

BIOL 1114 Exam #1 (Preview) September 18, 2017

Use a #2 pencil to fill in the information on your [NCS answer sheet](#).

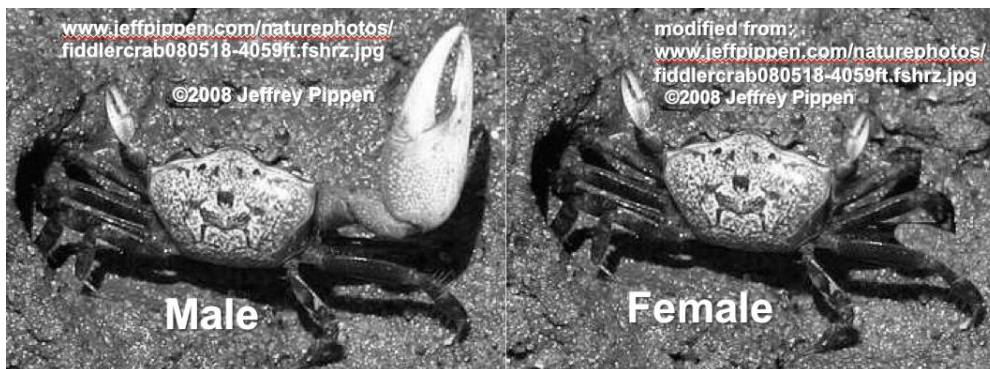
1. Put your [O-Key Account Username](#) in the spaces indicated for LAST NAME and darken the corresponding circles.
2. **Write your Name** (Last, First) and the word "**Star**" or "**NoStar**" above the words "Last Name".
3. Put your **CWID** in the spaces indicated for "**Student ID**" and darken the corresponding circles.
4. Enter **1731** in the spaces indicated for "**Course number**" and darken the corresponding circles.
5. Enter **001** (Star) or **002** (NoStar) in the spaces indicated for "**SEC**" and darken the corresponding circles.

Failure to perform this correctly will incur a -10 pt handling fee. Read all questions and answers *carefully* before choosing the **single BEST response** for each question. Feel free to ask the instructor for clarification.

For almost twenty years, heart patients were advised to take niacin (vitamin B3) tablets to prevent coronary artery disease, in part, because of research involving small sample sizes. However, the American Heart Association recently ceased recommending this treatment, citing new experiments indicating that large niacin doses do not significantly prevent heart disease. This enormous set of experiments involved tens of thousands of patients, some of whom had chosen to take niacin daily and some of whom had not; the scientists did not decide which subjects took niacin. A side effect of taking large niacin doses is [niacin flush](#), in which the face and neck become quite warm. Fair-skinned people turn red. Heart muscle cells have more mitochondria per cell than do skin cells, and are acutely affected by lack of oxygen.



[Fiddler crabs](#) (which are invertebrates) live along shorelines on wet sand/mud, where it gets very hot in the summer. In many species of fiddler crabs, females have two small claws used for feeding, but males have one small feeding claw and one large claw used to fight for and attract females. (More on that later in the semester!) The claw is filled with muscle. Rarely is a male born with two large claws and these males seem to survive fine.



Modified images used by permission; [original](#) is found at www.jeffpippen.com

If you're curious, you can find additional (but not necessarily helpful for this exam) info at:
National Geographic Videos: [Bigger is better](#) [Crab Sword Fight](#) [You'll Find the Biggest...](#)

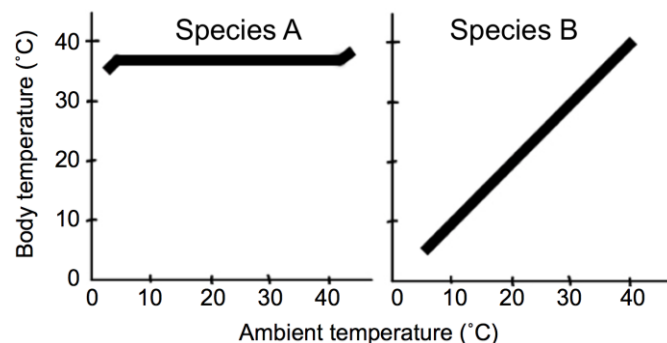
Gary weighed himself before and after his vigorous 1-hour workout at the gym, during which he drank 1 quart (= 2 pounds) of water, all of which he lost as sweat; although he did not urinate, he still lost 1 additional pound.

Usain Bolt, the Olympic track star, just completed training by running 1600 [meters](#) as fast as he can. At the end of the 1600 meters he immediately heads to the sideline to cool himself down. The ambient temperature in the track arena has not changed in this time. While he was running, his body used large amounts of glucose and his oxygen (O₂) intake increased.

You go to a pet store and find that [flying squirrels](#) from areas of the country with different climates differ remarkably in [surface area to volume ratio](#). You notice that the flying squirrel from one location drinks more water than the one from the other location.

You are growing [single-celled marine algae](#) in saltwater under growth lights to support photosynthesis. Under the microscope the algal cells look shriveled.

These two graphs represent the relationship between body temperature and ambient temperature for two different species of the same mass during the day.



When [Streptococcus pneumoniae](#) are exposed to an antibiotic, the bacteria try to pump the antibiotic out of their cells against the concentration gradient.

The [tarrkawarra](#) is a small Australian rodent capable of surviving without any free drinking water and produces very concentrated urine. Nursing females produce very concentrated milk and drink the urine of their offspring. The [collecting duct](#) is the last chance for the tarrkawarra to extract water from the fluid in the nephron back into the surrounding tissue and bloodstream.

A weightlifter is using heavy weights in short bursts for a competition. Because her muscle cells are not able to take in enough oxygen (O_2), her muscles begin to fatigue.

[Recently](#), collaborating [scientists](#) from England and Norway determined that goldfish (and their wild relatives), unlike any other vertebrate, are able to survive anoxic (oxygen free) conditions in which they are frozen in ice by producing alcohol. [Goldfish](#) (and their wild relatives) possess a unique biochemical pathway (series of chemical reactions) that converts pyruvate to lactic acid and then to alcohol. Lactic acid, which is mildly toxic, would remain in the fish, but alcohol can leave through the thin [gills](#), the same organ through which oxygen (O_2) and carbon dioxide (CO_2) are exchanged with the water. Goldfish retain all the normal aerobic cellular respiration components and those that produce lactic acid. As the ice melts and water warms in spring, O_2 becomes available. Chris accidentally spills [amytal](#), which inhibits one of the earliest proteins in the electron transport chain, into a pond containing goldfish.