# **BOOKLET 2: MULTIPLE ALLELES**

KNOW TO WORK THESE EXAMPLES (BE ABLE TO COME UP WITH AN ANSWER) AND NOT JUST MEMORIZE THINGS LIKE: "what an apricot genotype looks like" or "what are the 3 kinds of blood alleles"

## **Multiple Alleles:**

-many traits are controlled by multiple alleles

### In The Case Of: Eye Colour in Fruit Flies

-4 alleles control eye colour

WILD (RED) dominant over APRICOT dominant over HONEY dominant over WHITE

Can be represented by "E" menaning eye colour and superscript numbers with 1 being dominant over all and 4 not dominant over

$$E^1 > E^2 > E^3 > E^4$$

These are the possible eye colour combinations in this example:

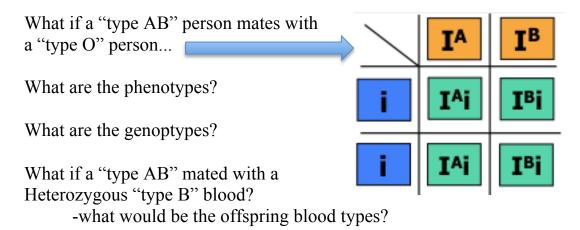
#### heterozygous fly is crossed with a white fly Phenotypes Genotypes $E^3$ E4 Wild Type E<sup>1</sup>E<sup>1</sup>, E<sup>1</sup>E<sup>2</sup>, E<sup>1</sup>E<sup>3</sup>, E<sup>1</sup>E<sup>4</sup> Parents: E3 E4 x E4 E4 Apricot $E^{2}E^{2}$ , $E^{2}E^{3}$ , $E^{2}E^{4}$ E<sup>4</sup> E3E4 E4E4 $E^{3}E^{3}$ , $E^{3}E^{4}$ Honey White E<sup>4</sup>E<sup>4</sup> E<sup>4</sup>

Predict the phenotypic outcome if a honey colored

-What offspring phenotype and genotypes are shown here?

### **In The Case Of: Human Blood Types**

- -3 alleles control blood type  $(I^A, I^B \text{ and } i)$ 
  - -the A or B are antigens and cannot be mixed with others of a different type
  - -only way to get type "O" is to have two "ii" is recessive
  - -Type AB if from Type A and Type B being CODOMINANT together



**PROBABILITY** = <u>number of chances</u> number of possible combinations

(eg) in the above example the probably of being a "type A" offspring is 2 out of 4 chances = (.5) = 50% chance

**PRODUCT RULE**= to calculate the probably of TWO events happening at the SAME time

(eg) in the above example what are the odds of getting a boy that is "type B" blood?

probability of boy probability of type B

Incomplete D	ominance.	what is	it?
Example			
_	Colors of a	Flower	(F)

What if a blue, homozygous flower was crossed with a yellow, homozygous flower....what would the offspring look like if blue and yellow were incompletely dominant to each other?

$$F^BF^B X = ???$$
punnett square???

### **Codominance...**what is it?

The word "roan" often used to describe livestock(cows) Example...

 $\frac{\text{Colors of a Cow }(C)}{\text{R = red, and W = white}}$ 

What if a roan cow mated with a white bull. What would that Punnett square look like?

$\mathbf{C}^{\mathbf{R}}\mathbf{C}^{\mathbf{W}}$	$\mathbf{V}$	
	Λ	