

# 4.1-Hypothetical-Deductive Thinking

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# You should know today:

- Understand the basics of the logic of scientific thinking
- Use this logic to address your research
- Relate: questions, hypotheses & prediction

# How science works?

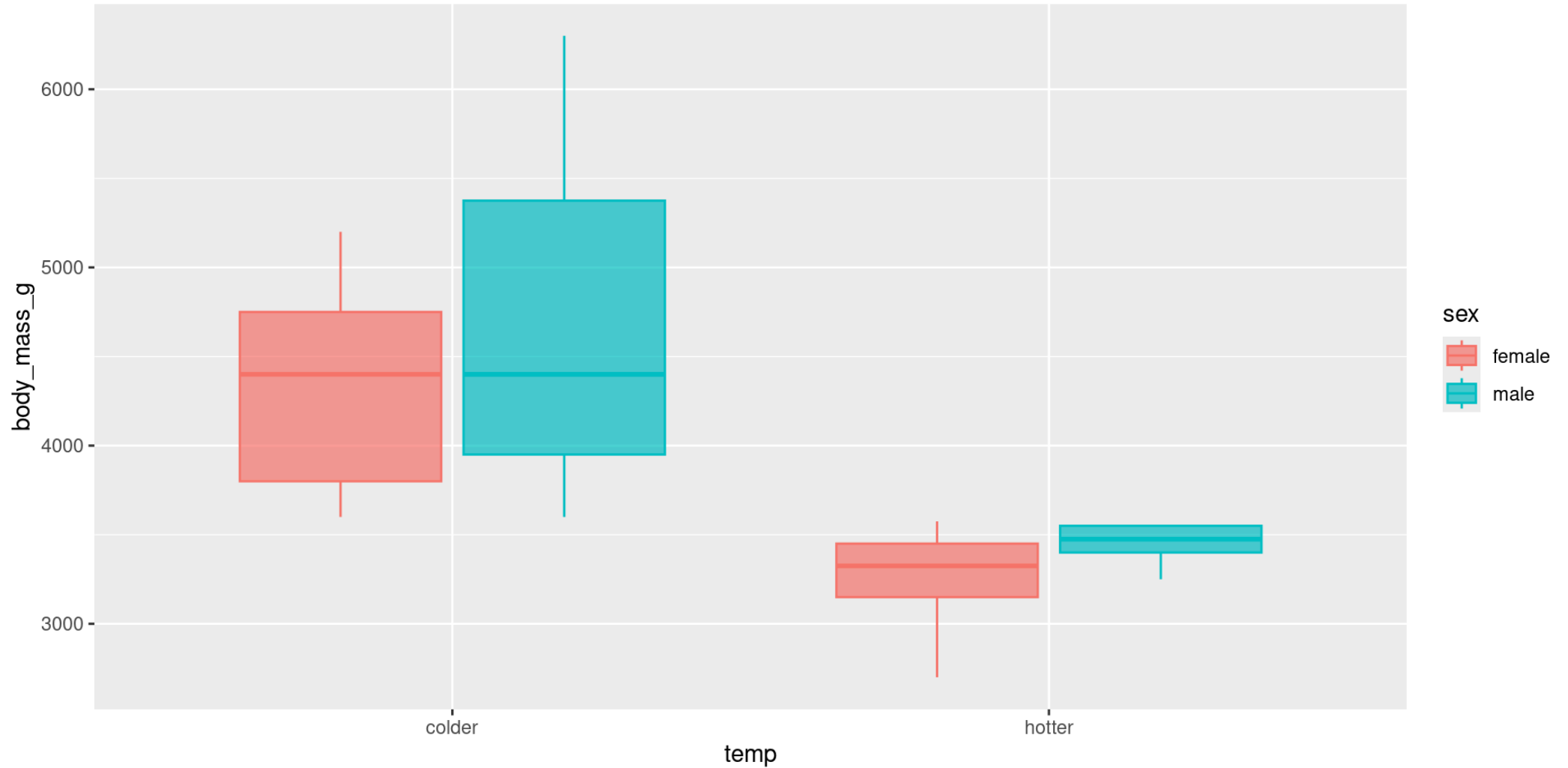
## The Hypothetico-Deductive Model



# Get used to a workflow

1. Question: How can climate location affect sexual dimorphism in penguins?
2. Hypothesis: Colder temperature leads to larger bodies thus reducing dimorphism
3. Prediction: Penguins in colder island have similar body measures

# Let's check it out



# Your turn

1. Make a question
2. Create a hypothesis
3. Draw a prediction

# Common errors



- “I have so many data and what to see what comes out of it”
- “I still don’t have a clear hypothesis or prediction but I started collecting my data”
- “My research doesn’t need a hypothesis”



# Workflow (from wikipedia)

- 1- Based on observation, previous collected data and literature, find a knowledge gap
- 2- Form a hypothesis that explains the phenomenon
- 3- Deduce some expected patterns, assuming your hypotheses is **true**
- 4- Design a experiment to test your hypothesis



source: Crnkovic and Crnkovic 2014

# The Role of Frugivorous Bats in Tropical Forest Succession

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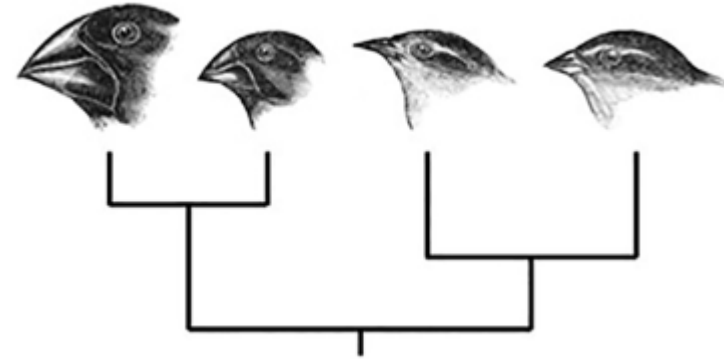
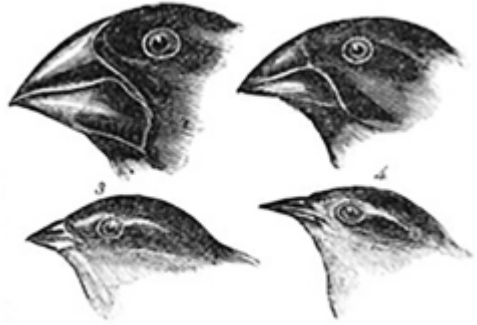
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## ABSTRACT

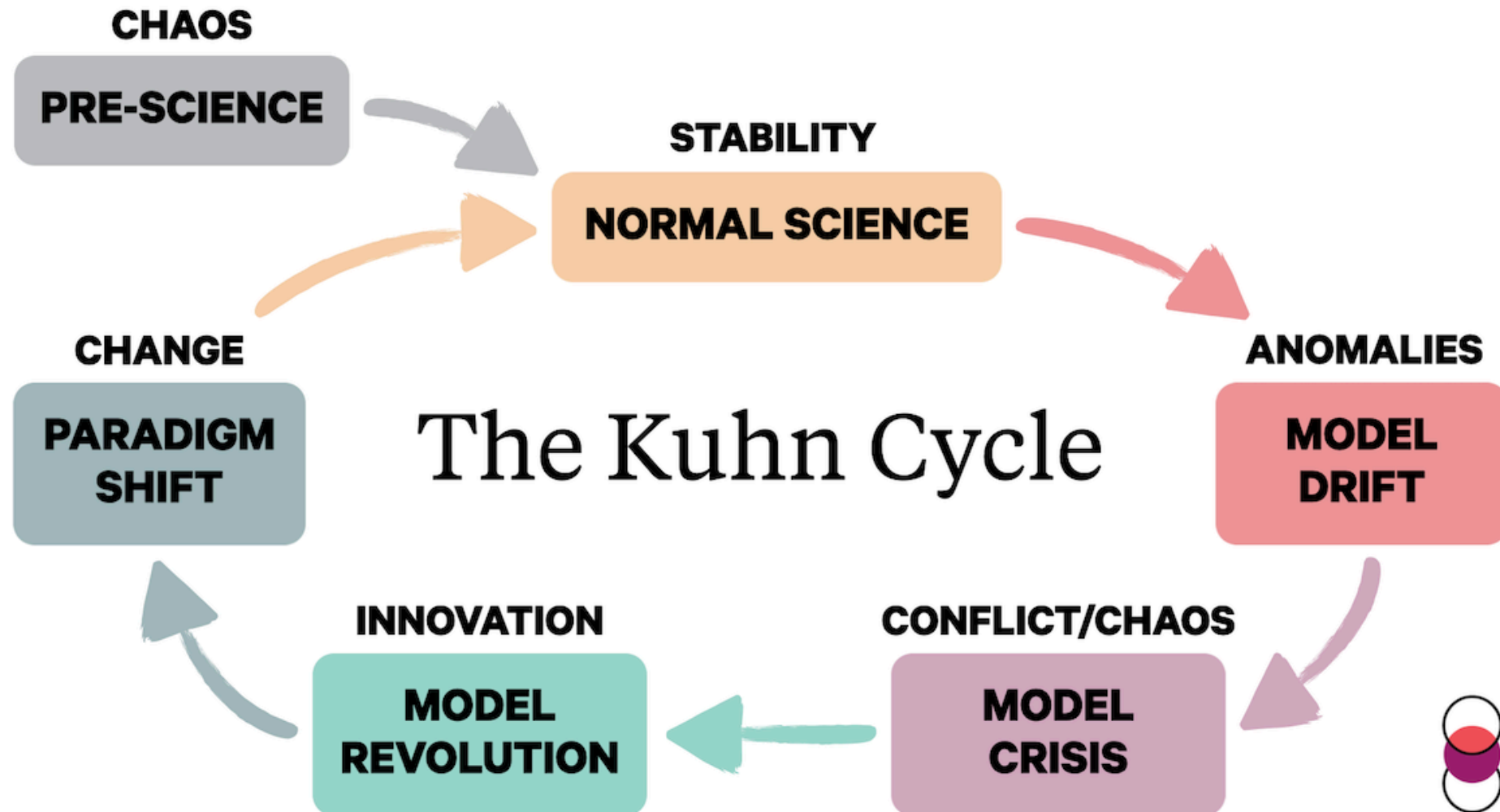
Discussion of successional change has traditionally focused on plants. The role of animals in producing and responding to successional change has received far less attention. Dispersal of plant propagules by animals is a fundamental part of successional change in the tropics. Here we review the role played by frugivorous bats in successional change in tropical forests. We explore the similarities and differences of this ecological service provided by New and Old World seed-dispersing bats and conclude with a discussion of their current economic and conservation implications. Our review suggests that frugivorous New World phyllostomid bats play a more important role in early plant succession than their Old World pteropodid counterparts. We propose that phyllostomid bats have shared a long evolutionary history with small-seeded early successional shrubs and treelets while pteropodid bats are principally dispersers of the seeds of later successional canopy fruits. When species of figs (*Ficus*) are involved in the early stages of primary succession (e.g. in the river meander system in Amazonia and on Krakatau, Indonesia), both groups of bats are important contributors of propagules. Because they disperse and sometimes pollinate canopy trees, pteropodid bats have a considerable impact on the economic value of Old World tropical forests; phyllostomid bats appear to make a more modest direct contribution to the economic value of New World tropical forests. Nonetheless, because they critically influence forest regeneration, phyllostomid bats make an important indirect contribution to the economic value of these forests. Overall, fruit-eating bats play important roles in forest regeneration throughout the tropics, making their conservation highly desirable.

# Knowledge vs Data



source: [Kalinowski & Pelakh 2023](#)

# How science advances?



# Are you doing science right?