

Georgia Performance Standards

SCIENCE
GRADE 5

S5L2: Students will recognize that offspring can resemble parents in inherited traits and learned behaviors.

- Compare and contrast the characteristics of learned behaviors and of inherited traits.
- Discuss what a gene is and the role genes play in the transfer of traits.

THEATRE ARTS

GRADE 5

TAES5.3: Acting by developing, communicating, and sustaining roles within a variety of situations and environments

National Standards

SCIENCE

NS.5-8.3: As a result of activities in grades 5-8, all students should develop understanding of:

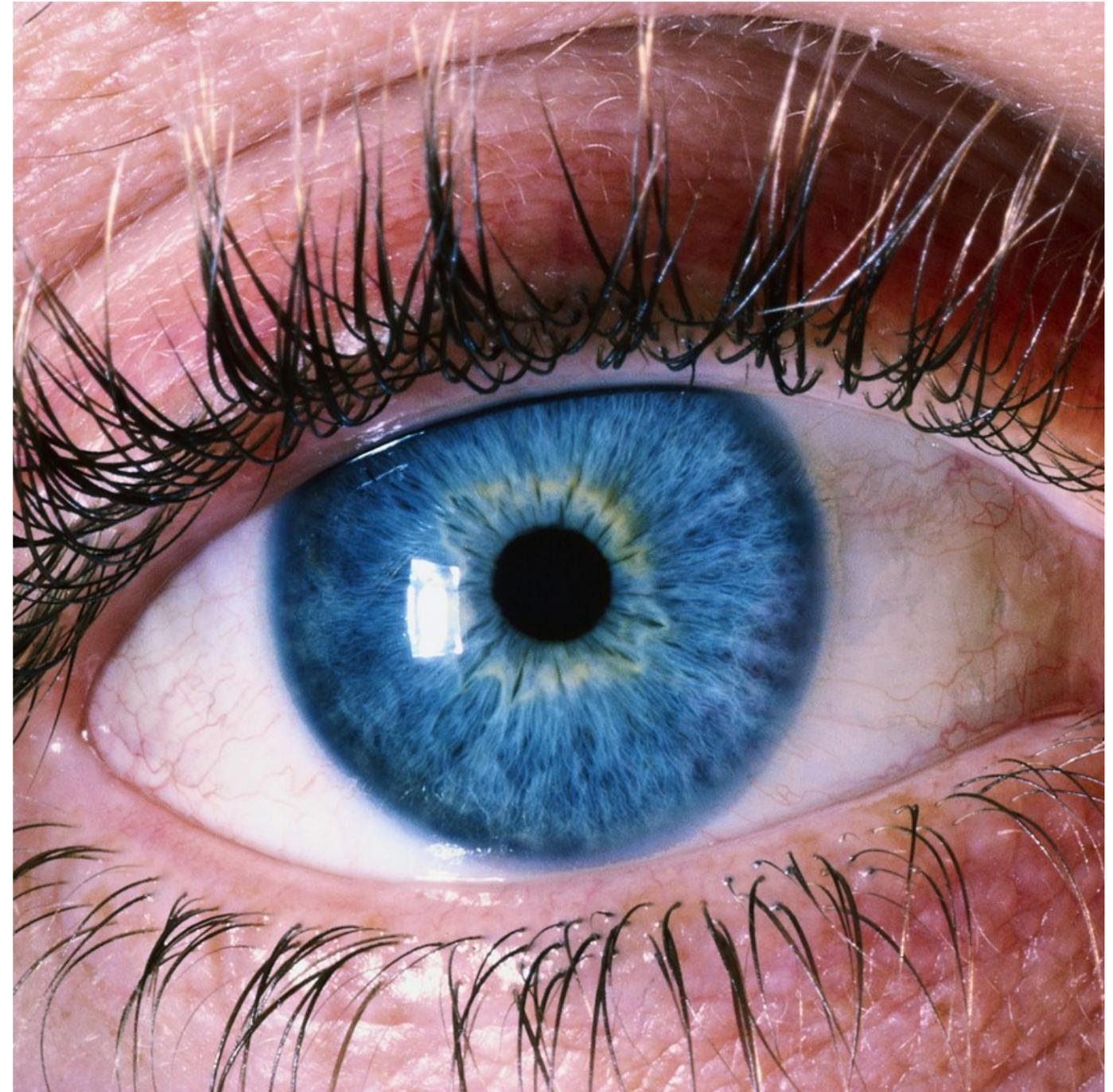
- Reproduction and heredity

THEATRE ARTS

Standard 2: Acting by assuming roles and interacting in improvisations

Standard 5: Researching by finding information to support classroom dramatizations

Embodying Science • Community • Inherited Traits •
Learned Behaviors • Heredity •



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Students will discover the difference between inherited traits and learned behaviors by bringing the traits to life in a game of charades. After that, the students will demonstrate knowledge of recessive and dominant traits as they help the Egg, Cantaloupe and Ball families create their offspring in “The Gene Connection Show”. Learning will deepen through empathetic role playing as students place themselves inside the standards and learn from the inside out.

Essential Question: How can the process of acting increase comprehension in other subject areas?

Process:

Inherited Traits vs Learned Behaviors – Use the vocabulary movements each time you say the words.

- Ask students to describe themselves.
- Have them write down 5 characteristics that describe themselves.
- Have them circle their favorite and ask them to show you with a sound and movement all at the same time on a count of three.
- You might have said that you have blue eyes, and that you like to skateboard.
- Now let’s look at our list.
- How many of your descriptions could also describe someone in your family?
- Probably only a family members like to skateboard...but one of your parents has blue eyes.
- Your eye color came from your parents, however you learned to skateboard.
 - Traits are physical attributes
 - Behaviors are actions
- Humans and other animals are a mix of characteristics from their parents and behaviors they learned on their own
- A physical characteristic that is passed from a parent to their baby (offspring) is an **inherited trait**. For example: Eye color, Skin color, Hair color, Curly or straight hair, Dimples, Freckles, Height
 - Are your ear lobes attached to the side of your head, or do they hang free?
 - The shape of your ear lobe is an inherited trait.
- A **behavior** is a way of acting. Behaviors can be inherited too. Inherited behaviors are called **instincts**. Many animals are born with instincts that help them survive.
 - Can you think of any animal instincts?
 - When the weather turns chilly in the fall, animals prepare for the winter by instinct.
 - Some animals head for warmer climates during the winter. Other animals find a safe spot and curl up for a long sleep.
 - No one taught these animals how to survive winters. They know what to do by instinct.
- Are you better at using the computer than some of the adults in your family? If so, you learned how to do this. You did not inherit this behavior from your parents. We do many many **learned behaviors** that helps us every day. These behaviors include how to make a sandwich, wakeboard, and be polite to others.

Inherited Traits vs Learned behavior Charades

- Ask a student to come to the front of the classroom and pick a card.
- Have them act out the trait/behavior on the card and ask other students to guess what is was.
- Then ask students to decide if it is an inherited trait or a learned behavior.

Heredity Review

- We can see that many of our traits are inherited and predetermined. We can’t decide what color eyes we want to have then make them that color, can we?
- We know that inherited traits are passed down from parents to offspring. Heredity is the passing on of traits and physical features from parents to their children. **Our parents pass these traits and features on to us through their genes.**
- **Genes** are the tiny sets of instructions in each human cell that determines inherited physical features and other traits. We get them from our parents. They help make us who we are. They affect how our body grows or looks and how you do things (artistic genes, mind for math). They carry information that helps make you who you are: curly or straight hair, long or short legs, even how you might smile or laugh, are all passed through generations of your family in genes.
- **Genetics** is the branch of science that studies how traits are passed down from one generation to another. Humans have 23 sets of chromosomes in each cell in their body. Traits like a person's height, eye and hair color, and intelligence are all examples of those things that are determined by a person's genes. The code is found on a double strand that is known as DNA.
 - For example, if both of your parents have green eyes, you might inherit the trait of green eyes from them. Or if your mom has freckles, you might inherit that trait and wind up with a freckled face. And genes aren't just in humans — *all* animals and plants have genes, too.

Materials

- Recessive and Dominant Gene Cards (4 of each)
- Large 3M post it note board or you can draw on a dry erase board
- Markers
- Game show music
- Index cards illustrating inherited traits and learned behavior for charades

Vocabulary

Heredity

Passion of traits from parents to offspring during reproduction

Inherited trait

Traits passed on from parents to offspring that are controlled by genes

Instinct

A way of acting that was passed onto you by your parents. Inherited behaviors are called instincts.

Behavior

A way of acting

Learned Behavior

Behavior that develops from observation or instruction rather than being passed down by heredity

Offspring

New organisms that have come from parents that have reproduced

Organism

A living thing

Trait

Characteristic of an organism, physical characteristics

Dominant trait

A genetic factor that blocks another genetic factor.

Recessive trait

A genetic factor that is blocked by the presence of a dominant factor.

Genes

The basic building blocks of heredity. They contain information about what kind of traits you will have.

Recessive vs. Dominant Gene Review

Now let’s look at how this gene stuff works.

Let’s say I have green eyes but my sister has brown eyes.

It’s a little complicated...let’s draw it out.

When it comes to eyes, each person gets two eye color genes—one from your Mom and one from your Dad

That means you can end with two genes that are the same color or two genes that are different colors—Like two green genes or two brown genes or one green and one brown.

What do you think happens if you have two dark brown genes (you have brown eyes)?

What do you think happens if you have one brown gene and one green gene (one green eye and one brown eye)?

No! You will have two beautiful brown eyes.

The dark brown eye genes are **dominant genes**, which means that they are stronger than green genes

The green eyes are the **recessive genes**. That means that they are weaker and only show up when there are two of them.

These equations are a great way to remember who wins in the gene game:

$$R + R = R$$

$$D + D = D$$

$$R + D = D$$

Gene Connection Show

Let’s see how this works!

Can we help the Egg family and the Melon Family and the Ball Families today?

They are going to have a baby and we need to help them determine what their baby will look like based on what they look like and what their genes look like. We are going to determine 3 characteristics of their baby egg: hair color, hair type, dimples or no dimples, free or attached earlobe, freckles or no freckles, eyebrow shape or tongue rolling ability.

The gene cards that the parents carry will inform us of the outcome, but we need to know if the genes are dominant or recessive to know which gene wins out and gets to the baby of the family.

Let’s play “The Gene Connection Show”.

We have a deck of cards that has been dealt to each family. Let’s start with the Egg family.

Can I have two volunteers to be Mr. and Mrs. Egg, please?

- Hand out Mr. Egg cards (hair type, hair color, dimples) and Mrs. Egg cards (hair type, hair color, dimples)
- Draw an oval egg on the board between them as they decide which traits will be passed down to the baby egg.
- Every time a decision is made on a trait, ask a student to put the correct equation on the trait.
- Repeat this process with the other two families of volunteers for the Melon Family and the Ball Family.
- Make sure to give specific praise for each student that participates.

Vocabulary Movements:

Inherited Traits

“in” - hands on both hips (parent)

“herited” - both hands out as if giving then make arms as if holding a baby (giving to offspring)

“trait” - point to eye (eye color)

Learned Behavior

“learned” - point to temple with right pointer finger

“behavior” - pretend to be texting on the phone

Recessive

“re” - hands curl back towards body

“cessive” - make the number 2 with right hand

Dominant

“do” - two muscle arms

“mi” - 1 finger up on right hand

“nant” - 2 fingers up on right hand

Assessment

- Students should accurately identify dominant and recessive genes
- Students should recognize the difference between inherited traits and learned behaviors
- Students accurately act out assigned inherited trait or learned behavior