**Name:** **Date:**

# Living Environment Summer Packet

Hello future science students! Please take the time to complete the following tasks to get you ready for Living Environment in September. Start warming up your brain now to think like a scientist! **READ THROUGH THE ENTIRE PACKET BEFORE YOU BEGIN!**

**Background Information:**
Every scientific discovery was inspired by an observation. Observations are things you notice and give thought to. A good scientist thinks of something that nobody has thought yet, while looking at something that everybody sees.

**Qualitative Observations-** Observations that describe the physical characteristics of something.

- Texture, color, smell, size, and shape are all quantitative observations.
- *For example,* just looking at this page you might observe that the paper is rectangular, white, and smooth. It has black letters. The font is small.

**Quantitative Observations-** Observations that involve measurements. There *MUST be a number* for an observation to be quantitative.

- Number, height, weight, time, length, and speed are all quantitative observations.
- *For example,* looking at this page you might observe that the paper is 8.5 x 11 inches, there are 324 words on the page, and the paper weighs .35 grams.

CHECKLIST (For each task, have a parent initial on the box to indicate that they have check for completion):

- ❑ Task 1:Make Observations
- ❑ Task 2: Ask Questions!
- ❑ Task 3: Take a Guess!
- ❑ Task 4: Can You Find the Answers?
- ❑ Task 5: Potato Famine Article and Questions
- ❑ Task 6: "Survival of the Sneakiest" Comic and Questions
- ❑ Task 7: Graphical Analysis

TASK 1- Make observations!

*Go somewhere-* your kitchen, your bedroom, the sidewalk, in your refrigerator, the park, ANYWHERE, and make some observations.

Location:

**Qualitative observations:** *Physically* describe 5 different objects that you see. *(Ex.- blue car, soft square pillow, brown furry dog, etc.)*

1.

2.

3.

4.

5.

**Quantitative observations:** *Count/measure* 5 different objects that you see. (Ex.- *1 jar of pickles with 8 pickles inside, 3 trees, 4 ounces of cheese, etc.)*

1.

2.

3.

4.

5.

TASK 2- Ask Questions!

A good scientist asks questions about the things they observe. All scientific experiments begin with a question. Ask a question about each of your observations!!!!!! No question is a bad question- dare to be creative!! (For example- *How fast can the blue car drive? Can the brown furry dog swim? How many pickles can I eat in 1 minute? How long does it take to chop down a tree? At what temperature does cheese melt?)*

**Questions:**

1.

2.

3.

4.

5.

6.

7.

8.

9.

TASK 3- Take a Guess!

Scientists use their knowledge to come up with educated guesses about their questions. A possible answer to a question is called a hypothesis. Try to answer each of the questions you asked! THERE IS NO WRONG ANSWER! In science, every hypothesis is considered a good hypothesis, because every hypothesis can lead to further research.

Examples:

*Question 1: How fast can the blue car drive?* *Hypothesis: I think the blue car can drive 120 mph.*

*Question 2: Can the brown furry dog swim?Hypothesis: I think the brown furry dog can swim.*

*Question 3: How many pickles can I eat in 1 min? Hypothesis: I think that I can eat 8 pickles in 1 minute.* **Your Turn! Write a hypothesis for each of your 10 questions.**

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

**Task 4: Can You Find the Answers?**

Extra credit if you can figure out the answers to your questions. Is your hypothesis (your educated guess) correct? There are some questions you might not be able to answer, some questions you might be able to look up, and some questions you might be able to answer by testing it out! **Write your answer AND how you got your answer (Internet, asking someone, experimenting, etc.).** If you were unable to answer a question, please write that.

**Example:**
***Hypothesis:*** *I think that I can eat 8 pickles in 1 minute.*
***Answer:*** *I tried it and I actually ate 6 pickles in 1 minute.*

**My Answers:**

**1.**

**2.**

**3.**

**4.**

**5.**

**6.**

**7.**

**8.**

**9.**

**Summer Packet, Reading Comprehension**

**Directions: In addition to all of the skills you practiced above, being able to read and comprehend scientific text is extremely important. When you read these articles, annotate and summarize each small paragraph to help you keep everything organized. Good Luck!**

As most people know, the Irish Potato Famine crippled Ireland and drove a huge migration of Irish people to America and other places. Many other people perished of starvation. What caused this terrible thing?

The potato is native to North America. It was brought back by Cortez and subsequent explorers and quickly became a staple crop in many countries. Easy to grow, nutritious, and filling, it became the food for the masses who could not afford much else.

In Ireland, the potato harvest was important. In September of 1845, potatoes were attacked by phytophthora infestans, an airborne fungus. It was carried to Ireland in the holds of ships from North America. Once there, it attacked with a vengeance.

Potatoes dug up at first looked edible. However, they soon rotted into a pile of stinking slime. Since almost the whole of the Irish people ate potatoes as their main food, this was serious.

Because the fungus was airborne, and the potatoes then grown had no immunity to it, the whole country was soon starving. This continued until approximately 1849, resulting In the death of a quarter of the Irish population. Many immigrated or were sent to North America, where one in five died on the crowded ships during the journey.

While the potato blight caused the potato crop to fail, monocropping, or depending on only one crop, caused the famine. It is important for people to grow many kinds of crops so that if one fails, they can feed themselves with the other ones. Just as important is that people grow different varieties of each crop. In other words, if you want to grow beans, in addition to growing the standard bean that everyone in your area grows, try another kind. That way if some bean disease hits one of your beans, you may be able to get a crop of the other type.

Genetic diversity is the key to avoiding global starvation. Grow lots of vegetables and you will always have something to eat.

Remember the Irish Potato Famine and learn from it.

**"Potato Famine" Text Questions:**

1. How many variations of the potato were planted during the Irish Potato Famine? (1 point)

2. What is the name of the fungus that killed all of the potatos? (1 point)

3. What is monocropping? (1 point)

4. Describe how genetic diversity can help farmers not lose ALL of their crops? (2 points)

# Survival of the Sneakiest

*by the Understanding Evolution team*

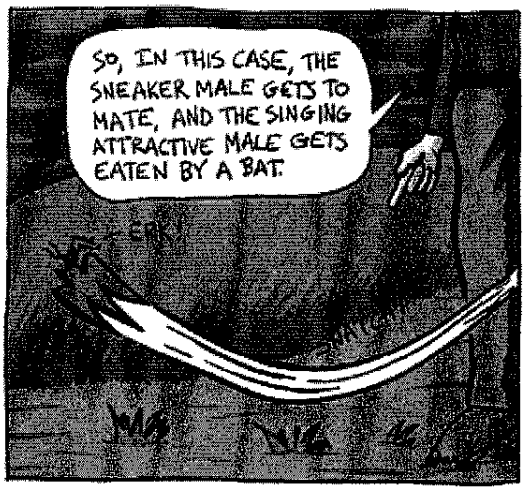
"**Survival of the fittest**" means that the strong succeed, and the weak fail, right? Well, often that's how it's portrayed, but the real story is a bit trickier. Let's take a closer look at what the crickets do...


NOT FAR AWAY, A FEMALE CRICKET LIKES WHAT SHE HEARS...
OH YEAH! MY EXOSKELETON IS Sooo GLOSSY! I'M PARASITE FREE!
OH MY!
THAT'S ONE HUNKA HUNKA BURNIN' CRICKET! JUST THE KIND OF MALE I WANT TO FERTILIZE MY EGGS!
drool
SO, SHE HEADS OFF TOWARD THE CALLER, FOLLOWING THE SOUND.
MEANWHILE, IN A NEARBY BURROW
♪OH GIRL, YOU MAKE MY ANTENNAE TREMBLE! TOGETHER WE CAN MAKE EXTREMELY ♪FIT OF SPRING!♫
WILL YA LISTEN TO THIS BLOWHARD?
I MEAN, I WANNA MATE AS MUCH AS THE NEXT GUY CRICKET, BUT YOU DON'T HEAR ME ANNOUNCING IT TO THE WHOLE MEADOW.
ACTUALLY, THAT GIVES ME AN IDEA.

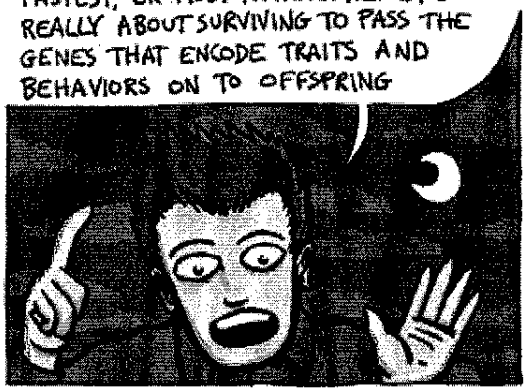

THIS SILENT, OR "SNEAKER," MALE CRICKET MOVES TO INTERCEPT THE APPROACHING FEMALE.
÷pant pant÷ OH HI! I LIKE YOUR SONG.
heh heh... YEAH, MY SONG...
OH YEAH, I'M THE ONE WHO'S PARASITE-FREE AND ALL THAT.
SCRATCH SCRATCH SCRATCH
SHHH... YOU HAD ME WITH THE SONG. NOW, LESS TALKING, MORE MATING.
THE SNEAKER MALE'S GAMBIT PAYS OFF.

AND OUR ORIGINAL, STRONG, LOUD, CALLING MALE IS OUT OF LUCK.


IN FACT, HIS SONG HAS ATTRACTED SOME UNWANTED ATTENTION.


SEE, "SURVIVAL OF THE FITTEST" ISN'T NECESSARILY ABOUT BEING THE TOUGHEST, FASTEST, OR MOST ATTRACTIVE. IT'S REALLY ABOUT SURVIVING TO PASS THE GENES THAT ENCODE TRAITS AND BEHAVIORS ON TO OFFSPRING

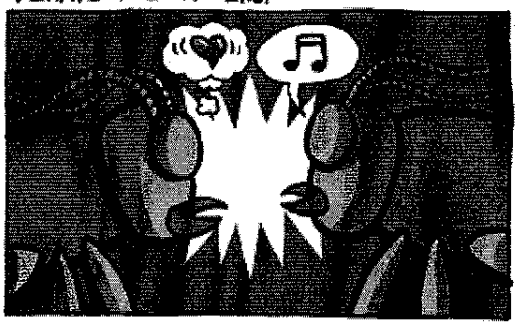


MAYBE OUR SNEAKER MALE'S KIDS WILL INHERIT THE "SNEAKY" GENES, AND IN TURN USE SNEAKY BEHAVIOR LIKE THEIR FATHER.


OF COURSE, TOUGHNESS **CAN** HELP TO INCREASE AN ORGANISM'S CHANCE OF LIVING LONG ENOUGH TO REPRODUCE...

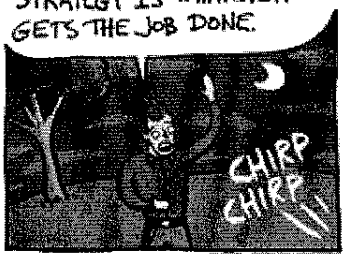

...BUT REPRODUCTION AND THE PASSING ON OF GENES ARE MOST IMPORTANT IN TERMS OF EVOLUTION. AND THERE ARE MANY WAYS THAT AN INDIVIDUAL CAN GET THEIR GENES INTO THE NEXT GENERATION.

CALLING IS STILL A GOOD STRATEGY FOR MALE CRICKETS TO INCREASE THEIR CHANCE OF MATING. FEMALES ARE ATTRACTED TO CALLING MALES, AND THERE WON'T ALWAYS BE SNEAKERS OR PREDATORS AROUND TO DERAIL THE CALLERS.



AND IF THEY ALL USED THE SILENT, SNEAKER STRATEGY, THEN **NO** FEMALES WOULD BE ATTRACTED AT ALL, AND THE MALES WOULD HAVE SOME LONG, LONELY NIGHTS.

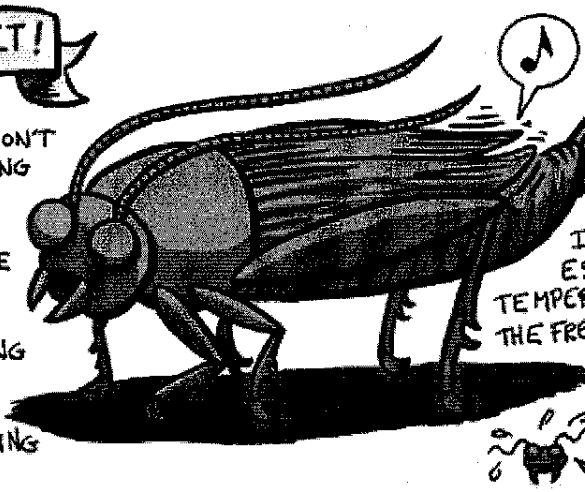

SO, WE END UP WITH A VARIETY OF SUCCESSFUL MATING STRATEGIES. THAT'S HOW NATURAL SELECTION WORKS. THERE IS NO ONE, TRUE, ULTIMATE SURVIVAL STRATEGY. A SUCCESSFUL STRATEGY IS WHATEVER GETS THE JOB DONE.






## EXTRA CRICKET!

CRICKETS DON'T ACTUALLY SING WITH VOICES, LIKE BIRDS OR PEOPLE. THE MALE CRICKET'S SONG IS MADE BY SCRAPING ONE WING ACROSS ANOTHER, SORT OF LIKE A VIOLIN BOW SCRAPING ACROSS A STRING.



CRICKETS CHIRP MORE OFTEN IF IT'S HOTTER. IN FACT, IT'S POSSIBLE TO ESTIMATE THE TEMPERATURE BASED ON THE FREQUENCY OF CRICKET CHIRPS.

Name: Date:

# Cricket Evolution Comic Questions

Direction: Please read the comic strip and answer the following questions.

1. What is the trait that attracted the female cricket to the male cricket? (1 point)

2. Why would it make sense that the female cricket wants this specific male cricket to fertilize her eggs? (2 points)

3. Which cricket wins in the end? why? (1 point)

4. Explain what "survival of the fittest" means in terms of the comic strip? What does it mean in general? (4 points)

5. Is "singing" considered a favorable trait or unfavorable? use evidence from the comic to support your answer. (2 points)

6. Give some examples of selection at work in this cricket story. (1 point per example)

**Summer Packet (Graphical Analysis)**

**Name:** _____ **Date:** _____

1. Base your answer to the following question on the information below and on your knowledge of biology.

A student performed a laboratory investigation to determine the effect of temperature on the heart rate of Daphnia (water flea). The following temperatures and heart rates were recorded:

20° C—260 beats/min; 10° C—152 beats/min;
25° C—300 beats/min; 5° C—108 beats/min;
15° C—200 beats/min

Organize the data by filling in the data table below. Complete both columns in the data table so that the temperature either increases or decreases from the top to the bottom of the table.

**Data Table**

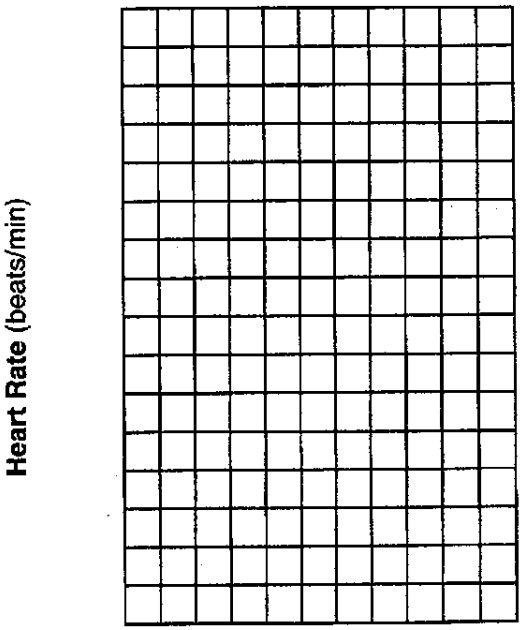
| **Temperature (° C)** | **Heart Rate (beats/min)** |
|---|---|
| | |
| | |
| | |
| | |
| | |

2. Base your answer(s) to the following question(s) on the information below and on your knowledge of biology.

A student performed a laboratory investigation to determine the effect of temperature on the heart rate of Daphnia (water flea). The following temperatures and heart rates were recorded:

20° C—260 beats/min; 10° C—152 beats/min;
25° C—300 beats/min; 5° C—108 beats/min;
15° C—200 beats/min

Construct a line graph on the grid following the directions below.

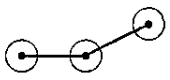



Mark an appropriate scale on the axis labeled "**Temperature** (° C)."

3. Mark an appropriate scale on the axis labeled "**Heart Rate** (beats/min)."

4. Plot the data from your data table. Surround each point with a small circle and connect the points.

   Example:



5. During which temperature interval did the greatest change in heart rate occur?

   A. 5–10° C  B. 10–15° C

   C. 15–20° C  D. 20–25° C