Grade 5 Science: Plant Classification

California Science Content Standards	Life Science 2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept: a. Students know many multi-cellular organisms have specialized structures to support the transport of materials. Investigation and Experimentation 6. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will: a. Classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria (e.g., seed plants or seedless plants.)	
NGSS Science and Engineering Practices	Practice 7: Engaging in Argument from Evidence Compare and refine arguments based on an evaluation of the evidence presented. Construct and/or support an argument with evidence, data, and/or a model.	
Specific Learning Objectives	Students will understand the differences between seedless and seed plants. Students will be able to classify plants based on how they reproduce, or form offspring.	
Materials	• California Science Grade 5 Interactive Textbook by Macmillan/McGraw- Hill (Chapter 2 pages 22-24). • Orange seeds • Wallet size color pictures of seedless and seed plants • Large T-Chart where students will classify plant pictures into two columns • Science Journals • Glue sticks	
Lesson Plan	Teacher asks/says/does:	Student asks/says/does:

Engage Concept/Learning Goal: Students begin to think about different types of plants.	1. Introduce the lesson objective. 2. Tell students story about an orange tree that was attacked by a wild rabbit that ate the oranges but left the seeds behind. Show students orange seeds. 3. Ask the students questions about how a person could grow a new tree. 4. Display pictures of a seed plant and a seedless plant to the whole class using the ELMO. 5. Ask students questions about the pictures. Use equity sticks to ensure a variety of voices.	1. Students will ask clarifying questions about the lesson objective and the lesson in general. 2. Students will be active listeners as the teacher tells the story of the wild rabbit and the orange tree. 3. Students will observe the orange seeds. 4. Students will observe the plant pictures and will offer comments, information, or questions about the pictures. Students will answer the teacher's questions by volunteering or being called on.
Instructional Strategies Used (with rationale):	Visuals are used so that students can connect to what they are hearing. The pictures of the two types of plants help activate student prior knowledge that they can draw upon during the remaining portion of the lesson.	
How is student participation ensured?	Whole Group Discussion Equity Sticks	
Questions and Levels of questioning (Blooms) used:	*What can a person do with the orange seeds that were left behind by the rabbit?* *Who can describe the plants for me?* *Give me similarities, and differences between these two pictures.*	Students recall or use previous knowledge to discuss and identify the plants in the pictures to form ideas and ask relevant questions about them.

	What do you know about each and what do you want to know?	
Explore Concept/Learning Goal: Students use prior knowledge to classify plants.	1. Provide each student with four different pictures of plants. Instruct students to work individually to classify the plants into categories based on how they reproduce (seeds or seedless). 2. Ask students to record their initial observations about the plants in their journals. 3. Have students discuss their initial thinking with a partner. Ask partner pairs to give examples of how they chose to classify the plants they were given. 4. Write students answers on the ELMO so all students can see responses.	1. Students sort (classify) the different plants into categories based on whether they are seedless plants or seed plants. Students record their initial observations about the plants in their science journals. 2. Students share their thinking with a partner. 3. Students volunteer or will be called on to describe the way they chose to classify their plants. 4. Students are actively listening to their peer's examples of classification.
Instructional Strategies Used (with rationale):	Students are given individual think before they work with a partner. This allows for increased participation in both the partner share and whole class discussion.	
How is student participation ensured?	Pair-Share Whole Group Discussion	
Questions and Levels of questioning (Blooms) used:	*What do you know about each plant in front of you?* *Why did you sort the plants in that particular way?* *Is there a plant that you were unsure of how to classify?*	Students apply prior knowledge to classify the different plants into categories based on what they know about plants. Students infer how the plants reproduce based on the pictures they classified

Explain Concept/Learning Goal: Students will read about how plants reproduce in a scientific text.	1. Ask students to put the pictures and journals aside and take out their textbooks. 2. Have students read a paragraph aloud (pages 22-23) while the rest of the students follow along in their own textbooks. Stop the students periodically throughout the reading to ask questions and check for understanding. 3. Ask students to explain concepts about vascular plants and vocabulary (roots, stems, leaves, seed, and spore) throughout the reading. 4. Ask students to read page 24 independently. Ask questions to check for understanding. 5. Use the ELMO to review the scientific content and vocabulary from the reading. Ask the students to write the information from the ELMO in their journals.	1. Students will put the pictures and journals aside and take out their science textbooks. 2. Students will participate in popcorn reading when called on. Students will follow along as their peers read the textbook (pages 22-23) aloud to the class. Students will answer the teacher's questions and ask questions about the reading. 3. Students will explain concepts about vascular plants and their classification in their own words. They will also define vocabulary (roots, stems, leaves, seeds, and spores) in their own words. 4. Students will read page 24 in their textbook independently. The students will ask questions they may have about what they just read. 5. Students will write about vascular plants and differences between seedless and seed plants. They will also write the scientific terms and definitions in their journals.
Instructional Strategies Used (with rationale):	The teacher calls on students to read aloud so that students can hear fluent reading and proper pronunciation of scientific terms and vocabulary. The teacher will guide reading and correct grammar when necessary. The teacher explicitly attends to scientific terms and definitions to help students access the text.	

How is student participation ensured?	Popcorn Reading Individual Reading Writing in Journals	
Questions and Levels of questioning (Blooms) used:	*Who can give me an example of a seedless plant?* *Who can give me an example of a seed plant?* *Who can tell me what a root is and what it does?* *Who can tell me in their own words how vascular plants are classified?*	Students will identify different vascular plants. They will also explain the lessons concepts in their own words and define vocabulary. The students will record important points, vocabulary and concepts in their journals with the help of the teacher.
Elaborate Concept/Learning Goal: Students will apply what they read to classify the plants.	1. Model for students how to classify the different plants into two categories (seedless and seed plants) using a new picture not used at the beginning of the lesson. 2. Instruct students to work in pairs to use what they learned from the reading to classify their stack of vascular plants in into two categories, seedless and seed plants. 3. Once the students have finished classifying with their partners hand out a glue stick to each pair of students. Instruct pairs to bring up a seed plant and a seedless plant to create a whole class T-chart displaying seedless and seed plants. 4. Ask students to give	1. Students will actively listen and observe the teacher as she gives instructions for the new activity. 2. Students will work in pairs using the facts and definitions recently learned from the textbook to classify their stack of vascular plants into two categories, seedless and seed plants. 3. Students will choose a seedless plant and a seed plant to bring up to the T-chart where they will glue their pictures in the appropriate place on the chart to create a whole class T-chart. 4. Students will justify their classification using evidence from the text.

	evidence and verbally explain why they classified each plant the way they did using the newly learned information and vocabulary. 5. Ask the class if they disagree with the placement of any of the pictures.	
Instructional Strategies Used (with rationale):	Students will apply what they just read to classify vascular plants. Students will support their classification using evidence from the text.	
How is student participation ensured?	Pair-Share Whole Class Presentation	
Questions and Levels of Questioning (Blooms) Used:	*Can you explain why that particular plant is seedless?* *How does that plant reproduce?* *Can you name one characteristic of a seedless plan that is different from a seed plant?* *Did you classify any pictures differently than you did at the beginning of the lesson?* *Do you agree with how the plants are classified on the T-chart? Why or why not?*	Students apply their newly learned information to complete the T-chart. Students will identify their plant and explain why they classified it the way they did using new concepts and vocabulary.
Evaluate Concept/Learning Goal: Students will synthesize what they learned during the	1. Use the ELMO to show students how to create a Venn diagram in their science journals. Ask them to use the Venn diagram to compare and contrast vascular plants (seedless and seed plants).	1. Students will compare and contrast seed and seedless plants using a Venn diagram. 2. Students will write down the five terms and explain the function of each in a vascular plant.

lesson.	Model for students how to complete the Venn diagram using one characteristic of vascular plants. 2. Ask students to give the functions of the five key parts of a vascular plant (e.g., roots, stems, leaves, seeds, spores).	
Instructional Strategies Used (with rationale):	The two tasks in this portion of the lesson are designed so that students will synthesize the main ideas from the lesson.	
How is student participation ensured?	Individual Activity	
Questions and Levels of Questioning (Blooms) used:	*What are similar characteristics of seed and seedless plants?* *What are differences between seed and seedless plants?* *Name the functions or jobs of the roots in a vascular plant.* *Briefly explain how a seedless plant reproduces.* *Name the functions or jobs of the leaves in a vascular plant.*	Students need to recall what they have learned to compare and contrast seedless and seed vascular plants. Students need to explain the functions of each vocabulary term in a vascular plant.