

# Evolution Homework 1

**Part One: IDENTIFICATIONS (IDs).** Use the book to help you identify the following. Be as specific as possible, and include names, dates, and relevant facts as appropriate. Be sure to explain the significance of the term. **There should be a minimum of three (3) sentences for each ID.** Use of the internet is okay if you are stuck, as long as you do not plagiarize. Hand written work only accepted.

**Chapter 22: Descent with Modification Reading Guide, Page 438, 7<sup>th</sup> edition**

- A) Taxonomy
- B) Natural vs Artificial Selection
- C) Homology and Divergent Evolution
- D) Analogous Structures and Convergent Evolution
- E) Transitional Fossils
- F) Drug Resistant HIV

**Part Two: Chi Square Problems.** Complete the problems using the Chi-Square test learned in class.

1) We collected data by flipping a two-sided coin 500 times. The coin landed heads-up 230 times and tails-up 270 times. Perform a Chi-Square test to see if there is any statistical difference between our results and the expected results. Accept or reject the null hypothesis.

Outcomes	Observed Outcome	Expected Outcome	O-E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
<b>χ<sup>2</sup> Chi Square Value:</b>					

Degrees of Freedom: \_\_\_\_\_ Accept or Reject Null Hypothesis: \_\_\_\_\_

2) After 100 rolls of a di, a student collected this information in regards to the landing of the rolled di: 1 (21 times), 2 (10 times), 3 (15 times), 4 (16 times), 5 (14 times), 6 (24 times). Perform a Chi-Square test to see if there is any statistical difference between our results and the expected results. Accept or reject the null hypothesis

Outcomes	Observed Outcome	Expected Outcome	O-E	(O-E) <sup>2</sup>	(O-E) <sup>2</sup> /E
1					
2					
3					
4					
5					
6					
<b>χ<sup>2</sup> Chi Square Value:</b>					

Degrees of Freedom: \_\_\_\_\_ Accept or Reject Null Hypothesis: \_\_\_\_\_

Degrees of Freedom (df)	Probability (ρ)										
	0.95	0.90	0.80	0.70	0.50	0.30	0.20	0.10	0.05	0.01	0.001
1	0.004	0.02	0.06	0.15	0.46	1.07	1.64	2.71	3.84	6.64	10.83
2	0.10	0.21	0.45	0.71	1.39	2.41	3.22	4.60	5.99	9.21	13.82
3	0.35	0.58	1.01	1.42	2.37	3.66	4.64	6.25	7.82	11.34	16.27
4	0.71	1.06	1.65	2.20	3.36	4.88	5.99	7.78	9.49	13.28	18.47
5	1.14	1.61	2.34	3.00	4.35	6.06	7.29	9.24	11.07	15.09	20.52
6	1.63	2.20	3.07	3.83	5.35	7.23	8.56	10.64	12.59	16.81	22.46
7	2.17	2.83	3.82	4.67	6.35	8.38	9.80	12.02	14.07	18.48	24.32
8	2.73	3.49	4.59	5.53	7.34	9.52	11.03	13.36	15.51	20.09	26.12
9	3.32	4.17	5.38	6.39	8.34	10.66	12.24	14.68	16.92	21.67	27.88
10	3.94	4.86	6.18	7.27	9.34	11.78	13.44	15.99	18.31	23.21	29.59
11	5.58	5.58	6.99	8.15	10.34	12.90	24.73	17.28	19.68	24.73	31.26
12	6.30	6.30	7.81	9.03	11.34	14.01	26.22	18.55	21.03	26.22	32.91
13	7.04	7.04	8.63	9.93	12.34	15.12	27.69	19.81	22.36	22.69	34.53
14	7.79	7.79	9.47	10.82	13.34	16.22	29.14	21.06	23.69	29.14	36.12
Nonsignificant						Significant					

**Part Three: Critical Thinking and Math**

3) Mosquitoes resistant to the pesticide DDT first appeared in India in 1959, but now are found throughout the world. A scientist collected data on the percentage of mosquitoes that are resistant to DDT.

(a) Graph the data in the table below. Use TAILS (Title, axes labeled, intervals correct, labeled, and correct scale). Identify the

Independent Variable: \_\_\_\_\_

Dependent Variable: \_\_\_\_\_

(b) Examining the graph, hypothesize why the percentage of mosquitoes resistant to DDT rose rapidly.

(c) Suggest an explanation for the global spread of DDT resistance.

Months after 1959	Percentage of Mosquitoes Resistant to DDT*
0	4%
4	23%
8	45%
12	77%
16	88%

\*Mosquitoes were considered resistant if they were not killed within 1 hour of receiving a dose of 4% DDT\*

