

## RADIOLAB Podcast “Inheritance” Homework Assignment

Name: \_\_\_\_\_

*Listen to the first three stories of the [“Inheritance” Radiolab Podcast](#) (Control + click on link to access podcast. You must have internet access to do this). Your grade will be based on how complete and correct your answers are.*

### SECTION I – Story 1 (Lamarck, Krammerer & the Midwife Toads)

1. Jean Baptiste Lamarck was a pioneer in the field of biology. He is most famous for coming up with a theory to explain how living things change over time. However, his theory happened to be wrong. Describe Lamarck’s theory and why it is incorrect.
2. Summarize the story of Paul Krammerer and his midwife toads. Specifically, how does this story relate to the subject of this podcast and to Lamarck’s work.

### SECTION II – Story 2 (Rat Maternal Behavior)

Regarding the experiment with rats that was measuring maternal behavior:

1. What do good rat mothers do to their babies? Are all rats good mothers?
2. How does the care that a rat mother gives her pup impact the kind of mother female rat pups grow up to be?
3. How do the researchers think this maternal rat behavior is being passed on? Are the mom’s teaching their pups? Are the moms changing the instructions in the rat pup’s DNA? Or is it something else? Support your answer. To answer this question, you must describe the process of gene expression that affects the maternal behavior of the rat pups. Your answer will involve a discussion of how the gene is turned on and how the protein is made (gene transcription and translation).

This assignment is from the free science education website [Science Prof Online](http://ScienceProfOnline.com) (ScienceProfOnline.com). Visit the website to find more science education resources such as lecture PowerPoints, practice test questions, review questions, science photos, videos and assignments.

4. What was turning off the maternal care gene (i.e. What was preventing the gene from being transcribed and translated)? How did the rat maternal behavior turn the gene back on?

### **SECTION III – Story 3 (Population data from Overkalix, Sweden)**

Regarding this analysis of population data:

1. How were the ancestors affected by a boy experiencing starvation between the ages of 9 - 11?
2. What inheritable effect do they think the boy's starvation had on his body?
3. How were ancestors affected by a boy being well-fed between the ages of 9 - 11?
4. What do the researchers think is the difference between the expression of some genes in the sperm of starving versus well-fed boys?

### **SECTION IV - Stories 2 & 3**

1. Define epigenome. How is it different than the genome?
2. Based on what you learned from Stories 2 & 3 in this podcast, do you think that your behavior and environment can impact the instructions in your children's DNA? On the molecular genetic level, what was altered about the DNA in the offspring and ancestors in Stories 2 & 3? (Your answer should relate to gene expression.)