

Name: _____ Period: _____ Date: _____

Punnett Squares Worksheet #2: Two-factor crosses

In pea plants, green pod color is dominant over yellow pod color. Tall plant height is dominant over short plant height.

Ex) A tall green pea plant (homozygous for both traits) is crossed with a short yellow pea plant.

TT or Tt = tall tt = short GG or Gg = green gg = yellow

P Generation genotypes: TTGG x ttgg

Possible gametes: TG x tg

	TG	TG	TG	TG
tg	TtGg	TtGg	TtGg	TtGg
tg	TtGg	TtGg	TtGg	TtGg
tg	TtGg	TtGg	TtGg	TtGg
tg	TtGg	TtGg	TtGg	TtGg

Phenotypic Ratio: 16 tall/green : 0 tall/yellow : 0 short/green : 0 short/ yellow

Genotypic Ratio: All TtGg

1) A tall green pea plant (homozygous for height, heterozygous for pod color) is crossed with a tall green pea plant (heterozygous for both traits).

P Generation genotypes: TTGg x TtGg

Possible gametes: TG, Tg x TG, Tg, tG, tg

	TG	TG	Tg	Tg
TG	TTGG	TTGG	TTGg	TTGg
Tg	TTGg	TTGg	TTgg	TTgg
tG	TtGG	TtGG	TtGg	TtGg
tg	TtGg	TtGg	Ttgg	Ttgg

Genotypic Ratio: 2 TTGG: 4 TTGg: 2 TtGG: 4 TtGg: 2 Ttgg: 2 TTgg

Phenotypic Ratio: 12 tall/green : 4 tall/yellow : 0 short/green : 0 short/ yellow

2) Two tall green pea plants are crossed. One plant is heterozygous for height and homozygous for pod color, while the other is homozygous for height and heterozygous for pod color.

P Generation genotypes: TtGG x TTGg

Possible gametes: TG, tG x TG, Tg

	TG	TG	tG	tG
TG	TTGG	TTGG	TtGG	TtGG
TG	TTGG	TTGG	TtGG	TtGG
Tg	TTGg	TTGg	TtGg	TtGg
Tg	TTGg	TTGg	TtGg	TtGg

Genotypic Ratio: 4 TTGG: 4 TtGG: 4 TTGg: 4 TtGg

Phenotypic Ratio: 16 tall/green : 0 tall/yellow :
 0 short/green : 0 short/ yellow

3) Two tall, green pea plants (heterozygous for both traits) are crossed.

P Generation genotypes: TtGg x TtGg

Possible gametes: TG, Tg, tG, tg x TG, Tg, tG, tg

	TG	Tg	tG	tg
TG	TTGG	TTGg	TtGG	TtGg
Tg	TTGg	TTgg	TtGg	Ttgg
tG	TtGG	TtGg	ttGG	ttGg
tg	TtGg	Ttgg	ttGg	ttgg

Phenotypic ratio: 9 tall/green : 3 tall/yellow : 3 short/green : 1 short/ yellow

Genotypic ratio: 1 TTGG: 2 TTGg: 2 TtGG: 4 TtGg: 2 Ttgg: 1 TTgg: 1 ttGG: 2 ttGg: 1 ttgg

- 4) Red flower color is dominant over white flower color. Tall plant height is dominant over short height. A tall red flowered plant (heterozygous for both traits) is crossed with a short white flowered plant.

P Generation genotypes: TtRr x ttrr

Possible gametes: TR, Tr, tR, tr x tr

	tr	tr	tr	tr
TR	TtRr	TtRr	TtRr	TtRr
Tr	Ttrr	Ttrr	Ttrr	Ttrr
tR	ttRr	ttRr	ttRr	ttRr
tr	ttrr	ttrr	ttrr	ttrr

Genotypic Ratio: 4 TtRr: 4 Ttrr: 4 ttRr: 4 ttrr

Phenotypic Ratio: 4 tall/red : 4 tall/white : 4 short/red : 4 short/white