Evolution: Rat Island (due: 5/21, 5/22)

PART ONE:

A ship heading towards the United States had a major malfunction. Due to this malfunction, the ship eventually sank, and the only survivors were a group of rats that were living on the ship. As the ship sank, these rats swam to a nearby island. First, choose what this island looks like. Circle (or highlight) one choice for each of the ten island characteristics below:

Characteristic	Choice 1	Choice 2	Choice 3
Size of island	Small (3 miles wide)	Medium (8 miles wide)	Large (20 miles wide)
Number of plants	Hardly any trees and plants	Some trees and plants	Lots of trees and plants
Size of plants	Short	Medium	Tall
Water present	Hardly any ponds, lakes or streams	A few ponds, lakes or streams	Lots of ponds, lakes and streams
Weather	Colder (~60°) and Dry	Warm (~100°) and Dry	Warm (~100°) and Rainy
Terrain	Flat without many rocks	Some hills with rocks	Mountainous
Meat- food	Small fish and crabs	Insects	Small, quick lizards
Plants- food	Roots	Apples	Coconuts
Predators (major)	Wolves	Snakes	Hawks
Predators (minor)	Stronger species of rats	Cats	Strong, but slow Lizards

PART TWO:

Now, imagine that the ship actually sunk 500 years ago (*Filipa*, the little known fourth ship of Columbus' exploration) and that the rats have been living on the island ever since. Further, these rats are fully mature at 1/2 year old, can reproduce about four times a year, produce about 12 offspring at a time, and have a gestation period of about 21 days. Look back at your island and **list ten adaptations** that would have evolved in the rat population as a result your island's characteristics and many, many, many generations of rats. Remember, adaptations do not need to be major and can be physical or behavioral. They are usually based on variations that can be naturally found within the gene pool. Occasionally they are a result of a fortuitous gene mutation. They provide a survival advantage to those individuals of a population that possess the particular trait(s). *Environmental demands direct the changes in the gene pool.*

In essay form, describe your island rat. Explain the relationship between the environmental demands and the evolved traits of your rat. Describe what challenges your rat faces on the island and how it is specifically suited to live in its environment. Remember your rat has evolved to meet the unique demands of its environment – it should be different than a rat that I could find here in Denton, Tx. Your essay must include (correctly used) the following scientific terms: **homologous structure, natural selection, adaptation, vestigial organ,** either **(directional selection, stabilizing selection, disruptive selection), fitness, genetic drift, and speciation**. Terms should be used correctly - confirm meaning.

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Characteristic	Adaptation (behavioral or physiological)
Size of island →	
Number of plants →	
Size of plants →	
Water present →	
Weather →	
Terrain →	
Meat- food →	
Plants- food →	
Predators (Big) →	
Predators (Small) →	

****DRAW A PICTURE OF YOUR RAT****

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RAT ISLAND GRADING RUBRIC

NAME _____

CATEGORY	EXCELLENT WORK	SATISFACTORY WORK	WORK IN PROGRESS	YOUR SCORE
ISLAND DESIGN	10 Circled characteristics (10 pt.s)	1-9 Circled characteristics (1-9 pt.s)	0 Circled characteristics (0 pt.s)	**__/10**
LISTED ADAPTATIONS	10 Listed adaptations (21 pt.s)	1-9 Listed adaptations (2 pt.s/adaptation)	0 Listed adaptations (0 pt.s)	**__/21**
RAT ILLUSTRATION	Detailed, colorful, neat, and reflects time(24-30 pt.s)	Moderately colorful, neat, and detailed (23-13 pt.s)	Not adequately colorful, neat, or detailed (12-0 pt.s)	**__/30**
RAT ESSAY	Neat, grammatically, correct, logical, and 6-8 terms (21-18 pt.s)	Neat, grammatically, correct, logical, and 3-5 terms (17-10 pt.s)	Incomplete, terms not explained, 0-2 terms (9-0 pt.s)	**__/21**
PRESENTATION	Audible, clear, and well-rehearsed (18-13 pt.s)	Moderately clear, audible, and fluid (12-7 pt.s)	Not projecting voice, using "uh" or the like (6 pt.s-0 pt.s)	**__/18**
			TOTAL	**___/100**