

THE SCIENCE OF FRINGE

EXPLORING: MEMORY

A SCIENCE OLYMPIAD THEMED LESSON PLAN
SEASON 3 - EPISODE 4: **DO SHAPESHIFTERS DREAM OF ELECTRIC SHEEP**

Overview:

Students will learn about memory, which is the ability to store, retain, and recall information and experiences.

Grade Level: 9–12

Episode Summary:

A U.S. Senator is nearly killed in a car accident. When the Fringe team discovers that the senator was actually a shapeshifter, they work to restore some of its functionality in order to extract information. Meanwhile, Newton asks another shapeshifter agent that has been posing as a police officer for many years to infiltrate the Fringe lab and remove the memories of the disabled shapeshifter. However, Newton quickly discovers that the police officer has grown attached to his undercover life and isn't ready to move on.

Related Science Olympiad Event:

Technical Problem Solving - Teams will gather, process and interpret data to solve problems.

Learning Objectives:

Students will understand the following:

- Memories can be either short term or long term, depending on how the information is encoded and stored.
- The situation and emotional state of a person impacts the ability to gather and store information in either type of memory.
- Regular exposure to an item or information is the best way to build strong long-term memories.

Episode Scenes of Relevance:

- Walter demonstrating to the team how certain pictures evoke a response in the shapeshifter.
- The senator's wife trying to elicit a response out of the disabled shapeshifter.
- View the above scenes: <http://www.fox.com/fringe/fringe-science>

FOX CODE



FOR SMARTPHONES

Online Resources:

- Fringe “Do Shapeshifters Dream of Electric Sheep” full episode: <http://www.fox.com/watch/fringe>
- Science Olympiad Technical Problem Solving event: http://soinc.org/tech_prob_c
- National Institutes of Health: Memory: Medline Plus: <http://www.nlm.nih.gov/medlineplus/memory.html>
- Neuroscience Online: Learning and Memory: <http://nba.uth.tmc.edu/neuroscience/s4/iv7.html>

Procedures:

1. Tell your students that they are going to learn about memory.
2. Have your students research short and long term memory in resources such as physiology and psychology textbooks and websites and discuss what they have learned.
3. Divide your class into small groups. Have each group complete the following activity:
 - a. Materials: deck of cards, paper and pens, timer
 - b. Shuffle the cards and place 10 face down in a row.
 - c. Quickly flip the cards over and try to memorize them for 10 seconds.
 - d. Flip them back over, then wait at least 30 seconds before writing down the memorized cards.
 - e. Check each group member’s accuracy and record the accuracy percentage.
 - f. Repeat the process several times with new sets of 10 cards and lengthening time periods for memorizing them.
 - g. Graph the results and see what conclusions you can draw about time spent trying to memorize the cards versus accuracy of memorization.
4. Discuss with the class the results of the activity. Be sure to address:
 - a. Was there an optimal time? Did they end up getting worse results when the time was extended too long?
 - b. Studies show that short term memory is typically capable of handling 4-7 items. How did the class accuracies compare to this?
 - c. Were they able to recall certain aspects of the cards better than others, such as the color, suit, or rank?

Additional Discussion Suggestions:

- Some people are great at remembering names, or sports stats, or movie lines. What types of information does the class find easier to remember compared to most people? What might be some reasons for that?
- Most people have childhood amnesia of the period from birth until about 4 years old. What could be some possible causes of such amnesia?

Extension to Other Subjects:

Health Sciences: Memory loss is a common occurrence in older adults, and can often be a symptom of Alzheimer’s disease. What are the root causes of such losses and what if anything can be done to help mitigate them?

Physical Education: Athletes often rely on something referred to as ‘muscle memory’, which is obtained via repetition and practice. What similarities are there between such training and processes used for studying for a test?

Social Studies: We now live in the ‘Information Age’, where nearly everything is somehow recorded and available for retrieval online. What impact is this ‘online memory bank’ having on various aspects of our society, such as politics, education, and technological progress?



National Science Standards Alignment:

A. Science as Inquiry – Science as inquiry requires students to combine processes and scientific knowledge with scientific reasoning and critical thinking to develop their understanding of science.

H.A.1 Abilities necessary to do scientific inquiry

- c. Use technology and mathematics to improve investigations and communications.
- d. Formulate and revise scientific explanations and models using logic and evidence.
- e. Recognize and analyze alternative explanations and models.
- f. Communicate and defend a scientific argument.