



Lesson Plan: Backwards Design

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Grade Level/Subject Area: 6 / Statistics, Data Analysis, and Probability Date: 03/14/09

Lesson Topic: Probability using the monohybrid cross Content Standard: Statistics, Data Analysis, and Prob. (3.0, 3.1 and 3.3)

Adopted Text(s): none Supplemental Materials/Technology: Virtual Online Lab

Note: Use the Essential Components of Differentiated Instruction in the FAS Resource section of your padfolio to help differentiate instructional strategies, content, products or assessments.

California Induction Program Standards

Check all that apply:

- ☐ Standard 5: Pedagogy
- ☐ Standard 6: Universal Access: Equity for All Students
 - ☐ Teaching English Learners
 - ☐ Teaching Special Populations



Learning Outcomes - Students will be able to describe the meaning of dominant vs. recessive and the 3:1 monohybrid ratio. -Students will be able to calculate the probability of different phenotypes using the punnet square.	Key Concepts & Essential Questions -Represent probabilities as ratios, proportions, decimals between 0 and 1 and percentages between 0 and 10, - Represent all possible outcomes in an organized way (tables), - Know the meaning of the keys concepts such as dominant, recessive, and the 3:1monohybrid ratio.	Connections to Students' Knowledge, Skills, Experience -Teacher will ask students if they have any brother or sister that have different eyes, skin, or hair color.
Evidence of Learning (Product or Assessment) Result and analysis of fly experiment and calculations of M&M's. Also, based on the prediction of the fly experiment based on the M&M's	Teaching Strategies & Sequence Opening Start a conversation with students about family traits Instruction 1. Introduce the key terms and definitions of dominant, recessive, probability and monohybrid on the board or through the PowerPoint 2.Put students in small groups. Give each group two types of M&M's, brown Peanut M&M's representing dominant types, and blue regular M&M's representing recessive traits. representing the different traits. Pass out 2x2 Punnet's square. 3. Discuss the different results and the probabilities associated with each. 4. Analyze these results and predict the results for the flies. Guided Practice Perform virtual lab experiment with the flies, have the students try 2 or 3 different combinations Closure Discuss why the relationships do not follow the ratios exactly the expected 3:1 ratio but are close. Extension Activities or Independent Practice Extend to dominant vs recessive and the 9:3:3:1 dihybrid ratio	Ways to differentiate instruction For more advanced students have them work on a dihybrid cross and have them try to explain why this is different than the monohybrid. For EL have pictures available for the different vocabulary and add these things to the word wall For the low performing students allow them fewer combinations on the monohybrid ratio, and provide them assistance during the lab.
	Materials Computers, Punnet square worksheet and overhead, M&M's (peanut and regular)	

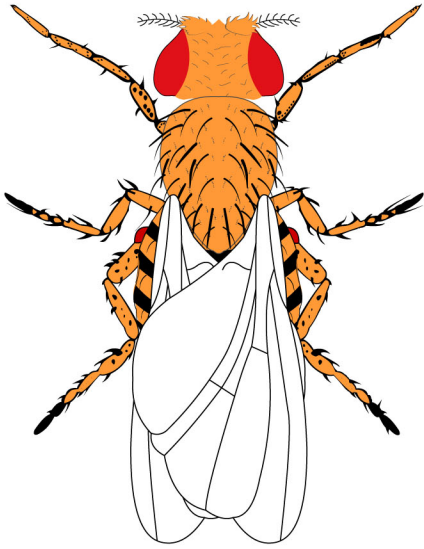
Adapted from the work of Wiggins and McTigue.

First Generation	B	B
b	Bb	Bb
b	bB	bB

Second Generation	B	b
B	BB	Bb
b	bB	bb

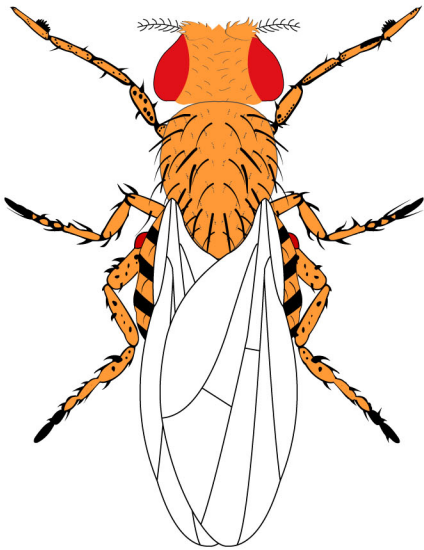
Third Generation	b	b
B	Bb	Bb
b	bb	bb

Notebook session started: 3/14/2009 2:16:49 pm



Parent for Cross #1
Female; Dumpy wings

Fly Phenotype of a Parent



Parent for Cross #1
Male; Wild Type

Fly Phenotype of a Parent

Cross #1 - Parents:
(Female: Dumpy wings)
x
(Male: Wild Type)

Phenotype	Observed	Hypothesis	Expected	Chi-Square Term
Male: Wild Type	611	1	602.50	0.1199
Female: Wild Type	594	1	602.50	0.1199
Total	1205	2	1205.00	0.2398

Chi-Squared Test Statistic: 0.2398
Degrees of Freedom: 1
Level of Significance: 0.6243

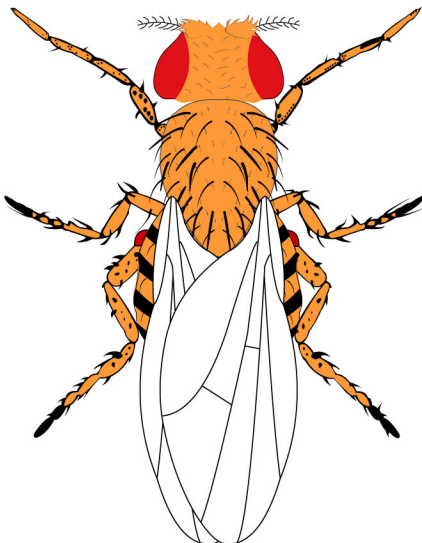
Chi-Square Analysis of Results

Cross #2 - Parents:
(Female: Wild Type)
x
(Male: Wild Type)

Phenotype	Observed	Hypothesis	Expected	Chi-Square Term
Female: Wild Type	448	3	448.88	0.0017
Male: Wild Type	436	3	448.88	0.3693
Female: Dumpy wings	163	1	149.63	1.1956
Male: Dumpy wings	150	1	149.63	0.0009
Total	1197	8	1197.00	1.5675

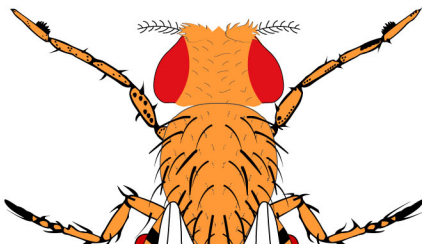
Chi-Squared Test Statistic: 1.5675
Degrees of Freedom: 3
Level of Significance: 0.6668

Chi-Square Analysis of Results

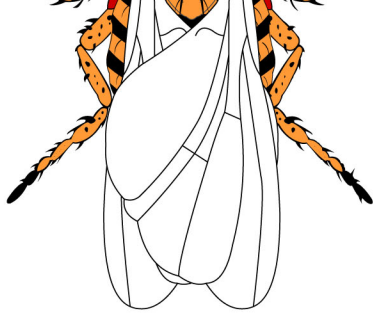


Offspring of Cross #2
Female; Wild Type
Number with this phenotype: 448
Parents:
Female; Wild Type
X
Male; Wild Type

Fly Phenotype resulting from mating

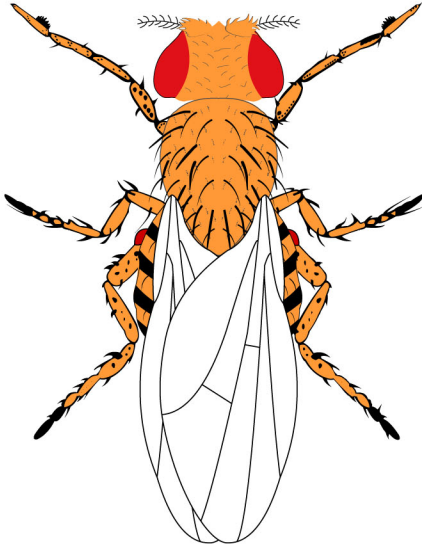


Offspring of Cross #2
Male; Dumpy wings
Number with this phenotype: 150
Parents:
Female; Wild Type
X



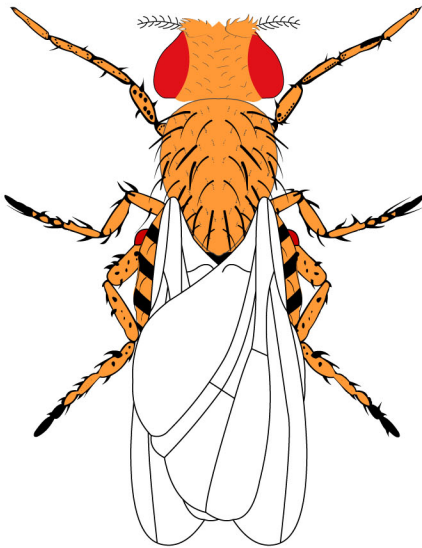
X
Male;Wild Type

Fly Phenotype resulting from mating



Offspring of Cross #2
Male;Wild Type
Number with this phenotype: 436
Parents:
Female;Wild Type
X
Male;Wild Type

Fly Phenotype resulting from mating



Offspring of Cross #2
Female;Dumpy wings
Number with this phenotype: 163
Parents:
Female;Wild Type
X
Male;Wild Type

Fly Phenotype resulting from mating