**Student Worksheet: Treadmill-sprinting vampire bats**

**Directions**: Answer the first set of questions as instructed by your teacher before reading the article. Then, read the online *Science News* article “[Putting vampire bats on treadmills reveals an unusual metabolism](https://www.sciencenews.org/article/vampire-bats-treadmills-metabolism)” and answer the remaining questions as directed by your teacher.

**Before Reading**1. After watching [this short *Science News* video](https://www.youtube.com/watch?v=rjBtx8AMR_Q&t=15s), write down two scientific questions that an experiment using this setup could address.

2. Metabolism describes how creatures acquire and use energy for fuel. Briefly describe how you might acquire energy in a typical day. What are some biological processes that might require this energy? List two such processes. Then, pick another organism with a different metabolic approach and contrast its strategy with a human's.

**During Reading**

1. Contrast the method of locomotion (ways of moving around) by the vampire bat (*Desmodus rotundus*) with what is more typical of bat species.

2. How do you think the observation regarding vampire-bat locomotion inspired scientists in their design of this experiment?

3. What percent of the bat's exhaled carbon dioxide came from fuel sources other than carbohydrates and fats?

4. Based on the chemical analysis of exhaled breath, what did researchers conclude about the vampire bat's primary fuel source? Briefly describe how the evidence from an analysis of the bat’s blood supported this conclusion.

5. Scientists observed that the ratio of exhaled carbon dioxide to the oxygen used remained consistent for the treadmill-running bats. Explain how and why these findings differed from what the scientists had expected.

6. Identify another species that metabolizes blood as the vampire bat does.

7. Ken Welch points out that vampire bats sustain themselves on a diet that has fewer nutrients than what’s eaten by most mammals. How does he suspect this difference affected the evolution of the bat's metabolic strategy?

**After Reading**

1. Pick an animal not mentioned in this article that, in your opinion, sustains itself on an unusual diet. Briefly explain what about this diet sets it apart from other similar animals. Come up with one scientific question regarding this animal's unusual metabolism.

2. Describe how scientists might use one of the techniques described in this story to address the scientific question you stated above. Then, describe one significant difference between this animal and the vampire bat — a difference that would require a modified approach to the experimental design.