Rockets

Equipment

- LoggerPro v3.3
- Digital video camera
- Solid fuel rocket engine and miscellaneous construction material

Objective

Data collection
- Digitize video motion

Graphical analysis
- Construct numerical simulation
- Graph simulated variables and compare to experimental data

Physics Concepts
- Acceleration equals force divided by mass

Conceptual (C-Level)

Draw a picture of a rocket launch.
- Draw a schematic diagram labeling the forces (free body diagram) for the rocket when the engine is firing.
- Draw a schematic diagram labeling the forces (free body diagram) for the rocket when the engine is finished firing.

Basic Lab (B-level)

You will be constructing a rocket and modeling its motion.
- Given a solid fuel rocket engine construct a stable rocket using "found" materials.
- Create a numerical simulation and graph position as a function of time for your rocket
  - ❑ [3-LEVEL] Use actual force data not average force
  - ❑ [4-LEVEL] Include air drag in simulation

Advanced/Extended Lab Ideas (A-level)

Your advanced level lab will include:
- Compare your simulation to other simulations on the internet
- Changing engine mass in simulation
- Coast time and resulting recovery system ejection
- Change of air drag coefficient at apogee

There are other things to consider:
- Air density changes with height
- Your rocket has a horizontal component