

Reading Performance Assessment
High School – 2009 – *How do Dogs Perceive Time?*

P3

Read the following story carefully and **make notes in the margin** as you read. Your notes will be part of your score and should include:

- Comments that show that you **understand** the story and your reactions to it.
- Questions you have that show what you are **wondering** about as you read.
- Notes and observations on the **literary elements** (theme, character, plot, setting, narrator, characterization, tone, mood, etc.) and how the author uses them to create an impact.
- Notes and observations on the **literary devices** (figurative language, imagery, point of view, foreshadowing, flashbacks, symbolism, etc.) and how the author uses them to create an impact in the story.

Your **margin notes** are part of your score for this assessment.

Student _____ **SSID** _____
Teacher _____ **Class Period** _____
School _____ **School District** _____

HOW DO DOGS PERCEIVE TIME?

By Jan McGrath

How do dogs perceive time?

⁽¹⁾Most dogs are never late for a meal -- they know exactly where to be at the same time every day. They also know when to expect their owner home and, like clockwork, place themselves patiently at the door for that arrival. When you witness this behavior, you assume dogs have a sophisticated understanding of time. But what is time really like for a dog?

⁽²⁾They say a human year is equivalent to about seven dog years. But what does this common theory tell us about a dog's perception of time? Actually, very little. The idea of "dog years" comes from the life expectancy of dogs compared to humans. So it wouldn't be correct to apply this idea to the concept of time perception.



⁽³⁾To understand how dogs perceive time, we first need to understand how humans perceive time. Arguably, each person experiences the passing of time in different ways at different times. Albert Einstein once explained the principle of relativity by saying, "When a man sits with a pretty girl for an hour, it seems like a minute.

But let him sit on a hot stove for a minute – and it's longer than any hour. That's relativity."

Notes on my thoughts, reactions and questions as I read:

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⁽⁴⁾Even though the experience of time is relative for every individual, all humans think about time in similar ways. For instance, our memories are inextricably tied to how we understand the passing of time. Our ability to remember events in a particular order plays a large part in our perception of time. We're also able to predict things. Though we don't all claim to be psychic, each of us counts on certain events in the future -- even as simple as assuming that the sun will come up tomorrow. These abilities have important implications -- for instance, memory and prediction allow us to have a sense of continuity, personal history and self-awareness.

⁽⁵⁾Do dogs and other animals have these same abilities? If you climbed inside a dog's mind, would you be presented with the memory of eating a raw hide bone earlier this morning?

How a Dog's Memory Works

⁽⁶⁾Research on how dogs perceive time is limited. But we can learn more about it when we look at the extensive research done on other animals, such as rodents, birds and primates. In his studies on how animals perceive time, animal cognition researcher William Roberts made some remarkable conclusions regarding animal memories, anticipation and more. He says that animals are "stuck in time." By this he means that, without the sophisticated abilities it takes to perceive time -- like truly forming memories -- animals only live in the present. Roberts thinks animals are "stuck in time" because they can't mentally "time travel" backward and forward. Humans can consciously and willfully think back to specific memories and anticipate events. Animals cannot.

⁽⁷⁾To many, this seems like a fallacious theory. After all, can't we train animals? And doesn't this training depend on the animals' own memories?

⁽⁸⁾Not necessarily -- at least not in the way we usually think of memories, according to Roberts. Animals might be trained to do things in the same way young children are trained to do things. According to studies on children, by the age of four, kids have learned lots of things -- crawling, walking -- but without the mental ability to remember where or how they learned them. In other words, they don't have the power of **episodic memory**, or the ability to remember particular events in the past. A dog can know how to respond to the command "sit" without having a memory of the specific event in which it learned that command.

⁽⁹⁾That's not all that's at work in the dog's brain to help it, for example, impeccably predict the arrival of its owner. Internal biological rhythms also play their part, according to Roberts. Researchers have discovered from experiments on pigeons that an "internal clock" allowed them to learn when and where food would be available. Similarly, dogs might use **circadian oscillators** -- daily fluctuations of hormones, body temperature and neural activity -- to know when food is likely to hit the bowl or when owners are likely to return from work. Instead of remembering how much time passes

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between meals or what time meals are given, dogs react to a biological state they reach at a particular time of day. And they react the same way at the same time every day to this stimulus.

⁽¹⁰⁾If dogs can't store memories like humans can, can they plan for the future?

⁽¹¹⁾Can animals learn and plan without a concept of time?

⁽¹²⁾Human beings have two important abilities to help us understand time: We are able to remember a sequence of events and we are able to anticipate future needs or events. Studies show that animals may have these abilities -- but to a lesser extent.

⁽¹³⁾Scientists have tested animals' **working memories** (short-term memory) and **reference memories** (long-term) to see how well the animals recall sequences of events. In working memory tests, pigeons and primates must remember a sequence well enough to peck or pick it in the right order again to get a reward. The animals did fairly well at these tasks, but their memory faded fast. Roberts thinks they were probably learning going from weakest memory to strongest memory, rather than actually "learning" or "remembering" a sequence.

⁽¹⁴⁾Other researchers found that pigeons and monkeys performed well at reference memory tests in which they needed to remember a sequence after a delay between learning and testing. But, it took extensive training for the animals to learn these sequences, suggesting to Roberts that the ability did not come naturally to them. From these tests, it seems that animals would perceive time differently from humans, who have a relatively reliable and sophisticated memory of sequence of events.

⁽¹⁵⁾In addition, animals don't seem to anticipate future needs and rewards very well, suggesting to researchers that they don't have a concept of the future. For instance, when given the choice, pigeons and rats chose a smaller immediate reward over a larger future reward. In one test, researchers presented primates with a choice between one banana and two bananas. Understandably, they chose two bananas consistently. However, as the supply of the two choices got larger, they started showing less of a preference -- they weren't hungry enough at that moment to eat 10 bananas, so they chose five bananas half the time. Roberts concludes from these experiments that these animals sought to satisfy immediate hunger needs, and didn't plan for future hunger. This is very unlike humans, who usually use reason and forethought to anticipate future needs, from deciding to pack a lunch for work to investing in a 401(k) retirement plan.

⁽¹⁶⁾So what about squirrels and other animals that hoard food for the impending winter months? That behavior seems to imply the animals anticipate future needs. Actually, maybe not. Studies have found that animals don't stop hoarding even when their supplies inexplicably disappear. This could mean the animals don't understand why they hoard, what it means for their future

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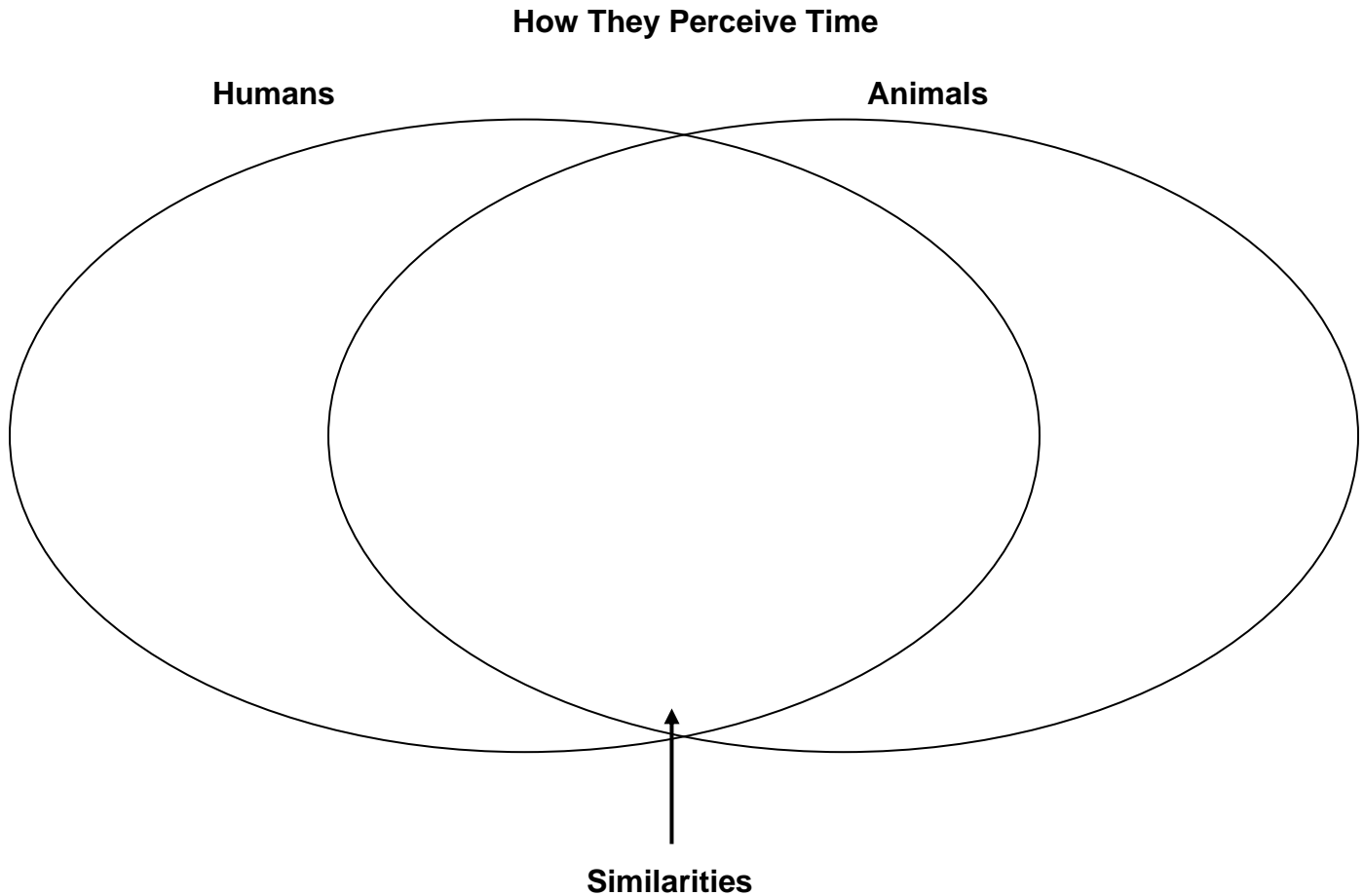
or even what future is. They simply do it out of instinct. Humans, on the other hand, understand their preparations and quickly change strategies when plans go awry.

Notes on my thoughts, reactions and questions as I read:

⁽¹⁷⁾If animals are "stuck in time," as Roberts suggests, this could mean understanding time is uniquely and fundamentally human. It's your choice whether to relish that fact or try to learn something from the canine, carefree outlook of "living in the moment."

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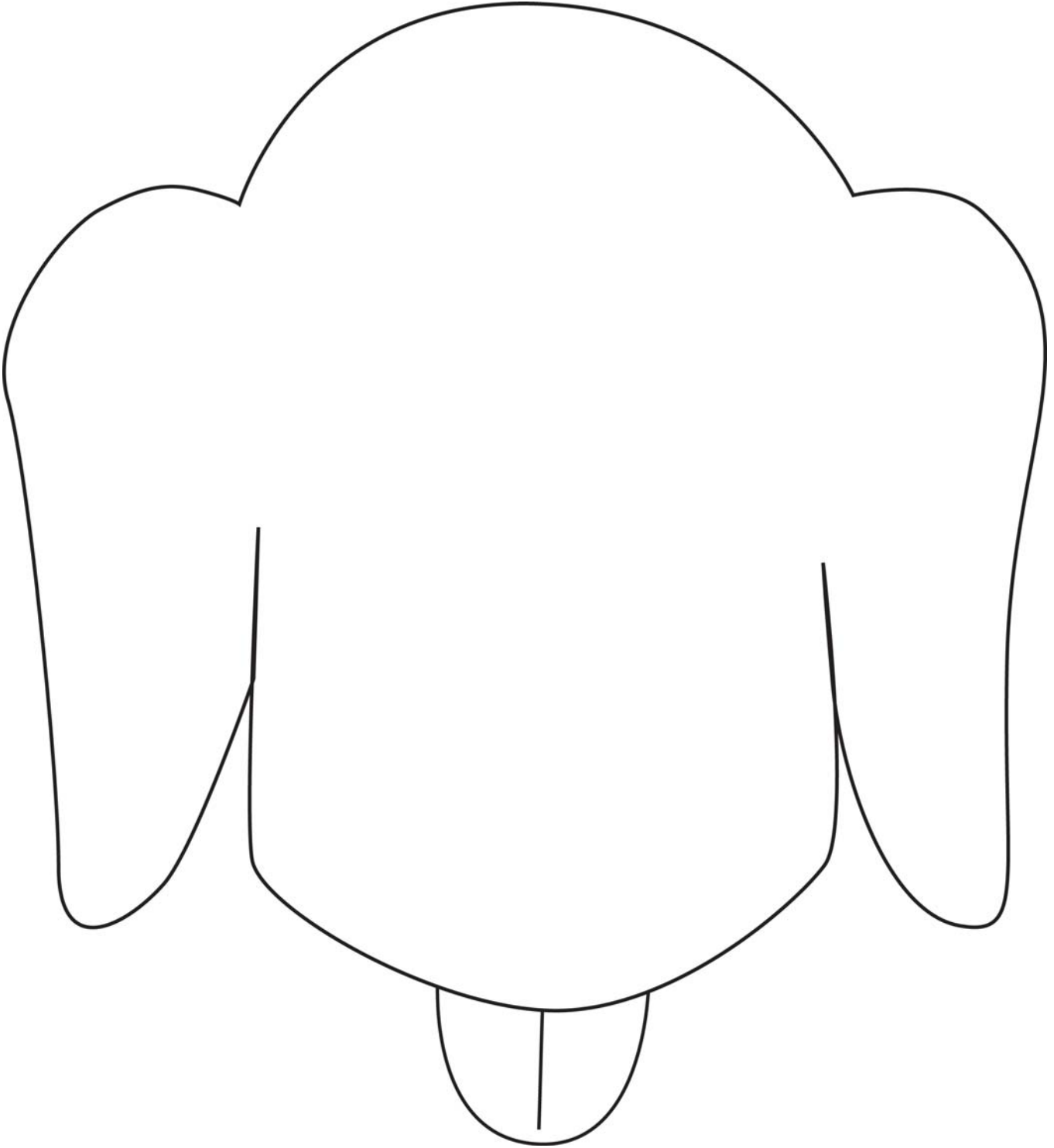
1. Use the Venn diagram to **list and explain** several **differences** from the article about how **humans** and **animals** understand time.



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2. The shape of a dog's head below represents the mind of a dog. Draw pictures or use words to show your understanding of how a dog knows when it is dinner time. You may include direct quotes from the article.



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3. In the section on ***How a Dog’s Memory Works***, the author discusses how a variety of animals perceive time. List below at least three theories that have been developed through research studies on other animals.
- a.
- b.
- c.
4. Paragraph #3 contains a quote attributed to Albert Einstein. In your own words, explain the meaning of the quote. Then, write another example that could be used to explain this “principle of relativity.”
- [meaning of the quote]

 - [new example]
5. Based on the article’s final paragraph as well as other evidence in the article, what is the author’s attitude about how dogs perceive time? Include specific quotes from the article to support your answer.

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6. The author uses subheadings and bold text in the article. Explain the most likely reason she does this and how it affects your understanding of the article.

7. Look at the paragraph beginnings throughout the article. Choose three and write them below. Then explain why you think these were effective or ineffective choices by the author.

| Paragraph Beginning | Effective or Ineffective |
|---------------------|--------------------------|
| a. | |
| b. | |
| c. | |