Biology 4605 / 7220
Quiz #10b

Name **Key**

25 November 2015

1. For the following analyses, list the type of response variable (binomial or ratio scale), the number of ratio-scale explanatory variables, and the number of nominal scale (categorical) explanatory variables. Number = 0 if absent.

	Response	Ratio-scale	Categorical
Annual rate of shrinkage of coral reef area.	ratio	1	0
Two-way ANOVA.	ratio	0	2
Seed germination in 3 plots, one planted with 10 seed, the two other with 20 seeds each.	binomial	0	1
Analysis of growth rate in relation to temperature in five microbial cultures.	ratio	1	1
Sex ratio in relation to size (shell diameter) of slipper limpets.	binomial	1	0
Growth rate of plants at 4 levels of exposure to CO_2, controlled for light and temperature.	ratio	2	1
or		0	3
Randomized block design.	ratio	0	2

2a. Assuming a probability of germination of $p_{germinate} = 0.5$ in each plot, calculate the expected number of germinations $E(N_{germinate}) = (p_{germinate})(N_{planted})$ and observed odds.

Plot:	A	B	Control
$N_{planted}$	10	20	20
$E(N_{germinate})$	5	10	10
$N_{germinate}$	4	2	1
Odds	4/6	2/18	1/19

2b. Define response and explanatory variables, with symbols, to test whether germination rate (odds of germination) are the same in all three plots.

Response   Odds of germination   g Odds

Explanatory   Plots   P

2c. Using symbols above, write a model to test whether the germination rate (odds of germination) are the same in all three plots.

$$g\,Odds = e^M + \text{binomial error}$$

$$\eta = \beta_0 + \beta_p \cdot P$$