



A “Crash Course” in Model Rocketry

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What is model rocketry?

Model rocketry is, in essence,
rocketry in miniature.

(The short answer)

For the **long** answer, watch the rest of this talk!

What is a model rocket?

- According to the "*Handbook of Model Rocketry*" (7th ed.):
 - Made of lightweight, non-metallic components
 - Weighs less than 1.5 kg
 - Uses pre-made solid fuel motors
 - Ignited electronically
 - Can be safely recovered and re-used



These are also “model” rockets...

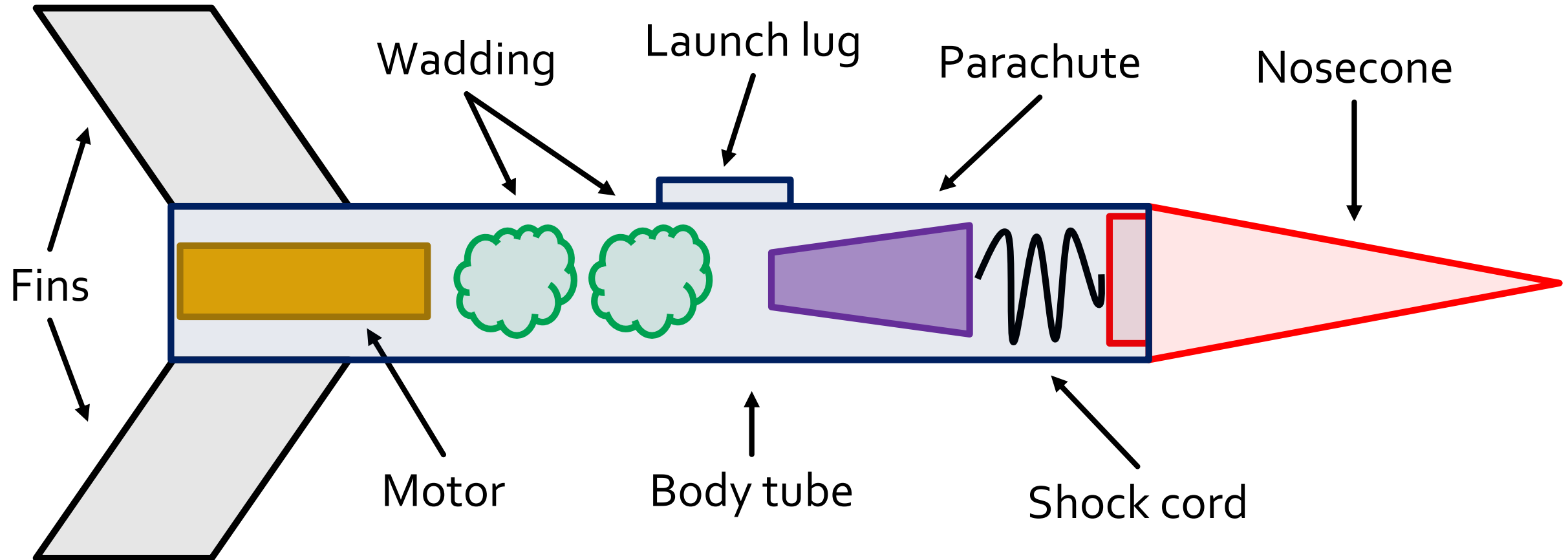


At least,
depending on
how flexible
your definitions
are...

Images: Derek Waterman



So how does a model rocket work?



The model rocket motor

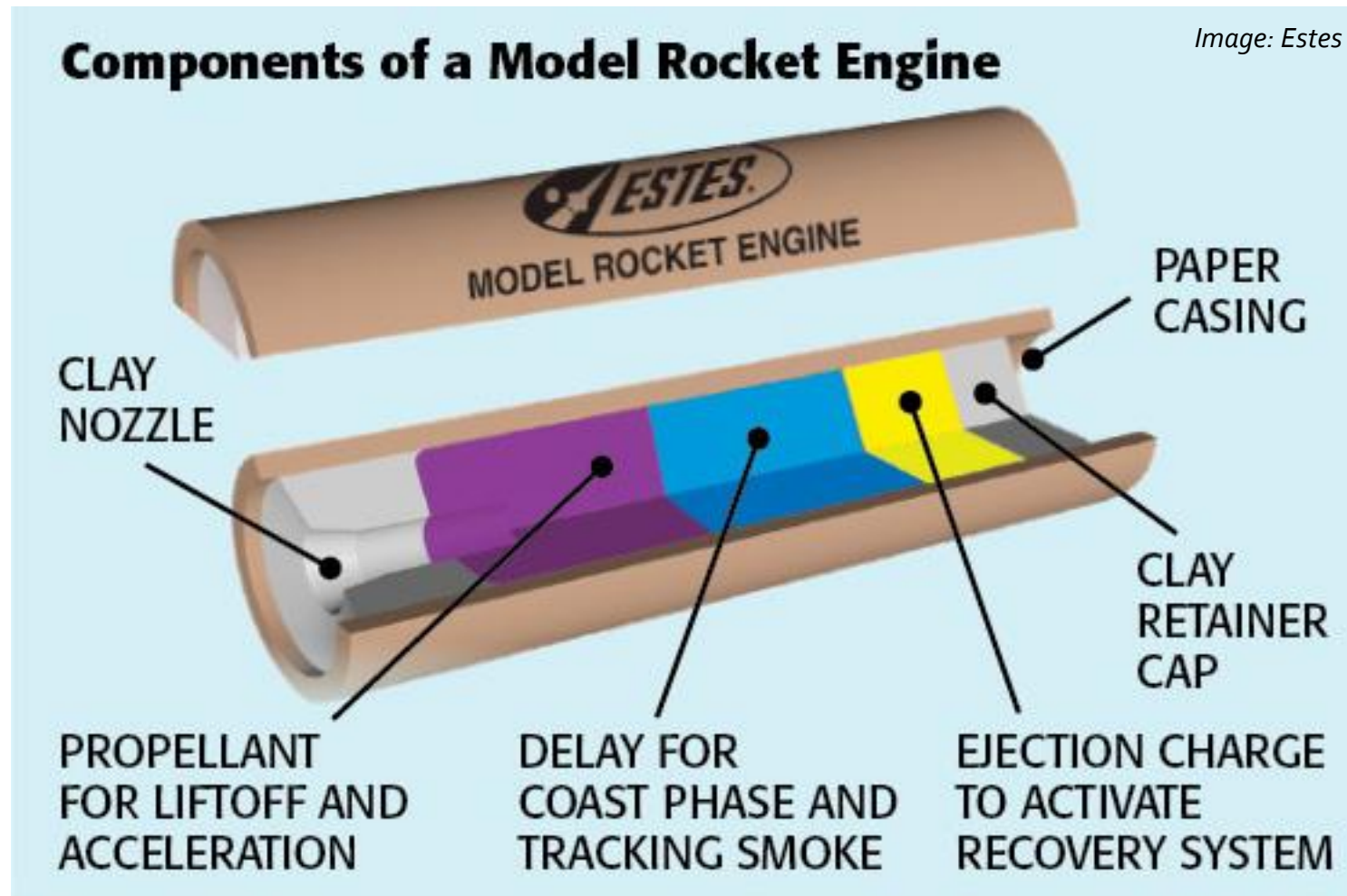
- Solid fuel:
 - Black powder (low – mid power)
 - Composite fuels (mid – high power)
 - Similar to Space Shuttle solid boosters
- Mass manufactured
 - Tested for safety
- Electrically ignited
- Classified by total impulse
 - Alphabetical system
 - Each letter doubles the total impulse

Image: TEMCO Industrial

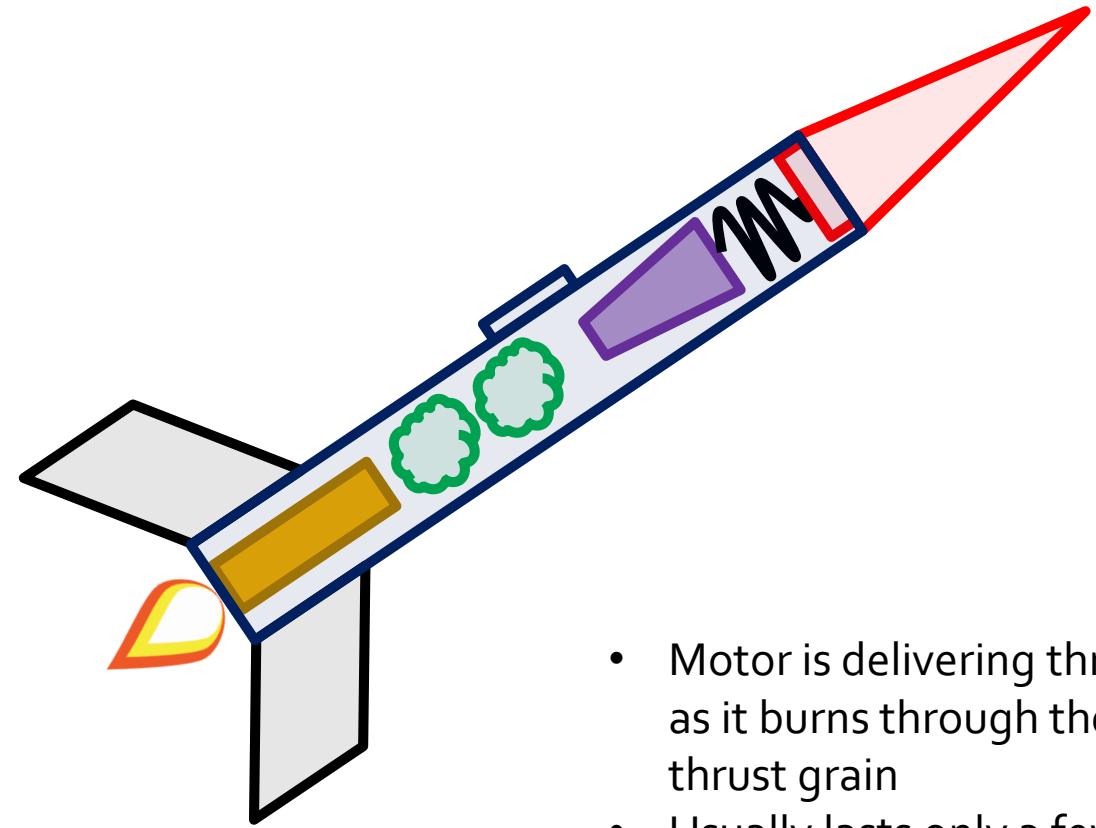
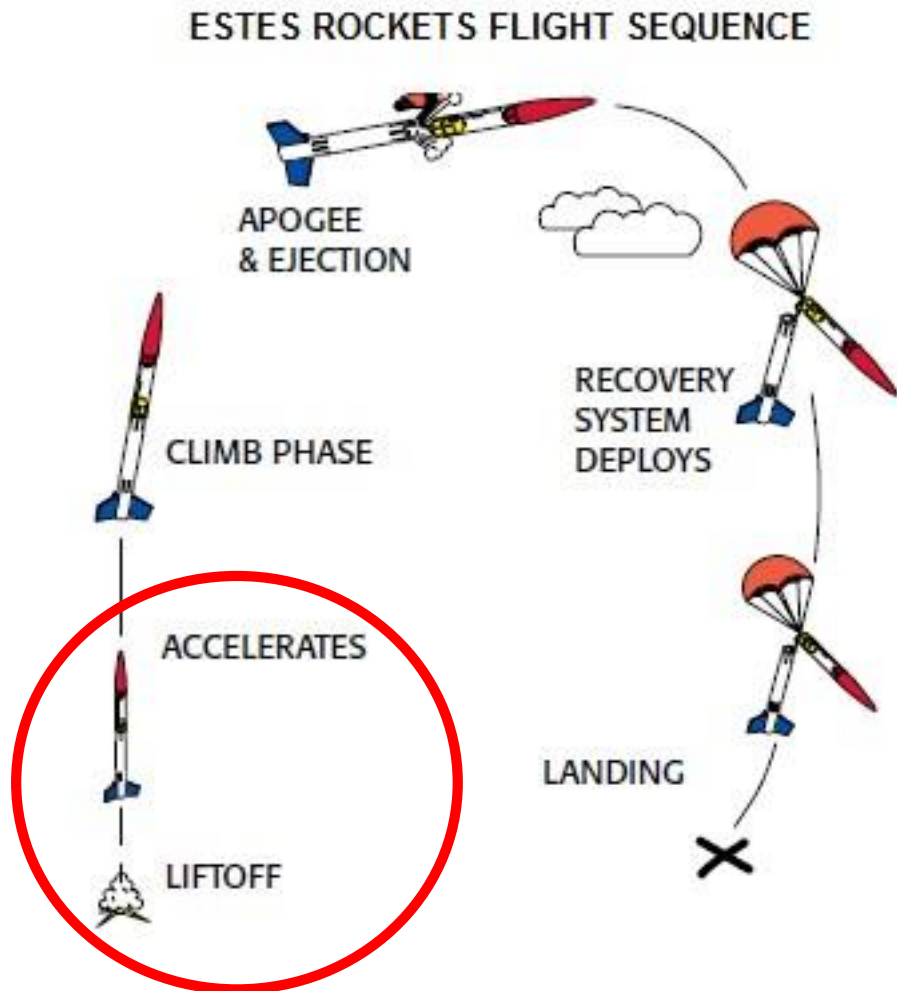


Image: Wikipedia / Nicholas Cassavagh
Image: Wikipedia / NASA

Inside a model rocket motor

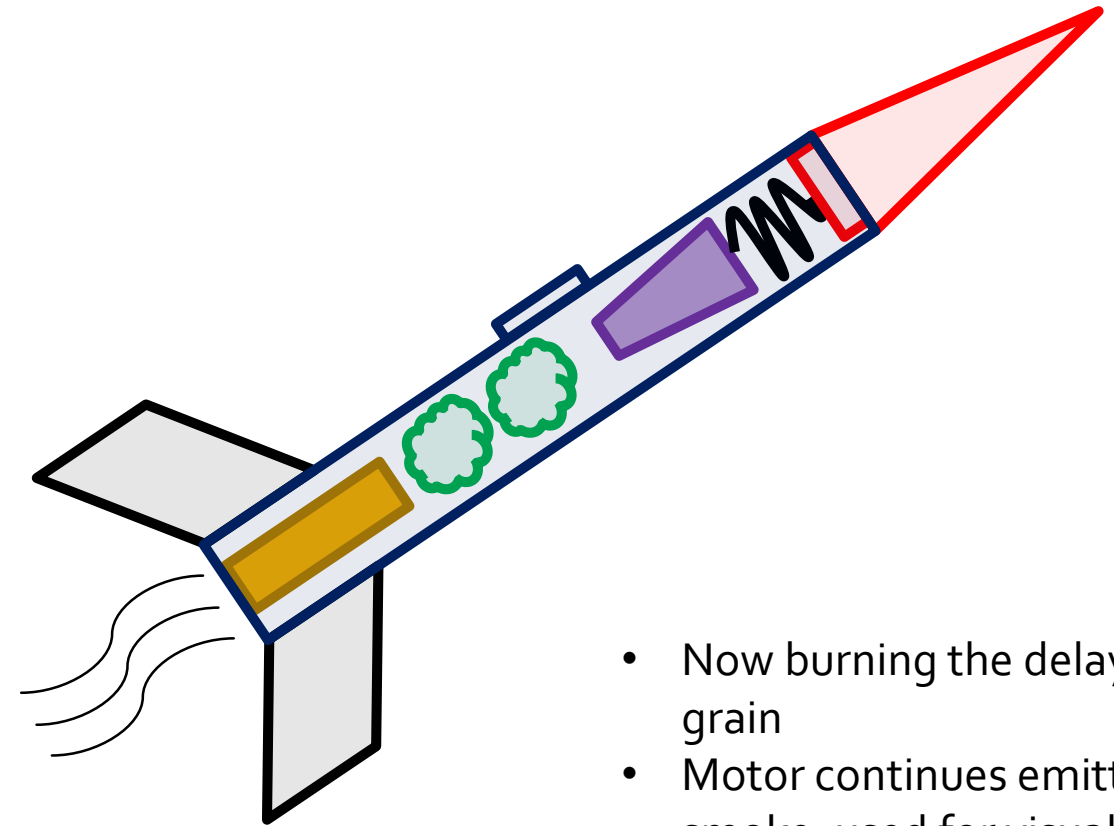
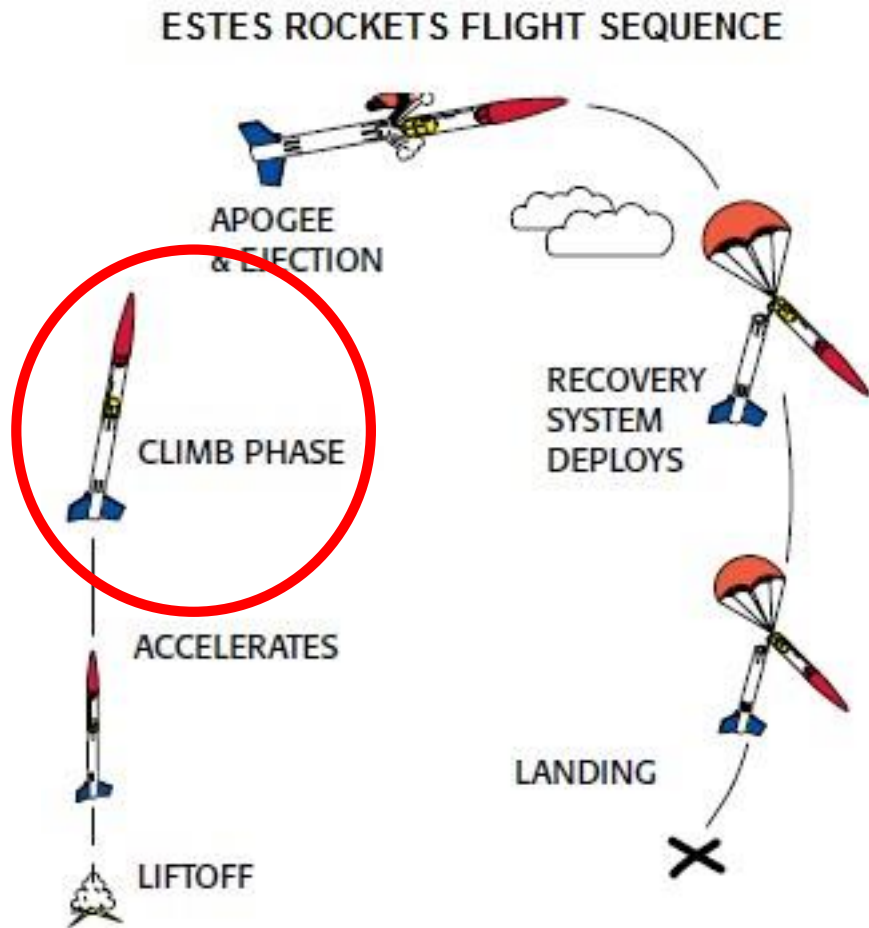


Stages of flight: Thrust



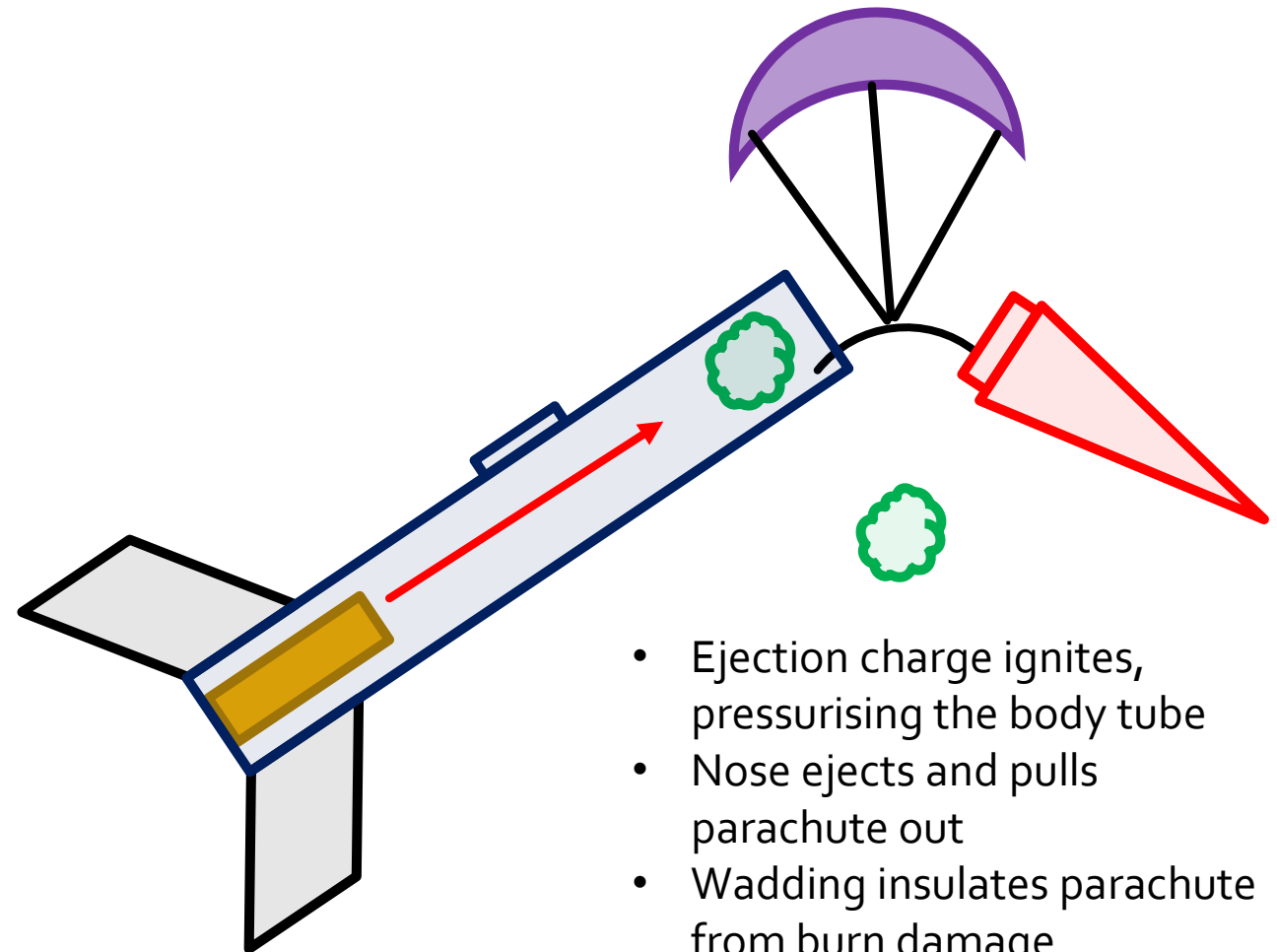
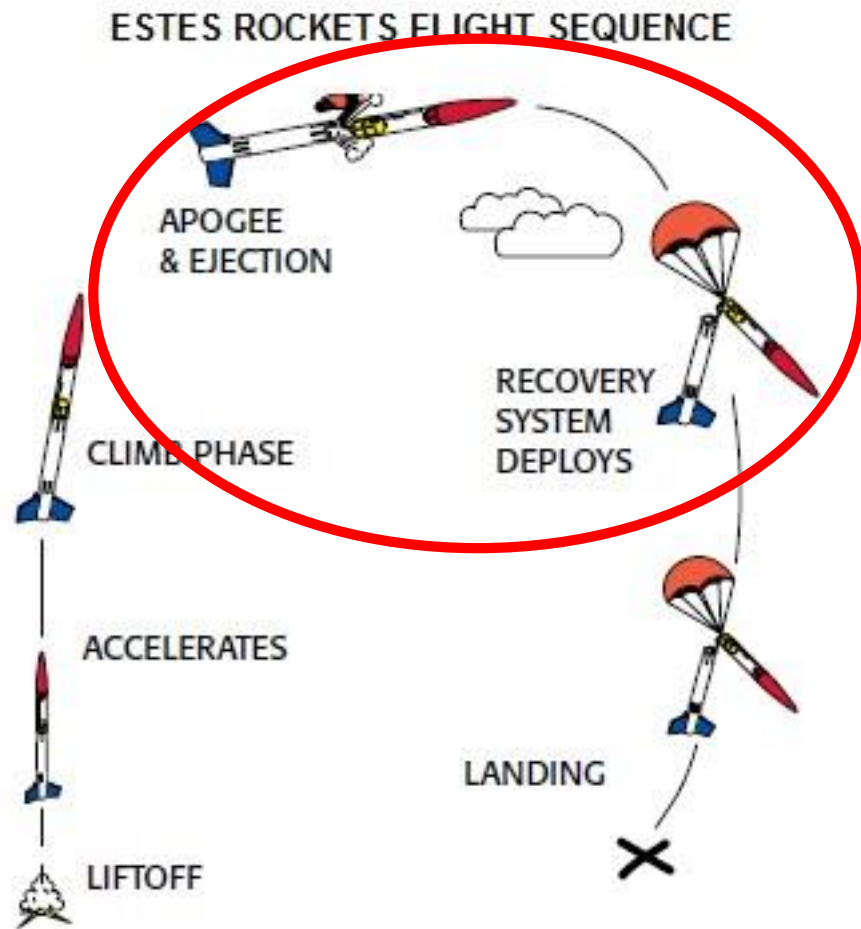
- Motor is delivering thrust as it burns through the thrust grain
- Usually lasts only a few seconds at most

Stages of flight: Coasting



- Now burning the delay grain
- Motor continues emitting smoke, used for visual tracking

Stages of flight: Ejection & Recovery

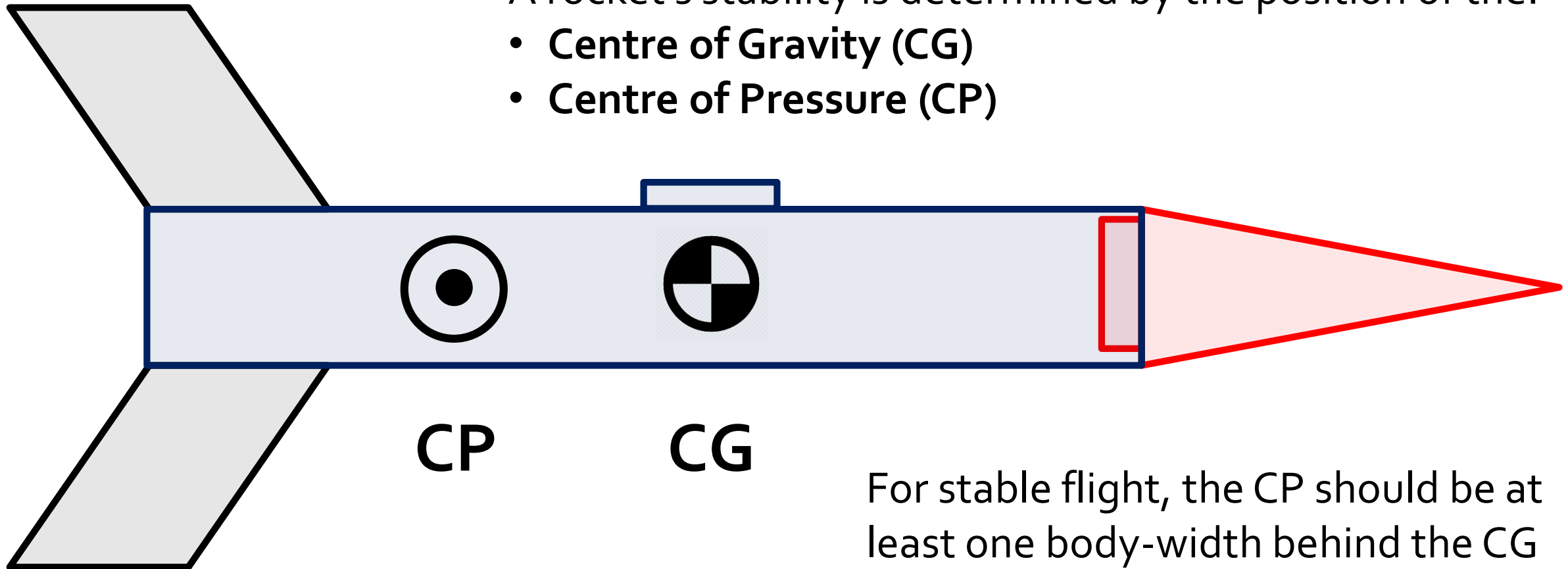




A word about stability

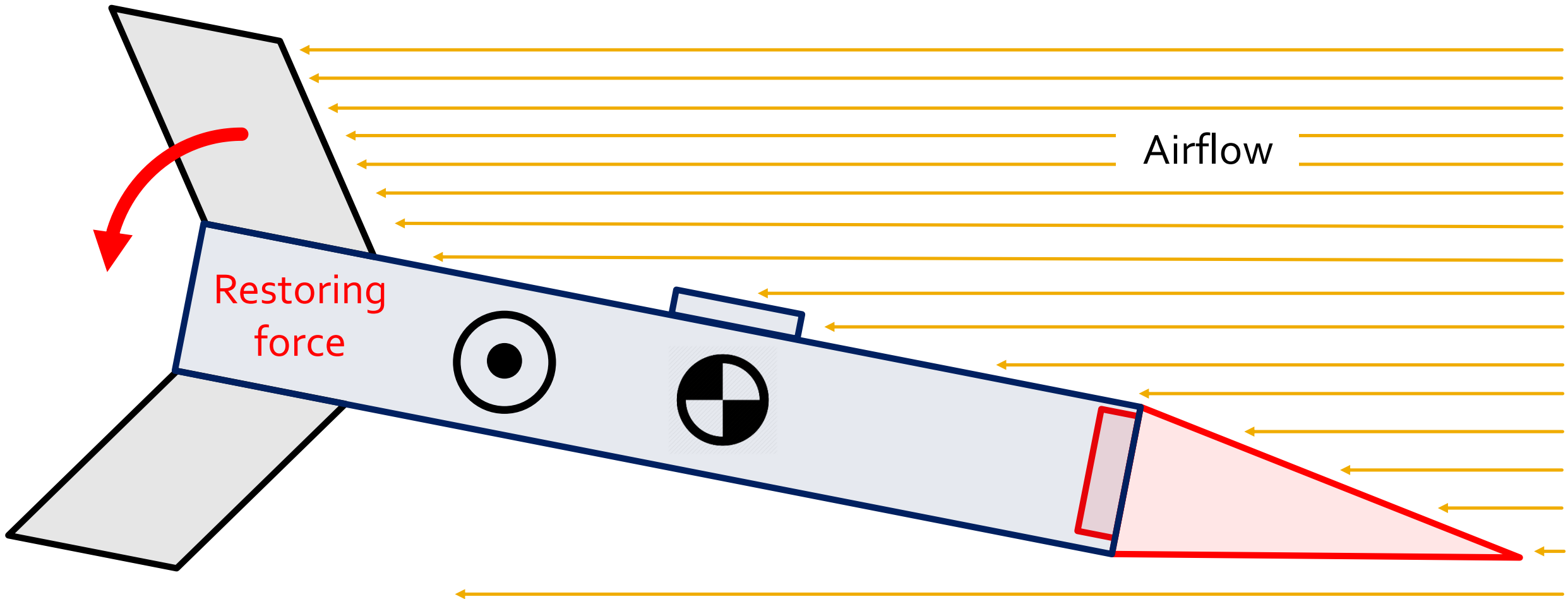
A rocket's stability is determined by the position of the:

- **Centre of Gravity (CG)**
- **Centre of Pressure (CP)**



For stable flight, the CP should be at least one body-width behind the CG

A word about stability





Low-speed stability and launch lugs



Beyond the basics

- Competition flying
- Scale modelling
- Multiple-motor rockets
 - Clustered
 - Staged
- Payloads
 - Altimeters, accelerometers, cameras, etc.
- Going **big**:
 - Mid Power Rocketry (MPR)
 - High Power Rocketry (HPR)



Image: Estes www.estesrockets.com.au

Image: Apogee Rockets

How about all at once? *(volume warning!)*

Video: https://www.youtube.com/watch?v=SxHaNL_c-nA



How do you get started?

- Model rockets typically come as kits, available at hobby stores:
 - Berg's Hobbies
 - HobbyCo
 - Frontline
- Multiple skill levels available
 - Some even come complete out of the box!



Where can you fly?

- Best to launch with a club
 - NSW Rocketry Association
 - www.nswrocketry.org.au
 - Whalan Reserve, Blacktown
 - Launches last Saturday of every month (except December), 9:00am – 1:00pm
 - Low – mid power
 - Mullaley & Yass launch sites
 - Roughly twice a year
 - High power









What is model rocketry?

Model rocketry is:

- A hobby
- A scientific pursuit
- Safe
- Educational (& an outreach tool)
- Fun!

