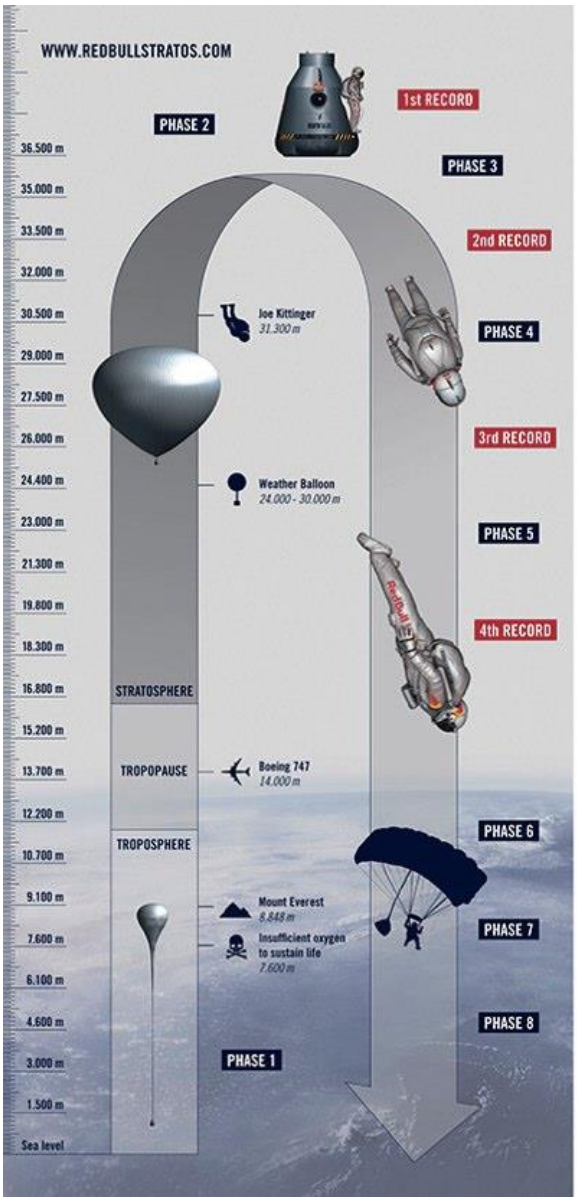
SECTION EUROPEENNE

Epreuve spécifique de Sciences physiques en anglais.

Free fall from space

The purpose of the "RedBullStratos" mission is to transcend human limits. Supported by a team of experts Felix Baumgartner ascended to 128,100 feet (39,045 km) in a stratospheric balloon and made a free fall jump rushing toward earth at supersonic speeds before parachuting to the ground. His successful feat on Oct. 14, 2012 holds the potential to provide valuable medical and scientific research data for future pioneers.

Doc1: Mission steps (as they were scheduled)



PHASE 1
Balloon launches, carrying Felix in the capsule.

PHASE 2
Balloon reaches edge of space in less than 3 hours.

PHASE 3
At approx. 36.000 m, Felix depressurizes capsule, steps out and jumps.

PHASE 4
As Felix attempts to break speed of sound, his suit maintains the oxygen and pressure levels he needs to survive.

PHASE 5
Freefall duration nearly 6 minutes. Eventually, air resistance slows him.

PHASE 6
Felix deploys parachute at approx. 1500 m.

PHASE 7
Felix lands approx. 10 min. after chute deploys.

PHASE 8
Mission Control triggers capsule/balloon separation. Both return to earth for retrieval.

THE 4 RECORDS

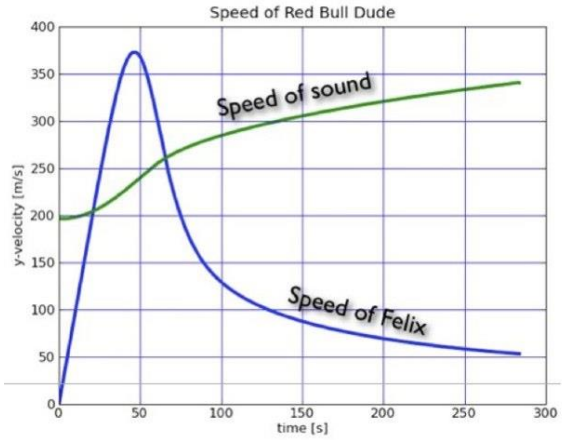
1st RECORD
HIGHEST MANNED BALLOON FLIGHT:
Expected minimum of 36.000 m
(Current record: 34.668 m, by Prather/Ross)

2nd RECORD
FREEFALL FROM HIGHEST ALTITUDE:
Expected minimum of 36.000 m
(Current record: 31.332 m, by Kittinger)

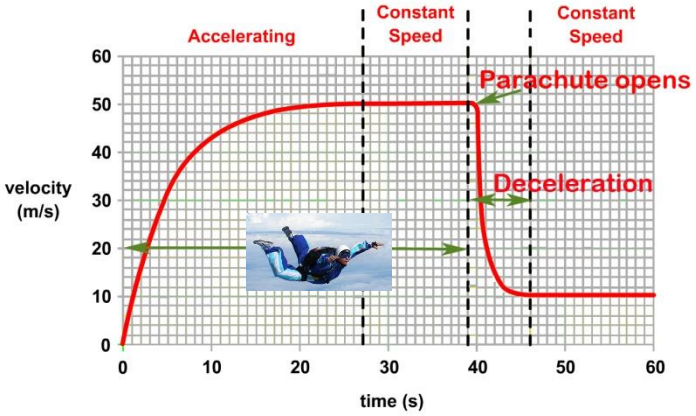
3rd RECORD
SUPERSONIC SPEED IN FREEFALL:
Expected: Mach 1, approx. 690mph, or faster (Current record: Mach 0.9, 614mph, by Kittinger)

4th RECORD
LONGEST FREEFALL TIME:
Expected: 5m35s or more
(Current record: 4m36s, by Kittinger)

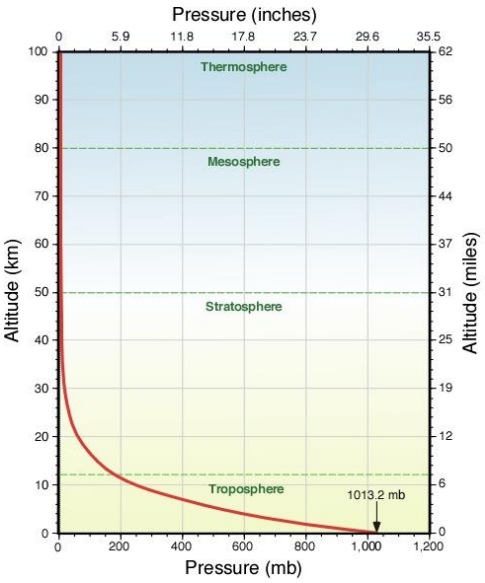
Doc 2: Speed of sound and speed of Felix Baumgartner vs. time (closed parachute)



Doc 3: Speed of a classical skydiver vs. time

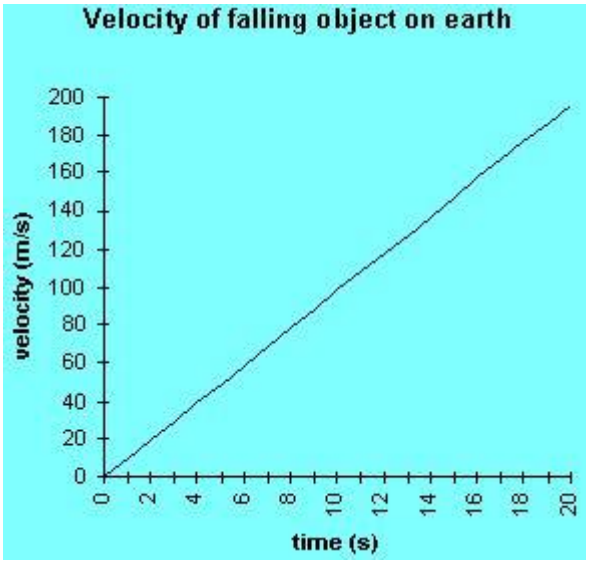


Doc 4: Earth's Atmosphere pressure:



(millibars)

Doc 5: Freefalling object (No air friction)



<u>TASK :</u> You are a science expert in a TV program. You have to explain Felix motion during his fall.

You can use the documents, your knowledge and the guidelines below to organise and support your presentation, but feel free to use them in any order you like.

- State the Newton's laws
- What forces are exerted on Felix during the fall?
- Explain the differences with a classical skydiver's fall