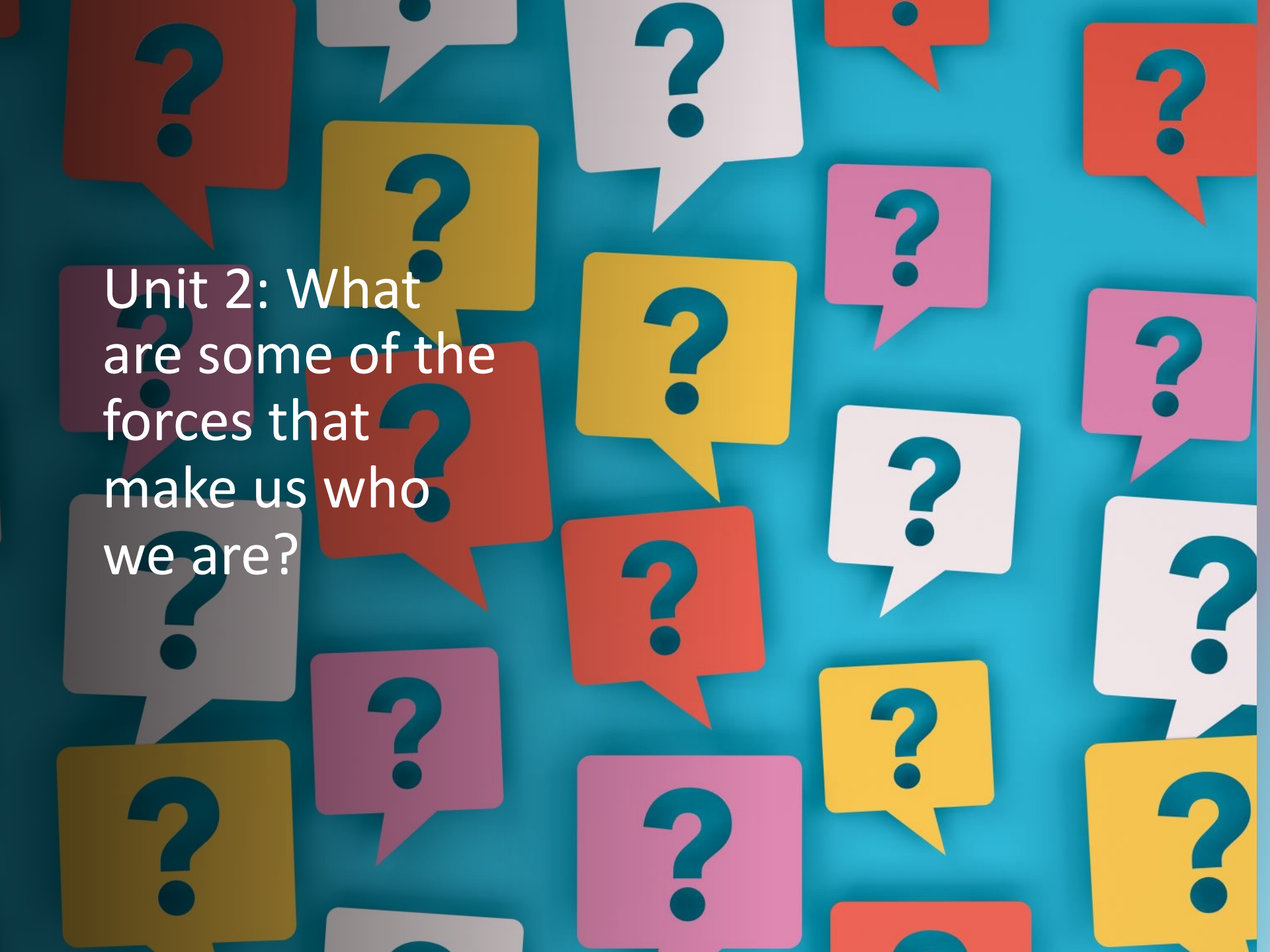


Summary of Unit 1

- In unit 1, we were concerned with philosophy
- In particular, the question of “epistemology”
- How do we know the outside world?



The background of the slide is a vibrant blue, densely populated with numerous speech bubbles of various colors including red, yellow, pink, and grey. Each speech bubble contains a large, bold, dark blue question mark, creating a visual theme of inquiry and questions.

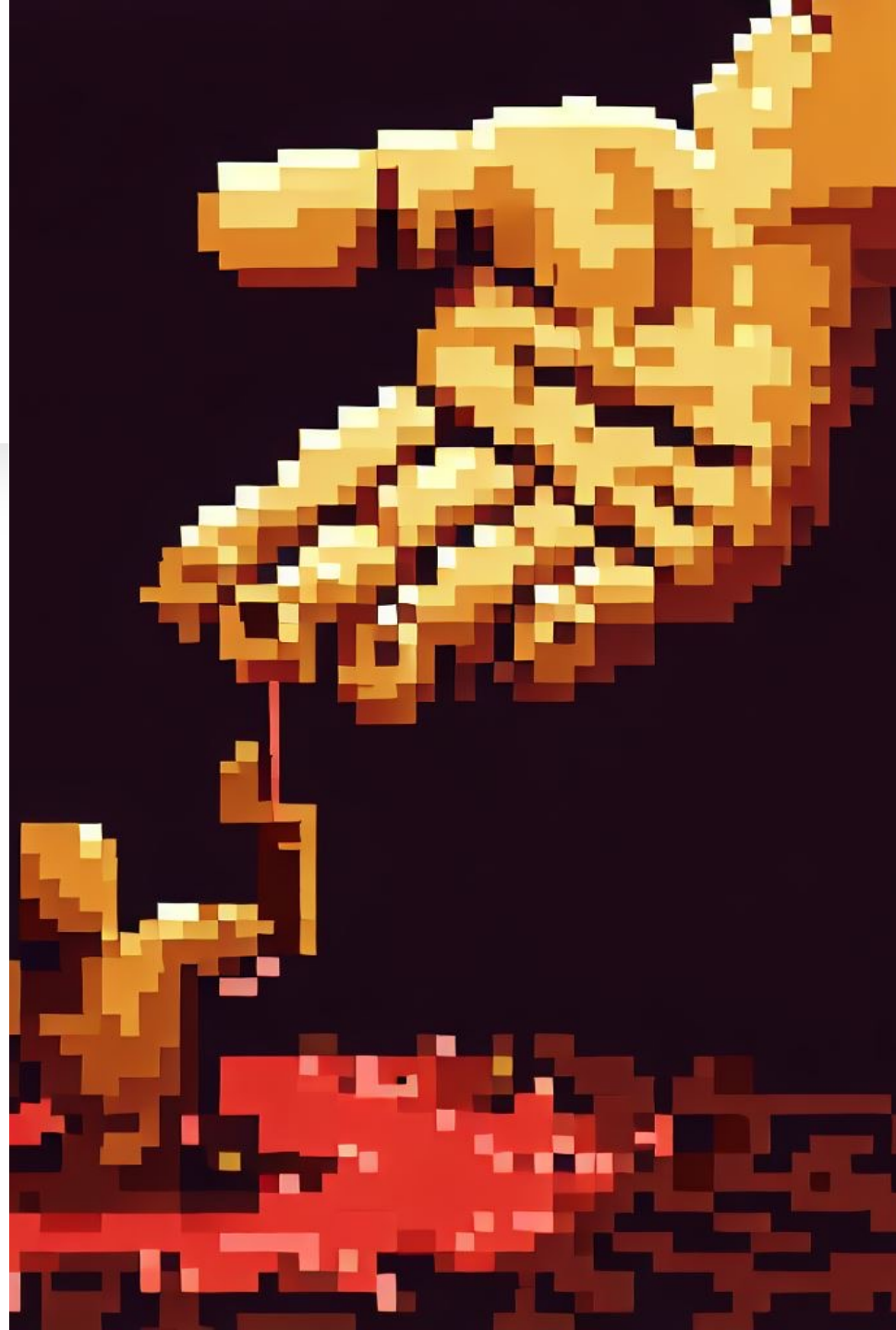
Unit 2: What are some of the forces that make us who we are?



Let's start with
the basics:
as humans we
have physical
bodies, and
those bodies
have some
characteristics

How did human bodies develop those characteristics?

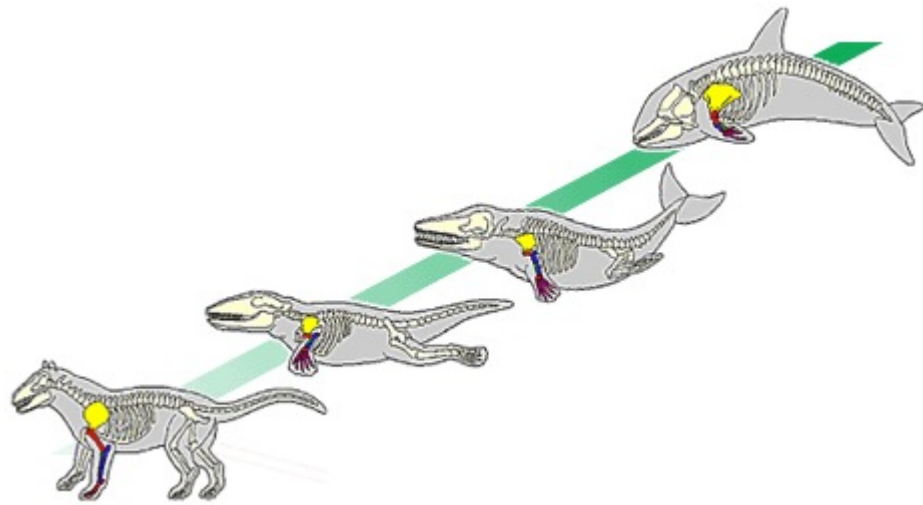
- One hypothesis: intelligent design theory
- All plants and animals were created by an intelligent designer
- They were created exactly the way they exist now – there has been no change



Issues with intelligent design

- The fossil record
- There is a wealth of evidence that most of the life that has existed in Earth's history has gone extinct, and most of the life that exists now didn't exist for most of Earth's history
- Our "designs" are flawed and often sort of ridiculous
- Our throat
- Our lower back
- Our appendix
- External genitalia?
- We can watch populations of living things that have short generations change in a short period of time
- Is there another hypothesis that explain these observations?





Evolution

Why are there so many different varieties of life, and how did this happen? And how does it affect us as individuals?



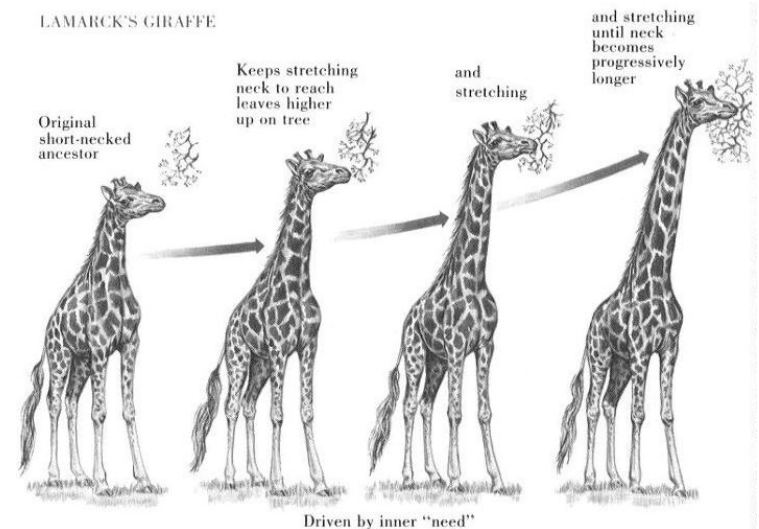
The natural world has a massive amount
of different varieties of plants and animals

Observation to be explained



One failed theory – Lamarckian evolution

- Animals change during their lives to adjust and adapt to their surroundings
- For example, an animal might stretch its neck in order to reach tall branches
- To Lamarck, that animal would have offspring that would have long necks
- However, this is not how genetics work
- Even if I work out constantly, I won't have a ripped and buff baby
- However, the study of epigenetics has caused a slight re-appraisal of Lamarck's ideas



Darwinian Evolution

- It isn't what an animal does when it's alive that changes the characteristics of its offspring
- Instead, what changes the population of a species is which individuals reproduce, and pass on their characteristics
- Natural selection
- Survival of the fittest

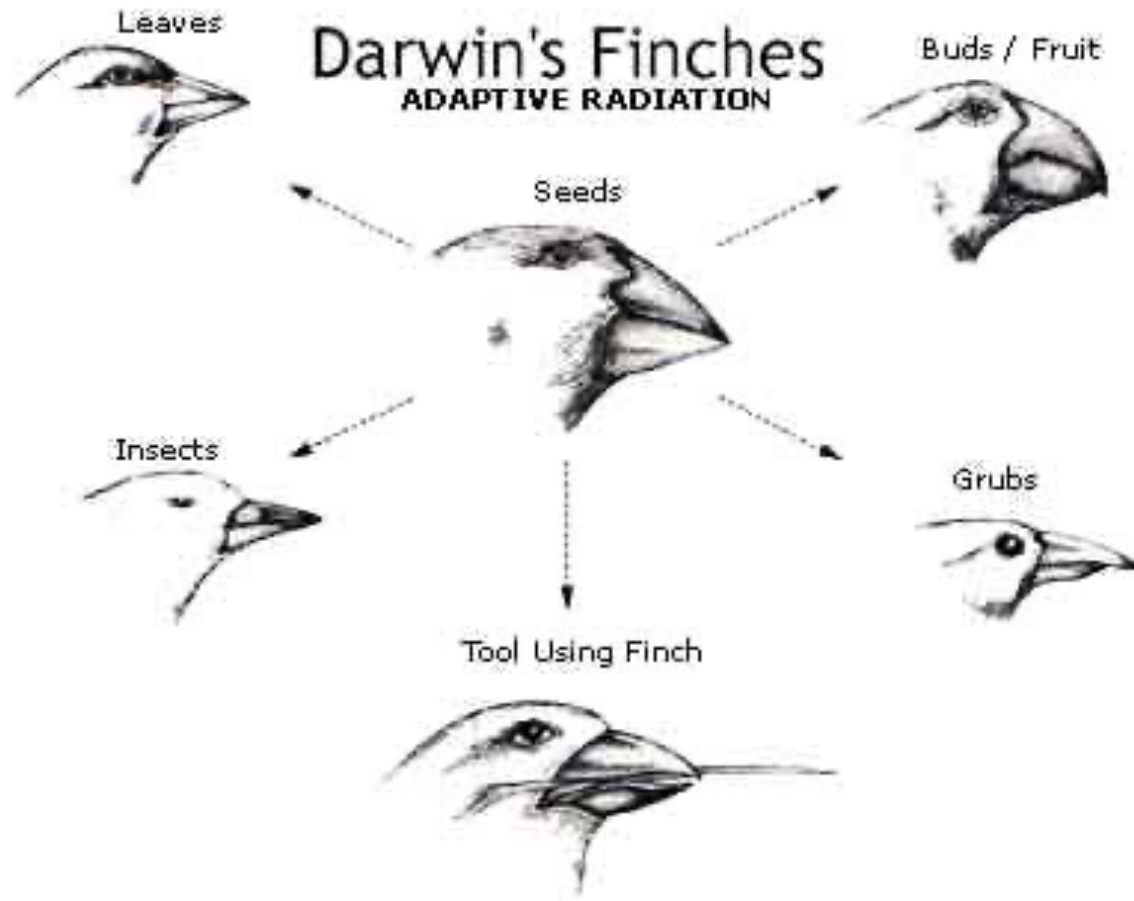


Voyage of The Beagle

- In 1831, the HMS Beagle left for a 5 year trip to map out the South American coastline
- Young Charles Darwin was brought along as a naturalist, to record new species of plant and animal
- When exploring the Galapagos Islands, Darwin captured what he thought were several significantly different species of bird
- Upon returning to England, he was told they were all different kinds of finches



Finch faces



So how did
this
happen?

Diversity +
reproduction +
adaptation + time





Diversity

Within any animal population, there is some diversity of characteristics



Animals tend to pass on their characteristics to their offspring

Reproduction

Adaptation

- Some of those characteristics make the animal more or less well-suited to the environment at the time





Examples of process

The Peppered Moth



Competition

- Animals that are well-suited to the environment will be more successful, have more offspring, and pass on those characteristics



Examples of process

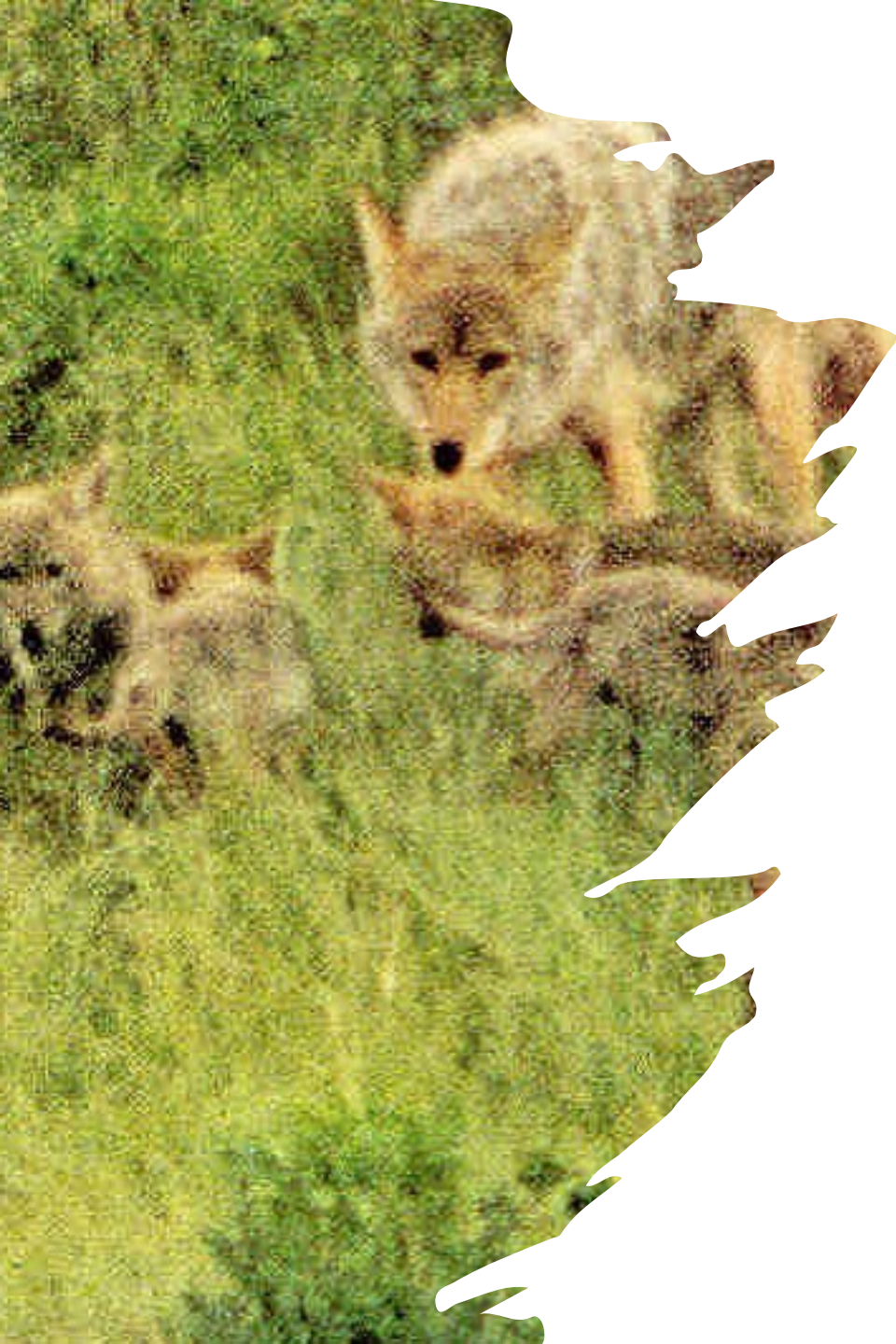
- Guppies



Mutation



- Any time there is replication of information, there is the chance for some of that information to be lost, or altered
- This results in mutation
- Mutations generally are harmful to the offspring
- Occasionally, a mutation may arise that is helpful



Evolution

- Over time, the animal population will change, based on which characteristics are helpful to causing those animals to reproduce more often

Why is the theory of evolution so threatening?

- If evolution is true, we are perhaps not part of a divine plan
- Humans lose their special place in the universe, and become just another (temporarily) successful organism
- It contradicts literalist interpretations of the Bible
- It attacks traditional beliefs of parental and romantic love



Cute

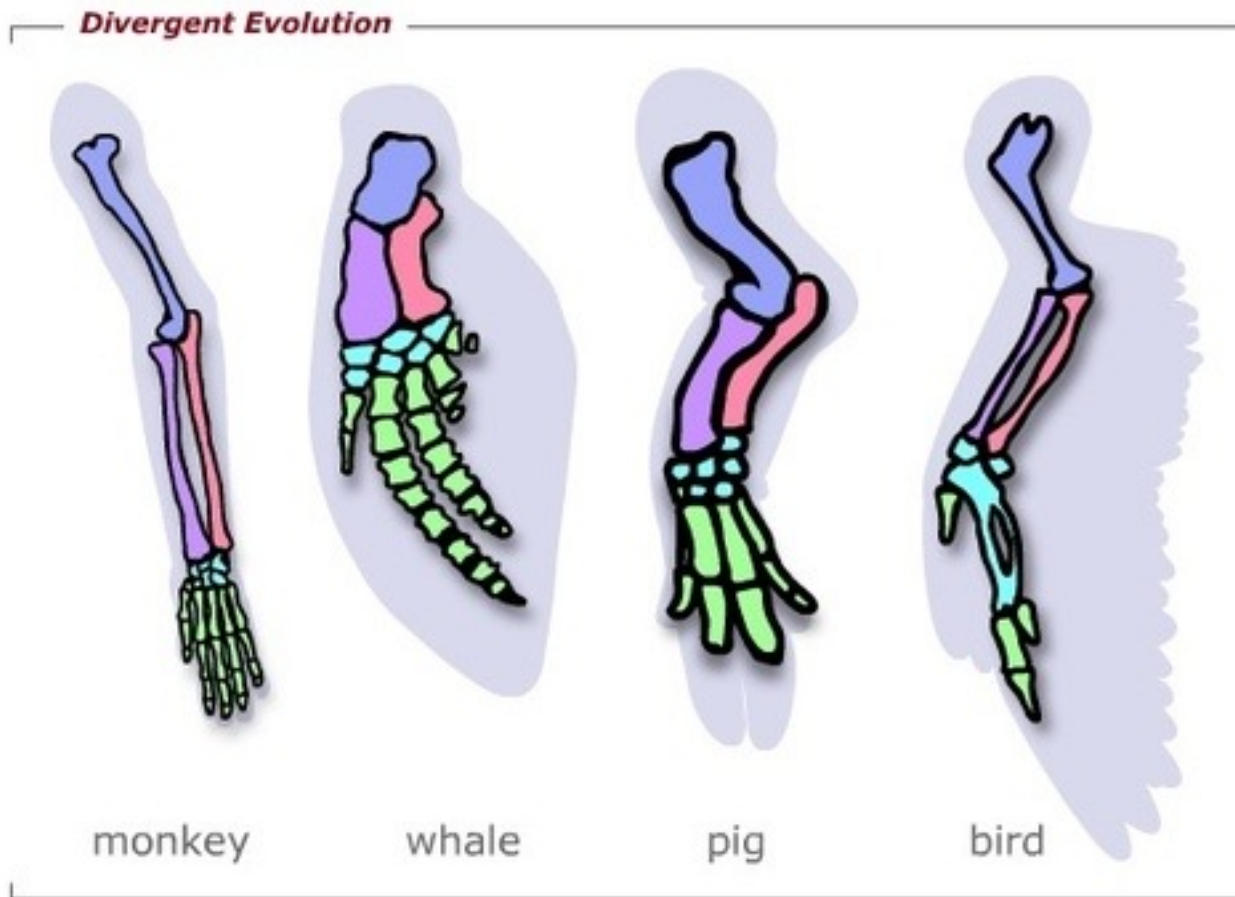


Romance

Evidence for evolution

- The fossil record
- The geological and cosmological record
- Observation of change in communities of organisms with quick generations
- DNA junk genes
 - Chickenosaurus?
- The fact that we have tails
 - 31-35 days as embryos
- Hand bones across the mammal and bird classes

Hand bones



Reasonable arguments against evolution

- Irreducibility of structures
- 2nd law of thermodynamics
- The octopus eye
- The fossil record isn't complete
- Evolution doesn't explain the origins of life
- A misunderstanding of evolution can lead to racism, eugenics, and genocide



Poor arguments against evolution

- If we came from monkeys, why are there still monkeys?
- Why have I never seen a dog turn into a cat?
- Why do we have stories of dragons if we didn't live at the same time as the dinosaurs?
 - Anti-evolutionist Dr. Richard Kent claims that the dinosaurs had to breathe so quickly in the thinner modern-day atmosphere that their nose caught on fire – hence, legends of fire-breathing dragons
- Evolution is “only a theory”



Conclusion

- Many of the arguments against evolution come from a mistaken or deliberately misunderstood interpretation of evolution
- Other arguments are driven by a willful dislike of the implications of the theory
- Disliking the implication is not a valid reason to discount a theory
- We may come up with evidence that disproves evolution some day, but so far it is a successfully tested paradigm