Name _____ Date _____ Class _____

Enrichment

LESSON 2

Fastest Strike

Move over mantis shrimp—the new record holder for the fastest strike by a predator is the trap-jaw ant. According to a 2006 press release from the University of California, Berkeley (UC Berkeley), "biologists clocked the speed at which the trap-jaw ant, *Odontomachus bauri*, closes its mandibles at 35 to 64 meters per second, or 78 to 145 miles per hour—an action they say is the fastest self-powered predatory strike in the animal kingdom."

Previously, scientists at UC Berkeley had thought that the mantis shrimp was the fastest-striking animal. This organism kicks out its clublike front leg to break the shells of its prey. Its leg moves at speeds up to 23 m/s. But the tiny trap-jaw ant, which hails from Central and South America, is much faster. Its mandibles, or jaws, snap shut "2,300 times faster than the blink of an eye," UC Berkeley scientists say.

Energy from Within

Sheila Patek, assistant professor of integrative biology at UC Berkeley, says that other animals can obtain faster speeds than the trap-jaw ants. Some falcons, for example, dive to capture prey at speeds of 300 km/h. However, the falcons begin their dives high in the sky and rely on the force of gravity, which pulls objects to Earth, to reach their death-defying speeds.

In contrast, organisms such as the trap-jaw ant and the mantis shrimp are self-powered; that is, they use energy stored in their bodies to reach their fast speeds. In the trap-jaw ant, for example, a pair of large muscles holds the mandibles in a cocked position. Each muscle has a latch. When the latches are triggered, the muscles are sprung, and the mandibles snap shut on the ant's prey.

"Having a latch system is critical in obtaining the explosive speeds," Patek explains. "In general, muscles aren't good at generating fast movements. If a person were to throw an arrow, it wouldn't get very far. But by using a crossbow, elastic energy is stored in the bow, and a latch releases the stored energy almost instantaneously. As a result, the arrow shoots out very fast and goes much farther. That's exactly what really fast organisms are doing.

Applying Critical-Thinking Skills

Directions: *Answer each question or respond to each statement.*

1. **Design** a way to model the snapping motion of the mandibles of the trap-jaw ant.
2. **Calculate** The trap-jaw ant snaps its mandibles at speeds of 35 to 64 m/s. How fast do the mandibles snap, on average?