Solutions to Complementation Problems

1) a) all of the mutants will require tryptophan for growth (trp^-).

b) In this case, since t1 is $trpA^- trpB^+$ and t2 is $trpA^- trpB^+$ the genotype of the diploid is:

$$\frac{trpA^- trpB^+}{trpA^- trpB^+}$$

There are no good copies of the *trpA* gene, so no TrpA protein will be produced, so the resulting diploid will be unable to synthesize tryptophan (Trp^-).

c) In this case, since t1 is $trpA^- trpB^+$ and t3 is $trpA^+ trpB^-$ the genotype of the diploid is:

$$\frac{trpA^- trpB^+}{trpA^+ trpB^-}$$

There are good copies of both the *trpA* gene and the *trpB* gene, so both TrpA and TrpB proteins will be produced, so the resulting diploid will be able to synthesize tryptophan (Trp^+).

d)

	t1	t2	t3	t4	t5	wt
t1	-	-	+	-	+	+
t2		-	+	-	+	+
t3			-	+	-	+
t4				-	+	+
t5					-	+
wt						+

e)

	t1	t2	t3	t4	t5	t6	wt
t6	-	-	-	-	-	-	-

Note that, from this data, it is impossible to tell if t6 is in gene *trpA* or gene *trpB;* in either case, the results would be the same.

Solutions for: 7.01 Epistasis and Complementation

1) a) Build up?

m1: X m2: Y m3: Z

b) Grow on?

m1: Y, Z, or A m2: Z or A m3: A

c) Build up?

m1,m2: X m2,m3: Y m1,m3: X

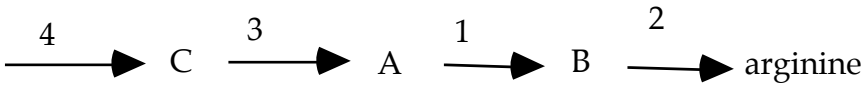
(the earlier of the two)

d) Grow on?

m1,m2: Z or A m2,m3: A m1,m3: A

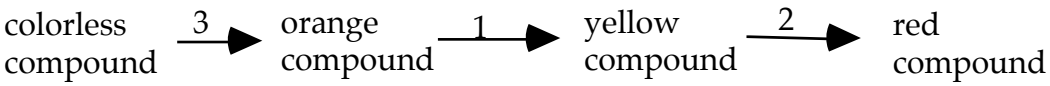
(the later of the two)

2) a)The pathway is:



b) m1,m4 would grow on B or arginine.

3) The pathway is:



4) a) There are 3 complementation groups identifying 3 genes:

m1, m4, and m5 are in gene 1

m2 is in gene 2

m3, m6, m7, and m8 are in gene 3

b) No. If you isolated more mutants, you might find more genes.