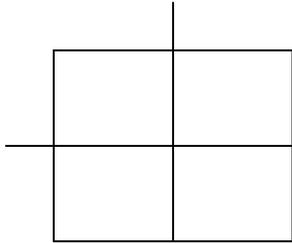# Using Punnett Squares
(Use with the Weblink "Baby Steps Through Punnett Squares.")

Guided Practice:
"T" = tall   "t" = short

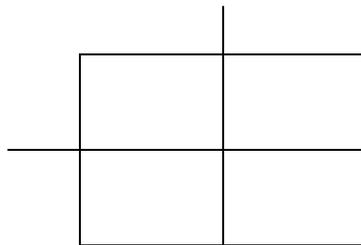## Independent Practice:
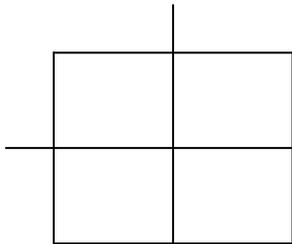 Red throated booby bird   "R" = red throat   "r" = white throat

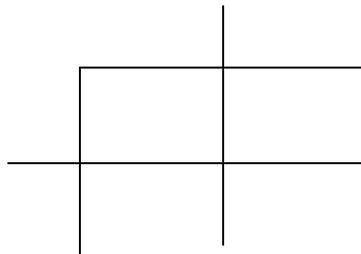1. Cross "RR" with "rr."   2. Cross "Rr" with "RR."
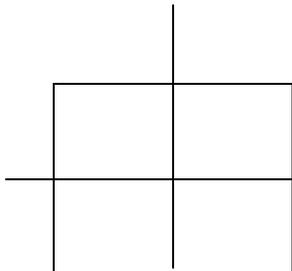
Guinea pigs   "B" = brown hair   "b" = white hair

3. Cross "BB" with "BB ."   4. Cross "bb" with "bb."

Pair 'Em Up!

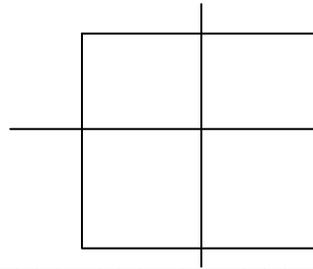**Question #1** What is probability and what does it have to do with genetics? _____
_____
_____

KEY
can roll tongue vs can't roll tongue
RR/ Rr = can roll
rr = can't roll

Question #2 If the parents are both heterozygous for the trait in the Key above, predict the alleles, gene pairs, of all possible offspring. Use the Punnett square below.

_____

Directions:
1. Get 2-3 pieces of blue paper, and 2-3 pieces of yellow paper.
2. Cut 100 squares out of each color, about 1.5 in by 1.5 in.
3. Write a capital "R" on all of the blue squares. Place 50 of them in one bag, and 50 of them in the other bag.
4. Write a lower case "r" on all of the yellow squares. Place 50 of them in one bag, and 50 of them in the other bag.
5. Label one bag "Male" and label the other bag "Female."
6. Shake up the bag. You and your partner each draw from a bag. Pair up the "chromosomes" to get an allele (gene pair).
7. Keep track of your results by drawing tally marks on your data table below.
8. Do NOT put used "chromosomes" back into the bags.

Data Table

Alleles (Genotypes)	Phenotypes	Tally	total #	%
RR				
Rr				
rr				

Conclusion Questions   **Name:**

1. In how many pairs did your group have <u>at least</u> one dominant "R?"

_____

2. In how many pairs did your group have only the allele "rr?"

_____

3. Explain the results that you wrote for Questions 3 and 4. (refer to dominant and recessive traits and how they work) _____
_____
_____

4. What is the ratio (ex. 2:1) of pairs with at least one "R" to pairs with the allele "rr?" _____

5. How do your group's percentages on the data table compare to the Punnett square you filled in for Question 2? _____
_____
_____

6. Why was it necessary to draw 100 pairs of chromosomes for this activity? Think back to the first 10 or 15 that you drew. Would the experimental outcome have been the same if you only drew a small amount? Explain. _____
_____
_____
_____

Pair 'Em Up!   Answer Key

Question #1 What is probability and what does it have to do with genetics?
Probability is the likelihood that something will happen. One is determining probability
when using a Punnett square to predict genetic outcomes of offspring.

KEY
can roll tongue vs can't roll tongue
RR/ Rr = can roll
rr = can't roll

Question #2 If the parents are both heterozygous for the trait in the Key above,
predict the alleles, gene pairs, of all possible offspring. Use the Punnett square
below.

	R	r
R	RR	Rr
r	Rr	rr

_____

Conclusion Questions KEY
1. In how many pairs did your group have <u>at least</u> one dominant "R?"
Answers will vary.

2. In how many pairs did your group have only the allele "rr?"
Answers will vary.

3. Explain the results that you wrote for Questions 3 and 4. The dominant trait
occurred more often because it is the stronger trait.

4. What is the ratio (ex. 2:1) of pairs with at least one "R" to pairs with the allele
"rr?" Answers will vary.

5. How do your group's percentages on the data table compare to the Punnett
square you filled in for Question 2? Results will vary, but a majority of groups should
have close, if not exactly the same percentages as provided by the Punnett square.

6. Why was it necessary to draw 100 pairs of chromosomes for this activity?
Think back to the first 10 or 15 that you drew. Would they experimental outcome
have been the same if you only drew a small amount? Explain. Probability is more
accurately predicted in large population samples. A good scientist always repeats
expieriments for this reason. A scientifically accurate survey includes a large and diverse
population sample.

Using Punnett Squares   Answer Key
(teacher instruction; to be used with the weblink "Baby Steps Through Punnett Squares")

Guided Practice:
"T" = tall   "t" = short

	t	t
T	Tt	Tt
t	tt	tt

Independent Practice:
Red throated booby bird   "R" = red throat   "r" = white throat

1. Cross "RR" with "rr."   2. Cross "Rr" with "RR."

	R	R
r	RR	RR
r	Rr	Rr

	R	r
R	RR	Rr
R	RR	Rr

Guinea pigs   "B" = brown hair   "b" = white hair

3. Cross "BB" with "BB ."   4. Cross "bb" with "bb."

	B	B
B	BB	BB
B	BB	BB

	b	b
b	bb	bb
b	bb	bb