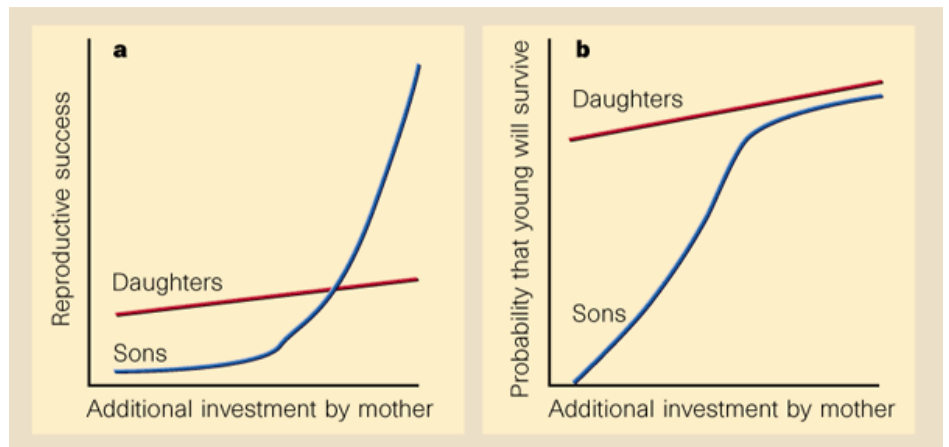Name_____Period_____Assignment #_____

What determines sex ratio in mammals?
Class discussion

1) What is the expected sex ratio for just about all organisms?

2) In mammals, who determines the sex of the offspring? Males or females

3) Explain your answer to the previous 2 questions
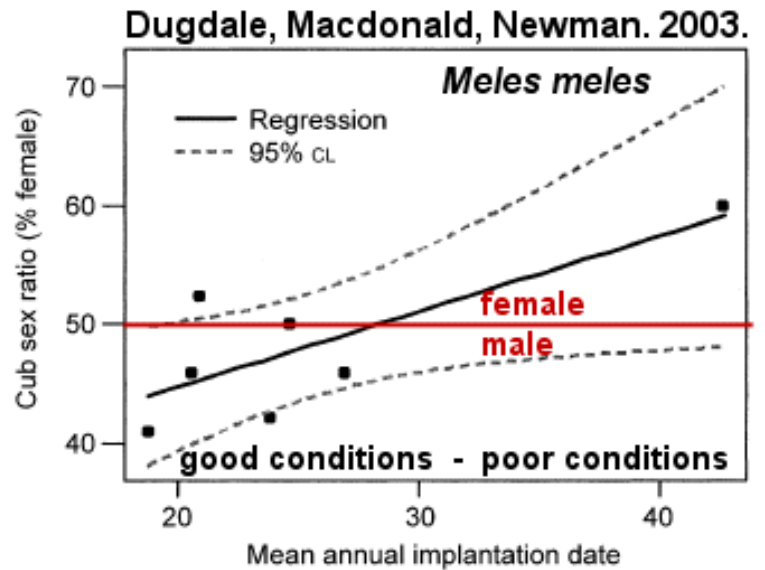

4) Write down observations about the 2 graphs

5) Which sex would natural selection favor investment in?

6) Justify your answer to the question above. A justification has 3 components: 1) scientific knowledge and/or theory; 2) specific data from your analysis related to the knowledge; and 3) and explanation of how the data from your analysis supports the knowledge.

7) Under what conditions would natural selection favor investment in females?

8) Justify your answer to the question above. A justification has 3 components: 1) scientific knowledge and/or theory; 2) specific data from your analysis related to the knowledge; and 3) an explanation of HOW the data from your analysis supports the knowledge.

Dugdale, Macdonald, Newman. 2003.

Meles meles

— Regression
---- 95% CL

Cub sex ratio (% female)

female
male

good conditions - poor conditions

Mean annual implantation date

9) What is the probability of making a type I error?

10) Explain how the Chi squared distribution curve illustrates the probability of making a type I error
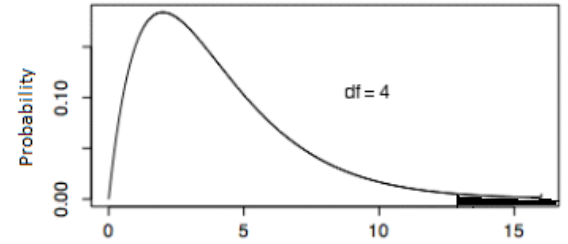
Probability

df = 4
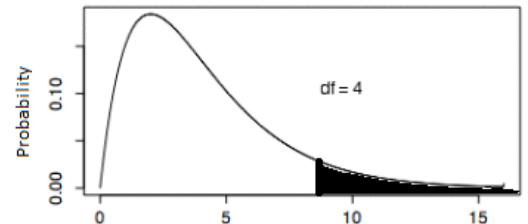
11) What is the probability of making a type I error?

12) Explain how this Chi squared distribution curve illustrates the probability of making a type I error

Probability

df = 4
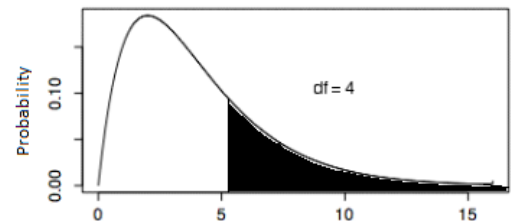
13) Why don't we make a significance level of 1% or less so we stop making type I errors (false positives)?

14) Calculate the chi square statistic for flipping a coin 20 times and getting heads 14 times. This is equivalent to saying you got heads 70% of the time

Chi-Squared Distribution: 1 Degrees of Freedom

15) What is the probability of getting 14 out of 20 heads?

16) State the results in terms of H_0 and H_A

Chi-Square Table
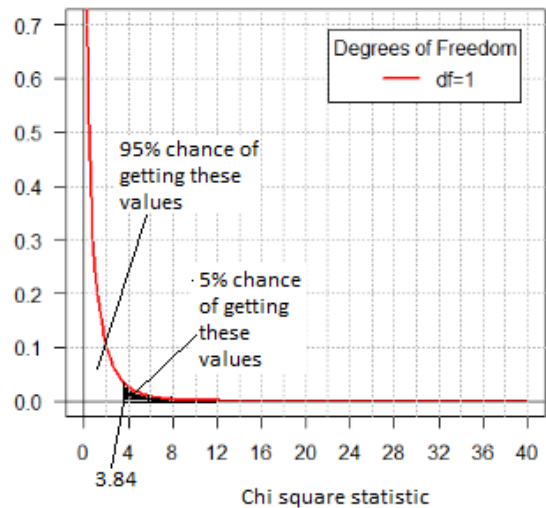
p value	Degrees of Freedom							
	1	2	3	4	5	6	7	8
0.05	3.84	5.99	7.82	9.49	11.07	12.59	14.07	15.51
0.01	6.64	9.21	11.34	13.28	15.09	16.81	18.48	20.09

17) Calculate the chi square statistic for flipping a coin 30 times and getting heads 21 times. This is equivalent to saying you got heads 70% of the time

Chi-Squared Distribution: 1 Degrees of Freedom
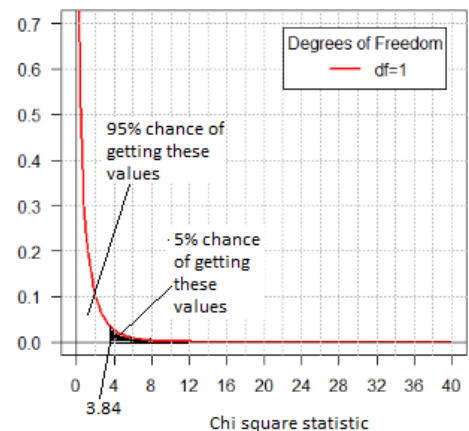
18) What is the probability of getting 21 out of 30 heads?

Chi-Square Table

p value	Degrees of Freedom							
	1	2	3	4	5	6	7	8
0.05	3.84	5.99	7.82	9.49	11.07	12.59	14.07	15.51
0.01	6.64	9.21	11.34	13.28	15.09	16.81	18.48	20.09

19) State the results in terms of H_0 and H_A

Cross Cutting Concepts in Science

Patterns

20) How was the following demonstrated in this lab?

- Mathematical representations are needed to identify some patterns.
- Empirical evidence is needed to identify patterns.

Cause and Effect: Mechanism and Prediction

21) How was the following demonstrated in this lab?

- Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.
- Changes in systems may have various causes that may not have equal effects.

Scale, Proportion, and Quantity

22) How was the following demonstrated in this lab?

- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs.
- Patterns observable at one scale may not be observable or exist at other scales.

Systems and system models

23) How was the following demonstrated in this lab?

- Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales.
- Models can be used to predict the behavior of a system, but these predictions have limited precision and reliability due to the assumptions and approximations inherent in models.