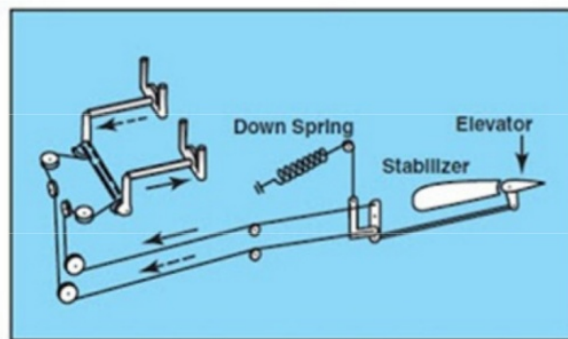


## Lesson #3 Engineering 11/12 Systems Approach to Problem Solving



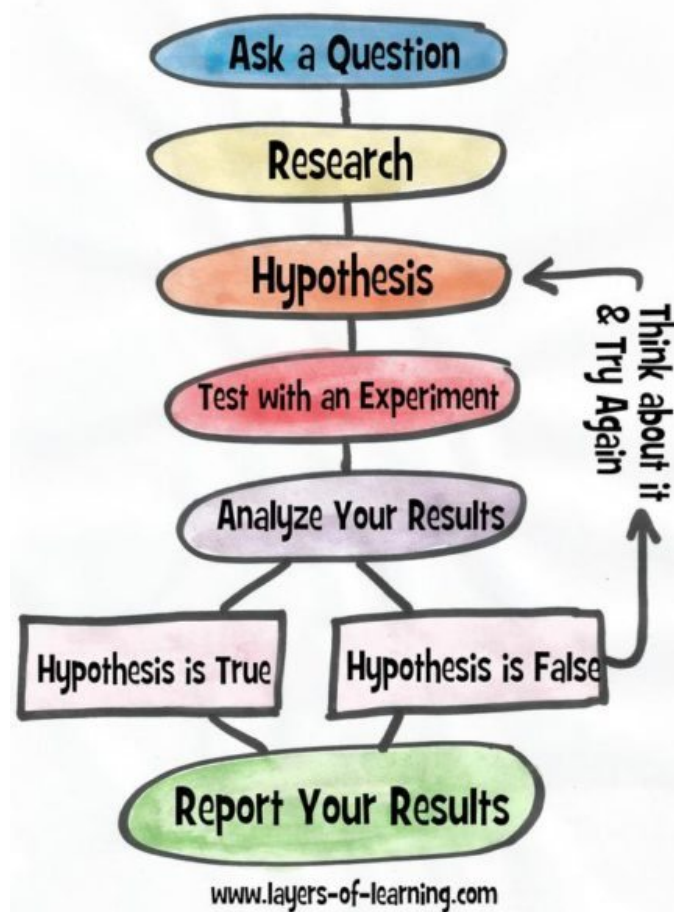
1. In addition to the engineering design process, a systems approach to problem solving can help make the design process manageable. The systems approach to problem solving is widely used in many disciplines to structure a potentially chaotic situation and to give the best chance for resolution.
2. The systems approach compartmentalizes the problem into manageable pieces. These pieces are interlinked and can be brought together in order to solve problems.

### MECHANICAL FLIGHT CONTROL SYSTEM



3. Once a problem is well defined the engineering team should break the problem into manageable components or systems. For example when an aircraft is being designed the systems are broken down into electrical, power plant, hydraulic, environmental, flight control, avionics, communication, navigation and so on. Separately these systems are manageable and essential components of a complete aircraft.

- Each component will have its own unique parameters that are essential to the successful reunification of the individual system components. Parameters are limitations and specifications to which the component needs to be built.
- Once the components are reunified, the effectiveness of the designed solution can be determined through a testing process. Computer modelling or real life models are often used during this stage because they are less costly than building a full scale object. This is the stage where performance can be tested against the specification and requirements and in addition changes can be made.



- In order for the testing process to be valid it needs to be done in a scientific manner. The scientific method is the only empirically valid approach to determine if results support or refute the hypothesis. The scientific method has six components. The components to the scientific method are: Ask a question about an observation, do some background research, state hypothesis, test hypotheses through experimentation, results, communication and revision. The scientific method is the only way for us to know things to be true, everything else is guessing or opinion.