

Darwin's Postulates Continued

Postulate 2: Some of an individual's variation is passed on to its offspring

- Variation is heritable

Postulate 3: In every generation, more offspring are produced than can survive

- Struggle for existence/ survival
- Example: Mola Mola- Lays 3 million eggs
Example: 2 Beetles (Boris and Natasha)



They mate and produce 10 offspring.

Environment only allows for 5 of the offspring to live

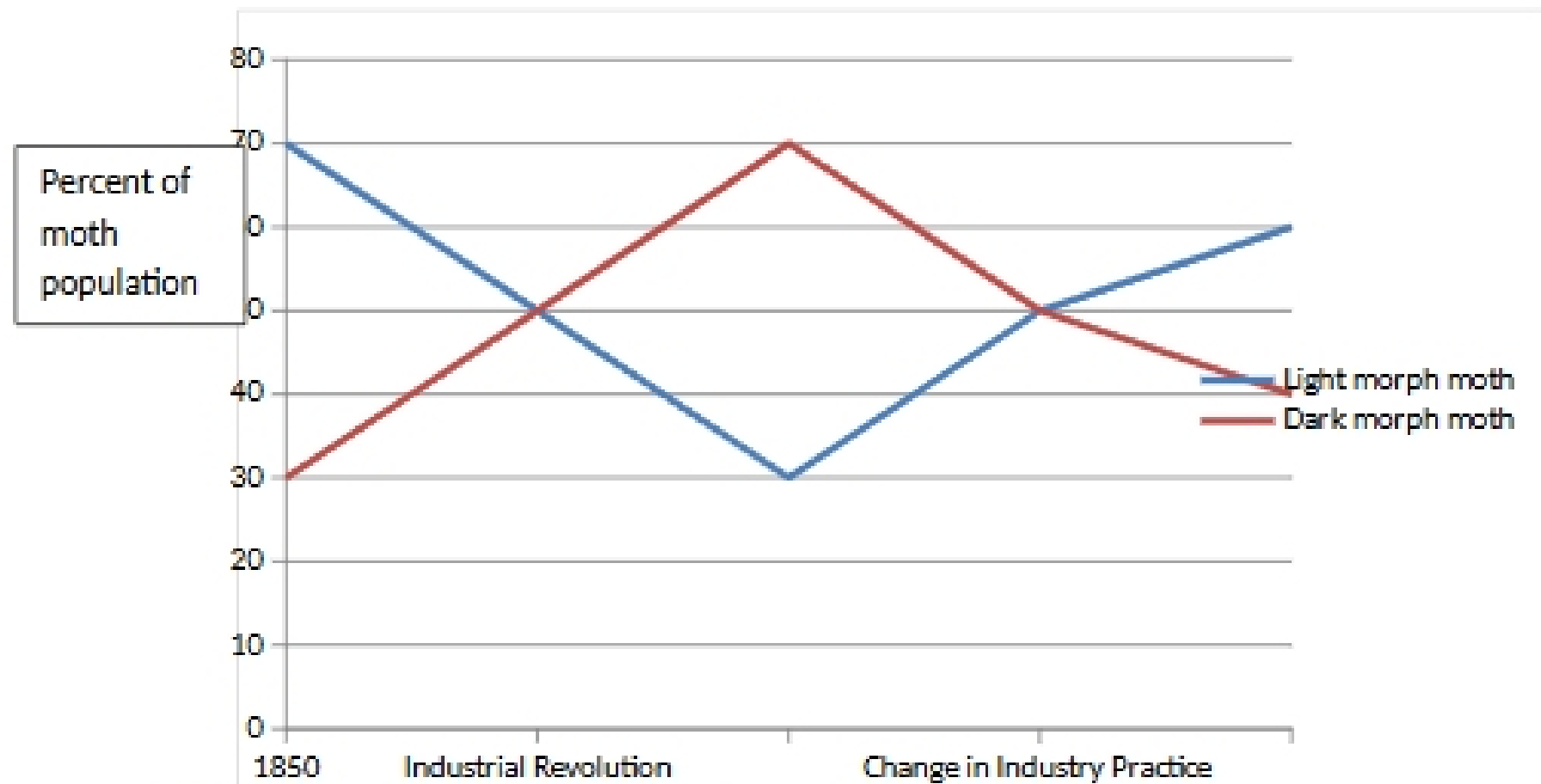
Postulate 4: Offspring that survive AND reproduce may have inherited variation that gives them an advantage

- Imagine that the 5 survivors from the last example had longer legs than their siblings
 - o Longer legs= increased speed to avoid predators and get food faster
 - o Variation allowed for increased survival and growth
 - This increases the likelihood of reproduction
 - Increases their fitness
 - NOT equal to quickness or physical agility
 - It is an index of reproductive success
 - Fitness increases with increased reproductive outputs
 - Important that they survive AND reproduce
 - Fitness= 0 if no offspring are produced
 - "Survival of the fittest"
- Now, imagine that the same struggle to survive and reproduce is repeated over 1000's of generations
 - o Each successive generation of beetles will be slightly quicker/longer legged
 - May change so much that speciation occurs

Evolution by Natural Selection

- One mechanism by which evolution occurs
 - Requires that variation is adaptive and results in selection for or against organisms (survival and reproduction)
- 1) Variation must exist for given trait

- a. Without variation selection does not affect survival in any way
 - b. All individuals respond the same to a given selective pressure
 - c. There are no advantages to be passed on to future generations
- 2) Variation leads to differential survival/fitness
- a. Peppered moth/ industrial melanism



- b. Food availabilities can change Natural Selection
 - i. Example: Ground Finch- has variability in its beak/bill characteristics
 - Shorter, thicker beaks allow the finch to eat larger seeds
 - Narrow, thin beaks allow for the finch to eat smaller seeds
- 3) Variation must be heritable
- a. Can be passed on to offspring

Lamarck 1744-1829

- Evolution by acquired inheritance/variation
 - o Trait variation passed to offspring was based on use/disuse by parents
 - Example: Giraffes have long necks because their ancestors had to stretch to reach the leaves in tall trees