Fly Nomenclature Assignment Name:

Pretend we are a community who will all explore a hypothetical organism: a groo. To do this we will use a common naming and symbolic system. We'll call it the "Groo Convention". Groos are dimorphic (males look different from females), are brick-red in colour, and have a blue, furry surface. Here's what wild type groos look like (guess which is the male and which is the female!):

Because the groos above are well-described by their researchers, the normal phenotypes (those most often found in the wild, and hence "wild type") are taken for granted. Deviations from these - mutations - are therefore interesting and are likely to be studied to determine the genetic nature of these. Thus our first rule:

1) The "normal" groo phenotype is described as wildtype, and this is the "base state" or "reference organism".

2) Any change from the wildtype phenotype is a mutation and must be named. For example, a trait that makes a groo appear as very pale could be named "*pale groos*." Note that names should be descriptive: cute puns/jokes might work (maybe you want to call the mutants below *jaundice*), but the name provides a clear description of the mutant trait.

3) The gene symbol must be 3 letters derived from the trait name. Underline the letters to show that they belong to a single trait. For example, you might want a "p", an "a", and a "g" from *pale groos*.

4) Dominant mutant trait symbols must have the first letter capitalized. Recessive mutant traits must be all lower case. Mutants are not always recessive!! Sometimes they are dominant! For example, if one determines that the *pale groos* trait is due to a dominant mutation, we write:

Pag

Or, if the *pale groos* trait is found to be recessive, we would write:

pag

5) The allele that is not mutated in this locus uses the exact same letters as the mutant, only a superscript '+" is added to the symbol. For example, assuming the *pale groos* mutation is dominant, the wildtype allele of *Pag* is:

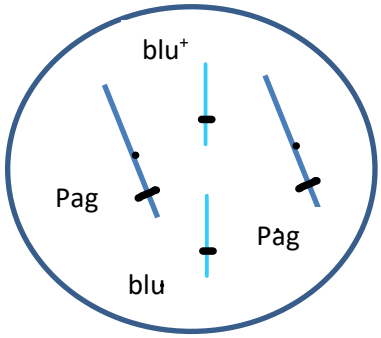
Pag^{+}

6) Homologous chromosome pairs are indicated with a '/' (slash) symbol.
For example, a groo that was heterozygous for the pale groos mutation, write:

Pag / Pag^{+}

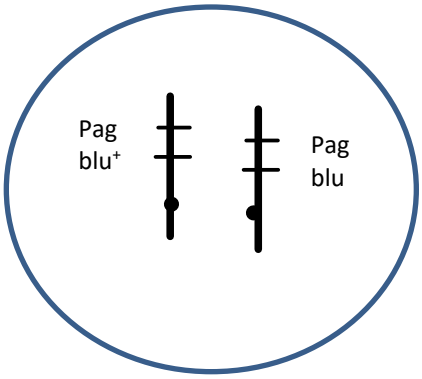
7) Genes on nonhomologous chromosomes are separated by a ';' (semicolon) symbol. For example, a groo that was homozygous for the pale groos mutation and heterozygous for a different trait, blue, on a different chromosome, write:

Pag / *Pag* ; *blu* / blu^{+}



8) Linked loci (loci that are on the same chromosome) are listed together on the same homologous chromosome. For example, if pale groos and being bald were linked traits, they would be on the same chromosome, and thus a groo that was homozygous mutant for *Pag* but heterozygous for *blu* would be described as:

Pag *blu*$^{+}$ / *Pag* *blu*

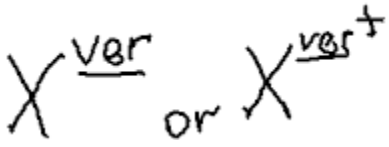


9) For X-linked traits (sex-linked), the trait is written as a superscript to the letter X.

For example, if vermillion was a dominant sex-linked trait, write:

X^{ver} (mutant) or
X^{ver+} (wildtype allele of vermillion)

*note: the underline for "ver" should be IN the superscript. The web editor does not force this for every browser. Here's what it should look like:



10) If the groo is hemizygous (i.e. male), use a 'Y' in place of the homologous chromosome.

For example, if there was a male groo with the X-linked trait, vermillion, write:

X^{ver} /*Y*

11) If the groo has two X-linked genes, add the loci to the superscript only.

For example, if there was a female groo heterozygous for two recessive X-linked traits, there are two possible genotypes:

$$\underline{X^{ver+}\ pub^{+}} / \underline{X^{ver}\ pub}$$
$$\underline{X^{ver+}\ pub} / \underline{X^{ver}\ pub^{+}}$$

… and let's look at a female who is heterozygous for a dominant mutant allele and a recessive mutant allele. The genotypes could be:

$$\underline{X^{Glu+}\ pub} / \underline{X^{Glu}\ pub^{+}} \text{ or}$$
$$\underline{X^{Glu+}\ pub^{+}} / \underline{X^{Glu}\ pub}$$

What phenotypes would you write down for these? The first would be a wild type female (het for two recessive mutants) and the second would appear to be a female *Glu* groo.

Let's try this out with some examples.

Question 1: From the genotype shown below question, determine

i. How many mutant traits are being described in this groo?
ii. The inheritance pattern of each trait (sex-linked, dominant or recessive),
iii. The linkage, if any, of traits,
iv. The phenotype (including sex) of the groo, and
v. The zygosity of each trait (homozygous [dom/rec], heterozygous, hemizygous).

The genotype:

$$\underline{X^{hel}} / \underline{Y}\ ;\ \underline{grn} / \underline{grn^{+}}\ ;\ \underline{Brs} / \underline{Brs^{+}}$$

Question 2: Now let's go the other way.

Give all possible genotypes for a groo in which:

i. Three traits are involved, *tny*, *wht*, and *Eye*
ii. *Eye* is X-linked; tny, wht are autosomal.
iii. This *groo* is heterozygous for all loci.
Bonus question: What is the phenotype of this *groo*?
Here are more for you to chew on:

Exploring genotype:

Question 3:

$X^{Hel}\ ^{fir}/Y$; *Grn Brs* / *Grn*$^{+}$ *Brs*

i. number of traits:

ii. inheritance pattern:

iii. linkage:

iv. phenotype (gender):

v. zygosity:

Question 4:

X^{fir+}/X^{fir}; *grn brs* / *grn*$^{+}$ *brs*

i. number of traits:

ii. inheritance pattern:

iii. linkage:

iv. phenotype (gender):

v. zygosity:

Question 5:

$X^{Hel+\ bag}/Y$; *Grn* / *Grn*$^{+}$

i. number of traits:

ii. inheritance pattern:

iii. linkage:

iv. phenotype (gender):

v. zygosity:

Question 6:

i. Three traits are involved, *tly*, *gnu*, and *uck*

ii. *tly* and *uck* are linked autosomal traits, *gnu* is sex-linked.

iii. This is a female fly

iv. The fly appears to be *gnu* and *uck*

Genotype(s): _____

Question 7:

i. Three traits are involved, *tny*, *Wht*, and *Eye*

ii. *Wht* is sex-linked; *tny* & *Eye* are autosomal.

iii. This is a male fly

iv. The fly appears to be *Wht* and *tny*

Genotype(s): _____

Question 8:

i. Four traits are involved, *blu*, *Tny*, *grl* and *uck*

ii. *Tny* and *uck* are X-linked traits, the others are autosomal but unlinked.

iii. This is a female fly.

iv. The fly appears to be wildtype.

Genotype(s): _____