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| **Grade 5** | **Lesson:** **Traits of Organisms Part 6****Traits of Plants** | Reference to English Interconnections LessonNone |
| **Science Standard(s): Standard 5 Objective 1**  |
| **Content Objective(s):** | **Language Objective(s):** |
| Students will demonstrate how parent plants share traits with their offspring plants by creating a plant with a partner and displaying it in the class flower garden of traits with a written paragraph.***I can show how parent plants share traits with their offspring plants by creating a paper plant with a partner and displaying it in the class flower garden with a written paragraph.******我可以跟我的同伴用纸做植物，展示亲代和子代植物的共同特征。然后，写一段话，并把植物在班上的花园里展示。*** | Students will be able to identify similarities and differences in two plants grown from seeds of a parent plant by talking with a partner and writing them down independently. ***I can state similarities and differences in two plants grown from seeds of a parent plant by talking with a partner and writing them down on a paper all by myself.*****我可以陈述两个有相同亲体的种子植物的相同点和不同点，然后独立写把陈述的内容写下来。** |
| **Essential Questions:***How can you provide evidence that shows traits are passed from parent to offspring?* *你怎么提供证据可以证明/展示一种特征是从亲体遗产给后代的？* | **Required Academic Vocabulary for Word Wall:****Listen:** traits, offspring, parent, reproduce, pollinate, plant cycle, inherit特征、后代、亲体、繁殖／繁衍、授粉、植物周期、遗传**Speak:** traits, offspring, parent, inherit特征、后代、亲体、遗传**Read:** **Write:** traits, offspring, parent, inherit特征、后代、亲体、遗传**Sentence Frames:**The offspring inherits \_\_\_\_\_\_\_\_ from \_\_\_\_\_\_\_\_.后代从\_\_\_\_\_\_\_\_那里遗传了\_\_\_\_\_\_\_\_ |
| **Materials:*** Pansies in different colors OR
* Large picture of Pansies
* Large picture of Gregor Mendel
* Large picture of Plant Cycle
* Trait Description 1
* Trait Description 2
* Coins- 1 for every partnership
* Blank paper- 2 sheets for each partnership
* Lined paper- 1 sheet for every student
* Construction paper
* Scissors- 1 pair for each partnership
* Glue- 1 for each partnership
* Crayons
 | **Additional Lesson Vocabulary:**Petal, stem, leaf, even, odd, thorns, veins, round, oval, center花瓣，茎，叶，偶数，奇数，刺，脉，圆形，椭圆形，中心 |
| **Lesson:**  | **Instructional Time: 45 Minutes** |
| **Opening:** **(5 minutes)**Hook: Bring a couple of pansies to class with different colors, or post the picture of pansies. “Look at these flowers. They are all pansies.”看看这些花。他们都是三色紫罗兰。Question: “What traits do these flowers have? Turn to your partners and tell them the different traits these flowers have.”这些花有什么的特征？跟你的伙伴，告诉他们这些花有什么不同的特征* Have a couple of students share their ideas.

Question: “Do you think these pansies with different colors had the same parents or different parents? Turn to your partners and answer the question and explain your reasoning.” 你觉得这些不同颜色的三色紫罗兰，有一样还是不一样的亲代？跟你的伙伴一起回答问题，并解释你的原因。* Have a couple of students share their ideas.

Explain: “The truth is, we don’t know for certain. But the answer that might surprise you is that although these flowers have completely different colors, they could have had the same parents. Today we are going to learn about plants and how the offspring plants can inherit traits from two different parent plants.”事实是，我们不确定。可是答案可能会让你大吃一惊，虽然这些花有完全不同的颜色，他们可以有相同的亲代。今天我们要学植物后代如何从两个不同的母体/亲代遗传它们的特征。“Introduce the Objectives: Have the students read the content objective with their partners and tell each other one new skill they want to have by the end of this lesson.**Introduction to New Material (Direct Instruction): (10 minutes)**Explain: “We have learned that humans and animals pass their traits on to their offspring. We know that even plants pass on traits. But how is it possible for a plant with flowers one particular color can have offspring with flowers a different color? I thought offspring were supposed to look like their parents. Just like a human or animal, the offspring receives some traits from its mother and some from its father. Plants also have a mother and a father. There can be two plants that are the same type of plant, such as a pansy.” “我们已经学了，人类和动物可以把它们的特征遗传给后代。我们知道，植物也会遗传特征给后代。可是，为什么一种只有一种特定的颜色的花，它的后代的花可以有不同的颜色呢？我认为后代应该看起来像他们的父母/亲代。就像一个人或动物，它们的后代会遗传亲代的一些特征。植物也有一个母亲和一个父亲。它们可以是两种一样类型的植物，比如三色紫罗兰”Show the class the picture of pansies. “Some are red, others are yellow, and some are purple. Some may have dark green stems, while others might have light green stems. Some have a yellow center, while others have a white center. Each plant has a special set of traits. When a mother plant with its set of traits pollinates a father plant with its set of traits, there becomes an offspring plant with a mix of these traits.”“有些是红色的，有些是黄色的，有些是紫色的。有些可能有深绿色的茎，而有些可能有浅绿色的茎。一些中间是黄色的，而有些中间是白色的。每朵花都有一套特殊的特征。当植物的母体有一套特征，父体也有一套特征，当授粉给植物的父体的时候，它们的后代就会有这两套组合起来的特征。“Question: “In past years, we have learned about the plant cycle and how plants reproduce through a process called pollination. What are the different parts of the plant cycle? Look at the picture of the plant cycle here, turn to your partners and explain the parts and process of the plant cycle.” “在过去的几年中，我们已经学了植物周期。我们也学了植物怎么通过授粉这个过程来繁殖。植物周期的由哪几部分组成？看看这些植物周期的图片，跟伙伴解释这些部分，以及植物周期的过程。“ Post the picture of the plant cycle on the board or under the document camera.* Have a couple of students share with the class what they discussed with their partners. Review with the students the process of pollination and germination.

Explain: “We have learned in past years that a plant pollinates and reproduces by transferring its pollen to another plant. Wind, animals, and insects can transfer the pollen. Through this process, offspring seeds are created and grown in the plant. At some point, the seeds are spread and shared. Wind, animals and insects can scatter the seeds as well. When the seeds are planted, receive water and sunlight, they grow. This offspring plant will have some traits from each parent plant. An important man named Gregor Mendel learned a lot about the traits of plants in the 1800’s. He was a monk and a scientist. He experimented with pea plants which showed how various traits of the offspring plants were inherited from each of the parent plants.” 在过去几年中，我们已经学了植物的授粉和繁殖就是把花粉从一种植物转移到另一种植物。风，动物和昆虫可以转移花粉。通过这个过程，后代的种子形成了，并在植物里生长。有些时候，种子被传播和分享。风，动物和昆虫也可以分散种子。当种子被种下去以后，收到水和阳光，他们就开始成长。后代的植物将会有分别来自父体和母体的一些特征。有一个重要的人叫Gregor Mendel，他在1800年学到了很多关于植物的特征。他是一个和尚，也是一个科学家。他用豌豆做实验，展示/证明，植物后代的各种特征是从父体和母体继承来的。“Post the picture of Gregor Mendel.Question: “How are plants and humans similar in the way they pass their traits to their offspring?” “植物和人类都将自己的特征遗传给后代，它们在哪些方面是相似的？”* Have a couple of students share with the class what they discussed with their partners.

**Guided Practice: (12 minutes)**Explain: “We are going to do a little experiment to see how offspring plants inherit traits from each of their parents. We have two plants here.” 我们要做一个小实验，来看看植物的后代是如何从父体和母体遗传特征的。我们这里有两种植物。 Post the Trait Description 1 of the two plants. “They are the same type of plant, but they have different traits. Parent 1 and Parent 2 are going to pollinate and make an offspring. We are going to determine which traits it will have by flipping a coin. Heads will mean Parent 1 and Tails will mean Parent 2. You will be working with a partner. I will flip the coin to see which traits the offspring will inherit, and each partnership will have one paper to draw that trait. You may use crayons. Each partner will take turns orally identifying the trait inherited, and from whom. You may choose to use the sentence frame, ‘The offspring inherits \_\_\_\_\_\_\_ from \_\_\_\_\_\_\_’ but feel free to use similar language to express your statement.” “它们是相同类型的植物，但它们有不同的特征。亲体1和亲体2将要授粉，形成后代。我们用掷硬币的方法，决定它们的后代有哪些特征。头是亲体1尾巴是亲体2。你跟你的伙伴一起。我会用掷硬币的方法看看它们的后代有哪些特征。每组都会有一张纸，你们要在纸上画出那个特征。你可以用蜡笔。每个人要轮流说什么特征被遗传了，是从谁那里遗传的。你可以选择使用的句子框架。“这个后代从\_\_\_\_\_\_\_\_\_\_\_\_\_\_那里遗传\_\_\_\_\_\_\_\_\_\_\_\_\_\_”。你也可以用其他相似的方法来表达你的意思。”Post the sentence frame and pass out the paper. *Use the modeling cycle:**Teacher Does:** Use a puppet, stuffed animal or an imaginary group member to model. Flip the coin. “We are going to look at the first trait- petals. We will determine the color, shape and number. The coin says heads, so the offspring will get its petals from Parent 1. I am partner 1, so I will say my statement and then partner 2 will draw the trait on our paper with crayons. ‘The offspring plant inherits an odd number of red, round petals from plant Parent number 1.’ My partner now draws that trait on our paper, quickly. Next time Partner 2 will say the statement and Partner 1 will draw.”
* “我们现看的第一个特征---花瓣。我们来决定它的颜色，形状和数量。硬币说头，所以后代会从亲体1那里遗传花瓣。我的伙伴1，所以我会陈述，伙伴2会用蜡笔在纸上画这个特征。植物后代从亲体1那里遗传了奇数的红色的，圆形的花瓣。我的伙伴现在纸上很快地画一下这个特征。然后伙伴2陈述，伙伴1画。 Have all partnerships draw this plant trait on their papers.

*Teacher Does with a Student:** Call up a student to help you model. Flip the coin. “We are now looking at the second trait- the stem. The coin says tails so the offspring will get its stem from Parent 2. I am going to be partner 1 this time, so my partner 2 will say the statement, and I will draw the trait on our paper with crayons.” “我们现在看第二个特征--茎。硬币说的尾巴，所以后代会从亲体2得到遗传。我是伙伴1，所以我的伙伴会陈述，我会在纸上画它的特征。“The student should say, “The offspring inherits its light green, short stem with thorns from Parent 2.” 植物后代从亲体2遗传了它的浅绿色的叶子，有刺的短茎。Draw the trait on the paper quickly using crayons. Have all partnerships draw this plant trait on their papers.

*Two Students Do:** Call up two students to help you model. Flip the coin. “We are now looking at the third trait- the leaves. The coin says tails, so the offspring will get its stem from Parent 2.” “我们现在看第三个特征—叶子。硬币说的尾巴，所以植物后代会从亲体2遗传到叶子的特征。The student who is partner 1 should say, “The offspring inherits its light green, oval leaves with even number of veins from Parent 2.” 。伙伴1应该说“后代从亲体2遗传了浅绿色的叶子，椭圆形的叶子，和偶数的叶脉。Partner 2 will draw the trait on the paper quickly using crayons. Have all partnerships draw this plant trait on their papers.

*All Students Practice:** Finish the rest of the first description. Use the same description of Parent 1 and Parent 2 to make another flower and pass out another sheet of paper. Flip the coin and go through the traits one by one as a class. Ensure that the coin toss is creating a different plant than the previous one. Partner 1 and Partner 2 will take turns saying their statement and drawing the picture.

Explain: “We have two completely different offspring plants that have come from the same two parent plants. Let’s identify some similarities and differences between these two plants. As I write them down on the board, we will all write them down on one of our flower papers. You should now have two drawings of flowers on your desks, so each of you will have a paper to write on.” “我们有两个完全不同的植物后代，它们都来自相同的两个母体植物。让我们来辨别一下这两个植物的一些相同和不同特征。我在黑板上写下来，我们都要在我们画了花的纸上写下来。你们现在应该有两张有花的纸，所以你们每个人都有一张可以写。”Question: ”Let’s look at some similarities. What do these two plants have in common? Turn to your partners and identify some similarities.”“让我们来看看一些相似的特征。这两种植物有什么共同特征？跟你的伙伴，辨别出/找出一些相似的特征。”* Have a couple of students share with the class what they discussed with their partners.
* Write some of the similarities on the board and have the students write similar sentences on their papers. Encourage the students not to simply copy what you are writing. Have them write similar ideas.

Question: ”Let’s look at some differences. What is different about these two plants? Turn to your partners and identify some differences.” “让我们来看看一些不同的特征。这两个植物有什么不同的特征？跟你的伙伴，辨别出/找出一些不同的特征。”* Have a couple of students share with the class what they discussed with their partners.
* Write some of the differences on the board and have the students write similar sentences on their papers. Encourage the students not to simply copy what you are writing. Have them write similar ideas.

**Independent Practice: (15 minutes)**Explain: “You will now be going through a similar process to make 2 construction plants for our class flower garden of traits. I will be posting descriptors for Parent 1 and Parent 2 on the board. Each of your partnerships will have their own coin. You will take turns flipping the coin. Each of you will take turns saying the statement and making a part of your plant out of construction paper. By the end, you will glue your traits together and have a beautiful, unique plant that is a part of our garden of flowers that all came from the same parents. You will go through the process again to make a second plant from the same parents. When you have made two plants, each of you will also use a piece of lined paper or write in your journals about your two offspring plants. You should write a couple of sentences describing the similarities and differences in the traits of your two plants.”“你现在要用相似的过程，为我们的班花花园做两个construaction植物。我会在白板上描述亲体1和亲体2。每组都会有自己的硬币。您将轮流掷硬币。你们每个人会轮流陈述和在纸上画植物的一部分。最后，你们把所有的特征粘在一起，你们就有了一个美丽，独特的植物。它们将成为我们班花园中的花，而且它们都来自相同的亲体。你会用相似的过程，再做第二个植物。你们做完两个植物以后，你们每个人用了一张横线纸或者用的你的日记本，描述这两个后代植物。你应该写几个句子描述这两个植物特征的相同点和不同点。“ * Students should be familiar with the language and the procedure since a very similar procedure was used during the guided practice. If the students need clarification, use the modeling cycle to model. Ensure all students are using the target language and taking turns. Ensure students each write their own paragraph about their offspring plant. Collect the paragraphs and assess them for accuracy in the content and the language.

**Closing: (3 minutes)**Revisit the Objectives: Have students reread the content objective as a class. Have students explain to their partners one new skill they learned today, and how they know they learned it. Have some students share with the class.Real World Application: Again relate how plants and humans both share traits with their offspring. Remind students that just as there are not two students in the class who look exactly alike, there are also not two flowers that look exactly alike. Even siblings look differently, as do two plants with the same parents. Encourage students to look closely at two different plants that are the same type and have them identify similarities and differences between the two plants. Provide time in a future class period to share their answers. |
| **Assessment:** |
| Observe students during guided and independent practice. Collect their writing sheets to assess their knowledge of the content objectives and ability to use the language objectives. Observe their conversations in guided and independent practice to assess their mastery of the language objective. |
| **Extra Ideas:** |
| Corny Heredity:*Introduction:** Do we all look the same? Yes and No.
* We all look like humans. We have human characteristics such as arms, legs, head, fingers, toes, soft skin, hair on our heads, etc. We don’t have other characteristics like tails, claws, fur, leaves, stems, thorns, etc.
* Although we are all humans, we are not all the same. The color of our hair, eyes, skin, etc. are different. We are different sizes and shapes.
* It is fairly easy for us to distinguish between one human and another, but it isn’t always as easy to tell the difference between two plants.
* We can distinguish a rose from a corn plant, but can you tell the difference between two corn plants? Does that mean all corn plants are exactly the same? What if the plants have the same parent plant?
* Give each group of students a dried ear of Dent corn or Indian corn. Ask each group to make a chart of similarities and differences between the kernels on an ear (each kernel is an individual offspring of the plant that produced the ear). As a class, discuss their observations. Also compare the traits of the two corn varieties.
* (Note: If you do not have ears of corn available, have students compare all of the Dent corn seeds and all of the Indian corn seeds they will germinate.)
* Let’s grow some corn plants to find out if there is a difference.

*Plant and Grow the Corn:** Give each student with a Dent corn and an Indian corn seed.
* Have them draw a picture of each corn seed and describe it in their “Heredity” book.
* Give each student a plastic jewelry bag, 2 cotton balls, cup of water, length of yarn, and permanent marker.
* Have the students use the permanent marker to label one side of their jewelry bag “1” and the other side “2.”
* Dip the cotton ball in water so that it is thoroughly wet.
* Put the Dent corn seed on one side of the ball and place it in the jewelry bag so that the seed faces the side labeled “1.”
* Wet the second cotton ball, put the Indian corn seed on it and place it in the jewelry bag so that it faces the side labeled “2.”
* Seal the bag.
* String the yarn through the hole in the jewelry bag. Tie a knot in the end of the string to form a necklace.
* The bags can be hung from tacks in a bulletin board and taken down each day for student observations. Add water if the cotton balls become dry.
* Each day have students record in their “Heredity” books the changes they observe in their seeds, including information about observable traits such as: number of days from “planting ” until the root and the shoot can be seen; root and shoot lengths and color; and number of leaves and roots.
* Use rulers to measure the length of roots and leaves as they emerge and grow.
* As a class, make charts and graphs for all of the measurable traits (root and leaf length) for each type of corn seed.
* Compare and contrast the amount of variation present among the offspring of each type of parent plant (Dent corn and Indian corn).
* Students should observe that all seedlings of the Dent corn variety (which has been bred for mass production) are very similar, while more differences can be observed among the Indian corn seedlings (which have not been selected as often).
* (Note: The corn seeds will sprout in 3-6 days. Planting them on a Friday and making the first observations on Monday is a quick way to speed up this activity.)
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Trait Description 1

Parent #1: Red petals, round in shape, odd number

 Dark green, tall stem, no thorns

 Dark green, round leaves, odd number veins

 Yellow, small center, no visible seeds

Parent #2: White petals, oval in shape, even number

 Light green, short stem, with thorns

 Light green, oval leaves, even number veins

 Orange, large center, with visible seeds

特征描述1

亲体1：红色的花瓣，圆形，奇数

深绿色，高大的茎，无刺

深绿色，圆叶，奇数叶脉

黄色，小中心，无肉眼可见的种子

亲体2：白色花瓣，椭圆形，偶数

短茎，浅绿色，带刺

浅绿色，叶椭圆形，偶数叶脉

橙色，大中心，可见叶子

Trait Description 2

Parent #1: Yellow petals, round in shape, odd number

 Light green, short stem, with thorns

 Dark green, round leaves, odd number veins

 Purple, small center, no visible seeds

Parent #2: Orange petals, oval in shape, even number

Dark green, tall stem, no thorns

 Light green, oval leaves, even number veins

 Blue, large center, with visible leaves

特征描述2

亲体1：黄色的花瓣，圆形，奇数

短茎，浅绿色，带刺

深绿色，圆叶，奇数脉

紫色，小中心，无肉眼可见的种子

亲体2：橙花瓣，椭圆形，偶数

深绿色，高大的茎，无刺

浅绿色，叶椭圆形，偶数脉

蓝色，大中心，可见叶