Name: _____ Section: _____

Quarterly Article Review

Throughout this year, my main goal is to provide a strong foundation for those science courses that you will be taking in the years to come and to generate an interest in science. In an attempt to get you more involved and aware of scientific studies/research/news, you will have to write a quarterly review of a scientific article. These articles may come from magazines, newspapers, scientific journals, and/or the internet. I would encourage you to find articles that focus on a topic that you find interesting.

Your Article Review should:

- Be accompanied by the actual article
- Be at least one typed page
- Be double spaced
- Be mechanically sound (grammar, spelling, etc.)
- Not have type larger than thirteen point
- Have an appropriate font
- Have one paragraph (or more) summarizing (**NOT PLAGIARIZING**) the article
- Have one paragraph (or more) discussing your personal feelings/connections on/to the article
- Have a definition of an unfamiliar word from the article

The article review will be handed in midway through each quarter (I will give you a specific due date when the times come). The article review is worth 30 points, so it is very important that it is completed by the due date. These article reviews may be shared with the class, so please be knowledgeable about the article's content and be prepared to discuss it.

☼ Remember, the goal of this activity is to help generate an interest in science so please be sure to choose articles that you find interesting and **DON'T PROCRASTINATE!**

Name: _____ Section: _____

Quarterly Article Review Grading Rubric

Component	Description	Possible Points*	Points Received
Paragraph One	A paragraph that summarizes the important points from the article. ***It is important that techniques to avoid plagiarism are applied when utilizing information directly from the article.***	5	
Paragraph Two	A paragraph that highlights opinions on or connections to the article. ***It should be clear how your article is related to science, therefore it is not necessary to state this in the paragraph.***	5	
Definition	A definition of an unfamiliar word is written at the end of your review	5	
Format	The review is typed using the appropriate font and size, double spaced, and at least one page long	5	
Mechanics	Proper grammar, spelling, and citations	5	
Article	The article is science related and attached to the review	5	

Total Points = ____/30

***You will receive points ranging from 5-0, depending on the quality of the respective component**

Bitty Beasts of Burden: Algae can carry cargo

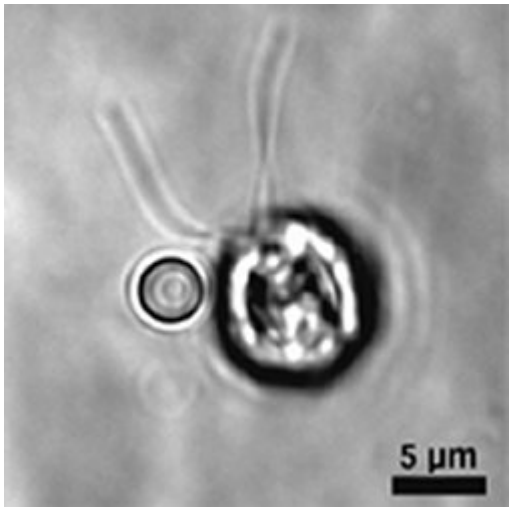
Christen Brownlee

For thousands of years, people have been coaxing other creatures into doing chores. Now, a team of scientists has microsized the strategy. They've devised a way to make single-cell algae bear loads over distances of several centimeters—a tactic that the researchers say could prove useful in tiny machines.

Algae and other single-celled organisms power their movements with molecular motors. Scientists have long coveted these motors for use in micromachinery, notes chemist Douglas B. Weibel of Harvard University.

However, pulling the devices from cells and modifying them to work with lab-derived machinery would require sophisticated bioengineering techniques. To avoid that hurdle, Weibel and other scientists led by George M. Whitesides of Harvard tried something simpler. The team recruited entire organisms, leaving their motors in place.

The researchers harnessed algae of the species *Chlamydomonas reinhardtii* to transport tiny beads. First, the scientists engineered a molecule to have two sticky ends and a middle section that breaks apart when exposed to ultraviolet (UV) rays. One end of the molecule adheres to polystyrene, and the other to an alga's cell wall. The team used the engineered molecule to coat beads made of polystyrene plastic.



ON FOR THE LONG HAUL. Beating its twin flagella, this algal cell lugs a polystyrene bead through water.
PNAS

The algae, which convert sunlight to biochemical energy, tend to travel toward visible light. Whitesides' team placed a few algae at one end of a thin, straight track cut into a polymer-coated glass plate. A pile of beads sat at the midpoint of the track.

When the researchers shined a low-intensity visible light from the end of the track opposite the algae, the organisms swam toward the light, each cell beating its two flagella breaststroke-style. When the algae reached the midpoint, they collided with the beads. The sticky molecules linked one or two beads to each cell, and the cells continued moving toward the light.

As long as the beads didn't adhere near an alga's flagella, each cell could haul a load of its own weight with little slowdown. "These cells are workhorses. They can really pull," says Weibel.

When the cells reached their destination—swimming as much as 20 centimeters, or 20,000 of their own body lengths, from start to finish—the researchers flashed UV light to break the chemical bond that attached the beads. Visible light shining from the track's opposite end coaxed the organisms back to the start.

Whitesides' team reports its results in the Aug. 23 *Proceedings of the National Academy of Sciences*.

Nadrian C. Seeman, a chemist at New York University who designs nanoscale devices made of DNA, says that the 10-micron diameter of the algal cells could limit how small any devices that incorporate the organisms could be made. However, he notes, algae or other microbes might eventually play a pivotal role in tiny machines that move objects a significant distance, such as along a microscopic assembly line.

John Jones
Quarterly Article Review

Section 1
October 10, 2005

Bitty Beasts of Burden: Algae can carry cargo

http://www.sciencenews.org/articles/20050820/fob6.asp

This article describes how scientists have been using microscopic organisms, specifically algae, to transport things (in this case small beads). The scientists were curious about how to use the motility of these tiny organisms to work within micro-machines. They created a molecule that acted like glue, which caused the bead to stick to the algae once it moved past it. In order to get the algae to move in a certain direction, the scientists used a light source to help guide/attract them. Relatively speaking, these algae were capable of moving long distances, "swimming as much as 20 centimeters, or 20,000 of their own body lengths, from start to finish." Once the algae reached their final destination, a UV light shone on them would cause the bond created by the special molecule (which the scientists made) to break.

It is pretty amazing that scientists are capable of manipulating such tiny things. I never would have guessed that something as small as algae could be used to perform such important tasks. I found this article very interesting, because it shows how science is an ever-growing field, with new discoveries being made each day. I wonder what advances can be made and all the improvements that might be possible from this discovery. It seems like scientists have just discovered how to move things too small to have been transported before. I am also curious about these "micro-machines" that the article references. Where or how are these machines used? Are they used in computers or possibly in people? This article makes me excited because I can't help but wonder- "What will they think of next?"

Bioengineering - The application of engineering principles to the fields of biology and medicine, as in the development of aids or replacements for defective or missing body organs.