

Name: \_\_\_\_\_

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Period: \_\_\_\_\_

## The Science of Thanksgiving

Week # \_\_\_\_\_

*Directions: Read and annotate the passage below. Then answer the questions.*

Let us give thanks on Thanksgiving for its cornucopia of foods: mashed potatoes, gravy, stuffing, creamed corn, cranberry sauce and, of course, turkey. Every fourth Thursday of November, friends and family in the U.S. travel thousands of miles to gather and gorge in a celebration tracing back to 1621 when Plymouth Pilgrims and Native Americans broke bread in gratitude for the year's plentiful harvest. Those early revelers were probably knocked out by their marathon feast, and most people today are familiar with the post-Thanksgiving food coma. But often the blame falls on the bird. Turkey allegedly causes drowsiness because it is packed with a nutrient called tryptophan.



Tryptophan is a naturally occurring amino acid that the body is unable to make on its own, so it must be obtained from food. Tryptophan is used by the human body to make serotonin, a neurotransmitter (brain chemical). Studies have shown that serotonin promotes deep sleep in humans. Thus, it is no wonder that turkey is associated with torpidity.

1. (RST.9-10.4) Define the following terms using context clues:

cornucopia: \_\_\_\_\_

revelers: \_\_\_\_\_

torpidity: \_\_\_\_\_

2. (RST.9-10.1) How does eating turkey cause sleepiness?

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\_\_\_\_\_

\_\_\_\_\_

3. Tryptophan is an amino acid. What do many amino acids make up? \_\_\_\_\_

But the story is not so simple. Turkey and other protein-rich foods contain many amino acids, and tryptophan is the scarcest among them. After a turkey dinner, several amino acids circulate through the bloodstream. To get into the brain they must be shuttled into the brain by specialized transporter proteins. Like passengers trying to board a crowded bus, amino acids compete for rides on these transporters. Not only does tryptophan have paltry representation among the passengers, it also competes with five other amino acids for the same transporter. The chances of tryptophan getting into

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the brain are extremely low. If tryptophan was the only amino acid present, it would increase brain serotonin, but no food source contains only tryptophan and no other amino acids.

4. (RST.9-10.4) Define the following term using context clues:

paltry: \_\_\_\_\_

5. (RST.9-10.1) How might tryptophan NOT be the cause of the post-Thanksgiving food coma?

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So if tryptophan isn't causing the sleepiness, then what is? "Interestingly, what probably makes people sleepy after Thanksgiving dinner is...dessert," says one scientist. "Eating carbohydrates also increases brain serotonin." Gobbling a slice of sweet pumpkin pie, for instance, causes the pancreas to secrete insulin, a hormone that causes the uptake of glucose and amino acids from the bloodstream into the tissues. By sopping up other amino acids from the blood, insulin reduces tryptophan's competition for the transporters, giving tryptophan a higher chance to get into the brain.

6. (RST.9-10.1) Explain how desserts can cause sleepiness.

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What else besides dessert causes post-Thanksgiving lethargy? It may simply be a function of scarfing down enormous quantities of food. Studies have indicated that stretching of the stomach and small intestine induces sleepiness and, more blood going to the digestive tract means less going elsewhere—for example, the brain or muscles. The opposite of the "fight or flight" response, is after all, "rest and digest."

7. (RST.9-10.4) Define the following terms using context clues:

lethargy: \_\_\_\_\_

induces: \_\_\_\_\_

8. (RST.9-10.1) How does eating a lot of food cause sleepiness?

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*Adapted from the article, "Does Turkey Make You Sleepy?" by Coco Ballantyne for Scientific American, on Nov. 21, 2007.*