1. (a) total (n) of candies: 56

$H_0$: $p_{Brown} = 0.3$, $p_{Red} = 0.2$, $p_{Yellow} = 0.2$, $p_{Orange} = 0.1$, $p_{Green} = 0.1$, $p_{Blue} = 0.1$

$H_a$: At least one of the proportions in $H_0$ has a value different than proposed.

| | Brown | Red | Yellow | Orange | Green | Blue |
|---|---|---|---|---|---|---|
| Expected | 16.8 | 11.2 | 11.2 | 5.6 | 5.6 | 5.6 |
| | $=(56)(0.3)$ | $=(56)(0.2)$ | $=(56)(0.2)$ | $=(56)(0.1)$ | $=(56)(0.1)$ | $=(56)(0.1)$ |

(b) There are 6 colors, so $df = 6-1 = 5$.

(c) It is reasonable, but not necessary. We can obtain a P-value referencing a chi-square distribution, with command

1 - pchisq( $X^2$, df = 5)

because all expected counts are at least 5.

2. (a) $SSG = 56.54$, $df_2 = 24$, $F = 8.389$

(b) $k - 1 = 2 \implies$ There are $k = 3$ groups.

(c) $n - 1 = 2 + 24 \implies$ There are $n = 27$ mice.

(d) $H_0$: $\mu_1 = \mu_2 = \mu_3$ $H_a$: At least one pair of group means $\mu_i$ differ

Here, each $\mu_i$ is the average weight gain in the 3 groups / populations (not merely the sample means).

(e) 1 - pf(8.389, 2, 24)

(f) We shall reject $H_0$ in favor of the conclusion that at least two populations represented in our samples of mice are different.

3. (a) tally( group ~ genotypeClass, data = FastTwitch)

(b) It is the Sprint - XX cell, with expected count $\dfrac{(74)(108)}{504} \doteq 15.86$

(c) It is the assumption that $H_0$ is true, where

$H_0$: the variables 'group' and 'genotypeClass' are independent.

(d) The expected count for that cell is $\dfrac{(260)(160)}{504} = 82.54$

Its contribution: $\dfrac{(86 - 82.54)^2}{82.54} = 0.145$.

(e) Use $(3-1)(3-1) = 4$ dfs. 1 - pchisq(6.8115, 4)

(f) Our data is consistent with the null hypothesis that variables 'group' and 'genotypeClass' are independent.