

Probability Theory



The probability of getting
number "3" with one throw?

$$\frac{1}{6}$$

The probability of getting
number "3" with double throw?

$$\frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$$



Try It! - Coin Flip

- 1) During a coin toss at a football game, what is the probability of a coin landing heads up?

$$\frac{1}{2} = 50\%$$



- 2) What is the probability of a coin landing heads up 3 times in a row?

$$\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{8}$$

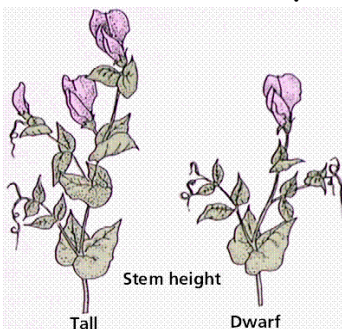


Genotype - genetic makeup of an organism.

1) Homozygous - same allele
same.

2) Heterozygous - different alleles
different.

Allele for tall plant = T; Allele for dwarf plant = t



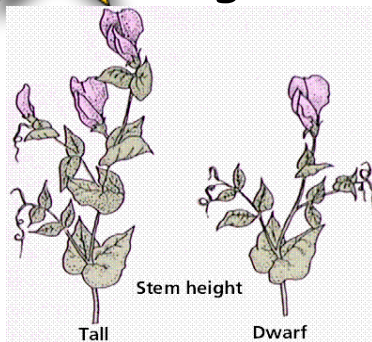
Tt = heterozygous

TT = homozygous

tt = homozygous



Phenotype - observable trait of an organism



$Tt = \text{tall}$

$TT = \text{tall}$

$tt = \text{dwarf.}$



Punnet Squares - Determine the probability of specific genetic traits

→ dominant or recessive.

¹
1) Mono-hybrid cross = 1 trait

²
2) Di-hybrid cross = 2 traits

Mono-Hybrid Cross

- 4) Millhouse Van Houten and Lisa Simpson recently attended the Springfield Elementary King of Hearts dance together. Millhouse is homozygous for nearsightedness (meaning that he needs glasses) but Lisa can see fine without glasses. Nearsightedness is a dominant trait. Complete a Punnett Square to show the possibilities that would result if Millhouse and Lisa had children.

		<u>N</u> ♂	<u>N</u>
♀	<u>n</u>	Nn	Nn
	<u>n</u>	Nn	Nn



N = nearsighted
n = normal vision

- a. probability of child needing glasses

$$\frac{4}{4} = 100\%$$

- b. probability of child not needing glasses

$$\frac{0}{4} = 0\%$$

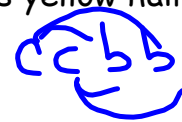
Di-Hybrid Cross

- 4) Millhouse Van Houten and Lisa Simpson recently attended the Springfield Elementary King of Hearts dance together. Millhouse and Lisa both have straight hair. Lisa has yellow hair and Millhouse has blue hair. The following are their genotypes B=blue, b=yellow, C=curly, c=straight

Millhouse: Homozygous straight hair = cc Heterozygous blue hair = Bb

Lisa: Homozygous straight hair = cc Homozygous yellow hair = bb

a. Cross: cc Bb x cc bb
m. l. h. o. u. t. e. l. i. s. a.



b. Gametes:

c. Punnett Square:

	cB	cb	cB	cb
cB	ccBb	ccbB	ccBb	ccbB
cb	ccBb	ccbB	ccBb	ccbB
cB	ccBb	ccbB	ccBb	ccbB
cb	ccBb	ccbB	ccBb	ccbB



- d. Probability of a blue straight haired child: $\frac{8}{16} = 50\%$
 Probability of a yellow straight haired child: $\frac{8}{16} = 50\%$
 Probability of a blue curly haired child: $\frac{0}{16}$
 Probability of a yellow curly haired child: $\frac{0}{16}$

curly