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**Activity 4: Selective breeding**What could go wrong?

Every prawn contains two alleles for its growth gene, one obtained from the female parent and one from the male parent. An allele can be named as black (B) or white (W).

When there are two white alleles together (WW), prawns grow very slowly and are too small to be commercially viable. These prawns are culled. When there are two black alleles together (BB), or one black and one white allele (BW or WB), prawns grow at a desirable rate and are suitable for sale.

In this simulation, coloured beads or counters are used to represent the alleles, and opaque bags or cups (so the selection of beads is random) represent the parent prawns. When a bead is removed from each of the two bags, this represents fertilisation of an egg by a sperm to create a prawn larva.

**Resources for each group:**

* Two opaque cups or bags, one labelled ‘mother’, the other labelled ‘father’
* 30 black beads or counters (representing the dominant gene)
* 20 white beads or counters (representing the recessive gene)­
* Pen and paper to record the results
* Parent cross

Place 20 black beads in one of the bags. Place 10 black beads and 10 white beads in the other bag.

Remove one bead from each bag and record what you get (either BB or BW). Continue to do this until there are no more beads left in either bag.

Record the proportion of each combination of beads that you pulled from the bags as a percentage, decimal, ratio or fraction.

Record your results in a class data table and compare your results with those of everyone else.

Combine the class data. What is the probability of getting each of the combinations when you have this kind of parent gene combination? Will the prawns grow normally or not?

**First generation backcross**

This time you are going to cross one of the offspring with one of its parents.

Place 10 black beads and 10 white beads in each of the two bags.

Remove one bead from each bag and record what you get (either BB, BW or WW). Continue to do this until there are no more beads left in either bag.

Record the proportion of each combination of beads that you pulled from the bags as a percentage, decimal, ratio or fraction.

Record your results in a class data table and compare your results with those of everyone else.

What is the probability of getting each of the bead combinations when you have two heterozygous parents.

Combine the class data. What is the probability of getting each of the combinations when you have this kind of parent gene combination? Will the prawns grow normally or ­­not?