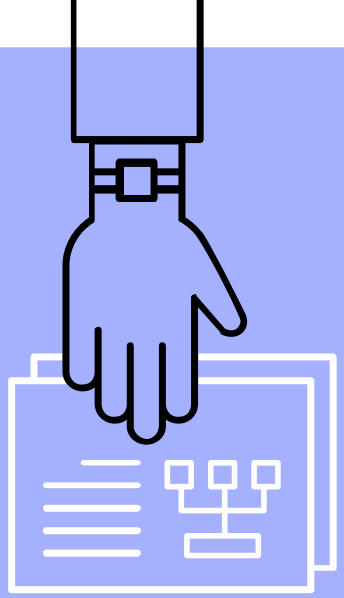
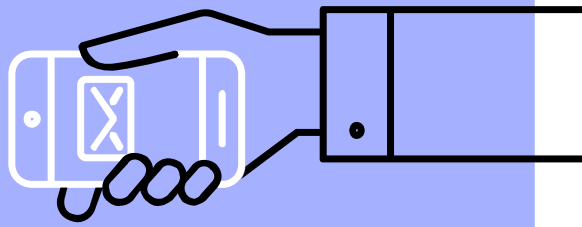
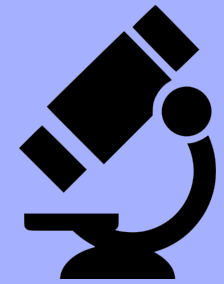


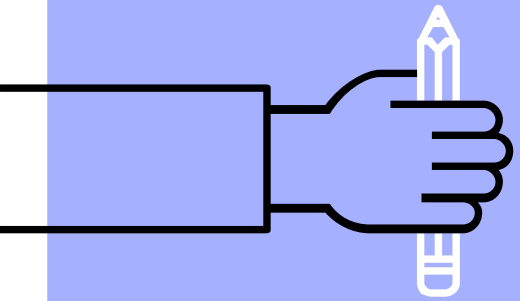


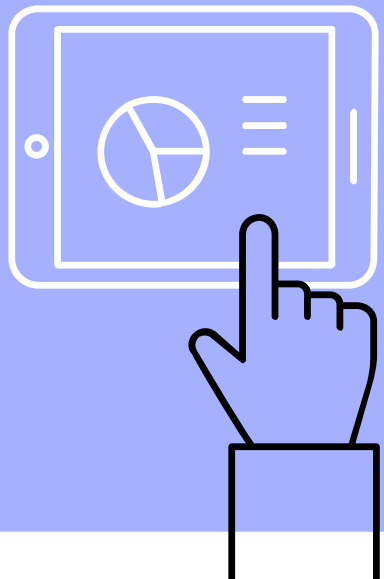


Bio Lab

ScioVirutal

Summer 2021





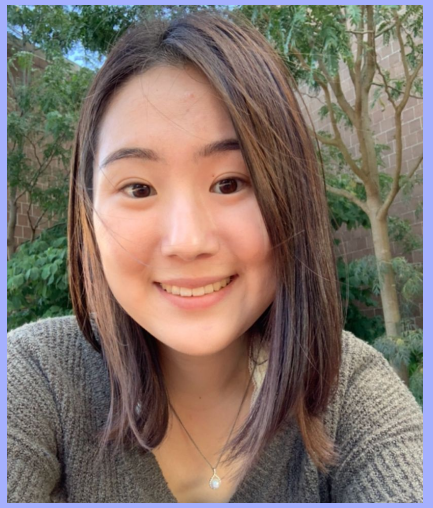
Introductions

Joanna

- Rising junior at Cornell University
- Biological Sciences Major
- Killed my pet fish by mistake
- Ophir Lab
- Modern Family on Hulu

Erin

- Rising senior at Reedy High School in Texas
- Passion for science (especially biology)
- Plays tennis
- Fav shows are The Office & Criminal Minds











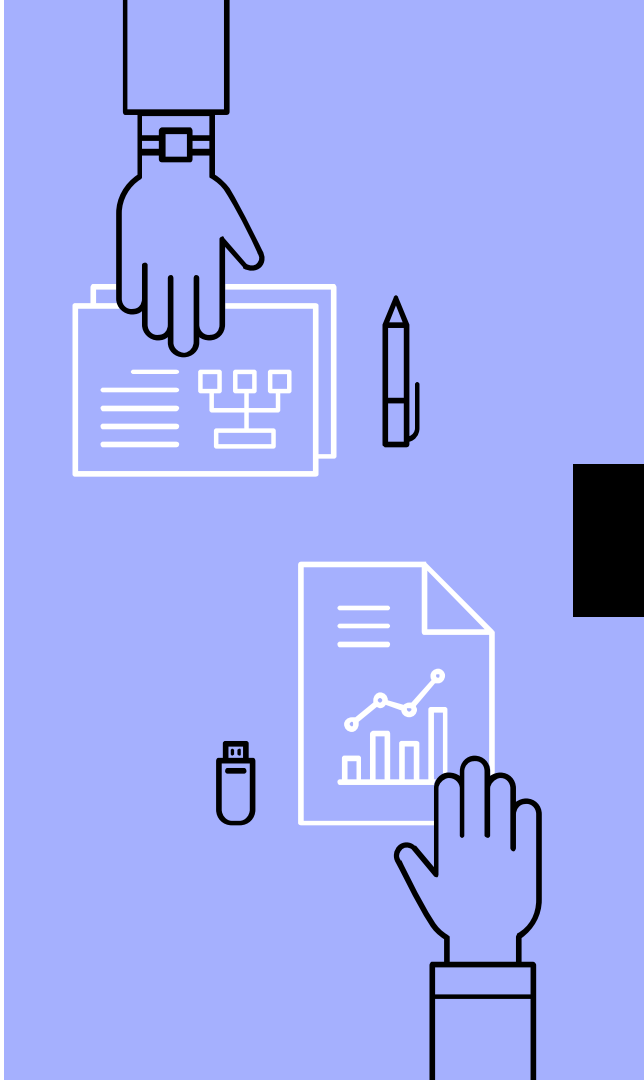


Icebreaker Questions

1. Introductions (name, state, grade level, etc.)
2. Why are you taking this short course? What got you interested in bio?
3. If you could live in any fictional place where would you live?
4. If you were a potato, what way would you like to be cooked?
5. If you could have an extra hour of free time everyday, how would you use it?

Zoom Guidelines

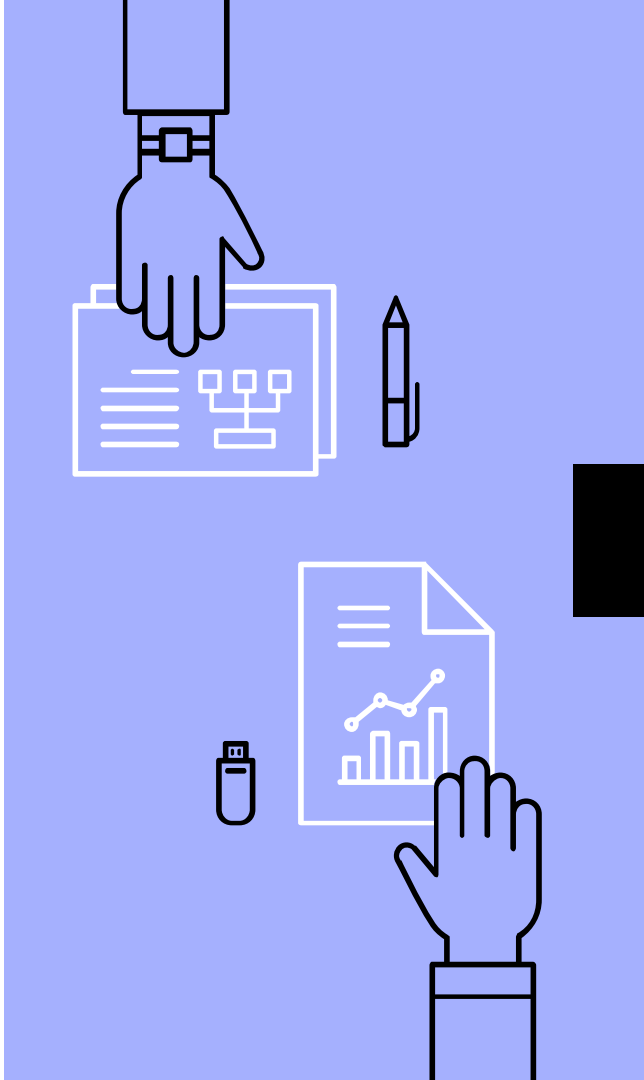
- Link is same for all classes each M, W, F at 8-9pm EST.
- “Camera on” is strongly encouraged for attendance!
- Participation is also strongly encouraged, both during class and on Google Classroom!
- Keep yourself muted unless you wish to speak in that moment!
- Be respectful of other people’s opinions throughout the class both when speaking and typing in the chat. This is a must.



Logistics & Assignments

- **There is no required homework for the class!**
  - But, there will be discussion posts every now and then on Google Classroom (code: pdjfafh & in email) which we encourage you all to comment on.
  - There is currently a discussion post on Google Classroom — please post comments to make our class both more fun for you to learn & for us to teach!

- **Attendance form link will be dropped in the zoom chat + posted on Google Classroom**
- Slides for each class will be posted afterwards on the Google Classroom so enjoy the lecture & don't worry too much about taking notes!
- If you have question at any time, the best way to reach us is to post on Google Classroom.

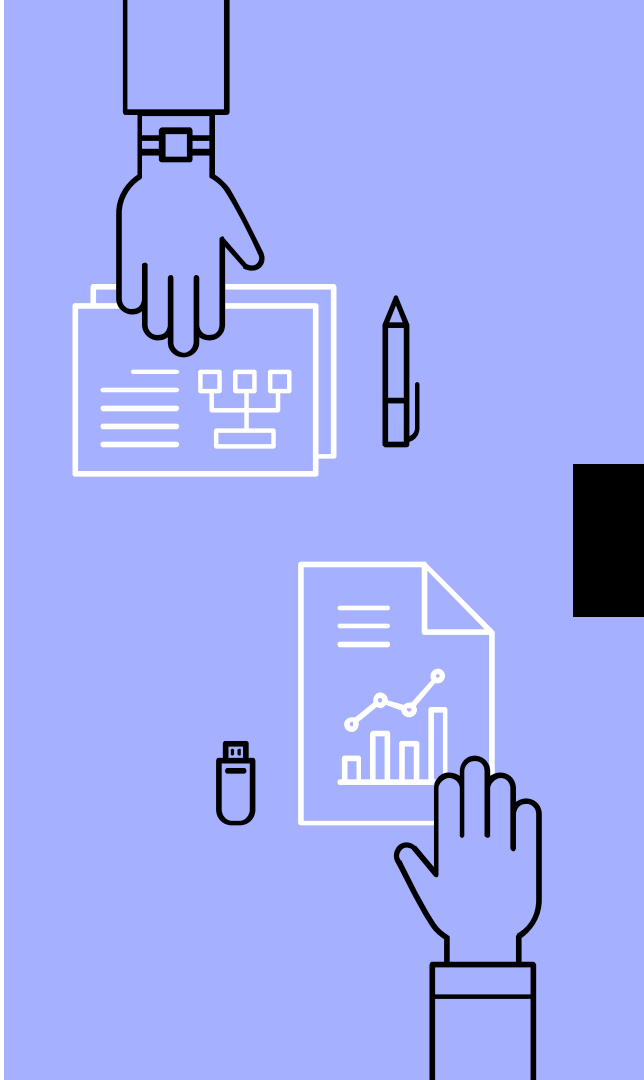


What is “Biological Sciences”?

According to google, the definition of biology is...

“the study of living organisms, divided into many specialized fields that cover their morphology, physiology, anatomy, behavior, origin, and distribution.”

- **Examples:**
  - the plants and animals of a particular area, such as the amazon rainforest
  - the physiology, behavior, and other qualities of a particular organism or class of organisms
  - human biology



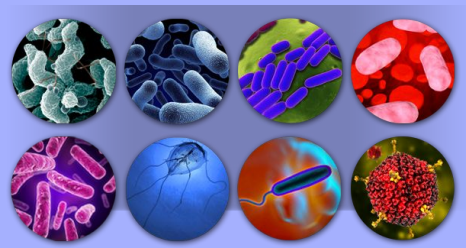
Fields of Study in Biological Sciences

- Genetics
- Neuroscience
- Behavioral Biology
- Molecular & Cellular Biology
- Biochemistry
- Immunology & Virology
- Human Anatomy & Physiology
- Zoology (Land & Marine)
- Botany (Plants)
- Microbiology
- Ecology
- Evolutionary Biology
- Environment & Sustainability
- Computational Biology
- **...and MANY MORE!**











What field of biology are you most interested in?

Type in the zoom chat!

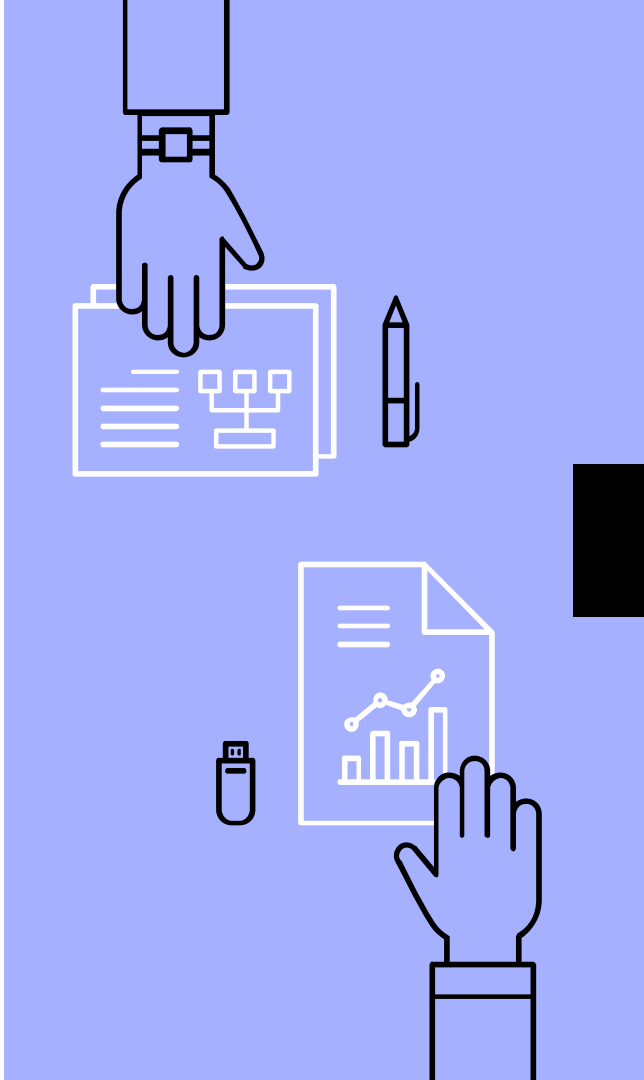


Biological Sciences Research

Research in the biological sciences can be in specific fields or across multiple fields

Research can involve various experimental methods including bench work (wet lab), behavioral observations, computational/statistical analysis, etc.

Research can be done from various levels of analysis to ask questions and interpret results!



Fields of Study in Bio Lab

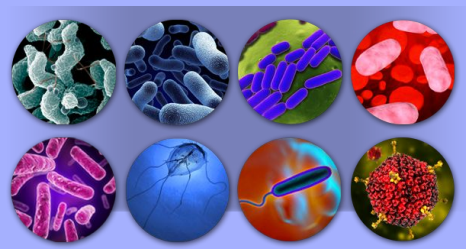
During the course, we will mainly cover research in...

- **(1) Behavioral Biology**
  - for animals, aka neuroethology
- **(2) Molecular & Cellular Biology**
  - Wetlab
  - Scioly's "Bio process"
- **(3) Botany** → if we have time
  - and its biochemical applications, such as aspirin & chemotherapy









Research is all about Questions!

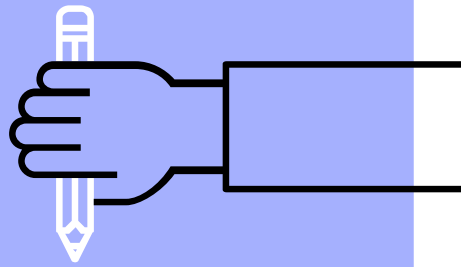
When thinking about research, instead of trying to first narrow down your field of study, try to think of what you wish you knew about something. What are you curious about? What puzzles you?

For instance, **when you see a familiar bird flying over your house, what do you wonder?**

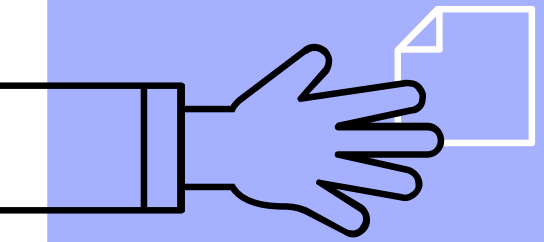




...and that brings me into the topic of...



Behavioral Biology



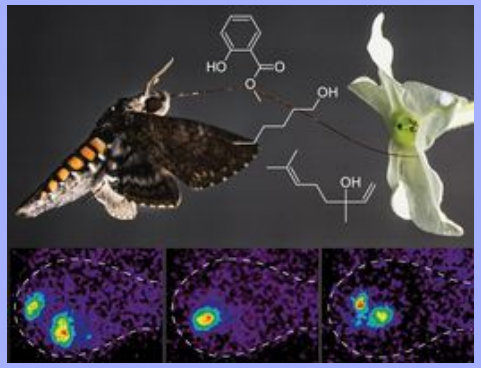
Topic(s): Neuroscience, Animal behavior (ethology), Field research techniques



Within behavioral biology,

“neuroethology” = “neuroscience” + “ethology”

“**Neuroethology** *is the evolutionary and comparative approach to the study of animal behavior and its underlying mechanistic control by the nervous system. It is an interdisciplinary science that combines both neuroscience and ethology.”*







Questions in Behavioral Biology & Neuroethology

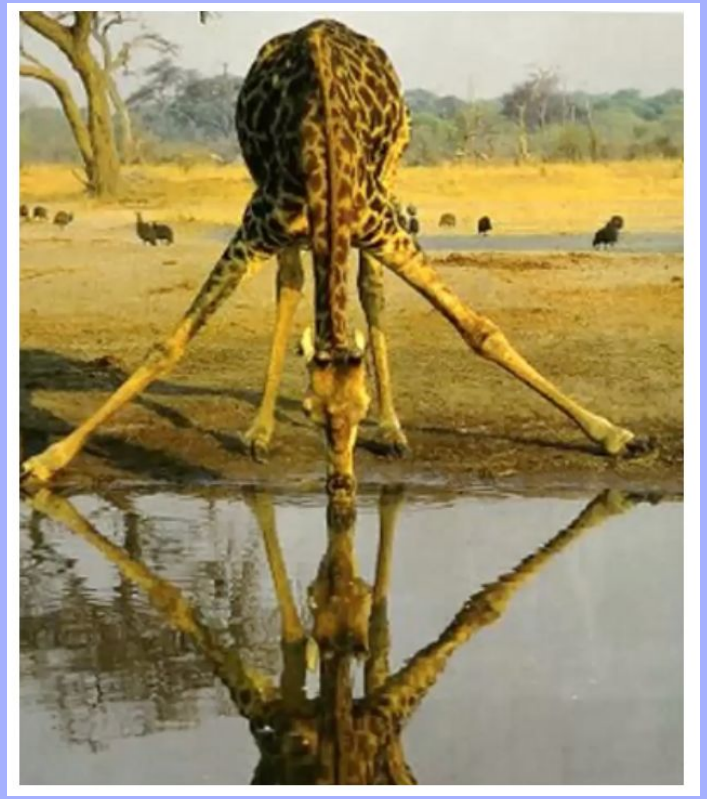
In general, research in the field of neuroethology involves asking questions surrounding the causation of animal behavior. We answer these questions based on principles of neuroscience.

Behavior = Any observable action or response of an organism



Discuss in breakout rooms...

Come back and share ideas in chat!





Opening Exercise: **Why do giraffes have long necks?**

Why have long necks evolved?

Hypothesis 1:
To reach food high in trees (i.e. advantages in foraging)

Prediction 1: If you watch giraffes forage, they should forage high in trees

Prediction 2: Longer necked giraffe individuals have access to more food



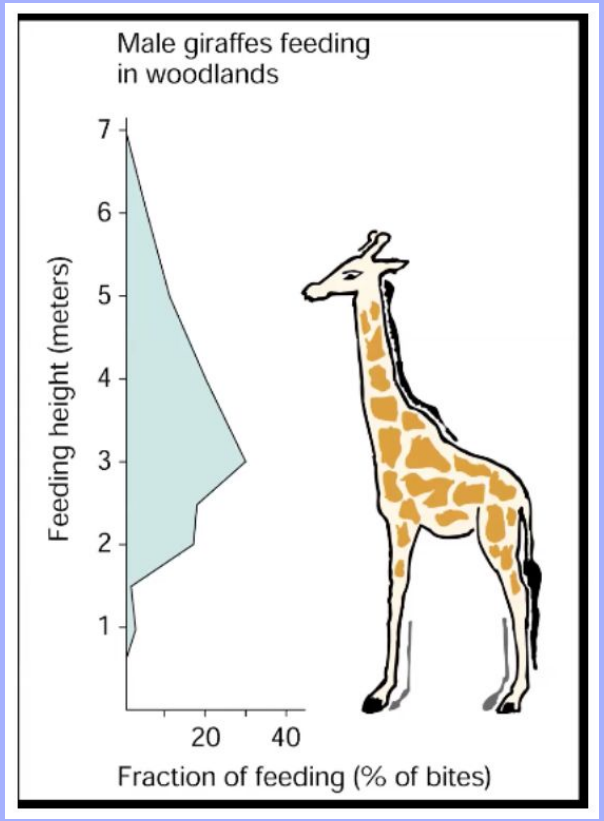
Link to video:

Results 1: ❌

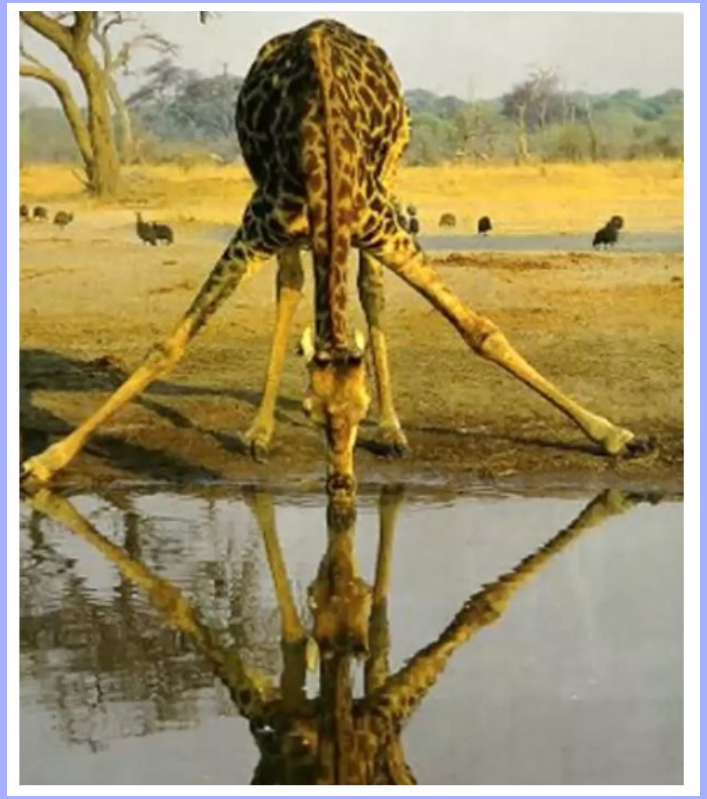
Results showed that most of the time, giraffes are actually foraging things lower than their own height.

Hence, prediction 1 and 2 are wrong!

Also, in nature, it's disadvantageous for giraffes to be tall, particularly since taller giraffes have to bend over more to drink, they are more susceptible to predation!



So if it's not to reach taller trees... what are some other explanations?



Type in zoom chat!

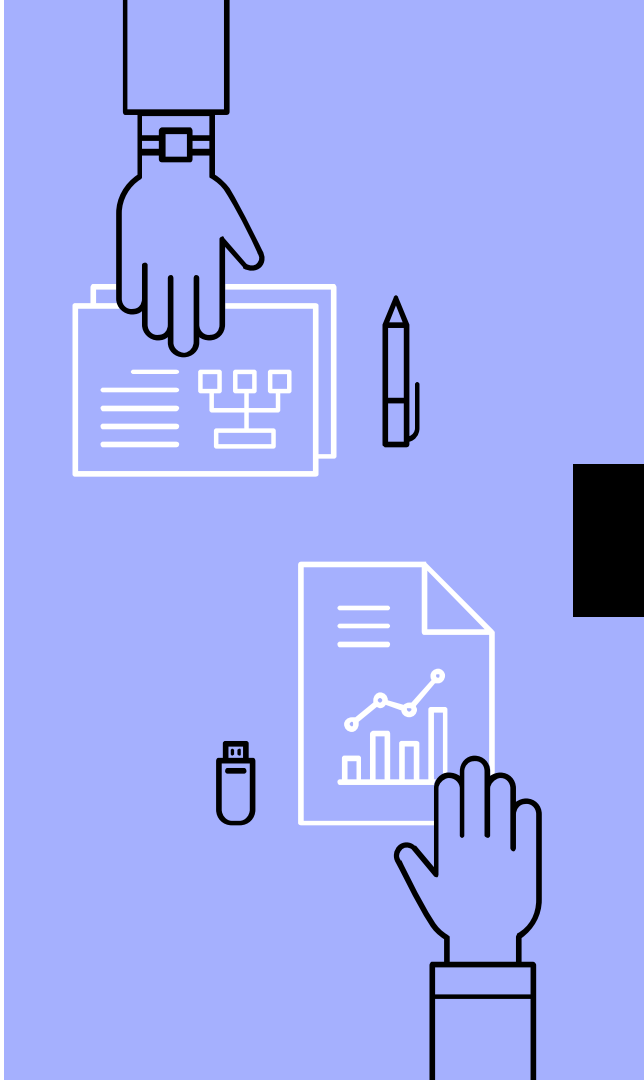
Opening Exercise: **Why do giraffes have long necks?**

Why have long necks evolved?

Hypothesis 2:
Male giraffes have long necks to fight for mates

Prediction 1: Should use necks in fight

Prediction 2: Longer necked males get more female mates



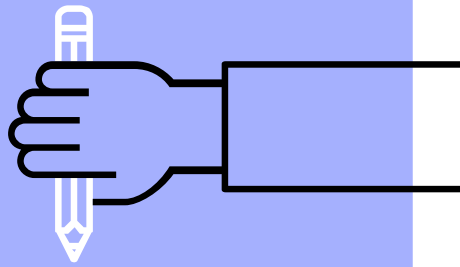
Results 2: ✅

Predictions all hold true!

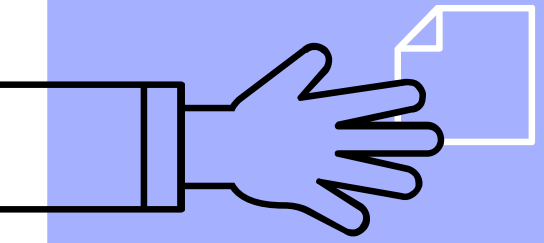
Hence, the answer to the question “Why do giraffes have long necks” is because the taller giraffes get more mating. Long necks are useful for combat in males fighting for mates.

Link to video:
https://www.youtube.com/watch?v=VDhNutbXpFE





End of Day 1?



Any questions?
Please ask away!

Attendance Form