www.birdsandblooms.com/gardening/flower-gardening/top-10-best-roses/

https://www.davidaustinroses.com/us/specific-planting-situations/thornless-roses

https://www.heirloomroses.com/info/care/roses/thornless-roses/

https://www.davidaustinroses.com/us/roses-by-type/climbing-roses