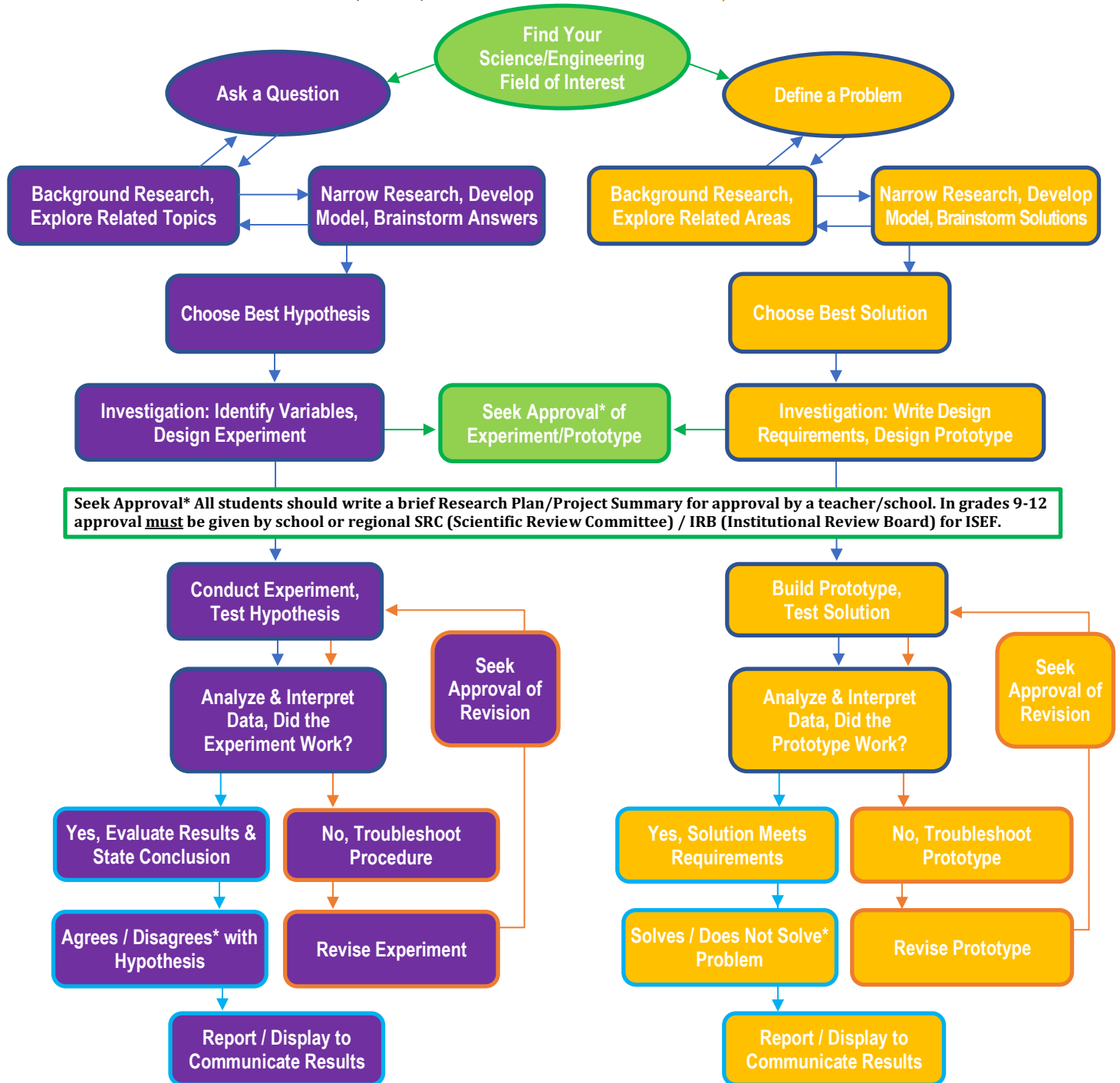# Comparison of Scientific & Engineering Practices

Science Projects

- How does nature work?
- Observe, explore, &/or model for the sake of knowledge
- Can be a theoretical or applied investigation
- Ask a question about a phenomenon
- Design a scientific investigation (experiment) to test a hypothesis
- Must control variables and be falsifiable (testable)

Engineering/Computer Projects

- Put nature to work: create something new
- Inventing, creating, and/or modeling
- Can be investigating "how" a device works
- Define a problem or need
- Design a solution to solve the need or problem
- Must be practical

Find Your Science/Engineering Field of Interest

Ask a Question → **Define a Problem**

Science	Engineering
Background Research, Explore Related Topics	Background Research, Explore Related Areas
Narrow Research, Develop Model, Brainstorm Answers	Narrow Research, Develop Model, Brainstorm Solutions
Choose Best Hypothesis	Choose Best Solution
Investigation: Identify Variables, Design Experiment	Investigation: Write Design Requirements, Design Prototype

Seek Approval* of Experiment/Prototype

Seek Approval* All students should write a brief Research Plan/Project Summary for approval by a teacher/school. In grades 9-12 approval **must** be given by school or regional SRC (Scientific Review Committee) / IRB (Institutional Review Board) for ISEF.

Science	Engineering
Conduct Experiment, Test Hypothesis	Build Prototype, Test Solution
Analyze & Interpret Data, Did the Experiment Work?	Analyze & Interpret Data, Did the Prototype Work?

Seek Approval of Revision

Seek Approval of Revision

Yes, Evaluate Results & State Conclusion	No, Troubleshoot Procedure	Yes, Solution Meets Requirements	No, Troubleshoot Prototype
Agrees / Disagrees* with Hypothesis	Revise Experiment	Solves / Does Not Solve* Problem	Revise Prototype
Report / Display to Communicate Results		Report / Display to Communicate Results	

Disagrees* or Does Not Solve* - Not all experiments or prototypes will result in a positive finding. If not then report your results and consider what hypothesis/solution you might propose next time.