DATA SCIENCE REASONING FRAMEWORK

weak explanation; mechanism still unclear

more specified & plausible explanations

detailed understanding of mechanism; vetted; most plausible explanations

DEFINE PROBLEM & QUESTIONS
- Observe the problem
- Explore data
- Ask Why questions about the problem
- Ask How What When questions

PROPOSE EXPLANATIONS
- Formulate multiple testable explanations to address the questions
- Explore data

FIND STRATEGY FOR TESTING EXPLANATIONS
- Identify explanatory & outcome variables
- Predict outcomes
- Design experiment
- Explore data

TEST EXPLANATIONS WITH DATA
- Collect data
- Analyze data (e.g. patterns & outliers)

INTERPRET RESULTS
- Determine if results support or refute each testable explanation

REVISE / PROPOSE EXPLANATIONS

FIND STRATEGY FOR TESTING EXPLANATIONS

TEST EXPLANATIONS WITH DATA

INTERPRET RESULTS

REVISE / PROPOSE EXPLANATIONS

FIND STRATEGY FOR TESTING EXPLANATIONS

TEST EXPLANATIONS WITH DATA

INTERPRET RESULTS

ARTICULATE REASONING
- Synthesize multiple data sources
- Develop a claim
- Apply scientific reasoning & concepts

EXPLANATION IMPROVES WITH EVERY NEW ROUND OF TESTING & EVIDENCE