



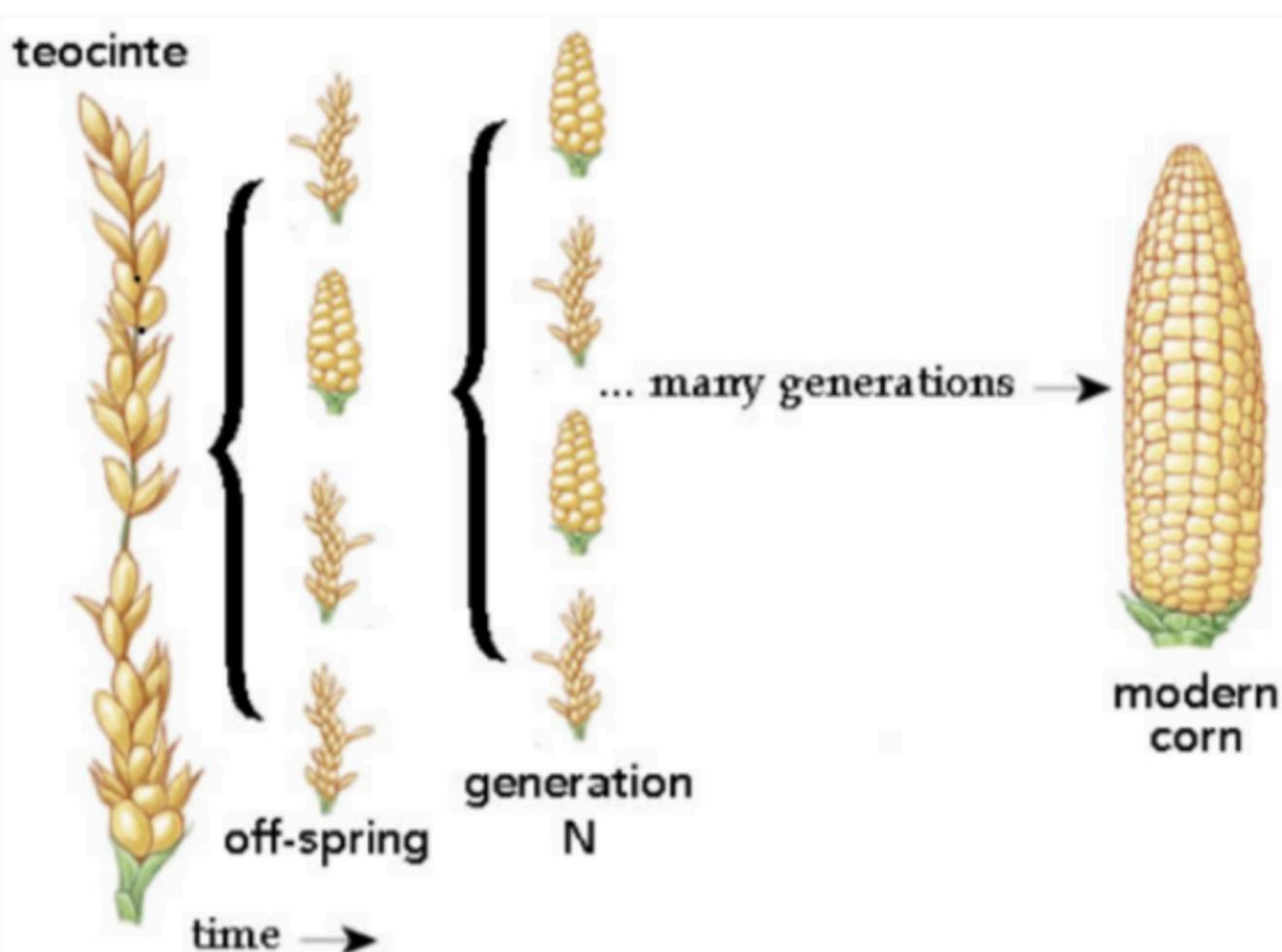
first practice exam is now on NB

Questions?

What is the difference between
a (scientific) law and a theory?

Darwin took a lesson from the experiences of plant and animal breeders; they recognized the variation between individuals, together with their ability to select those individuals allowed to breed. Over many generations individuals that displayed extreme versions of the selected were generated.

circle the offspring (in generation N) that you would breed to generate modern corn from teocinte and explain your reasoning below.



Draw

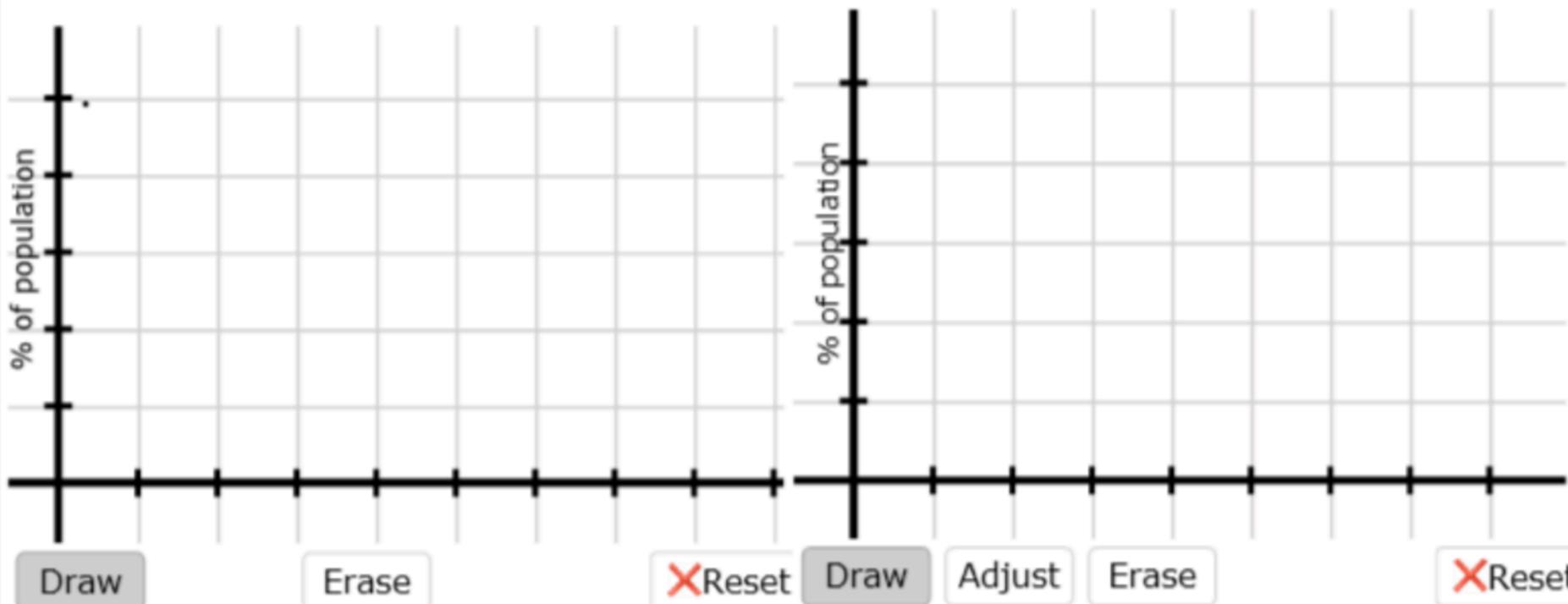
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Reset

Questions to answer:

23. How would you explain the observation that the products of artificial selection are not generally competitive with "native" organisms?

Some traits, such as blood type, are discontinuous, while others, such as height, are continuous. Discontinuous traits are often completely under genetic control, whereas continuous traits are often significantly influenced by the organism's environment. **Generate** graphs of a hypothetical population and display blood type (graph 1) and height (graph 2). (**X** is reset)

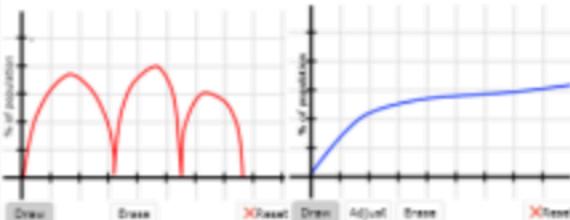


Explain the differences if any between the two graphs

Chapter 3-3 **read pages 57-66 first!**

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Explain the differences if any between the two graphs.

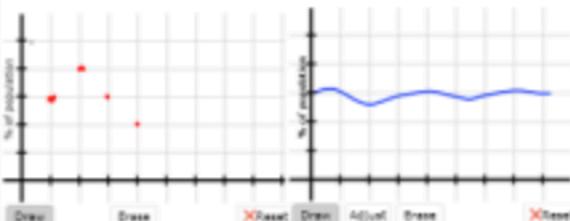
With discontinuous traits the trait can come and go throughout generations at a random rate. While continuous traits will stay constant through out generations.

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Chapter 3-3 **read pages 57-66 first!**

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Explain the differences if any between the two graphs.

Continuous traits such as height have intermediate values in the graph. There's a range.

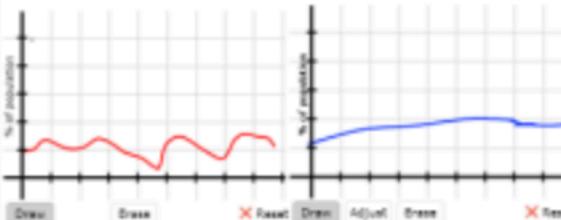
Discontinuous traits such as blood type are acute. Either a person is A, O, AB, or B. This takes away intermediate values, resulting in defined points instead of a curve.

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Chapter 3-3 **read pages 57-66 first!**

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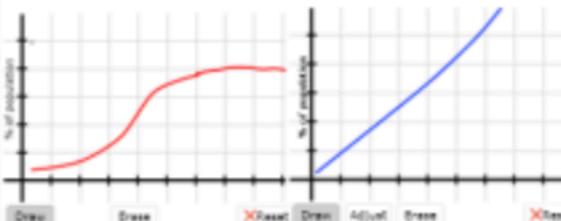
Blood type is a constantly changing, unpredictable thing, even if having one blood type may be considered more beneficial to our survival it will still be constantly changing. Height is predictable based off of who we get it from. I think it was beneficial to our survival because if you had intensive in our regular human environment everyone is pretty the same height making it a continuous trait, not very common.

30561

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Explain the differences if any between the two graphs.

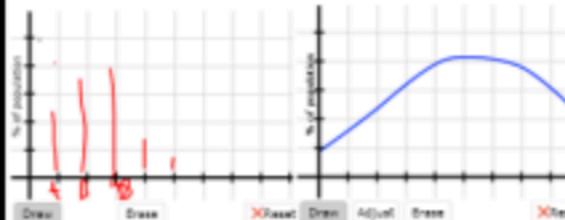
Discontinuous graphs, like the blood type graph, tend to level out as a result of the discontinuous variation in sequence of genetics. You can not have complex blood types, they must be A, B, AB, or O. Whereas with height, everyone is different in height. Height is exactly the same height as one another, therefore there is much variation between the genetic sequences attributed to height.

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Chapter 3-3 **read pages 57-66 first!**

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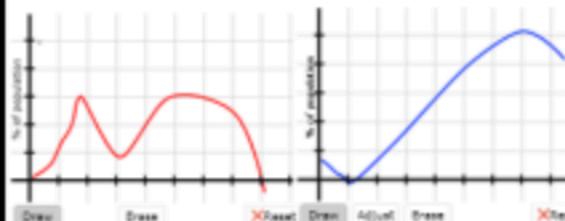
One is a continuous line that becomes more smooth with more people because of more data points. With blood type you can only be one classification, so there is more of a bar graph than a gradient.

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Chapter 3-3 **read pages 57-66 first!**

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Explain the differences if any between the two graphs.

discontinuous shows traits that have no evolutionary advantage as opposed to continuous which will further evolve.

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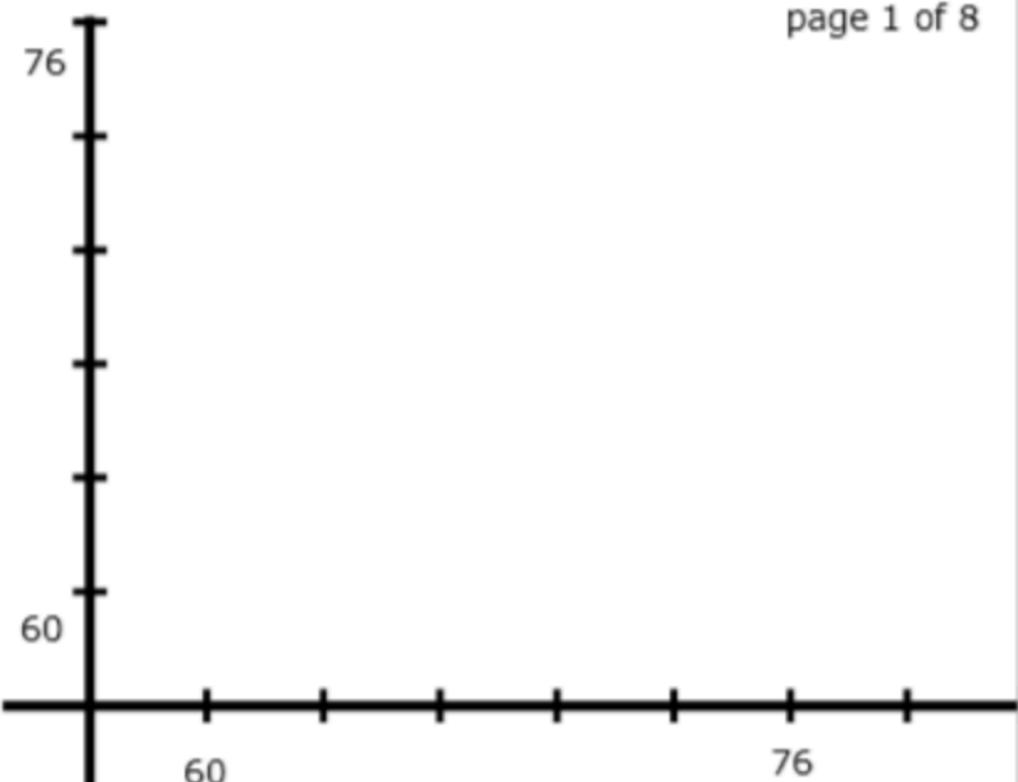
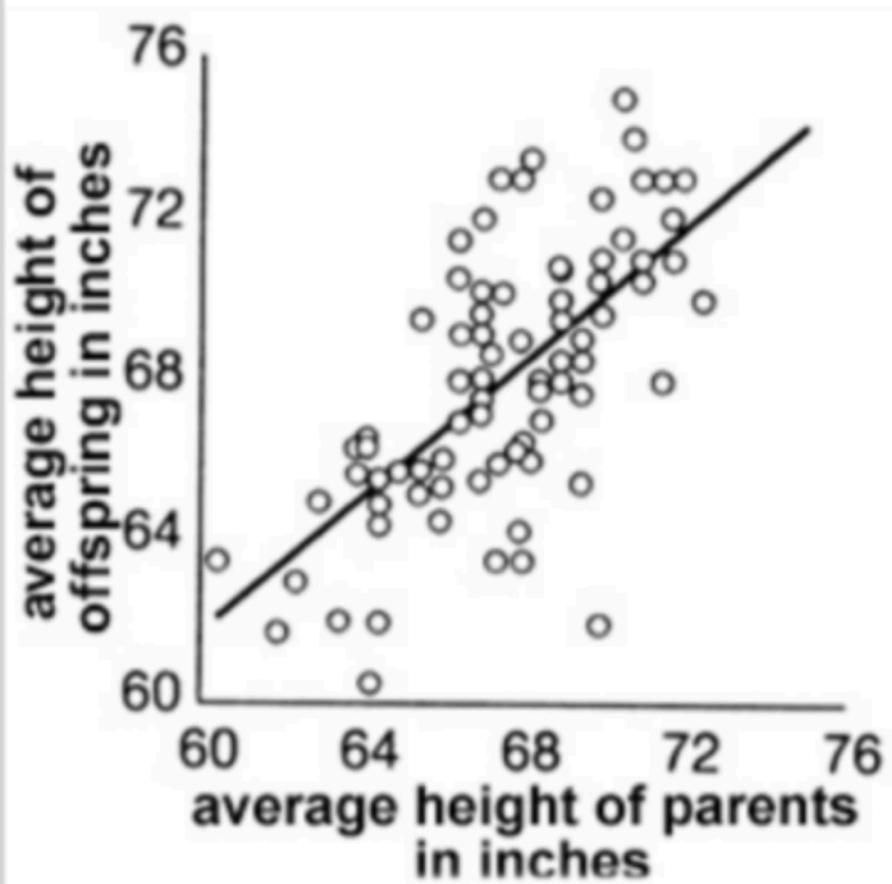
Blood type (A,B,AB,O) is determined by a single genetic locus.

How might a discontinuous trait change if the “degree” of the trait were influenced by other genetic loci?

What can we conclude about “continuous” traits in terms of the number of genetic loci involved.

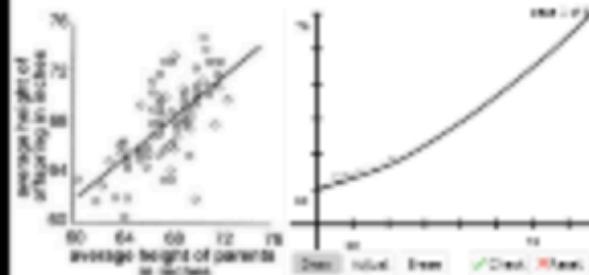
So how do we know that a trait is inheritable? For now we can examine how the traits of offspring relate to the traits of parents. Below (left) is a graph of the distribution of heights of off-spring as a function of the average heights of their parents. **Redraw** the graph as it might look if height were determined solely by genetics.

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How would you explain the variation in heights of offspring.

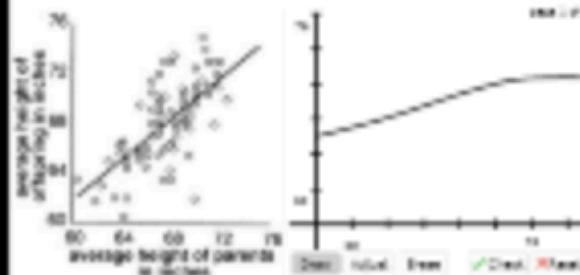
Below Go one from DnaG or DnaC is inherited. For more we can determine from the Delta of offspring leads to the traits of parents. Below left is a graph of the distribution of heights of offspring as a function of the average heights of their parents. Below the graph is a single test. DnaG or DnaC were determined when for pedigree.



How would you explain the variation in heights of offspring

Offspring is likely to differ from the average height of their parents.

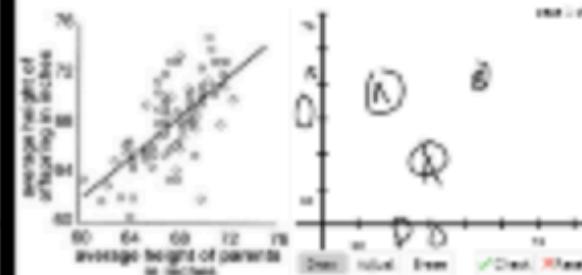
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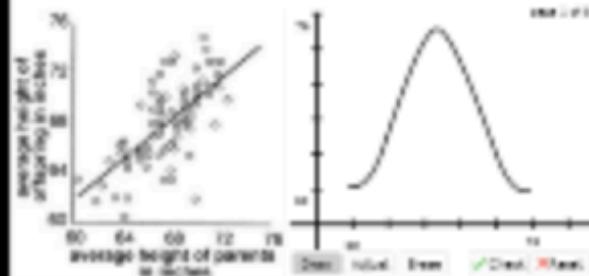
The variance of the offspring is not the same as that of the parents or the trait varies due to environmental factors.

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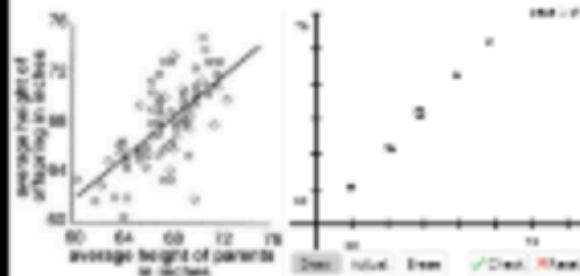
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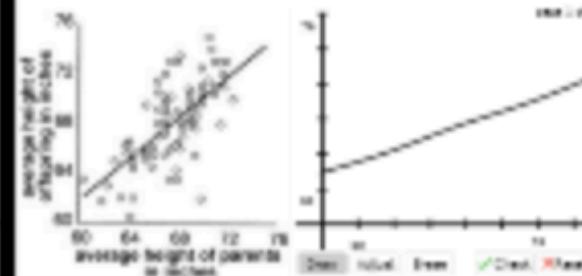
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How would you explain the variation in heights of offspring

Offspring is more similar because the distribution is for the offspring and not the parents.

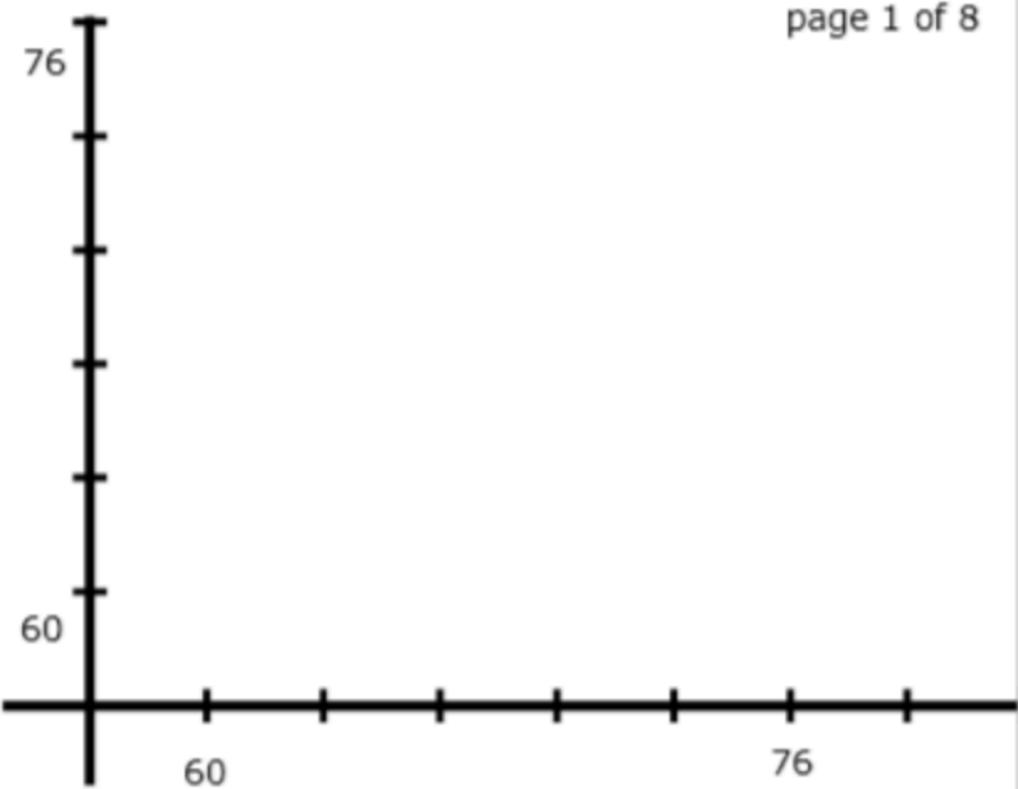
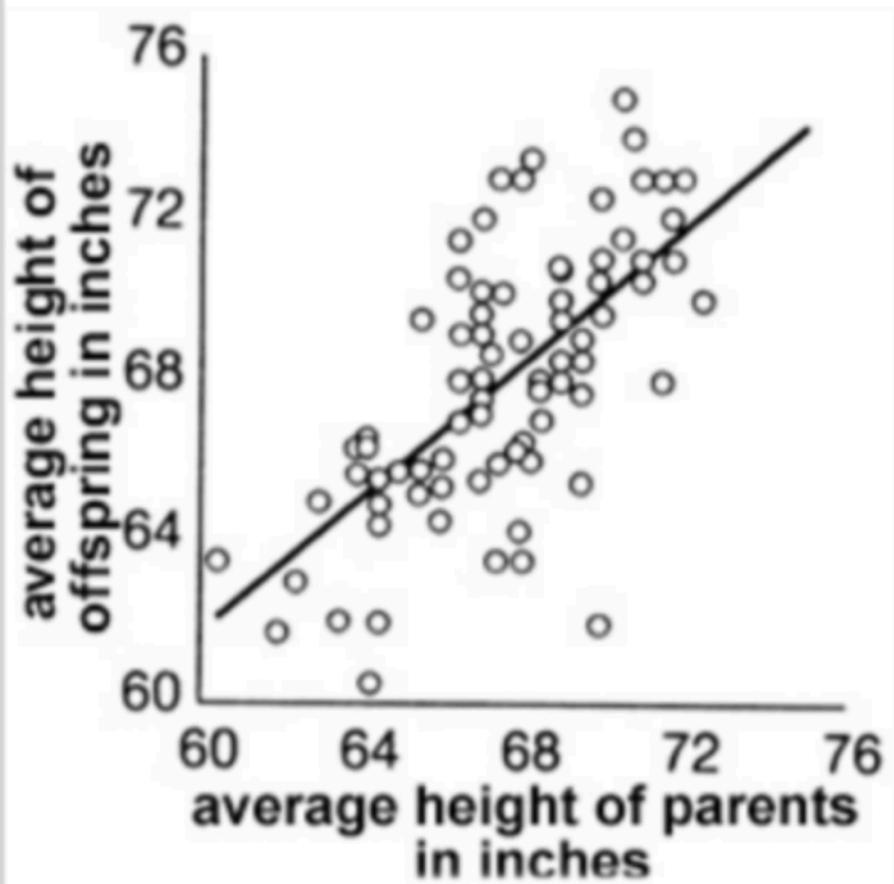
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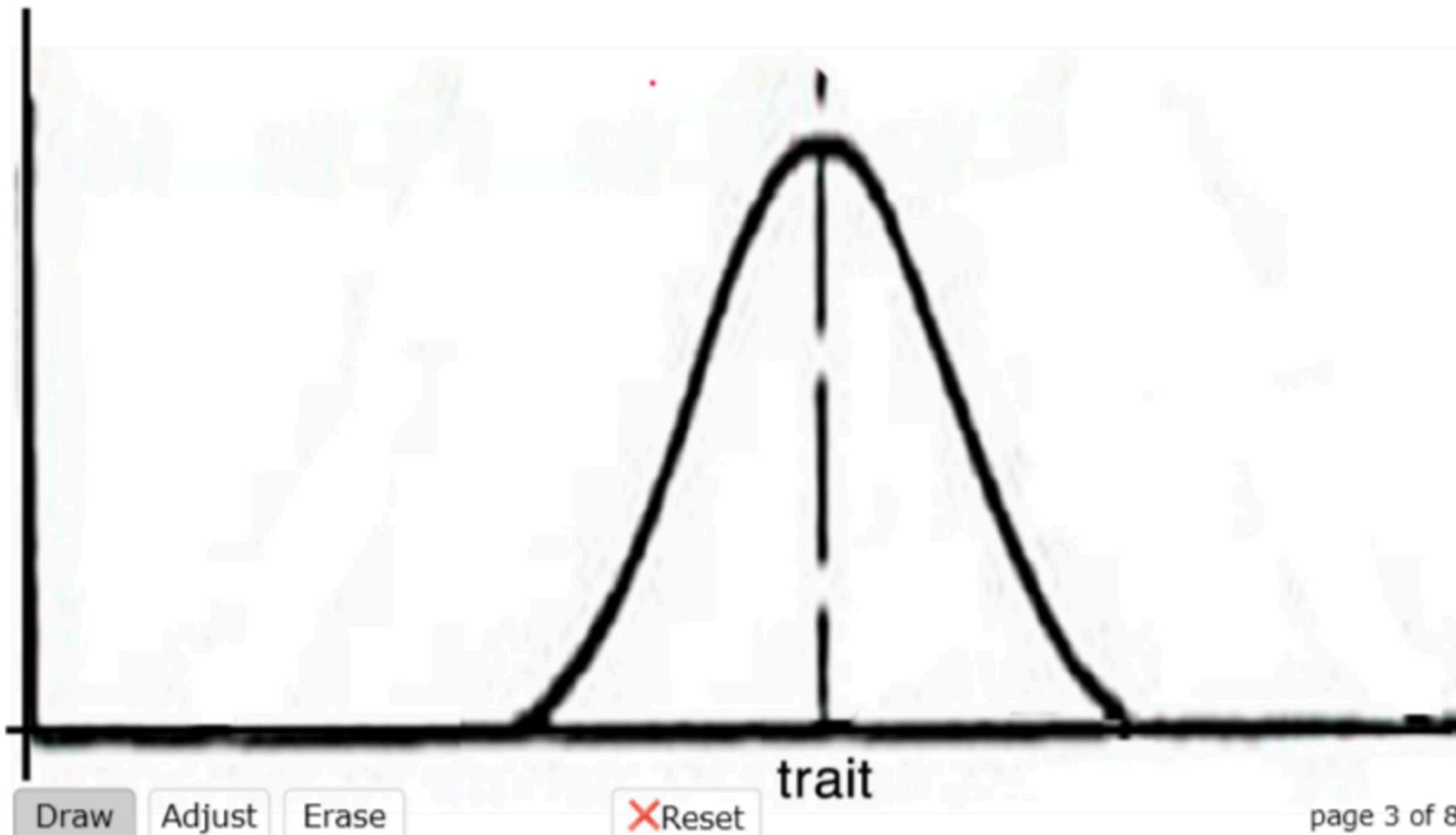
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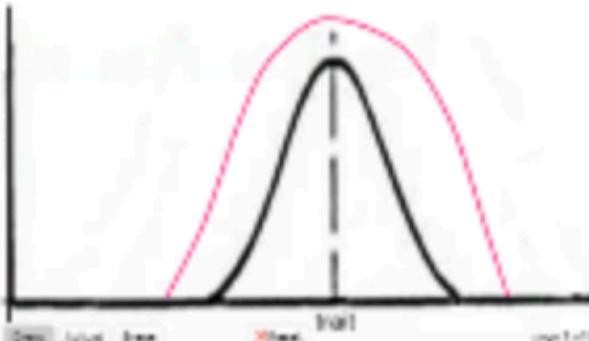
How would you explain the variation in heights of offspring.

24. What does the word correlation mean to you? what does it mean mathematically?
25. If an individual's height is determined by the genetics of their parents, then why don't all of the individual height measurements lie on a straight line? Where does the scatter come from?

Displayed here is population distribution, with the extent (degree) of the trait displayed on the X axis, and the % of the population with that form of the trait on the Y axis.
How would the distribution change if the mean value stayed the same while the standard deviation increased?

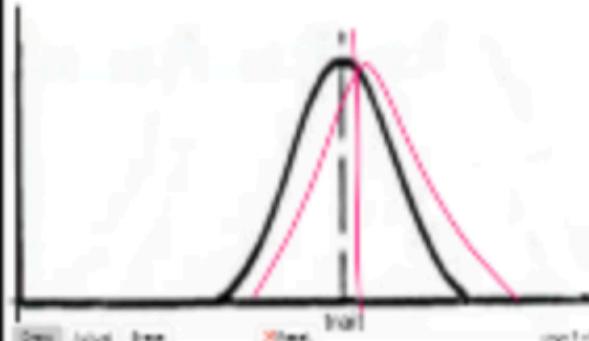


Decided there is population distribution, with the extent (degree) of the heat disclosed on the Y-axis, and the % of the population with that form of the heat on the X-axis.
How could the standard change in the mean value stay at the same while the standard deviation increased?



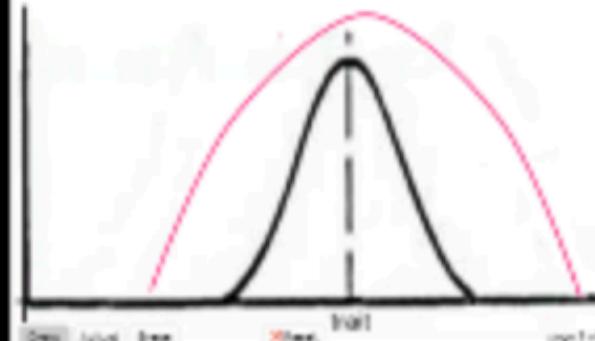
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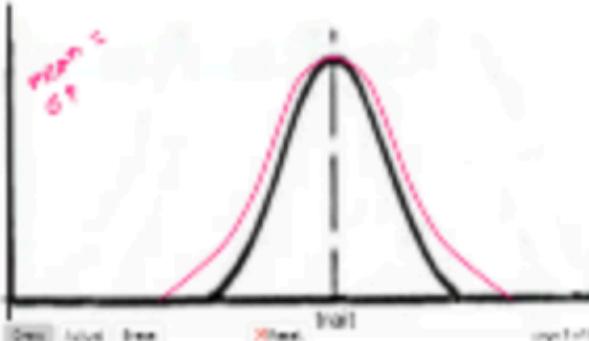
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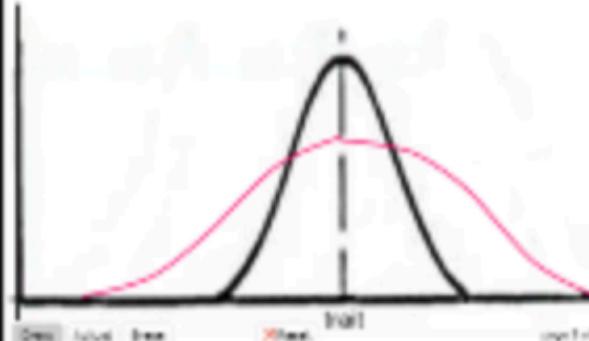
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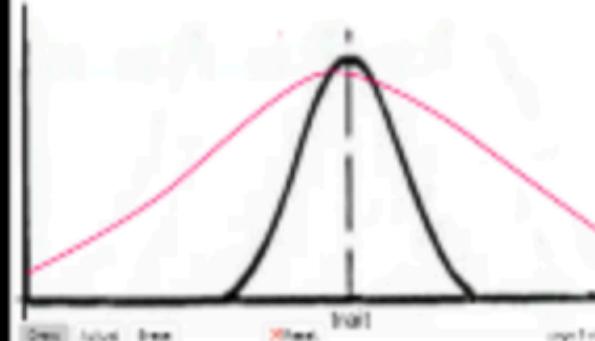
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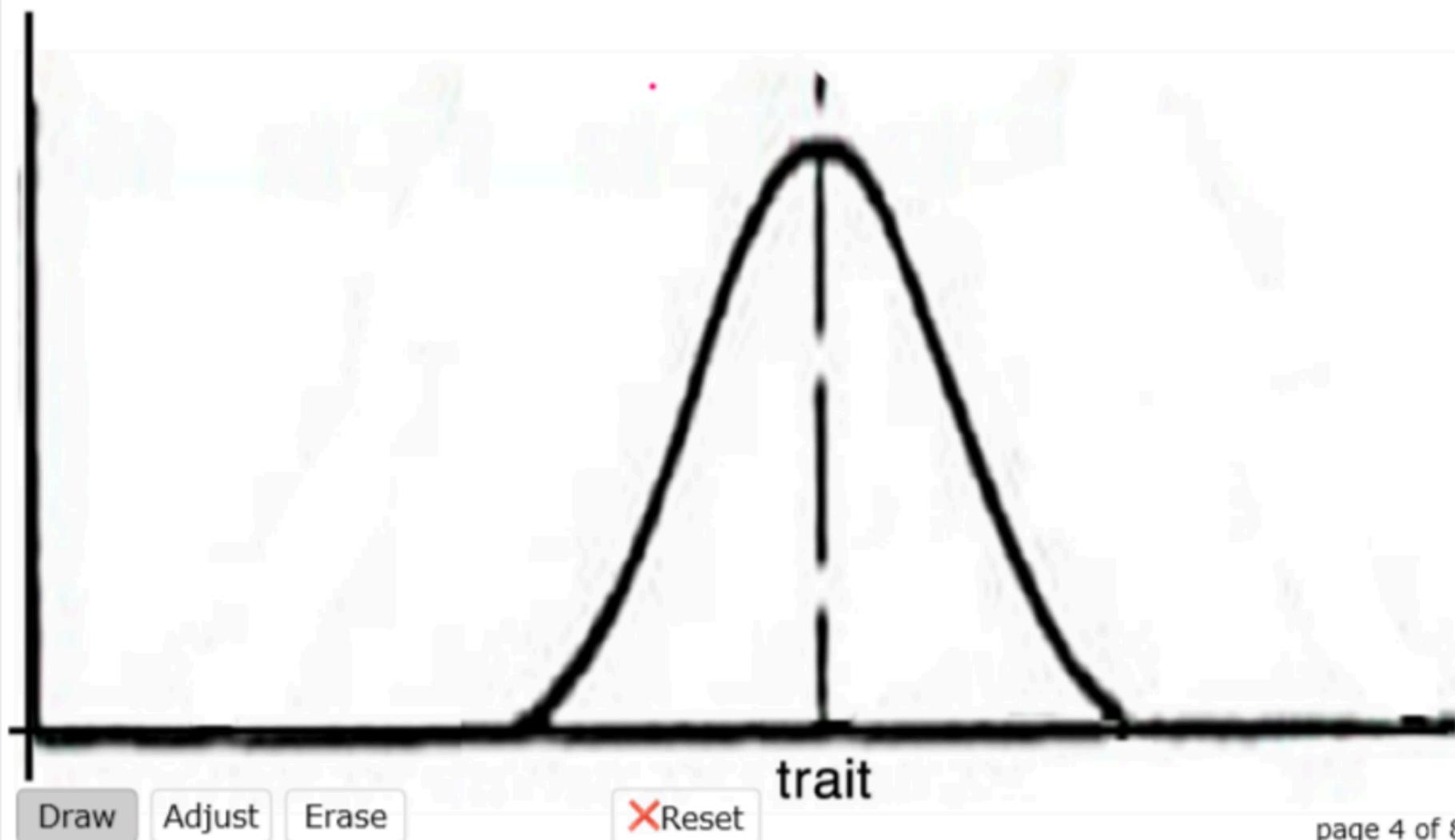
30570

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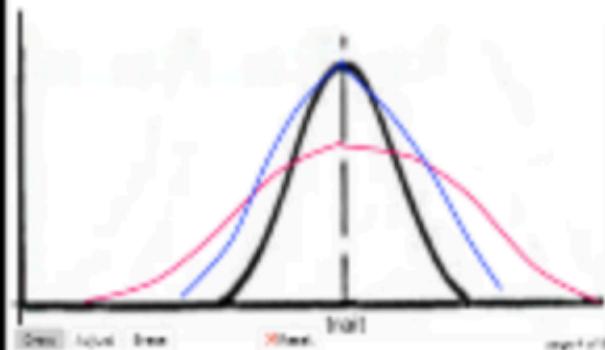


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The original population distribution is in black. Indicate how the distribution would change if the mean value stayed the same while the standard deviation decreased.

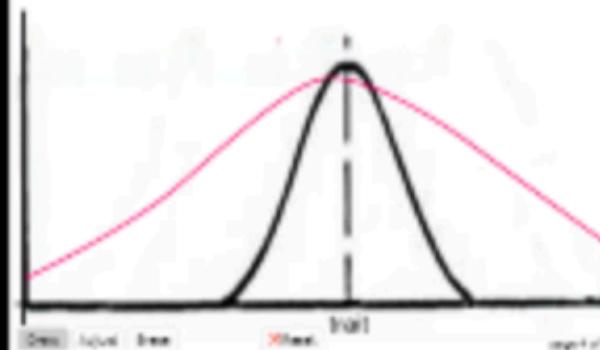


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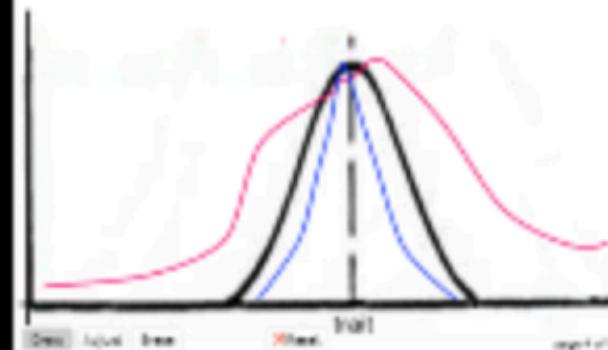
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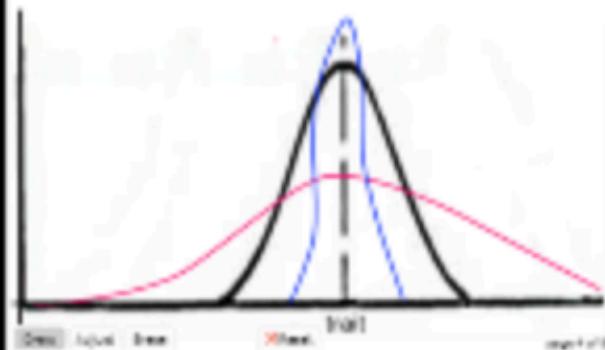
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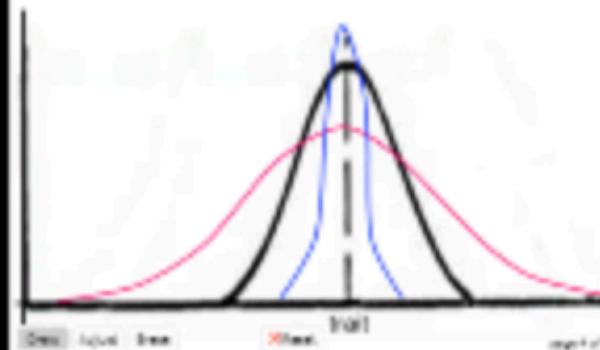
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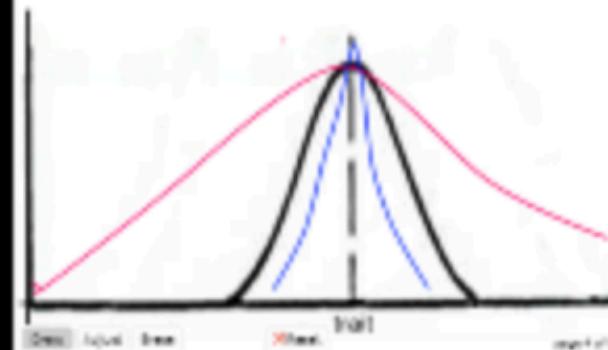
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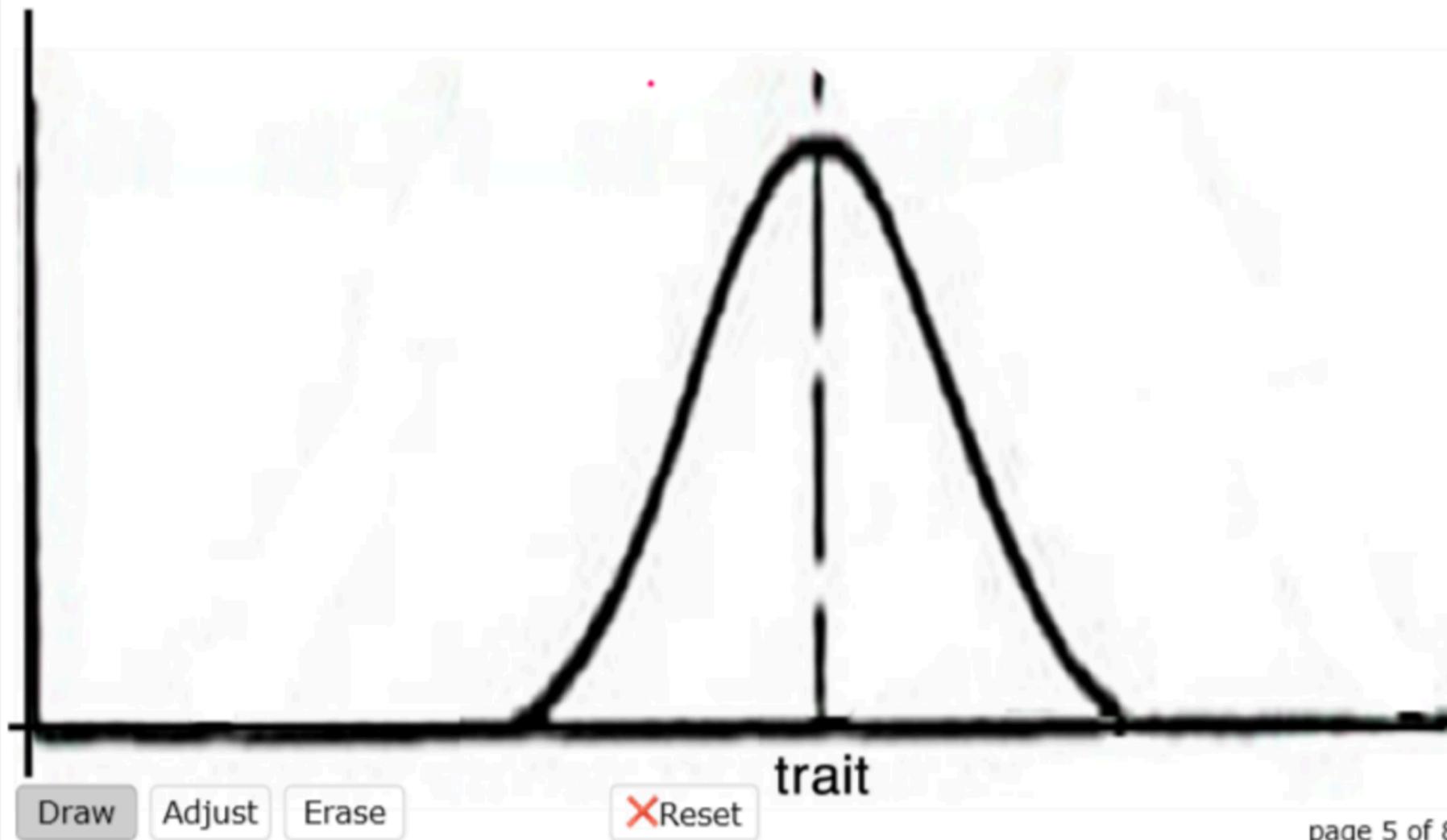
30580

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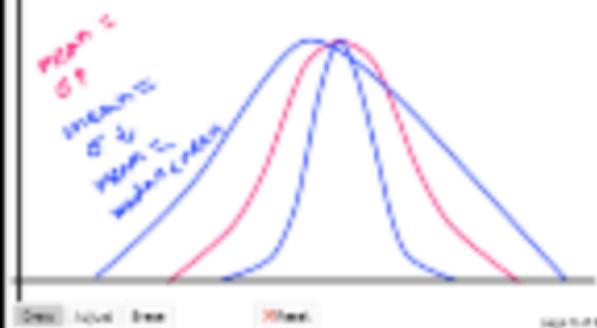


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Draw how the distribution might change if population mean stayed the same, while the median value became smaller than the mean.

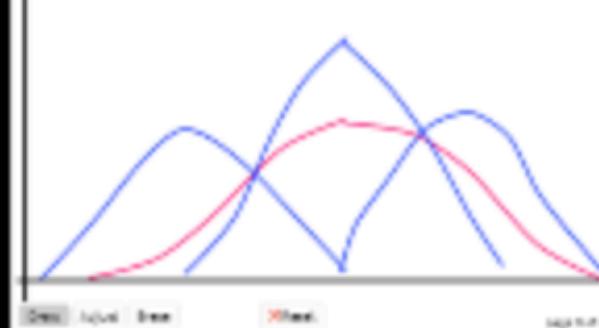


Does the distribution right-skewed? population mean stayed the same, while the median value became smaller than the mean.



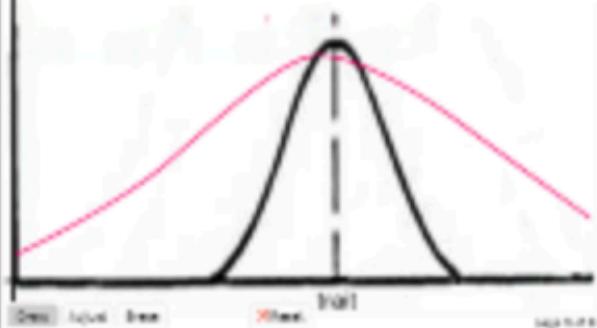
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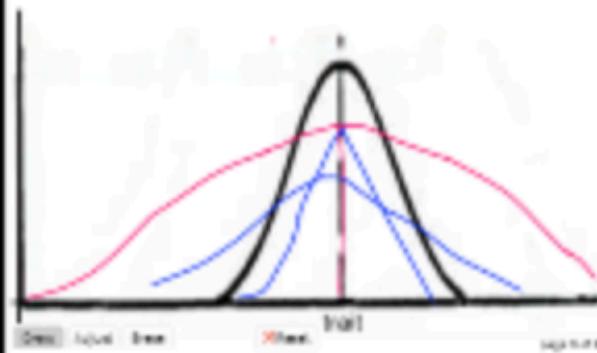
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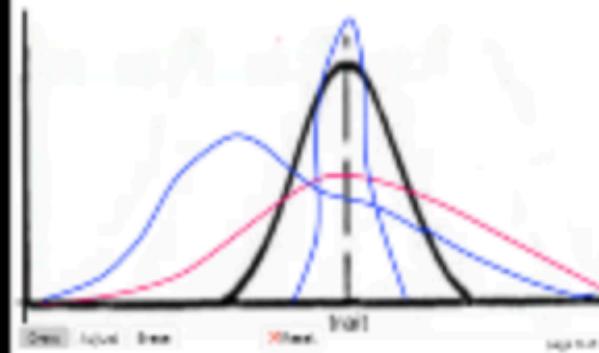
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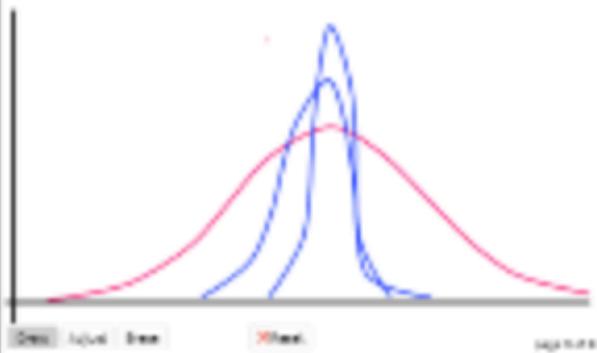
30578

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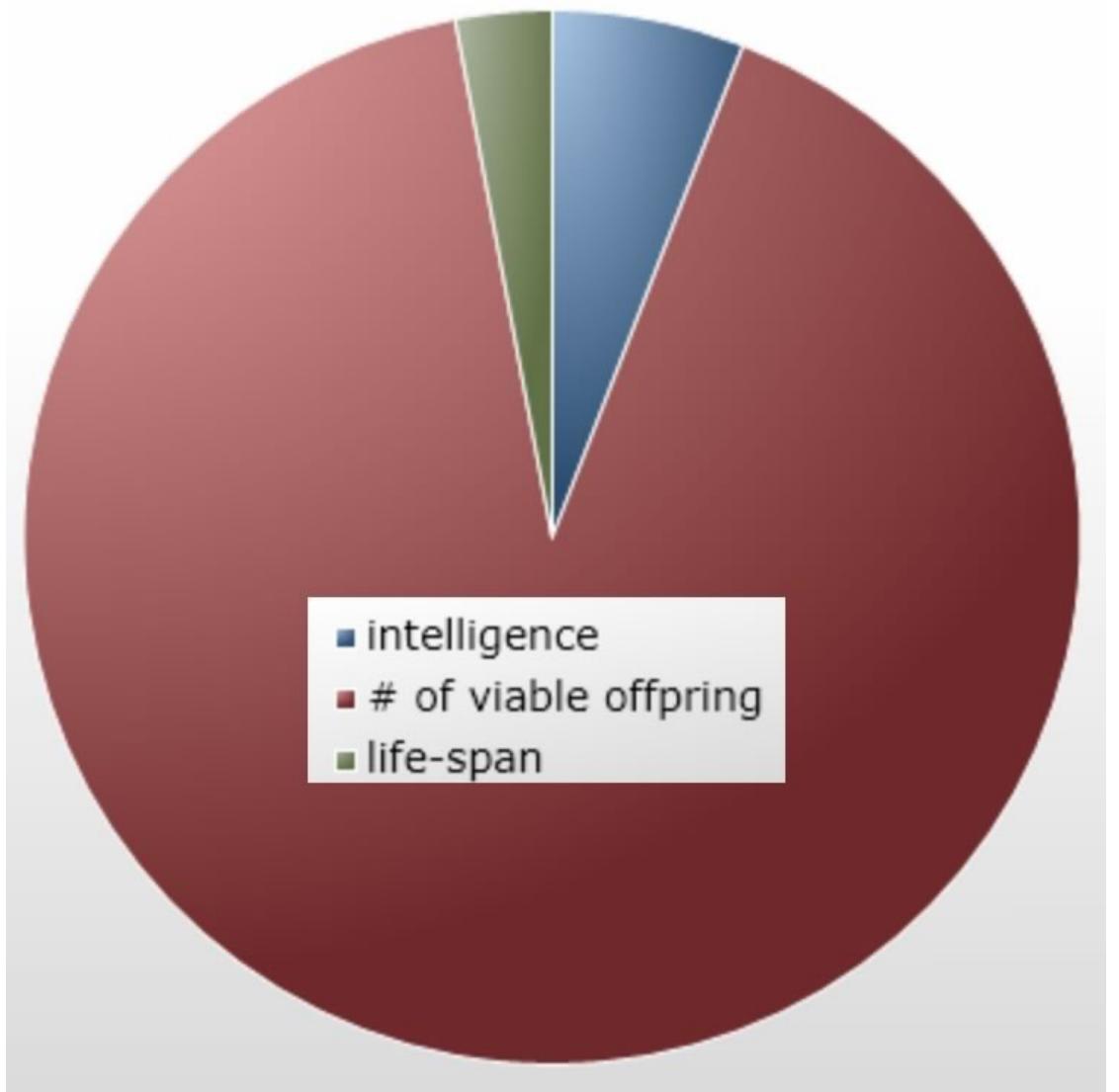
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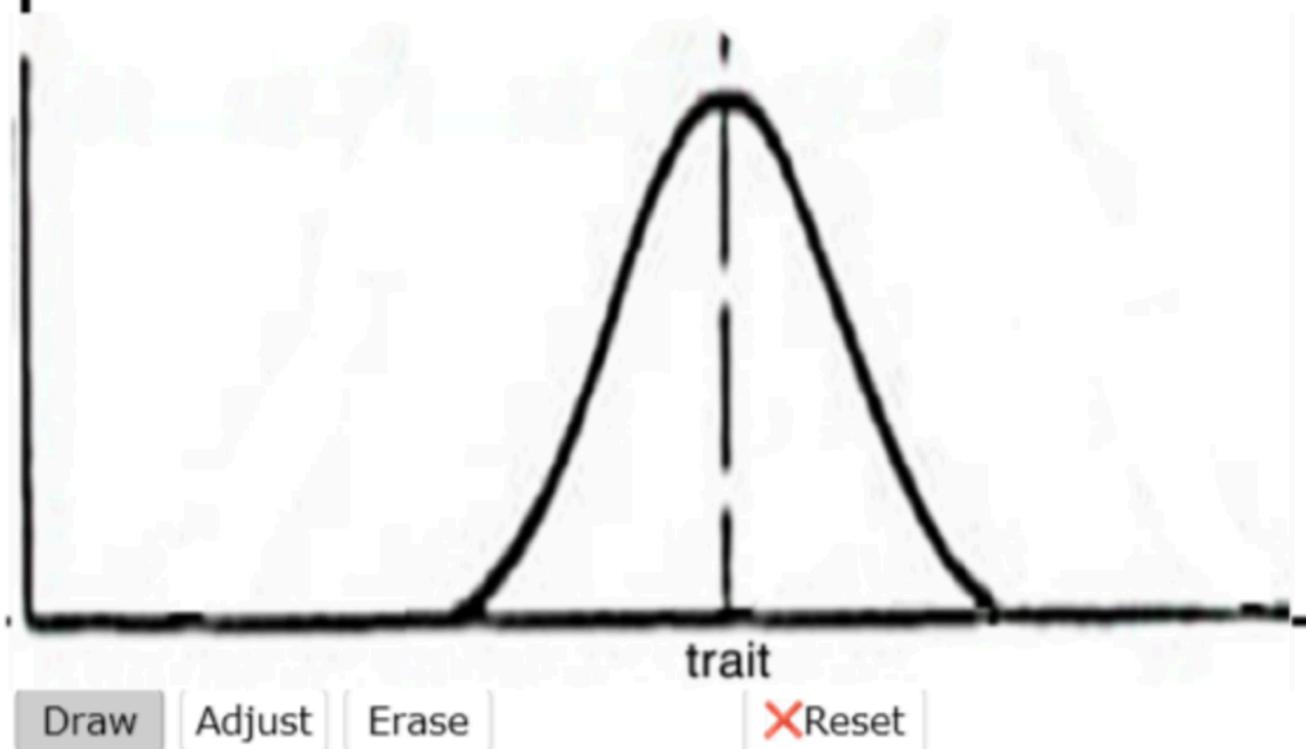
You are asked "what drives selection"; your answer involves a single factor. That factor would be:



- intelligence
- # of viable offspring
- social skills
- life-span

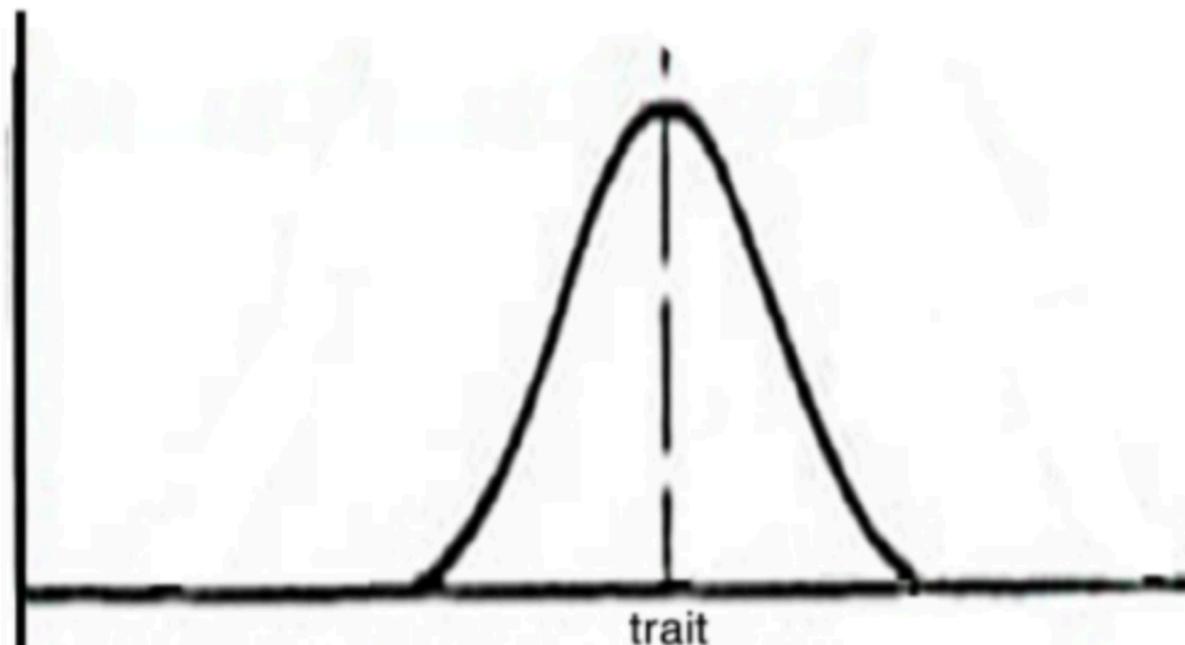
A population is under **conservative selection**. Generate a graph of relative reproductive success as a function of a trait; indicate, with an arrow(s), where selection is negative.

The graph presents the distribution of the trait within the population at time=0. **In the box** explain how the population will look like at $t=n$, where n is many generations later?



A population is under **disruptive** selection associated with a particular trait. Generate a graph of relative reproductive success as a function of a trait; indicate, with an arrow(s), where selection is negative.

Generate a plausible scenario under which disruptive selection might occur; what will happen if organisms with extreme forms of the trait no longer mated with one another.



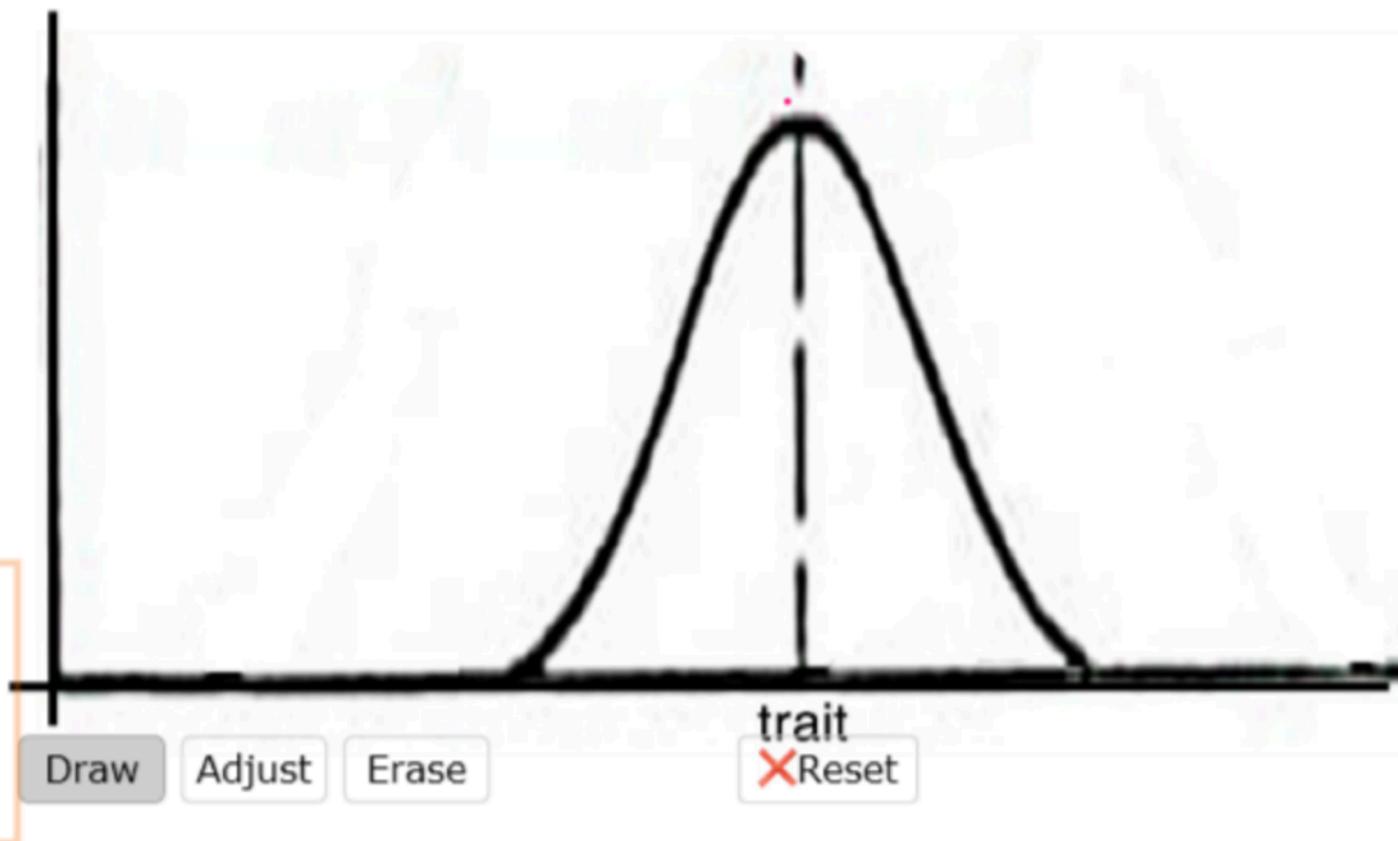
Draw

Adjust

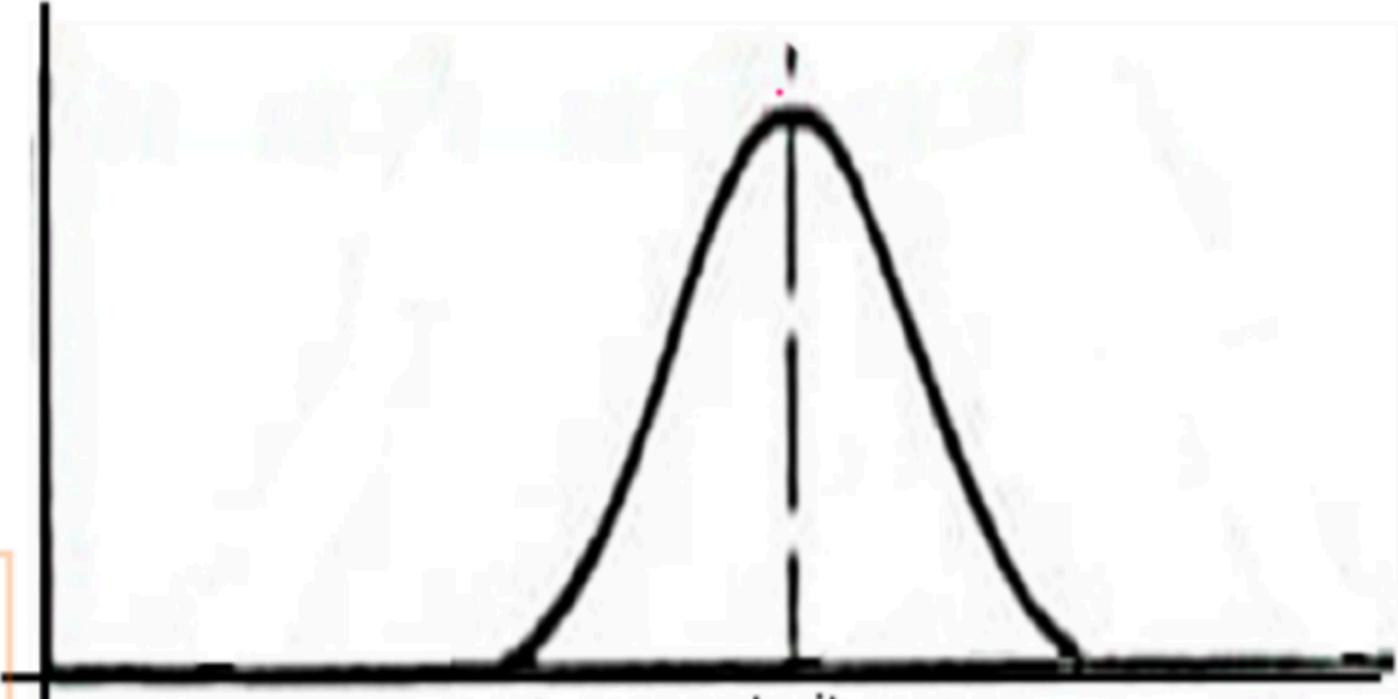
Erase

Reset

A population is under **directed** selection towards larger values of a particular trait. Generate a graph of relative reproductive success as a function of a trait; indicate, with an arrow, where selection is negative.



What factors would limit how extreme the trait could



Assume that different alleles of a single genetic loci (gene) are associated with various “degrees” of the trait - what happens to the relative frequencies of these alleles within the population over time?

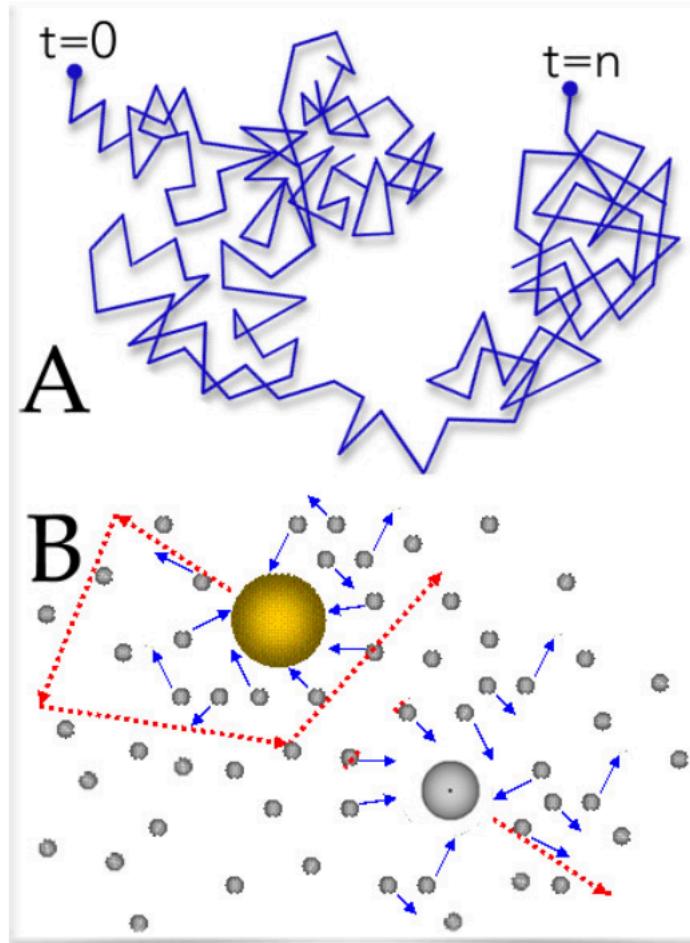
Questions to answer:

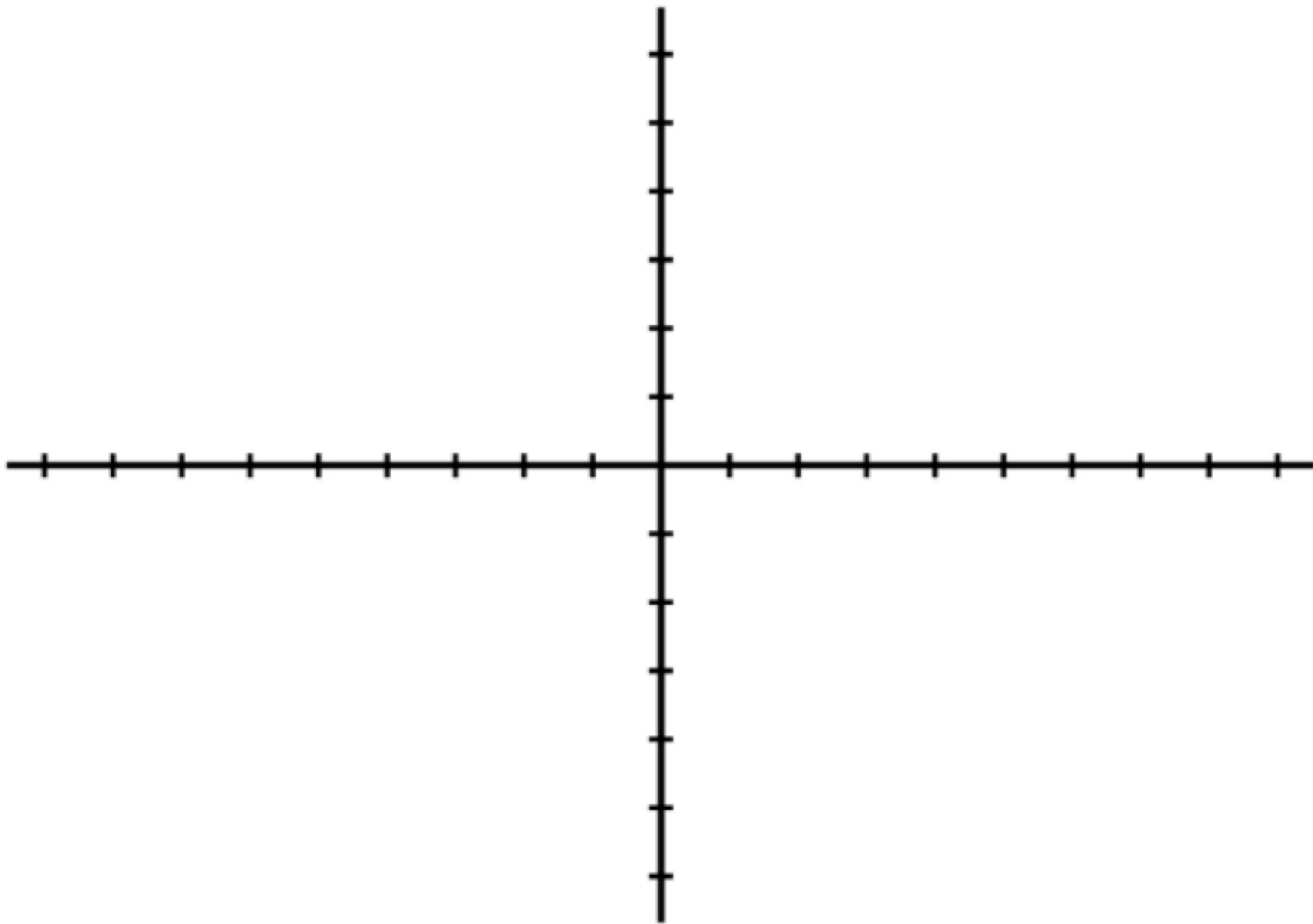
27. Why does variation never completely disappear even in the face of strong stabilizing selection?
28. Under what conditions would stabilizing selection be replaced by directed or disruptive selection?
29. By looking at a population, how might one estimate the strength of conservative selection with respect to a particular trait?

What is a stochastic process?

What can be predicted about a single particle undergoing Brownian motion? what cannot be predicted?

Does this change when we consider a population of particles?





Draw

Adjust

Erase

Check

Reset

Average distance of population's traveled



This is a fair die; you role it 11 times, it comes up
1,3,1,2,1,3, 4, 5, 1, 2, 1

Which number is most likely to be come up next?

Questions to answer:

30. What types of behaviors define a stochastic event; what types of everyday stochastic events are you familiar with. How do you know that they are not random?
31. What types of events are not, in theory, study-able scientifically?