



## In Class Exercises (ICE) - 4/6/01

**The images below show a variety of people, animals, weapons and vehicles. Everything and everyone pictured below can reach speeds in excess of 20 km per hour (about 13 miles per hour).**



Donovan Bailey, a sprinter from Canada. Mr Bailey won two gold medals in the 1996 Olympic games and set a world record for the 100m.



“The Viper.” This roller coaster one of the most popular rides at Six Flags Magic Mountain, in Valencia, California. The clothoid loop is the roller coaster’s “clothoid loop” which is a section of the ride that subjects people to very strong forces and



The Magnum .44 caliber revolver. The most powerful handgun in the world. Why? It could blow your head clean off.

The object of interest here is the bullet fired from the Magnum .44.



The McLaren F-1 GTR, the most expensive (and fastest) production car ever made.



The F-14 Tomcat carrier launched fleet defence interceptor and air superiority fighter. Like other Navy jets, the F-14 uses a steam catapult to accelerate it when it launches from an aircraft carrier.



The cheetah (*Acinonyx jubatus*) is probably the fastest land animal over distances of a few hundred feet.



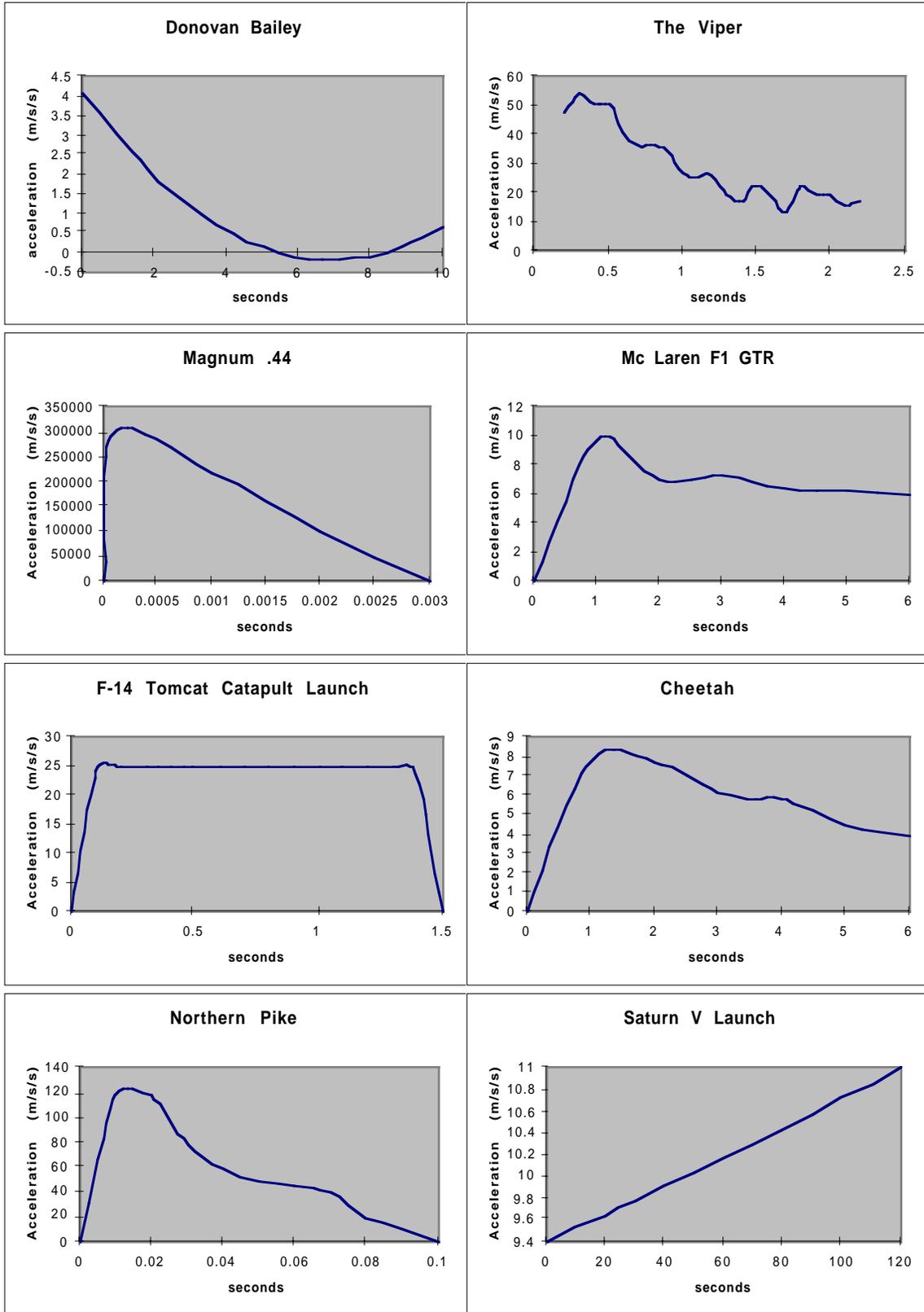
The Northern Pike (*Esox lucius*) is a ferocious freshwater predator found in North America. The pike grows to lengths of up to four feet and can weigh as much as 20 pounds. The pike is an “ambush predator” meaning that it prefers to lie in wait for prey items to wander by. The pike then lunges to capture its prey.



Apollo 11: The Saturn V rocket.

- **Suppose each of the creatures, people or vehicles pictured accelerates from a standstill. Rank the creatures, people and vehicles according to the time they take to reach a speed of 20 km per hour.**

- The graphs below show the acceleration of each of the creatures, people and vehicles. Use these graphs to check your ranking.



## Image and Data Credits:

### Images:

- Donovan Bailey: (Official Donovan Bailey web site) <http://www.donovanbailey.com/>
- The Viper: (Roller Coaster Database) <http://www.rcbd.com/>
- Magnum .44: <http://144.16.66.99/~sanjiv/guns.html#Pistols>
- Clint Eastwood: (Northern California Movies) <http://www.norcalmovies.com/>
- McLaren F-1: <http://www.fantasycars.com/>
- F-14 Tomcat: (US Navy) <http://www.navy.mil>
- Cheetah: <http://www.geocities.com/bugsydee30/index.html>
- Pike: (Wisconsin Department of Natural Resources) <http://www.dnr.state.wi.us/>
- Saturn V: (Image courtesy of NASA) <http://www.nasa.gov>

### Data:

- Donovan Bailey: Glen Elert (ed.) "The Physics Factbook." <http://hypertextbook.com>
- The Viper: This data was collected by Rebecca Grigsby, Mike Henne, Claire McKinney and Ron\bin Wolley. <http://www.hullabaloo.com>
- Magnum .44: <http://www.library.nuigalway.ie/webpath/TUTORIAL/GUNS/GUNBLST.HTM> and <http://photon.iyte.edu.tr/PhysicsNet/Topics/Kinematics/AccelerationValues.html>
- McLaren F-1: <http://www.fortunecity.com/boozers/zbar/507/>
- F-14: <http://showcase.netins.net/web/herker/ejection/physics.html>
- Cheetah: <http://www.ecoworld.com/>
- Pike: <http://web.mit.edu>
- Saturn V: <http://sibyl.www.media.mit.edu/people/sibyl/projects/cognition/science/rocket.html>