Name: _____ Date: _____

Student Exploration: Inheritance

Vocabulary: acquired trait, asexual reproduction, clone, codominant traits, dominant trait, inherit, offspring, recessive trait, sexual reproduction, trait

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. Johnny and Isabelle are a young couple expecting their first child. Both have blue eyes, tattoos, and green hair. Which features do you think their child is most likely to have?
   - ☐ Blue eyes
   - ☐ Tattoos
   - ☐ Green hair

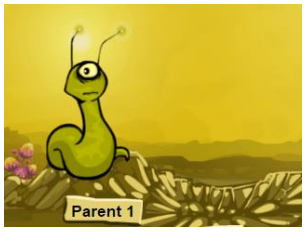
2. Features like eye color, skin tone, height, and hair color are called **traits**. What traits do you think children **inherit**, or receive, from their parents?

   _____

   _____

Gizmo Warm-up

In the *Inheritance* Gizmo you can create and breed aliens on an imaginary planet. Select **Asexual reproduction**. During **asexual reproduction**, a single parent produces **offspring** (children).



1. Click **Create alien** and create your own alien. Describe its traits in the **Parent** row of the table:

Alien	Body type	Skin Color	Antenna shape	Tattoo
Parent				
Offspring				

2. Drag the parent over to the **Parent 1** space and press **Reproduce**. Fill in the **Offspring** traits on the table above. What traits appear to be inherited from the parent?

   _____

   Because this offspring inherits its traits from one parent, it is called a **clone**.

Activity A: **Inherited traits**	Get the Gizmo ready: • Select **Sexual reproduction**. • Drop all remaining aliens (if any) in the **Exit** hole.	

Question: Are all parental traits inherited by offspring?

1. Observe: In **sexual reproduction**, two parents pass traits to the offspring. Create and breed a variety of aliens. Record your observations on a separate sheet of paper.

2. Form a hypothesis: Which traits do you think are passed down from alien parents to their offspring, and which traits are not? Explain. _____

   _____

3. Experiment: Set the **Food supply** to **2 bushes**. Create two identical parents with thick bodies, green skin, curly antennas, and triangle tattoos. Make two offspring and record their traits in the table below.

Offspring	Body type	Skin Color	Antenna shape	Tattoo
Offspring 1				
Offspring 2				

4. Analyze: Compare the offspring traits to the parent traits.

   A. Which traits were passed from parents to offspring? _____

   B. Which traits were *not* passed down? _____

   Traits that are not passed down (not inherited) are called **acquired traits**.

5. Investigate further: Create offspring with a few different levels of **Food supply**. How does food supply affect the body type of offspring?

   _____

6. Think and discuss: Suppose a human child had a mother with dyed-pink hair and a father who was missing a finger (lost in an accident). Would the child inherit these traits? Explain.

   _____

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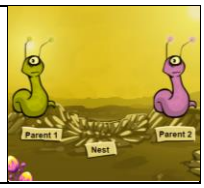
Activity B: **Skin color**	Get the Gizmo ready: • Clear all parents and offspring from the Gizmo by dropping them into the **Exit** hole. • Create a green alien and a pink alien.	

Question: How is alien skin color inherited?

1. Predict: What do you think the offspring of a green alien and pink alien will look like? _____

   _____

2. Experiment: Test your prediction with the Gizmo. What did you find? _____

   _____

   When offspring show a mixture of parent traits, the traits are called **codominant traits**.

3. Predict: What do you think will happen when you breed two green-and-pink spotted aliens?

   _____

4. Experiment: Follow the steps below. (You may have already done the first step or two.)
   - Place a green alien and a pink alien in the locations for **Parent 1** and **Parent 2**.
   - Breed these parents twice. Drag both offspring to the spaces below the **Nest**.
   - Drag the two green-and-pink offspring up to become the new **Parent 1** and **Parent 2**.
   - Breed these aliens 10 times. Record how many times each skin color occurred in their offspring. (For example, if there were 2 green offspring, write "2" below "green.")

Skin color	Green	Green and pink	Pink
Number of offspring			

5. Analyze: Look at the results of your experiment.

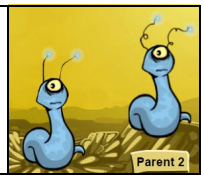
   A. What kind of skin did most of the offspring have? _____

   B. Did *all* of the offspring have green and pink skin? _____

6. Think and discuss: For a codominant trait, do the offspring of identical parents always look like the parents? Explain your answer.

   _____

   _____

Activity C: **Antenna shape**	Get the Gizmo ready: • Clear all aliens by dropping them into the **Exit** hole. • Create two aliens – one with straight antenna and one with curly antenna.	

Question: How is alien antenna shape inherited?

1. Predict: What do you think will happen when you breed an alien with straight antenna to an alien with curly antenna? _____

2. Experiment: Test your prediction using the Gizmo. Create at least 5 offspring. What did you notice? _____

3. Analyze: Sometimes when two traits are combined, one is a **dominant trait** and the other is a **recessive trait**. If both traits are present, only the dominant trait is seen in the offspring.
   A. Which trait is dominant, straight antenna or curly? _____
   B. Which trait is recessive? _____

4. Investigate further: Take two of the straight-antenna offspring and breed them together to produce 10 new offspring. Record the antenna type of each offspring.
   A. What happened? _____
   B. Did the recessive trait disappear? _____
   C. How can a trait skip a generation? _____
   _____

5. Draw conclusions: For a dominant/recessive trait, do the offspring of identical parents always look like the parents? Explain. _____
   _____

6. Compare: How do the offspring of two parents that reproduce sexually differ from the offspring of a single parent that reproduces asexually?
   _____
   _____