

# Inquiry methods that lead students through the process of authentic scientific discovery

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Learning a body  
of knowledge

Understanding  
how new  
knowledge is  
created in  
discipline

VS.

Memorization and  
understanding

Analysis and  
Synthesis

Passive

Active



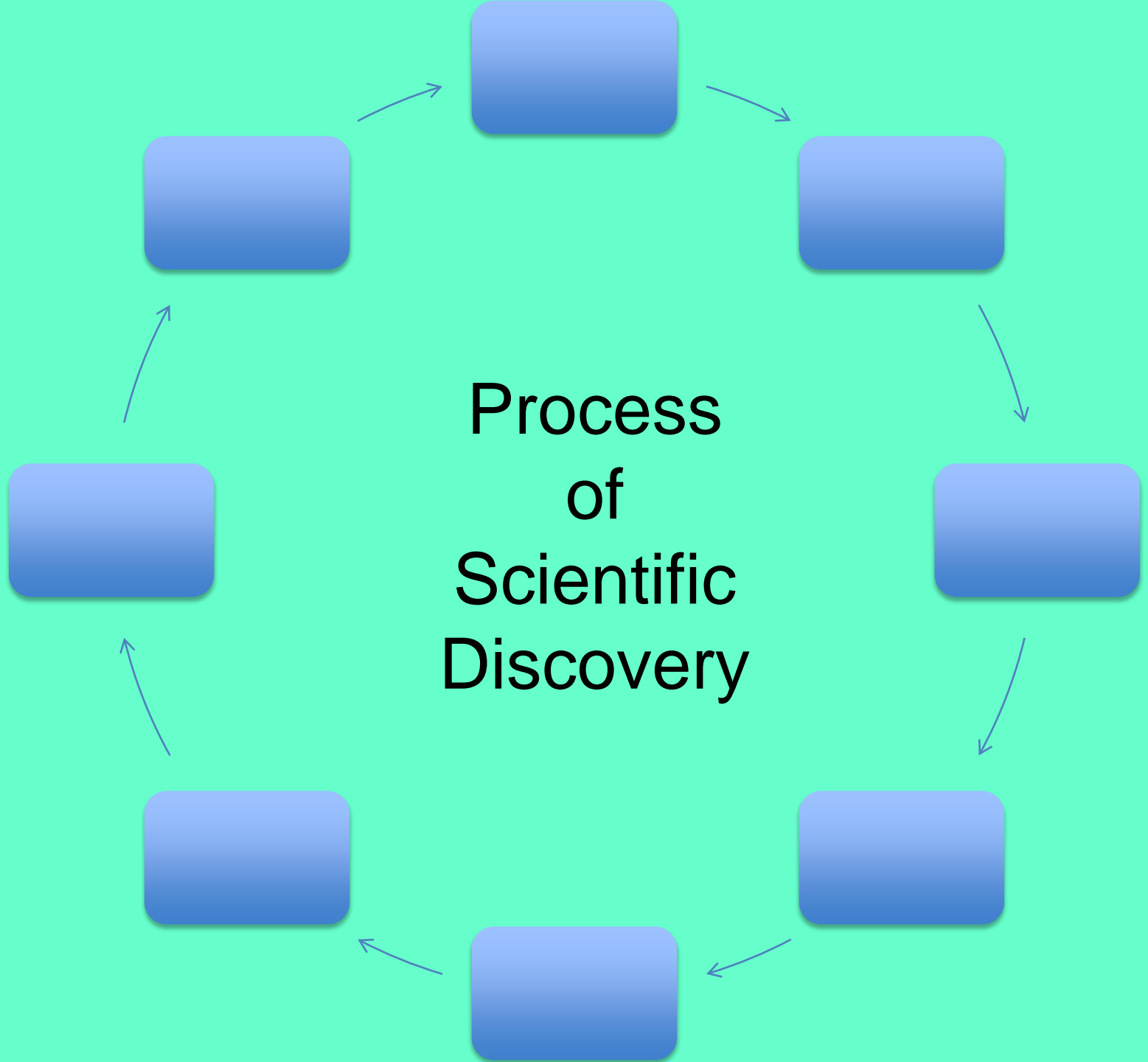
Traditional focus on lecture, textbook,  
“canned” labs

Dull

Seems like all questions are answered

Students don't practice thinking in discipline

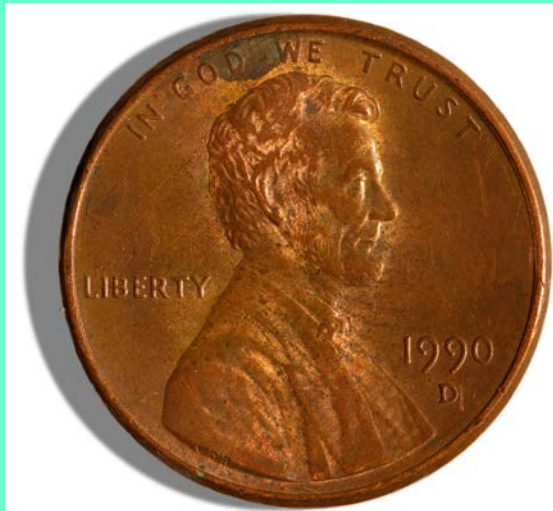
Process  
of  
Scientific  
Discovery



# Start by practicing experimental design in a thought experiment



Example: an apple a day keeps the doctor away



Example: find a penny, pick it up, and all day long, you'll have good luck

# Process starts with background knowledge

- Readings
- Class' previous experiment
- A technique
  - Example: How to ID trees using leaves
  - Example: How to measure soil nutrients
  - Example: How to measure species diversity

# Generate questions individually

- Emphasize quantity, not quality
- 3 per 5 minutes in lab/ 20 per 20 min at site/ 60 per 60 minutes on walk

# Generate questions individually

- Emphasize quantity, not quality
- 3 per 5 minutes in lab or 20 in 20 min at site or 60 in 60 minutes on walk

## Brainstorm as class--1 per student

- Challenge to refine ideas “can you be more specific?”
- Circle doable questions

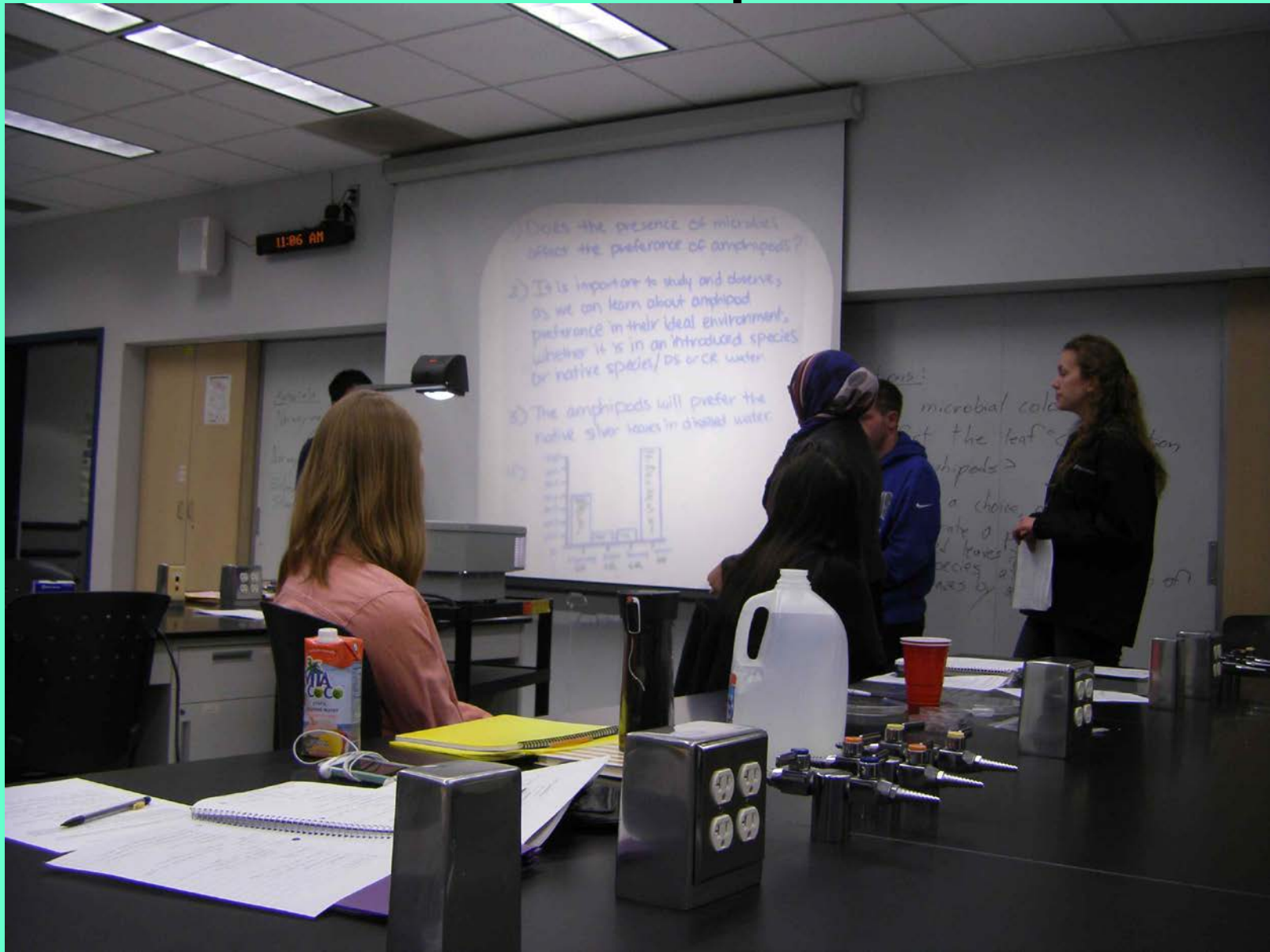


# Pilot experiment--work out methods

- Students create plan in groups, practice methods, then check in
- Stand back



# “Grant Proposal”





- Collect data
- Practice writing in discipline
- Generate new questions

Process  
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Scientific  
Discovery

