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Inherited Traits Versus Learned Behaviors [4th grade]

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UNDERSTANDING BY DESIGN

Unit Title: **Inherited Traits Versus Learned Behaviors**

Grade Level: **4th grade**

Subject/Topic Area(s): **Life Science**

Designed By: **Kathryn Morrow**

Time Frame: **Ten 30-40 minute periods**

School District: **Round Rock Independent School District**

School: **Great Oaks Elementary School**

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Content Standards

112.6 Science, Grade 4

9) The student knows that many likenesses between offspring and parents are inherited or learned. The student is expected to:

A) distinguish between inherited traits and learned characteristics; and

B) identify and provide examples of inherited traits and learning characteristics

Brief Summary of Unit

In this unit, students will learn the about innate and learned characteristics in animals and humans through a series of teacher- and student-led discussions, readings, reflections, learning activities, and demonstrations. They will learn that most animal behavior is directly related to survival needs, and that the environment influences what an animal learns. Students will consider how and why behaviors are learned and determine what kinds of animals are capable of learning. They will debate how we know whether a trait is inherited or learned, and they will learn that the fields of genetics and behavioral science still hold many mysteries for scientists today. Students will investigate these ideas further by reading case studies involving chimpanzees and the work of Jane Goodall, as well as articles focused on common house pets.

The unit will conclude with the *Survival Guide Project*, during which students will describe inherited traits and learned behaviors that will help them survive in a natural environment of their choice. They will indicate how they acquired these survival traits and skills and choose additional inherited traits or learned characteristics that would increase their chances of survival. The final product will be presented in small groups and assessed using a rubric.

Unit: Inherited Traits Versus Learned Behaviors
Grade: 4th Grade Science

Stage 1: Desired Results

Understandings

Students will understand that…
Many likenesses between offspring and parents are inherited or learned.
Mammals have a combination of inherited traits and learned behavior.
A mammal's behaviors are influenced by environmental factors.
Animals vary in their genetic predispositions and capacity to learn behaviors.

Essential Questions	Knowledge & Skill
(Highlighted in yellow in Stage 3) How do we know if a trait is inherited or learned? What factors influence what mammals can learn to do?	*This unit addresses the following TEKS:* 4.9 The student knows that many likenesses between offspring and parents are inherited or learned. The student is expected to: A) distinguish between inherited traits and learned characteristics; and B) identify and provide examples of inherited traits and learning characteristics 4.3 E) connect Grade 4 science concepts with the history of science and contributions of scientists *This unit will be preceded by the teaching of the following TEKS and assumes that students have the implied background knowledge and skills:* 4.8 The student knows that adaptations may increase the survival of members of a species. A) identify characteristics that allow members within a species to survive and reproduce B) compare adaptive characteristics of various species C) identify the kinds of species that lived in the past and compare them to existing species

Stage 2: Assessment Evidence

*Performance Task: (See **Survival Guide Description, Checklist,** and **Survival Guide Rubric**)*
Survival Guide Project
Students will imagine that they are stranded somewhere in nature. They are completely alone and have no tools or supplies with them. They must choose an environment in which to be stranded. Students will:

- describe what *inherited traits* they have that will help them survive and demonstrate *how* these traits will help them survive in the environment.
- indicate where these traits came from (are they common to all human mammals or do they have them because they were passed on by a specific set of parents?).
- describe what *learned behaviors* they have that will help them survive and demonstrate how these behaviors will help them survive in the environment.
- indicate how or where they learned these behaviors.
- describe characteristics they wish they had in order to survive and demonstrate how these characteristics would help them survive.
- explain whether these are inherited traits or learned characteristics.

Students will choose from several methods to communicate this information. More detail can be found on the Survival Guide Project Description (on page 9 of this document). Students will be provided with a self-assessment checklist and will be assessed using the Survival Guide Rubric.

Other evidence: *(indicated by purple text in Stage3, except for informal teacher observation assessments)*

- Teacher observation during class discussions and partner/group activities
- Exit tickets (Day 1, Day 5)
- Lesson Concept Review/Assessment WB27 from Harcourt Science book – *How Do Animals' Behaviors Help Them Meet Their Needs?*
- *Pet Behaviors* Thinking Questions
- *Animal Survival Scenario* Activity

Stage 3: Learning Activities

(Steps taken to get students to answer Stage 1 questions and complete performance task)

DAY 1

Hook Activity: Milling to Music

Purpose: Activate students' schemas, facilitate movement and inclusion
Time: Five minutes

Students will walk ("mill") around the classroom as music plays. When the music stops, they will quickly find a discussion partner. Each partner will be given about one minute to share. The teacher will pose the question and act as time-keeper, indicating when it is time for the partners to switch roles. The teacher will pose the following question:

> *Have you ever been to SeaWorld or another place where animals performed for entertainment? Tell your partner what you remember about the experience.*

After both students have had the opportunity to share, the teacher will begin playing the music again and students will return to their milling. When the music stops again, students will find a new discussion partner and the teacher will pose the following question:

> *Do you have any pets? Tell your partner about your pets and whether they can do any tricks or have any unusual behaviors.*

Ask students to return to their seats after each partner has had one minute to share. Invite several class members to share something interesting that they heard from a discussion partner. (Students will share what their *partners* said, not their own experiences. This encourages students to be active listeners and fosters building of community.)

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Class Discussion: Activating Prior Knowledge

Purpose: Find out what students already know, elaborate on the topic introduced in the prior activity
Time: Ten minutes

Ask students *"What is behavior?"* Record student responses on chart paper or overhead.

Explain that animals behave in certain ways for 3 basic reasons: 1) to find food, 2) to avoid predators, and 3) to reproduce.

Ask students:
What is learned behavior?
If behavior is learned, who do you think might teach the behavior?
Who can learn a behavior?
Can all animals learn behavior?

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Demonstration: Learned and Inherited Behavior Activities

Purpose: To expose students to real-life examples of their own learned and innate behaviors
Time: Five minutes

Put students into groups of two and pass out a ruler to each pair. Explain to students that they will be doing an activity called "Ruler Catch" in which one student will drop a ruler between the thumb and forefinger of another student. The other student will attempt to catch the ruler before it drops past their fingers. (Successive attempts will show that with practice, students can catch the ruler more quickly, demonstrating a learned behavior.)

After each partner has had the opportunity to "learn" how to catch the ruler, ask:
What happened? (hopefully students will note that it was difficult to catch the ruler at first, then got easier)
Why do you think it got easier? (student learned when to close fingers in order to catch ruler before it dropped)
Make sure that students understand that they just learned a behavior.

Next, have students close their eyes and put their heads on the desk as they are told an initially peaceful story. Say: *"Imagine you are the only one lying on the beach listening to the waves of the ocean. You are watching the waves come in and out, in and out, in and out."* (Saying it softly). At the point when the students are calmed and relaxed, drop a book or a hard object on a desk or table to get the students to react instinctively to the noise. (Hopefully, students will open their eyes, jump from their seats, and look around the room for the cause of the noise.) A discussion will lead students to recognize that their behavior was an instinctive response. They did not need to be taught to jump or to look around when they hear a startling noise. If an animal is startled by a noise, his instinct may tell him that a predator is near by.

In summary, explain that *learned behavior* is behavior changed by experience. *Instinctive (or inherited, or innate) behavior* is behavior that occurs from instinct. Instincts are behaviors animals are born with.

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Extending Knowledge: Textbook Reading
Purpose: Connecting previous introductory activities with information from the text
Time: Ten minutes

Read and discuss pages A48-A53 in Harcourt Science textbook: Animal Adaptations: Behaviors. (Popcorn reading or have students read in their groups or with partners)

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Check for Understanding: Exit Ticket
Time: Five minutes

On a 3x5 index card, ask students to write two things that they learned today and one question they have about this topic of inherited versus learned behaviors.

DAY 2

Small Group Discussion: Reviewing Information
Purpose: To review what was learned yesterday, to facilitated cooperation and community
Time: Ten minutes

Put students in small groups. Give each group a set of discussion questions (see ***Day Two Review and Discussion Questions***) and each student two talking pieces (these can be math cube manipulatives or any other small object). Groups will have ten minutes to discuss all questions. Groups are responsible for making sure all students participate in the discussion. When a student contributes an answer or an idea, he or she places one talking piece in the middle of the table. All students must "use up" both of their talking pieces, but they may speak more than twice if everyone's pieces are gone and the group is not finished discussing the questions. Groups do not need to record their answers.

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Class Discussion: Enduring Question
Purpose: To introduce and begin to discuss one of the unit's enduring questions
Time: Ten to fifteen minutes

When students return to whole group, have a few students share something interesting or wise they heard in their groups. Also, ask students if there are any questions they are wondering about with this topic. Record student questions on a piece of chart paper or on the overhead. Validate student questions and let them know that we will explore them as we continue on in this unit. Teacher may choose to discuss some questions now, or save student questions for tomorrow.
Then, as a class, begin to explore the enduring question: How do we know if a trait is inherited or learned? (Make sure this question is posted and visible throughout the unit.) Ask students to tell what they think and to give examples to support their ideas. Make sure that students know that genetics and behavioral science are huge fields of study. Though scientists know a lot, there are still many unanswered questions. Sometimes scientists don't know if a trait is inherited or learned, or a combination of the two. Discuss how scientists research these behaviors.

Class Discussion and Brainstorming Activity: Considering Human Behavior
Purpose: To reiterate the difference between learned and innate behavior, to consider human behavior and learning
Time: Ten to fifteen minutes

Ask students to think about all the actions they have performed so far today (such as waking up, brushing teeth, showering, blinking, sneezing, walking, eating, preparing for class, answering questions, etc.). Students will make a list on a piece of notebook paper. Write the following questions on the board for students to consider:

- *Which of the behaviors you listed are learned and which are instinctual?* (Have them put an "I" next to instinctual behaviors and an " L" next to learned behaviors on their lists.)
- *Have you demonstrated more instinctive behaviors or learned behaviors today?*
- *If the behaviors were learned, how did you learn them?*

As a class, debate which behaviors are more common in everyday life, learned or innate.
Then, on the back side of their sheet of notebook paper, ask students to explain the various ways in which learned behaviors can be learned. For example, how did you learn to tie your shoes? How did you learn that it's best keep your eyes closed when you're washing shampoo out of your hair? Brainstorm other examples to discuss.

DAY 3

Check for Understanding: Individual Assessment
Time: Ten minutes

Students will complete *Lesson Concept Review/Assessment WB27 from Harcourt Science book – How Do Animals' Behaviors Help Them Meet Their Needs?* Students are asked to read a list of behaviors and indicate whether they are an instinct or learned. (It would benefit students to go over the following vocabulary before assigning this worksheet: instinct, migration, and hibernation.) On the back side of the worksheet, ask students to choose an animal and illustrate a behavior typical of that animal. Below their drawing, they should write one to three sentences explaining how the animal's behavior helps it to survive and whether the behavior is learned or inherited.

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Reading Activity: Jane Goodall's Study of Chimpanzee Behavior
Time: Twenty to thirty minutes

Begin by reading page A56 in the Harcourt Science textbook out loud to students. This page will introduce behaviorist Jane Goodall. (Science TEK 4.2, E – connect science concepts with contributions of scientists)

After reading and discussing this introduction, divide students into small reading groups. (More than one group may be reading the same passage.) Teacher may choose to group students based on reading ability, as some passages are more challenging than others, or students may be grouped heterogeneously. Each group will receive one of the *Jane Goodall's Study of Chimpanzee Behavior* reading passages. There are three passages, listed in order from least to most challenging (based on vocabulary):
"Tool Use"
"So Like Us"
"Communication"
Each member of the group will receive a copy of the reading passage. Groups will read the passage out loud, then discuss the two questions under "Think About It" at the bottom of the page. Groups should also determine the main idea or key facts of the passage.
When groups have completed this task, they will share a brief summary of their passage and their answers to the "Think About It" questions with the class.

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Wrapping Up: Discussion Question OR Student Generated Questions
Time permitting

As a class or in small groups, compare animal adaptations to behaviors that humans show. For example, proboscis monkey mothers must teach their young which leaves are safe to eat. What are some similar behaviors that humans show? Think about other animal adaptations, such as migration, hibernation, primate grooming, and teaching young to use tools. What human behaviors remind you of these adaptations?
OR
Return to any unaddressed questions generated during yesterday's discussion. If possible, provide outside resources.

DAY 4

Warm Up: Community Circle/Photo Share

Time: Five to eight minutes

In preparation for today's warm-up activity, invite students to bring in a photograph or drawing of their family pet if they have one. Then, in a Community Circle format, students may share a picture of their pets and tell one observation they have made about that pet's behavior. If they do not have a pet, they can share what kind of pet they would like to have and what kind of behaviors they might expect that pet to exhibit.

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Class Discussion: Animals as Pets

Time: Ten minutes

Ask students:

- *Why do people like pets?*
- *What are some different kinds of pets?* (mostly small and medium-sized mammals, some birds, fish, reptiles, amphibians, and larger mammals)
- *Which ones can you give more freedom to?*
- *What are some reasons that you can or cannot leave a pet without supervision?* (Could be for own protection or to protect property. Or it could be it needs to stay in a controlled habitat.)
- *Which pets do we usually keep caged versus allow free reign? Discuss indoor/outdoor pets.*
- *Why do some animals make better pets than others?*
- *What training methods have you tried with your pets?*

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Reading Activity: Pet Behaviors (with written assessment piece)

Time: Twenty-five minutes

Pass out the article called *Pet Behaviors.* This reading defines innate and learned behaviors, and how ethnologists and animal behaviorists work with animals. Explain to students that behavior is determined by a combination of inherited traits, experience, and the environment. Read the article out loud as a class and discuss.

After students have read and reviewed the article, students will complete the *Pet Behaviors* Questions. These questions should be collected for assessment.

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Extra Time/Enrichment Reading

(These are great extension activities for gifted students or students who finish work early, or teacher may choose to read these articles to or with students.)

Students may read *The Homing Instinct* or *The Right Way to Train a Dog* articles found at the Science NetLink website: http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=6&DocID=288, or teacher may provide a printed copy of the article.

Students may complete the A Visit to the Vet Web Activity and/or explore the Ask the Behaviorists website: http://www.pbs.org/wgbh/nova/vets/ask.html.

DAY 5

Class Discussion: Enduring Question

Purpose: To introduce and discuss one of the unit's enduring questions

Time: Ten minutes

Ask students, What factors influence what mammals can learn to do? Post this question on the board, along with the previous question (How do we know if a trait is inherited or learned?) Students should discuss:

- Brain size/intelligence
- Inheritance (some animals are predisposed to learn certain behaviors, such as humans learning language or tigers learning how to hunt)
- Environment

Encourage students to provide examples and counter-examples as much as possible. Draw on outside resources to enhance discussion.

To consider during discussion:
Can an organism's instincts and learned behaviors be related to its environment? Think about this: In order to survive, a polar bear instinctively goes into "winter sleep" to conserve its energy when it has gone about two weeks without food, which can be scarce in the Arctic. What is the behavior-environment connection? Discuss other animals that demonstrate behaviors related to their environment.

Group Activity: Animals and Their Environments
Time: Twenty to thirty minutes

As a class, brainstorm a list of possible environments or habitats (such as desert, rainforest, arctic, ocean, etc.) Assign each group one of the habitats. The groups will use the *Animals and Their Environments* Graphic Organizer to come up with a list of ways that environment might affect animals who live there, and a list of adaptations and/or learned behaviors that will help the animal survive.

A mother grizzly bear instinctively raises and protects her young cubs. Yet after a mother iguana lays eggs, her job as a mother is finished. Explain why you think some animals have a strong instinct for parenting while others do not. How might it relate to the number of babies or amount of eggs it produces?

Check for Understanding: Exit Ticket
Time: Five minutes

On a 3x5 index card, ask students to write one animal that can learn behaviors and another animal that cannot (make sure they label them accordingly). On the other side of the card, ask students to explain how the environment affects what an animal learns to do. Collect cards for assessment.

DAY 6
Warm-Up: Animal Survival
Purpose: To check for understanding
Time: Ten to fifteen minutes

Pass out an *Animal Survival Scenario* to each student. At the top of the paper, the student will find an animal and an environment listed. The student's task is to list two inherited traits and two learned characteristics of that animal and tell how each helps the animal to survive in its environment. Teacher may want to review habitats prior to having students complete this activity. Students may share what they have written with their group or the class, and then students should turn this in when it is completed.

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Present *Survival Guide Project*
Time: The rest of the period

Go over the project description and the self-assessment checklist with students. Students will begin working on a rough draft/plan for their project. They should begin brainstorming and drafting, as well as request any necessary supplies.

DAY 7
Work on **Survival Guide Project.**

DAY 8
Work on **Survival Guide Project.**

DAY 9
Complete **Survival Guide Project**, possibly begin sharing if time permits.
Allow students who finish early to explore some of the websites and/or books collected on this topic.

DAY 10
Present **Survival Guide Project**. Each group member will share their project. While they are sharing, group members will engage in active listening and will refrain from asking questions or making comments. When the student is finished sharing, each group member will be given the opportunity to ask one question and the student who is presenting may respond. After all the questions have been asked, each group member will share one affirmation or positive comment about their group member's project.

Projects will be turned in and assessed by the teacher using the **Survival Guide Project Rubric**.

Time permitting, the class may do a Community Circle after projects have been shared. The teacher may pose a question such as:
What was the most interesting thing you heard in your group?
What was the most challenging part of doing the Survival Guide Project?
What was the most exciting part of doing the Survival Guide Project?
Share your favorite part of your Survival Guide Project
.
If time does not allow for a Community Circle reflection, the teacher may choose to have students complete individual written reflections.

Resources

Textbooks

Gibbs, Jeanne. *Reaching All by Creating TRIBES Learning Communities: 30th Anniversary Edition.* CenterSource Sustems, LLC, 2006.
Harcourt Science: Fourth Grade. Harcourt School Publishers, 2000.

Websites

http://www.sciencenetlinks.com/lessons.cfm?Grade=6-8&BenchmarkID=6&DocID=461
http://www.janegoodall.org/default.asp
http://school.discovery.com/lessonplans/programs/animalinstincts/
http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=6&DocID=288
http://www.cas.sc.edu/cse/animalbehavior.htm

Name _____

Survival Guide Project Description

Throughout this unit, we have been talking about inherited traits and learned behaviors in mammals. Today we are going to think about how these apply to the human mammal – YOU!

Imagine that you are stranded somewhere in nature. You are completely alone and have no tools or supplies with you. You must use only your inherited traits and learned behaviors to survive.

You will need to complete the following tasks:

- Describe/depict the **environment** in which you have been stranded. (Are you on an island, in the jungle, in the Arctic, etc.?) Remember, you are outdoors (in nature) and there are no other people or man-made supplies to help you. Think about what you would see, hear, feel, and smell in this environment. What kinds of foods and resources might you find? What kind of climate would you expect? How would that affect your survival?
- Describe **three or more inherited traits** you have that will help you survive. Be sure to consider both your physical traits (your body) and your reflexes. Are these traits that all humans have, or were they passed down from your specific parents?
- Explain how these inherited traits will help you survive in your environment.
- Describe **three or more learned characteristics** you have that would help you survive. (These must be things you actually know how to do in real life.)
- Explain how your learned behaviors will help you survive in your environment.
- Explain how or where you learned these behaviors. Who taught you?
- Describe **two or more adaptations or skills you wish you had** in order to help you survive in your environment.
- Explain whether the desired adaptations or skills are ***inherited traits*** or ***learned characteristics*** and how you know.
- Explain how these characteristics would help you survive.

With these tasks in mind, you will choose one of the following methods to communicate what you know about survival. You may:

- Write a journal entry or traveler's log
- Create a cartoon or a picture book
- Write an essay
- Choose another method (make sure to discuss it with the teacher before you start!)

Name _____

Survival Guide Project
Self Assessment Checklist

Check off the items listed below when you are sure you have included them in your Survival Guide project. These are the basic expectations for this project, but please consider adding other ideas as well!

☐ I have chosen a **natural environment** (no people, buildings, cars, tools, etc.)

☐ I have described with words or drawn a clear picture of my environment – my reader can tell **what kind of environment** I have chosen.

☐ I have included **3 or more inherited traits**.

☐ I have explained **how each of these inherited traits will help me survive** in my environment.

☐ I have included **3 or more learned characteristics** that I actually have in real life.

☐ I have explained **how each of these learned characteristics will help me survive** in my environment.

☐ I have explained **how, where, or from whom I learned** these characteristics.

☐ I have included 2 or more traits or characteristics I **wish I had** to help me survive.

☐ I have explained whether these desired characteristics are **inherited** or **learned**.

☐ I have explained **how** each these desired characteristics would **help me survive**.

☐ I have edited for grammar, conventions, neatness, and spelling.

☐ I have included my name and today's date on my work.

☐ I am sure this work is my **personal best**!

Name _____

Survival Guide Project Rubric

	Unacceptable	Approaching Expectations	Meeting Expectations	Exceeding Expectation
Description of Environment (15 points)	You have not indicated your environment, OR your description is so limited that the reader cannot tell where you are.	Your description of the natural environment is somewhat clear, but it leaves the reader with some questions about where you are.	You have provided a clear description of your natural environment.	You have provided a detailed description of your natural environment, including sights, sounds, climate, resources, etc.
Inherited Traits (25 points)	You have not given three inherited traits AND you have not explained how each trait will help you survive.	You have not given three inherited traits OR you have not explained how each trait will help you survive.	You have given three inherited traits AND you have explained how each trait will help you survive.	You have given more than three inherited traits AND/OR given detailed explanations of how each would help you survive.
Learned Characteristics (25 points)	You have not given three learned characteristics AND/OR you have not explained how each will help you survive AND/OR you have not described how you learned these behaviors.	You have not given three learned characteristics OR you have not explained how each will help you survive OR you have not described how you learned these behaviors.	You have given three learned characteristics AND you have explained how each will help you survive AND described how you learned these behaviors.	You have given more than three learned characteristics AND/OR you have explained in detail how each will help you survive AND described how you learned these behaviors.
Desirable Learned Characteristics (25 points)	You have not given two adaptations or skills you wish you had AND/OR you have not explained how each will help you survive AND/OR you have not indicated whether each is inherited or learned.	You have not given two adaptations or skills you wish you had OR you have not fully explained how each will help you survive OR you have not indicated whether each is inherited or learned.	You have given two adaptations or skills you wish you had AND you have explained how each will help you survive AND you have indicated whether each is inherited or learned.	You have given more than two adaptations or skills you wish you had AND/OR you have explained in detail how each will help you survive AND you have indicated whether each is inherited or learned.
Creativity and Effort (10 points)	Your project does not reflect your personal best. It is sloppy, incomplete, or does not address the requirements.	You have put some effort into your project, but the work is not original or conveys a lack of effort. It does not reflect your personal best.	Your project is neat, complete, and shows thought and creativity. You clearly made an effort to do your personal best.	You have gone above and beyond in creativity AND/OR effort. It is clear that you challenged yourself to do your personal best!

Day Two Review and Discussion Questions
Innate and Learned Behaviors

1. What is an instinct? Is an instinct learned or innate?

2. Where do animals' instincts come from?

3. How is an instinct different from a learned behavior?

4. Give two examples of innate behaviors in *animals* and two examples of learned behaviors in *animals*.

5. Give two examples of innate behaviors in *humans* and two examples of learned behaviors in *humans*.

Discuss (More than one group member should share his or her ideas!)

Suppose a dog barks when a stranger comes close to its home. Suppose it also barks when its master asks it to speak. Which behavior is probably learned? Which behavior is an instinct?

How do scientists know if a behavior is learned or innate?

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How do scientists know if a behavior is learned or innate?

Name _____

Jane Goodall's Study of Chimpanzee Behavior

Tool Use

One day in October of 1960, Jane Goodall found a chimp that she had named David Greybeard squatting on a termite mound. Not wanting to startle him, she stopped some distance away and could not see clearly what he was doing. He seemed to be poking pieces of grass into the mound, then raising them to his mouth. When he left, she approached the mound. She inserted one of the abandoned grasses into a hole in the mound and found that the termites bit onto it with their jaws. David had been using the stem as a tool to "fish" for insects!

Soon after this discovery, Jane observed David and other chimps actually picking leafy twigs then stripping the leaves so that the twig was a suitable tool. This was modification of an object to make a tool — the crude beginning of tool making. Until that time scientists thought that humans, and only humans, used and made tools. Our species was defined as "Man the Tool Maker." That ability was thought to separate us from other animals more than any other characteristic. When Louis Leakey received an excited telegram from Jane describing her discoveries he made his now famous response: "Now we must redefine tool, redefine Man, or accept chimpanzees as humans."

Eventually it was discovered that the Gombe chimpanzees use objects — stems, twigs, branches, leaves, and rocks — in nine different ways to accomplish tasks associated with feeding, drinking, cleaning themselves, investigating out-of-reach objects, and as weapons — flailing branches and throwing rocks as missiles. In communities outside Gombe, chimpanzees use objects for different purposes. These behaviors, passed from one generation to the next through observational learning, can be regarded as primitive cultures.

Resource: http://www.janegoodall.org/chimp_central/chimpanzees/gombe/tool.asp

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Think About It

What was so unusual about Jane Goodall's discovery on that October day in 1960?

Would you say the chimpanzee's use of tools was innate or learned behavior? Why?

Name _____

Jane Goodall's Study of Chimpanzee Behavior

So Like Us

"The structure of the chimpanzee brain is startlingly similar to that of the human." — Jane Goodall

Many aspects of chimpanzee behavior and social relations, emotional expression and needs, and intellectual abilities are similar to humans. There are, in particular, close parallels between the chimpanzee infant and the human child. Both have the capacity for endless romping and play, are highly curious, learn by observation and imitation, and above all, need constant reassurance and attention. For both, affectionate physical contact is essential for healthy development.

Various mental traits once regarded as unique to humans have been convincingly demonstrated in chimpanzees; reasoned thought, abstraction, generalization, symbolic representation, and concept of self. Non-verbal communications include hugs, kisses, pats on the back, and tickling. Many of their emotions, such as joy and sadness, fear and despair, are similar to or the same as our own. The longer-term studies of chimpanzee behavior in the field (at Gombe and Mahale Mountains national parks in Tanzania; Budongo Forest and Kabale Forest in Uganda; Tai Forest in Cote d'Ivoire; and forests in Guinea) along with other shorter studies in the wild and a number of studies in captivity, have taught us not only a great deal about the chimpanzee's place in nature, but our own, as well.

Once we admit that we are not the only beings with personality, reasoned thought, and above all, the ability to feel and express emotions such as joy, despair and empathy, then we develop a new respect for chimpanzees. The line between human and other non-human beings, once thought so sharp, becomes blurred. This forces us to a new respect also for the other amazing animal beings with whom we share the planet.

Resource: http://www.janegoodall.org/chimp_central/chimpanzees/similarities/like_us.asp

Think About It

List some behavioral similarities between chimpanzees and humans and decide which behaviors are innate and which are learned.

What does studying chimpanzees and other animals teach us about ourselves?

Name _____

Jane Goodall's Study of Chimpanzee Behavior

Communication

Calls

Chimpanzees communicate with a wide range of calls, postures and gestures. The food calls -- a mixture of food grunts, barks, and pant hoots -- alert other chimpanzees to the whereabouts of food sources. A special intensity of excited calls of this type indicates that there has been a successful kill after a hunt. Each individual has his or her own distinctive pant-hoot, so that the caller can be identified with precision. A loud, long, savage-sounding wraaaa call is made when a chimpanzee comes across something unusual or dangerous. When young chimpanzees play, they emit breathy laughter. And soft grunts uttered by foraging or resting chimpanzees probably serve to maintain communication within the group.

Posture and Gestures

Posture, gesture, and facial expression communicate many messages and emotions within a group. When greeting a dominant individual after an absence or in response to an aggressive gesture, nervous subordinates may approach with submissive signals - crouching, presenting the rump, hold the hand out - accompanied by pant-grunts or squeaks. In response, the dominant individual is likely to make gestures of reassurance, such as touching, kissing, or embracing the subordinate.

Friendly physical contact is crucial in maintaining good relationships among chimpanzees. For this reason, social grooming is probably the most important social behavior, serving to sustain or improve friendships within the community and to calm nervous or tense individuals. The grin of fear seen in frightened chimpanzees may be similar to the nervous smiles given by humans when tense or in stressful situations. When angry, chimpanzees may stand upright, swagger, wave their arms, throw branches or rocks - all with bristling hair and often while screaming or with lips bunched in ferocious scowls. Male chimpanzees proclaim their dominance with spectacular charging displays during which they slap their hands, stamp with their feet, drag branches as they run, or hurl rocks. In doing so, they make themselves look as big and dangerous as they possibly can, and indeed may eventually intimidate a higher-ranking individual without having to fight.

Resource:
http://www.janegoodall.org/chimp_central/chimpanzees/behavior/communication.asp

Think About It

What are some of the ways chimpanzees communicate in a group? When have you seen humans communicate this way?

Would you say that the chimpanzees' means of communication are innate or learned behavior? Why?

Teacher Page
Possible Responses to Think About It Questions

Tool Use

What was so unusual about Jane Goodall's discovery on that October day in 1960?

Until that day, scientists thought only humans made and used tools.

Would you say the chimpanzee's use of tools was innate or learned behavior? Why?

It was learned, because the chimps pass behavior like this down from one generation to the next.

Communication

What are some of the ways chimpanzees communicate in a group? When have you seen humans communicate this way?

Calls, barks, grunts, body posture, facial expressions, presenting the rump, holding out the hand, grooming, grinning, waving arms, swaggering, throwing rocks and branches, charging others are some of the ways chimpanzees communicate in a group. During sporting games like football, in traffic, when people feel inconvenienced or frustrated are times when humans communicate in a similar way.

Would you say that the chimpanzees' means of communication are innate or learned behavior? Why?

It was probably mostly learned. Chimps innate know how to make sounds and gestures, but they must teach their young what the different sounds and movements mean. However, some sounds, facial expressions, and actions, could be innate. This seems feasible because people and primates all over the world and throughout time seem to make the same expressions and movements in response to certain emotions.

So Like Us

List some behavioral similarities between chimpanzees and humans and note which behaviors are innate and which are learned.

Innate: Need attention and affection; physical contact; concept of self; emotions.
Learned: Emotional expressions; play; reasoned thought; abstraction; nonverbal communication.
Please note that these answers can be open to debate. Encourage your students to explain their answers.

What does studying chimpanzees and other animals teach us about ourselves?

We are not the only species that has reasoned thought, expresses emotion, or has personalities. Humans and nonhumans are more alike than scientists used to believe.

Pet Behaviors

From http://www.sciencenetlinks.com/interactives/pets_resource.html

Have you ever seen a dog that can shake hands? Do you think you could teach a hamster to do this? Or a rabbit? Or even a cat? It helps that a dog has front legs and paws that can easily be lifted and placed in your hand, but is it just a matter of having the right "equipment?"

When you get right down to it, a dog doesn't need to shake hands, although it can be taught to do so. There is nothing innate-or pre-programmed-in a dog's nature that requires this behavior, but many dogs are willing to learn to shake if it makes an owner feel good. As social animals who obey the pecking order of "the pack," dogs intuitively understand that a pet owner likes it when the dog obeys commands.

What is the range of behaviors that our pets can learn? All animals-including humans-have inherited traits and characteristics in their genes that define what can and can't be done. These innate traits evolve and get passed along in the offspring of each species. This is why right from birth a dog barks like a dog and doesn't quack like a duck, and why an orb spider can spin a perfect web the first time it tries.

The range of innate behaviors across different species is amazing. Think about the cat who can find its way home after being deposited over 800 miles away. This homing instinct in cats is not fully understood, but it is similar to the behavior of salmon and birds in terms of amazing navigational abilities.

Did you ever teach a cat to use a litter box? A dog not to chew something? What were the difficulties you encountered in these tasks? Why are some behaviors easy for one species to learn and not another-i.e., the dog will shake hands, the snake has no chance, and the cat could care less!

Ethnologists study animals in their natural environment. They investigate how the DNA in chromosomes form "templates" that determine the range of innate behaviors in each species. Animal behaviorists study animals outside of their natural environment, such as the pets in your house. They help us to understand how innate and learned behaviors can be modified through training and changes in a pet's diet or environment.

Modifying a pet's behavior can be a challenging task for pet owners. Although pet owners have the responsibility for teaching their pets, they often do not have any formal training themselves in how to do this. Unfortunately, many animals end up in shelters or are abused when owners misunderstand the cause of their pet's behavior.
Understanding why pets sometimes "misbehave" requires careful understanding of their innate traits and their ability to learn. The disposition of a particular pet and the circumstances surrounding the behavior are also factors. For example, if a cat is not using a designated kitty litter box, is it because the cat is not a sanitary animal? Is it because he or she is a "bad kitty?" Anyone who has witnessed the grooming habits of cats knows they are tidy by nature. Very often something in the cat's home environment or improper training has caused this behavior to occur.

Name _____

Pet Behaviors Thinking Questions

Use the article Pet Behaviors *to help you answer the following questions.*

1. What is an example of an inherited trait in a pet?

   _____

2. What is an example of a learned behavior in a pet?

   _____

3. Name a kind of pet and give an example of a species-specific trait for it. (This means that all animals of that species have that trait.)

   _____

4. Name something that your pet or a pet you have known has learned.

   _____

5. How does an animal's brain affect its intelligence and learning?

   _____

   _____

6. Which animals have reputations for being intelligent? Are these reputations true? Explain your answer.

   _____

   _____

   _____

7. What is an innate behavior demonstrated by both human and non-human animals?

   _____

Name _____

Animals and Their Environments
Graphic Organizer

My environment is:

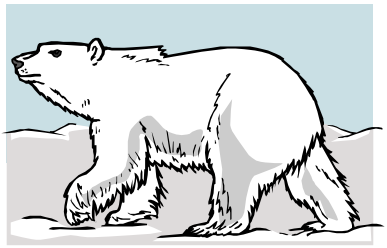
Ways the environment affects animals	Adaptations and learned behaviors that help animals survive
	(Mark innate traits with an "I" and learned behaviors with an "L")

Name _____

Animal Survival Scenario #1

Animal: Polar bear

Environment: Arctic



Inherited trait #1: _____

How it helps: _____

_____

Inherited trait #2: _____

How it helps:_____

_____

Learned behavior #1: _____

How it helps: _____

_____

Learned behavior #2: _____

How it helps: _____

_____

Name _____

Animal Survival Scenario #2

Animal: Lion

Environment: Sahara Desert

Inherited trait #1: _____

How it helps: _____

_____

Inherited trait #2: _____

How it helps:_____

_____

Learned behavior #1: _____

How it helps: _____

_____

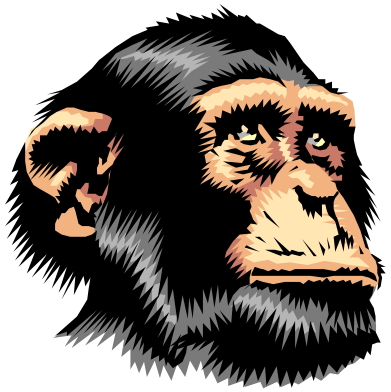
Learned behavior #2: _____

How it helps: _____

_____

Name _____

Animal Survival Scenario #3



Animal: Chimpanzee

Environment: African forest

Inherited trait #1: _____

How it helps: _____

_____

Inherited trait #2: _____

How it helps:_____

_____

Learned behavior #1: _____

How it helps: _____

_____

Learned behavior #2: _____

How it helps: _____

_____

Name _____

Animal Survival Scenario #4

Animal: Wolf

Environment: Wooded forest

Inherited trait #1: _____

How it helps: _____

_____

Inherited trait #2: _____

How it helps:_____

_____

Learned behavior #1: _____

How it helps: _____

_____

Learned behavior #2: _____

How it helps: _____

_____

Name _____

Animal Survival Scenario #5

Animal: Dolphin

Environment: Ocean

Inherited trait #1: _____

How it helps: _____

_____

Inherited trait #2: _____

How it helps:_____

_____

Learned behavior #1: _____

How it helps: _____

_____

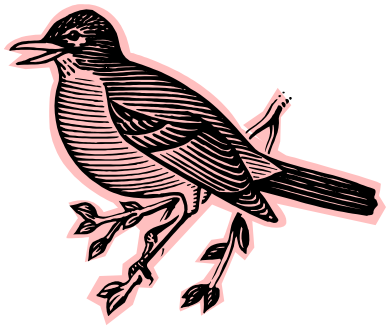
Learned behavior #2: _____

How it helps: _____

_____

Name _____

Animal Survival Scenario #6



Animal: Bird

Environment: Forest

Inherited trait #1: _____

How it helps: _____

_____

Inherited trait #2: _____

How it helps:_____

_____

Learned behavior #1: _____

How it helps: _____

_____

Learned behavior #2: _____

How it helps: _____

_____

Background Information & Resources for Teachers
Innate and Learned Behaviors

Certain behaviors contribute to an animal's survival. For example, bears can adapt to harsh winters by hibernating, and humpback whales migrate from their nurseries off the coast of Hawaii to feed in the krill-rich waters off of Alaska. Some of these behaviors are instincts, or traits that the animal is born with, and some are learned behaviors, or behaviors that were taught to the animal, often by its parent. For example, proboscis monkeys have an instinct for swimming (they never learn how to do it), but they must learn ways to cross a crocodile-infested river safely. Humans instinctively use their voices to communicate (newborn babies cry when they want something), but in order to speak, they must learn their language. Dolphins instinctively know how to swim, but trainers at an aquarium can teach them to swim certain ways—or do "tricks"—on command. Many young animals, such as wolf and dog pups and lion kits, are born with an instinct for rough play with their siblings, but some may learn the hard way not to play rough with a larger adult of the species.

Discuss with students the behaviors of other animals (such as salmon, bats, and lions) and whether they are instinct or learned behaviors.

Some animals are difficult to study and scientists do not know if their behaviors are instinctual or learned. Some animal species are limited to a repertoire of genetically determined behaviors; others have more complex brains and can learn a wide variety of behaviors.

Vocabulary

hibernation: To pass the winter in a resting state.
Context: Hibernation occurs when an animal remains inactive to save energy through the harsh winter.

homing: To return accurately to one's home or natal area from a distance.
Context: Polar bears are born with a homing instinct that always helps them find the most direct way home

***instinct*:** A natural or inherent aptitude, impulse, or capacity, OR adaptations with which animals are born that help the animal to meet its needs.
Context: For proboscis monkeys, excellent swimming is an instinct, or a behavior that an organism is born with.
Ex. Migration of butterflies, birds, sea turtles
Ex. Hibernation for squirrels, bats, bears

***learned behavior*:** A behavior that an organism must learn. Usually taught by an older member of the species.
Context: For orangutans, building a nest correctly is a learned behavior, or a behavior that an organism must learn.
Ex. Adult tigers are great hunters, they teach their young to hunt

***migration*:** The act of moving from one country, place, or locality to another.
Context: Animals such as humpback whales and monarch butterflies go through a yearly migration, temporarily changing their habitat in order to survive.

Internet Resources

Lesson Plans

Science NetLinks: Exploring Learned and Innate Behavior in Primates
http://www.sciencenetlinks.com/lessons.cfm?Grade=6-8&BenchmarkID=6&DocID=461
http://www.janegoodall.org/default.asp
http://www.enchantedlearning.com/subjects/apes/index.html
(These websites are the resources for the Jane Goodall Reading Cards Activity)

Discovery.com
http://school.discovery.com/lessonplans/programs/animalinstincts/
(A great resource for discussion questions and extension activities on this topic)

Science NetLinks: Pets - Oh, Behave!
http://www.sciencenetlinks.com/lessons.cfm?BenchmarkID=6&DocID=288

Example Lesson with a Web component
http://www.scienceoutreach.org/SSI2002/lessons/Animal%20Behavior/Animal%20Behavior.htm (many of the links on this site do not work)

http://www.cas.sc.edu/cse/animalbehavior.htm (another example lesson)

Background Information

From http://www.cas.sc.edu/cse/animalbehavior.htm

Behavior is anything an animal does involving action and response to a stimulus such as walking, blinking, swimming, breathing, and eating.

There are two main patterns of animal behavior: inherited, or inborn, behavior and learned behavior. **Inborn behaviors** are passed on from parents to offspring through their genes. For example, fiddler crabs are born knowing how to dig burrows. An inborn behavior can be as simple as moving toward or away from a stimulus, such as a snail retreating into its shell during dry weather. In higher invertebrates and vertebrates, the simplest form of inborn behavior is a **reflex**. A reflex, such as a frog jumping when touched, is simply an automatic reaction. A more complex inborn behavior is called an **instinct**. When a snail digs a hole to lay its eggs, or when a fiddler crab waves its claw to attract a female, the animals are acting on instinct.

Learned behavior is behavior that has changed because of a certain experience. For example, a goldfish can be trained to come to the water's surface when a light is flashed. An organism's pattern of behavior is related to the nature of the organism's environment, including kinds and numbers of other organisms present, the availability of food and other resources, and the physical characteristics of the environment. When the environment changes, behavior patterns also change.