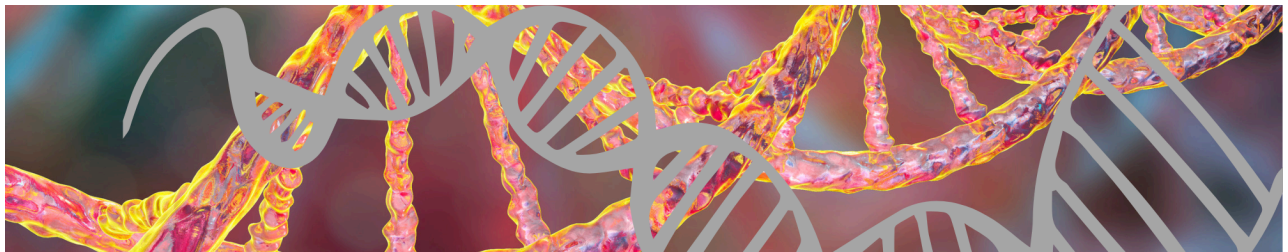




# artsNOW

Integrated learning solutions

## THE GENE CONNECTION SHOW Grade Band: 4-5 Content Focus: Theatre & Science



### LEARNING DESCRIPTION

Students will discover the difference between inherited traits and learned behaviors by bringing the traits to life in a game of charades. Next, 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 role playing as students place themselves inside the standards and learn from the inside out.

### LEARNING TARGETS

Essential Questions	“I Can” Statements
How can theatrical techniques help us understand genetics on a deeper level?	I can accurately identify dominant and recessive genes.
What is the difference between inherited traits and learned behaviors?	I can recognize the difference between inherited traits and learned behaviors,



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	I can accurately act out assigned inherited traits and learned behaviors.
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**GEORGIA STANDARDS**

Curriculum Standards	Arts Standards
<p><b>Grade 5:</b> S5L2. Obtain, evaluate, and communicate information showing that some characteristics of organisms are inherited and other characteristics are acquired. a. Ask questions to compare and contrast instincts and learned behaviors. b. Ask questions to compare and contrast inherited and acquired physical traits. (Clarification statement: Punnett squares and genetics are taught in future grades.)</p>	<p><b>Grade 5</b> TA5.CR.1 Organize, design, and refine theatrical work. TA5.CR.2 Develop scripts through theatrical techniques. TA5.PR.1 Act by communicating and sustaining roles in formal and informal environments.</p>

**SOUTH CAROLINA STANDARDS**

Curriculum Standards	Arts Standards
<p><b>Grade 3:</b> 3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have inherited traits that vary within a group of similar organisms.</p>	<p><b>Anchor Standard 1:</b> I can create scenes and write scripts using story elements and structure.  <b>Anchor Standard 3:</b> I can act in improvised scenes and written scripts.  <b>Anchor Standard 8:</b> I can relate theatre to other content areas, arts disciplines, and careers.</p>

**KEY VOCABULARY**

Content Vocabulary	Arts Vocabulary
<ul style="list-style-type: none"> <li>● <u>Heredity</u> - Passing of traits from parents to offspring during reproduction Inherited trait</li> <li>● <u>Traits</u> - Passed on from parents to offspring that are controlled by genes</li> <li>● <u>Instinct</u> - A way of acting that was passed onto you by your parents; inherited behaviors are called instincts</li> </ul>	<ul style="list-style-type: none"> <li>● <u>Theater</u> - Dramatic literature or its performance; drama</li> <li>● <u>Character</u> - A person, an animal or other figure assuming human qualities, in a story</li> <li>● <u>Body</u> – An actor’s tool, which we shape and change to portray the way a character looks, walks, or moves</li> </ul>



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| <ul style="list-style-type: none"> <li>● <u>Learned behavior</u> - Behavior that develops from observation or instruction rather than being passed down by heredity</li> <li>● <u>Offspring</u> - New organisms that have come from parents that have reproduced</li> <li>● <u>Organism</u> - A living thing</li> <li>● <u>Trait</u> - Characteristic of an organism, physical characteristics</li> <li>● <u>Dominant trait</u> - A genetic factor that blocks another genetic factor</li> <li>● <u>Recessive trait</u> - A genetic factor that is blocked by the presence of a dominant factor</li> <li>● <u>Genes</u> - The basic building blocks of heredity; they contain information about what kind of traits you will have</li> </ul> | <ul style="list-style-type: none"> <li>● <u>Ensemble</u> - All the parts of a thing taken together, so that each part is considered</li> </ul> |
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## MATERIALS

- Recessive and dominant gene cards (four of each)
- Optional game show music
- Index cards illustrating inherited traits and learned behavior for charades

## INSTRUCTIONAL DESIGN

### Opening/Activating Strategy

- Start with a general physical warm-up to get the students' bodies ready. Use exercises such as:
  - **Stretching:** Stretch all major muscle groups.
  - **Shaking Out Limbs:** Shake out arms, legs, and the whole body to release tension.
  - **Energy Passes:** Stand in a circle and pass a clap or a simple motion around to build group focus and energy.
- Tell students that they will be using movements to help them remember vocabulary from the lesson. Every time students hear the vocabulary word, the class will use the movements.
  - **Teach the following vocabulary movements:**
    - Inherited Traits



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- “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 two with right hand
- Dominant
  - “do” - two muscle arms
  - “mi” - one finger up on right hand
  - “nant” - two fingers up on right hand

## Work Session

*Remind students that every time they hear the terms inherited trait, learned behavior, recessive and dominant, they should use their bodies to make the movements that they learned in the activator.*

### INHERITED TRAITS VERSUS LEARNED BEHAVIORS

- Ask students to describe themselves in five characteristics.
- Have them circle their favorite and ask them to show it with a sound and movement simultaneously on a count of three.
  - Now ask students to look at their list and see how many of their descriptions could also describe someone in their family.
    - For example, probably only a few, if any, family members like to skateboard...but one parent might have blue eyes. Tell students that their eye color comes from your parents; however they 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 offspring is an inherited trait. For example: Eye color, skin color, hair color, dimples, freckles, height, etc. Ask students, “Are your earlobes attached to or detached from the side of your head? 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. Ask students if they can 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.
    - Ask students if they are better at using technology than some of the adults in their family. If so, they learned how to do this. They did not inherit this behavior from their parents.



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- Tell students that we do many many learned behaviors that help us every day. These behaviors include things like how to make a sandwich, use a computer, and be polite to others.

### **INHERITED TRAITS VERSUS LEARNED BEHAVIOR CHARADES**

- Give each student a 3x5 card. On the card, students will write a trait or behavior. Collect all cards and put them in a bucket/bag/box.
- Ask a student to come to the front of the classroom and pick a card.
- Have students act out the trait/behavior on the card and ask other students to guess what it is.
- Then ask students to decide if it is an inherited trait or a learned behavior.

### **HEREDITY REVIEW**

- Tell students that we can see that many of our traits are inherited and predetermined. For example, 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 have freckles. And genes aren't just in humans — all animals and plants have genes, too.

### **RECESSIVE VERSUS DOMINANT GENE REVIEW**

- Tell students that now you will look at how genetics actually work.
- For example, let's say you have green eyes but your 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 mother and one from your father. 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 brown eyes. The dark brown eye genes are dominant genes, which means that they are stronger than green



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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

- Tell students that now they will help the Egg family, the Melon Family and the Ball Family.
- Each family is going to have a baby and the class will help them determine what their baby will look like based on what they look like and what their genes look like.
- Students will determine the following characteristics of their baby egg: hair color, hair type, dimples or no dimples, free or attached earlobe, freckles or no freckles or eyebrow shape.
- Tell students that the gene cards that the parents carry will inform the class of the outcome, but they 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"!
  - Tell students that a deck of cards has been dealt to each family.
  - Starting with the Egg family, ask for two volunteers to be Mr. and Mrs. Egg.
    - 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.

### Closing/Reflection

- Close the lesson with a ticket out the door. Ask students to go back to their list of five characteristics from the beginning of the lesson. They should now write down which are inherited traits and which are learned behaviors (and which might be a combination!).
- Have students share with a neighbor. Remind students to explain why they classified each characteristic as they did.

## ASSESSMENTS

### Formative

Teachers will assess students' understanding of the content throughout the lesson by observing students' participation in the activator and students' ability to act out and identify traits versus behaviors.

### Summative

#### CHECKLIST

- Students can accurately identify dominant and recessive traits.
- Students can recognize the difference between inherited traits and learned behaviors.
- Students can accurately act out assigned inherited traits and learned behaviors.



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## DIFFERENTIATION

### Acceleration:

- Have students create their own questions and answers for the Gene Connection Game.
- Have students improvise or write a scene in which inherited traits, learned behaviors, dominant traits, and recessive traits are all characters.

### Remediation:

- Provide visuals/charts for students to help students understand the concepts of inherited traits, learned behaviors, and dominant and recessive traits.
- Chunk lesson and debrief with students after each activity.

## ADDITIONAL RESOURCES

NA

*\*This integrated lesson provides differentiated ideas and activities for educators that are aligned to a sampling of standards. Standards referenced at the time of publishing may differ based on each state's adoption of new standards.*

*Ideas contributed by: Susie Spear Purcell. Updated by Katy Betts.*

**SYNCHRONICITY**  
**THEATRE** SMART. GUTSY. BOLD.

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