If you think planting false memories only happens in the movies, think again. False memories happen all the time in humans—we frequently misremember how, when and why certain things happened. We misremember small details, but also major events. Often we misremember things that happened only recently. Now scientists are on the path to finding a better means of understanding why false memories happen to people, by learning how to plant them in the first place.

According to James Gorman in an article in the *New York Times* in 2013, researchers are already able in experiments to convince humans to remember certain words and images inaccurately. A recent study by scientists at the Massachusetts Institute of Technology (MIT) took this process a step further by planting entirely false memories in mice.

Though mice and humans are very different creatures, their memory formation processes are similar. Studying the memories of mice has helped researchers understand exactly what goes on in the brain during the formation of fake memories.
A team of scientists at MIT, who published their findings in the journal *Science*, found they could convince mice they had been shocked in a certain location when they had not in fact been shocked there.

The scientists first allowed a group of mice to become comfortable in a certain area without being shocked. They then introduced the mice to a second area where they received shocks, while stimulating the parts of their brains that had become activated while exploring the first area in peace. Next they put the mice back in the original area. The mice froze in fear of being shocked, though they had no actual memory of being shocked there. The activation of the brain cells while shocks were being delivered was enough to convince the mice they had in fact been shocked there before, though, they had not.

According to Joel N. Shurkin with the news service “Inside Science,” these false memories are as powerful and seemingly real as actual memories. At the same time, it is worth considering whether a human, with greater awareness and context than a mouse, would somehow be less easily convinced by the implantation of false memories. Still, this process reveals how easy it is to toy with the idea of “reality.”

This experiment and its conclusions further the understanding of specifically how and where memory formation occurs in the brain. Norwegian scientist Dr. Edvard I. Moser, who was not involved in the experiment but commented on it later for the *Times*, said this is the closest we have ever come to being able to point to a specific part of the brain and say it is responsible for memory.

Additionally, the ability to plant and further understand memory formation and how easy it is to create false memories, helps us understand that memory is actually a very unreliable tool. This is useful for humans to know as memory is used in many different ways, including witness testimony in court cases. In fact, witness testimony relies entirely on a person’s ability to remember events.

Shurkin quotes a statistic from an organization called the Innocence Project to highlight how serious this matter is when it comes to court testimony:
“...eyewitness testimony played a role in 75 percent of guilty verdicts eventually overturned by DNA testing after people spent years in prison. Some prisoners may have even been executed due to false eyewitness testimony. It was not because the witnesses were lying.”

In fact, the witnesses were just wrong without even realizing it. Someone who is convinced of a false memory believes it entirely to be true. This new information has the potential to forever change how we understand eyewitness testimony and general court proceedings.

While it may be scary to consider how unreliable our memories can be, researchers agree there is certainly a plus side to this new research. According to the authors of the study, “this type of research could one day help treat some emotional problems, such as post-traumatic stress disorder (PTSD), which involves the intrusion of unwanted memories.” The ability to play with humans’ memories gives us much more power over the way we think and cope with painful memories, and could be key in helping people who suffer from a range of emotional problems.

Scientists have also long wondered why false memory creation is so easy in humans in the first place. Why are humans’ memories so prone to failure? Gorman noted in the Times the ability for the brain to be flexible and imagine different scenarios could be responsible for a great deal of human creativity.

However, this creativity—or, the “imagination”—is unique to humans and is a big part of what makes us human. Unless animals are subjected to false memory experiments like the mice at MIT, they do not create false memories the way humans do.
1. What did scientists at MIT accomplish in a recent study?
   A They convinced humans to remember images inaccurately.
   B They planted false memories in humans.
   C They planted false memories in mice.
   D They proved that planting false memories only happens in movies.

2. What does the author describe in the passage?
   A a scientific study of false memory formation and its effects
   B a guide to planting false memories in mice
   C technological advances that have furthered our understanding of memory
   D the role of imagination in false memory formation

3. Scientists successfully gave mice false memories of being shocked in a certain location. Which evidence from the text supports this conclusion?
   A Scientists stimulated the area of the mice’s brains that were activated in the first location.
   B The mice were allowed to explore the first location in peace.
   C The mice received shocks in the second location.
   D The mice were afraid of the location where they had not been shocked.

4. Why is an understanding of memory formation in mice important for humans?
   A It allows scientists to develop cures for mice suffering from memory problems.
   B It allows scientists to create technologies that can create false memories in animals.
   C It allows scientists to better understand memory formation in humans since it is similar to memory formation in mice.
   D It allows scientists to conduct more experiments where they can convince mice of false memories.

5. What is this passage mainly about?
   A how scientists can plant false memories in mice
   B how scientists are learning about false memory formation and why this is important
   C the reasons why false memory formation occurs in humans
   D the failure of scientists to understand false memory formation
6. Read the following sentence from the passage: “According to the authors of the study, ‘this type of research could one day help treat some emotional problems, such as post-traumatic stress disorder (PTSD), which involves the **intrusion** of unwanted memories.’”

As used in the passage, what does “**intrusion**” mean?

A invasion  
B surprise  
C retreat  
D introduction

7. Choose the answer that best completes the sentence below.

Animals are not capable of imagination; __________, they do not create false memories independently.

A meanwhile  
B consequently  
C however  
D obviously

8. What did the MIT study on mice teach scientists about memory formation?

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______________________________________________________________________
______________________________________________________________________
9. The unreliability of memory is a serious problem when it comes to witness testimony. What evidence from the text supports this conclusion?

______________________________________________________________________
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10. Explain the potential effects the study of memory formation could have, using at least one example from the text.

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8. What did the MIT study on mice teach scientists about memory formation?

Suggested answer: Students may mention that the MIT study taught scientists more about how and where memory formation occurs in the brain. This MIT study is the closest we have come to pinpointing the specific part of the brain responsible for memory formation. Students may also state that this study revealed how easy it is to manipulate “reality” and further exposed the unreliability of memory.

9. The unreliability of memory is a serious problem when it comes to witness testimony.

What evidence from the text supports this conclusion?

Suggested answer: Students should state that because witness testimony relies entirely on a person’s ability to remember events, false memories result in false testimony. This can lead to incorrect court rulings, resulting in the imprisonment and even execution of innocent people. Students can mention the statistic: “eyewitness testimony played a role in 75 percent of guilty verdicts eventually overturned by DNA testing.”

10. Explain the potential effects the study of memory formation could have, using at least one example from the text.

Suggested answer: Answers may vary. Students can mention either of the following points; the exceptional student will mention both.

- Understanding false memory formation has the potential to change how we view the reliability of eyewitness testimony and how much weight it carries in court verdicts. A better understanding of memory could lead to more accurate court proceedings.
- Memory formation studies may be able to help treat emotional problems that are linked to painful memories, such as PTSD.