

ARTIFICIAL SELECTION LAB

Day 1: Plant seeds. Enter the date in your lab notebook. Each lab day, enter the date and record what you are doing and any notable observations.

Day 7-12: Quantify trait. (See description of trichomes and how they are counted on the first true leaf.)

- Count trichomes for each plant.
- Record number on plastic label and insert next to each plant
- (It would be nice to take a photo of a plant showing the trichomes for use in your lab report.)
- Create a histogram of the class data for this trait. Decide on appropriate bin sizes.
- Calculate mean, median, and range, for class data.
- Pick the top 10% plants for the class.
- If you have some of the top 10% plants, cut off the tops of the other plants in the containers. Set the container aside—we will use these plants and later cross pollinate them to get the next generation.

Day 14-16: Pollinate plants over 3 days. Be sure to use separate bee sticks for the top 10% group and the remaining plants.

Day 28-36: Let plants dry out. Harvest seed pods. Store seeds in paper bags till ready to plant.

Second generation: Plant seeds from selected group. When these plants are ~12 days old, count number of trichomes on first true leaf.

- Create a histogram of class data.
- Calculate the mean, median, range, for class data
- Create a box-and-whisker plot for both the original and the offspring populations.

<http://www.regentsprep.org/Regents/math/ALGEBRA/AD3/boxwhisk.htm>

- Work on lab report.

Lab Report Format

- I. **Heading:** Write your name, the date, the full names of all lab partners, and the title of the lab.
- II. **Purpose:** This is often stated in the lab handout. You will have to restate it in your own words.
- III. **Materials:** List all the materials used and provide a diagram/photo of the set-up.
- IV. **Procedure:** Describe exactly what you did. The steps may be numbered. Include enough information so that a stranger could duplicate your lab.
- V. **Results:** this section includes tables, graphs, and statistical analyses.
 - a. **Tables:** Put your data in table form whenever possible. Include units at the tops of columns or with each number. Tables should be titled. Your tables will be huge, so you may want to attach them to the end of the lab report under the heading "Appendix A."
 - b. **Graphs:** Graphs must have axes labeled (with units) and must be titled. You should have two histograms (one for each generation) and two box-and-whisker plots.
 - c. **Describe data:** include a paragraph describing the data that you are presenting in your tables and graphs. In this paragraph, state your median, mean, and range for your data. Also describe the significance of your two plots. You should also note any unusual observations that may affect your results. For example, if you throw out a data point, explain why. Your analysis won't make any sense if you start listing sources of error out of nowhere.
- VI. **Conclusions:** Your conclusion should be written in paragraph form with decent grammar. You should always restate the purpose of the lab. Then interpret your results and provide reasons for your interpretations. Support your argument with actual data or observations. Discuss the significance of the various statistical analyses that you did. Make it clear to me that you understand what each test is revealing about your data. You should also discuss sources of error and possible methods of reducing this error. Be specific and give reasons—saying "human error" is not acceptable. Additional topics to address include the following:
 - Why might a plant have trichomes? Is there a selective advantage to having trichomes? (Do some research) Could this advantage differ by environment?
 - Are the two population means actually different? How can you tell?
 - Speculate as to the mode of inheritance for this trait (monohybrid, dihybrid, codominance, polygenic, sex-linked, etc,etc). Explain your reasoning.
- V. **Works Cited:** Standard MLA format. Use <http://www.easybib.com/>. Cite any sources you used in your research on trichomes.

This lab report represents your own work; it is not a group effort. All information must be written by you

ARTIFICIAL SELECTION LAB RUBRIC

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____/1 **Purpose:** This is often stated in the lab handout. You will have to restate it in your own words.

____/1 **Materials:** List all the materials used

____/2 **Procedure:** Describe exactly what you did. The steps may be numbered. Include enough information so that a stranger could duplicate your lab.

Results: this section includes tables, graphs, and statistical analyses.

____/1 **Tables:** Put your data in table form whenever possible. Include units at the tops of columns or with each number. Tables should be titled. Your tables will be huge, so you may want to attach them to the end of the lab report under the heading "Appendix A."

____/6 **Graphs:** Graphs must have axes labeled (with units) and must be titled. You should have two histograms (one for each generation) and two box-and-whisker plots.

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Conclusions: Your conclusion should be written in paragraph form with decent grammar.

____/1 You should always restate the purpose of the lab.

____/1 Then interpret your results and provide reasons for your interpretations. Support your argument with actual data or observations.

____/2 Discuss the significance of the various statistical analyses that you did. Make it clear to me that you understand what each test is revealing about your data. Additional topics to address include the following:

____/3 Why might a plant have trichomes? Is there a selective advantage to having trichomes? (Do some research) Could this advantage differ by environment? Are the two population means actually different? How can you tell? Speculate as to the mode of inheritance for this trait (monohybrid, dihybrid, codominance, polygenic, sex-linked, etc,etc). Explain your reasoning.

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Class Data Generation 1

1	2	51	4	30	4	8	8	0	13
0	6	11	0	7	6	0	9	28	3
0	7	0	5	29	4	2	9	9	20
7	9	4	4	9	19	12	6	40	49
12	5	9	2	16	4	2	5	40	2
14	15	8	3	12	12	13	6	4	21
5	1	20	16	18	11	4	2	3	53
5	25	3	3	8	10	20	5	3	6
10	10	25	16	27	0	3	4	7	0
21	0	9	12	0	0	8	41	5	10
5	4	2	10	1	7	9	4	0	1
4	16	0	29	0	17	24	5	2	4
1	2	2	5	5	8	4	4	17	9
7	11	3	8	3	18	3	0	14	0
0	22	0	28	5	35	1	10	12	18
10	8	3	1	7	6	15	11	39	5
9	7	10	10	16	10	8	0	15	6
6	23								

15

23	11	50	8	11	18	14	18	8	15	30	N	15	53	50	11	50	21
21	10	51	50	8	8	50	15	30	20	24	50	24	21	10	12	50	8
0	58	2	14	5	8	10	10	12	12	50	50	50	0	58	50	50	11
3	0	5	10	50	4	4	50	30	20	50	N	N	3	0	12	50	3
L	3	3	24	54	4	4	4	15	15	50	50	50	0	3	50	50	0
35	35	N	54	L	4	4	4	50	30	50	0	0	35	35	0	50	10
3	3	8	2	10	18	10	18	8	15	50	0	0	3	3	20	50	4
2	2	N	20	14	8	14	8	18	18	50	0	0	2	2	12	50	51
30	30	13	13	54	0	0	0	0	0	50	50	50	30	30	5	50	0
51	51	15	15	58	17	17	17	40	30	50	24	24	51	51	0	50	0