Summary Table - Longevity Storyline

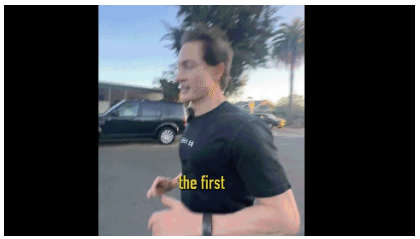
GROUP 22 -

Phenomenon: 100 Animal Lifespans

Guiding question: What causes animals to have different lifespans?

Driving Question Board - Add new View others

Initial Model Final Model



<table>
<tr><th>Supporting phenomenon</th><th>Link to work</th><th>What we did</th><th>What we figured out</th><th>How does this connect to animal lifespans ?</th></tr>
<tr>
<td>Tortoise, salmon, sunfish and naked mole rate life cycles (cycles)</td>
<td>Link</td>
<td>Mapped out the lifecycle of the tortoise, learned about the other 3.</td>
<td>Lifecycles have 4 stages: Birth, growth, reproduction, death.
Longer living organisms were slower moving had less predators,
<table>
<tr><td></td><td>Long lifespan</td><td>Short lifespan</td></tr>
<tr><td>watched over their babies / eggs</td><td>Y</td><td>N</td></tr>
<tr><td># of babies</td><td>Lots over time</td><td>Lots at one time</td></tr>
<tr><td>Predators</td><td>Less</td><td>More</td></tr>
</table>
</td>
<td>environment, natural predators, parental protection, ability to lay 1000's of eggs,</td>
</tr>
<tr>
<td>Salamander leg regeneration (repair)</td>
<td>Link</td>
<td>We watched a video of a salamander regeneration, growth through mitosis.</td>
<td>The stem cell undergoes mitosis and becomes tissue to regenerate the leg.

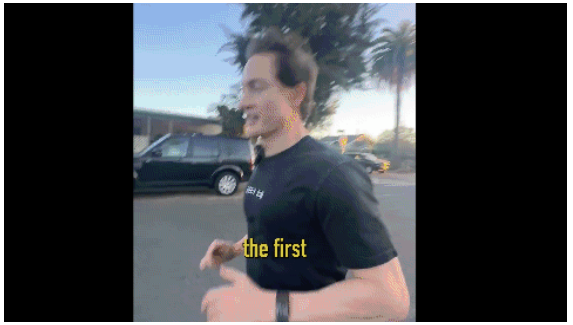
Ability to repair DNA see an increase in lifespan (shark, whale, human, elephant)</td>
<td>If a cell is damaged, the stem cell (blastema) will replicate through mitosis and will replace the missing cells.</td>
</tr>
</table>

Human reaction time (metabolism)	Link	Data chart #2 shows that organisms with a higher Cell Repair Efficiency score have a longer lifespan.	The dominant hand is much quicker to respond than the non-dominant.	For mammals the quicker the reaction time the longer the life span lower metabolism seeing a higher increase in lifespan Endotherms have a more linear progression compared to ectotherms whose environments change
The Hayflick limit (telomere)	Link	Looked at the data Your cells can only duplicate 40 times before it becomes a “zombie” cell. Telomeres get shorter and shorter with each replication.	The longer the reaction, the longer the lifespan. When metabolism increases, lifespan goes down. Telomeres get shorter and shorter with each replication.	Once cells hit the hayflick limit, they become more likely to be zombie cells, or cells that are imperfect/damaged. Higher hayflick limits have higher lifespans
Suicidal mating	Link		Fish have the widest maturity range anywhere from 25 days to 150 years, amphibians have a narrow maturity band 1.5-4 years, birds mature in about a year and live roughly 20 years, mammals have 3 distinct magnitudes of maturity (3 weeks/9 yr lifespan, 25 years/211 yr lifespan,	Maturity rate affects lifespan, and stress hormones do too. Organisms with longer time to reach sexual maturity typically have longer lifespan
Supertasters	Link	Genes make some people supertasters.	SIRT6 - Higher scores reflect greater estimated cellular growth acceleration and reproductive investment. mTOR is active, cells grow fast and divide quickly — but they also age faster.	SIRT6 and mTOR represent two opposing biological switches. Natural selection cannot maximize both simultaneously — resources spent on rapid growth (mTOR) are unavailable for maintenance (SIRT6) Long-lived species have evolved environments or strategies — low predation, stable food, flight, underground living — that reduce the pressure to reproduce quickly.

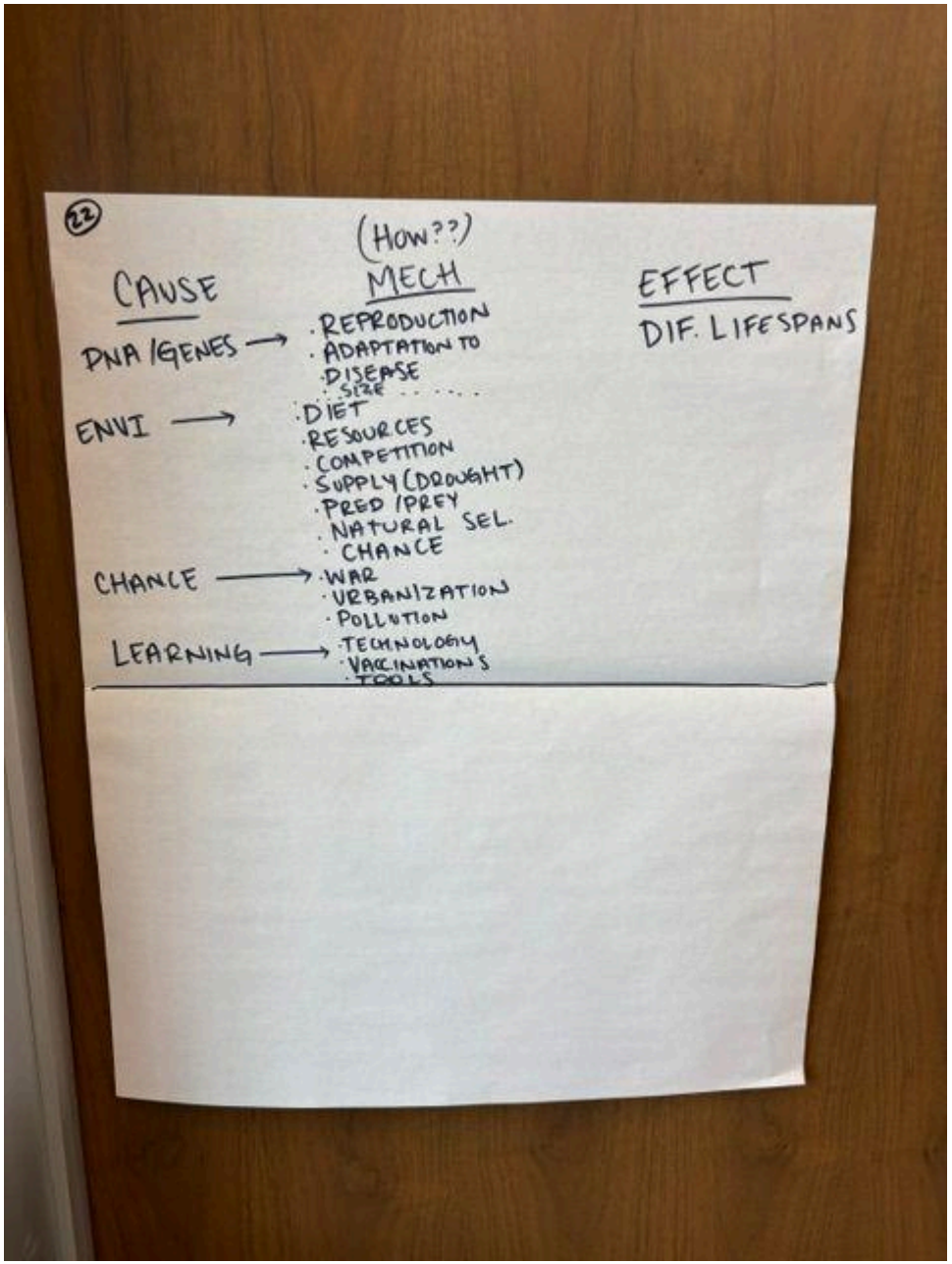
Turquoise Killifish and Bigmouths	Link			

Create a causal model that answers the following question

What causes animals to have different lifespans?



Initial Model

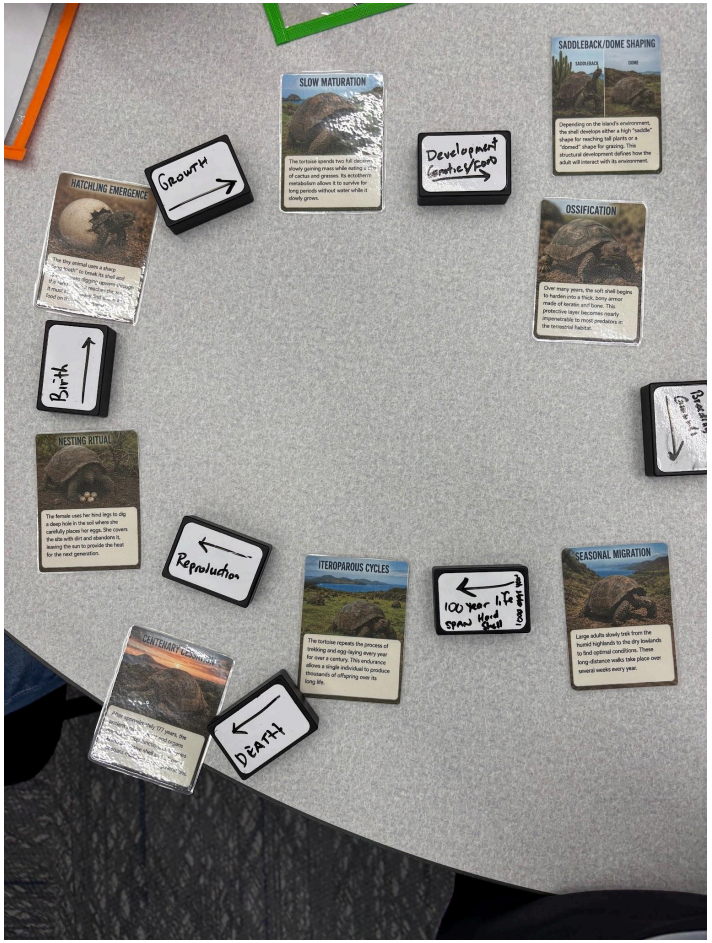


Final Model

Vertebrate Life Cycles

- [Back to summary table]

Show your work below (i.e. text, model images, questions, data etc.)



Salamander Leg Regeneration - Back to summary table

Show your work (i.e. text, model images, questions, data etc.)

Human reaction time - Back to summary table

Show your work below (i.e. text, model images, questions, data etc.)

The Hayflick Limit - Back to summary table

Show your work (i.e. text, model images, questions, data etc.)

Suicidal Mating - Back to summary table

Show your work (i.e. text, model images, questions, data etc.)

Supertasters - Back to summary table

Show your work (i.e. text, model images, questions, data etc.)

Turquoise Killifish and Bigmouths - Back to summary table

Show your work (i.e. text, model images, questions, data etc.)