NGSS Lesson Planning Template

Grade/ Grade Band 2nd-12th	**Topic:** Pistachios	**Lesson # _____ in a series of _____ lessons**

Brief Lesson Description: Describe pistachio production in Arizona

Performance Expectation(s): Students will practice inquiry, observation, research, and evaluation skills necessary in the field of science.

Specific Learning Outcomes: Explain pistachio characterics and how that relates to production in Arizona

Narrative / Background Information

Prior Student Knowledge:
Review scientific method, nutrition concepts such as food groups, plant growth, plant food products

Science & Engineering Standards:

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.
3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.
3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.
4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Possible Preconceptions/Misconceptions:
Most student know pistachios are a nut but they may not be familiar with the way they are grown or processed for edible products.

LESSON PLAN – 5-E Model

ENGAGE: Opening Activity – Access Prior Learning / Stimulate Interest / Generate Questions:
Tell students that today they will be learning about agriculture. Do not tell them what the topic is.
Explain that scientists help us feed the world by finding new ways to produce more food. Today, students will be practicing their science skills by performing a variety of research and investigations. Scientists are very good at asking questions of the world around them. Let's begin by practicing our questioning skills...

Tell students you will show a picture of a something and see if they can guess what it is before you show them the whole thing.

Uncover picture activity - Have students play 20 questions (yes or no answers) by brainstorming questions in a group about what they will see. Uncover one portion of the slide at a time. As each portion of the slide is uncovered, have students create open ended questions (higher level thinking) about what they think it is. What clues make you think this? How big is it? Why do some shells split? What grows/produces it?

EXPLORE: Lesson Description – Materials Needed / Probing or Clarifying Questions:
Materials: pistachio nuts
Caution: Check for nut allergies prior to introducing pistachios into the classroom. Use a video in place of dissection if allergies are present.
Students will practice observations.
Dissect a pistachio nut. Crack it open. Have students make observation of pistachio nut at each stage of dissection.
Use a sequential map of each step - look at the pistachio, list as many observation of characteristics as you can. Share with your shoulder partner and add any observations to your list. Drawings with labels are acceptable.

Alternative activity:
Taste Test - pistachio nuts, pudding, pistachio ice cream, aroma test pistachio flavoring
Create a tally chart on class likes/dislikes. Expand by creating a list of specific likes/dislikes (color, taste, smell, texture)
Discuss the role that the 5 senses play in observations.

EXPLAIN: Concepts Explained and Vocabulary Defined:
Vocabulary: Cooperative learning groups - assign each group a word to define and share with the class.
Specialty crop
Deciduous
Nut
Shell
Flower
Parts of a flowering tree
Drought tolerant
Antioxidants
Fiber
Saturated/unsaturated Fats
Pollen
Blank nuts
Irrigation
Fertilization
Pest control
Blemish
Premium/ Gourmet

Show slides on Facts about pistachio nuts

Activity 1:
production - see NMSU field trip videos 1 and 2 https://youtu.be/S6Tlw7kTJ48 https://youtu.be/wsZnFok4TDQ

Have students take notes/answer the following questions. Modify for level of learner.
How long does it take for a tree to produce a nut?
What is the difference between male and female tees?
How often are they watered
When are they harvested?
How do they keep pistachios fresh?
Pistachios weren't commercially produced until ____ in the US. (1970)
How much water does a tree need?
How are pistachios harvested differently from other nut crops?
98% of all pistachios are produced in _____. (Californial)
What are some ways we use pistachios?

Activity 2:
Use close reading strategies such as marking the text (number paragraphs, circle key words/vocab, underline main ideas) and jig saw with expert groups.
Teachers can use the following steps when developing the jigsaw strategy for a class:

1. Introduce the technique and the topic to be studied.
2. Assign each student to a "home group" of 3-5 students who reflect a range of reading abilities.
3. Determine a set of reading selections and assign one selection to each student.
4. Create "expert groups" that consist of students across "home groups" who will read the same selection.
5. Give all students a framework for managing their time on the various parts of the jigsaw task.
6. Provide key questions to help the "expert groups" gather information in their particular area.
7. Provide materials and resources necessary for all students to learn about their topics and become "experts".
8. Discuss the rules for reconvening into "home groups" and provide guidelines as each "expert" reports the information learned.
9. Prepare a summary chart or graphic organizer for each "home group" as a guide for organizing the experts' information report.
10. Remind students that "home group" members are responsible to learn all content from one another.

http://www.adlit.org/strategies/22371/

Reading:https://recipes.howstuffworks.com/why-pistachios-are-sold-in-their-shells.htm/printable

Patrick J. Kiger "Why Pistachios Are Sold in Their Shells — Unlike Most Nuts" 20 March 2017. HowStuffWorks.com. <https://recipes.howstuffworks.com/why-pistachios-are-sold-in-their-shells.htm> 13 June 2018

ELABORATE: Applications and Extensions:

Activity 1 - Field trip:
Based on the information students have learned from the video, have them develop a new pistachio product using the guidelines on the rubric. Each group will present their product "Shark Tank Style" and the class will vote on the best product.

See attached rubric

Activity 2- Why Pistachios Are Sold in their Shells:
Have students design an experiment to test the fastest way to shell pistachio nuts. Perform experiments and give time to reflect on ways **to** improve the design and cite possible sources of error.

EVALUATE:

Formative Monitoring (Questioning / Discussion): Pause at each stage to provide opportunities for reflection (have students highlight notes, steps, key concepts/vocabulary

Summative Assessment (Quiz / Project / Report): Have students create magazine ad or video ad promoting pistachios. Be sure to include history, nutrition, production, and consumption aspects.

Elaborate Further / Reflect: Enrichment:
Students can design an experiment with pistachios by identifying a question, creating a hypothesis, identify independent and dependent variable, and list procedures.
Write to an actual pistachio grower. Contact a Farm Bureau representative for more information.
Research nut allergies and how to treat/prevent anaphylaxis
https://acaai.org/allergies/types/food-allergies/types-food-allergy/tree-nut-allergy
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