



29:006 – The Physics of Everyday Experience: How Things Work

- Science is a part of everyday life.
- It is evident in the modern technological devices we use everyday-computers, cell phones, MRIs
- In this course we will discover the scientific principles in the everyday experiences and objects around us
- We will see that what may appear complicated can often be understood with just a few basic principles → *things happen for a reason!*

PRIMARY COURSE GOALS



- To learn some of the basic concepts of physics by studying common, everyday objects and activities
- To understand the physical concepts that makes things work
- To *participate* in science by exploiting our natural curiosity



ADDITIONAL COURSE GOALS

- To appreciate the *quantitative* nature of physical science → numbers matter!
- To recall how to deal with *simple formulas* to obtain *numerical solutions* to problems
- e.g., $a = b c$, $b = a/c$, $c = a/b$

SOME OF THE QUESTIONS THAT WILL BE EXPLORED IN THIS COURSE

- Why do things move?
- Does everything that goes up come down?
- Why does a bicycle stay upright when its moving but falls when it stops?
- Why do we wear seatbelts?
- why doesn't the moon fall into the earth?

- Why is it tough to walk on ice?
- Why does ice melt?
- What is sound?
- What is light?
- What is lightning?
- What makes rainbows?
- How can a boat made of steel float?
- Why can't we see air, how do we know that its there?

- Why are some turns on roads banked?
- What keeps me from falling on the Silly Silo at Adventureland?
- Why do my socks stick to my shirts in the clothes dryer?
- Why do I get a shock after I walk across the carpet room and touch something in winter?

- What's the deal with magnets? Why do they stick on refrigerators?
- By the way how do refrigerators and air conditioners work?
- Why can't I cool my room by keeping the refrigerator door opened?
- Why is it a bad idea to plug my TV, stereo, computer, radio and hair dryer into the same outlet?

- Where does electricity come from?
- Why doesn't the electricity leak out of the outlet?
- What do airplanes and curveballs have in common?
- Why do my ears 'pop' when I'm on a plane ?
- Why can I see all of myself in a mirror that is half as tall as I am?
- what is the Greenhouse effect?
- what's the deal with the ozone layer?
- **Is climate change for real? Are we causing it?**

- How do x-rays, microwaves, ultrasound, MRI's, LASERS, and cable TV work.?
- By the way how does TV work?
- Why does the water in my tub spin in a circle as it goes down the drain? Why does it always spin in the same direction?
- How does soap work?
- Why is the sky blue during the day but red at sunset?
- Are nuclear power plants safe?

- How do they take my temperature by sticking that gadget into my ear?
- Why does the cue ball stop dead when it hits another ball head on?
- What is a day, month, year?
- Why does a year on Jupiter last 12 years?
- Are hydrogen fuel cells or hybrid cars the answer to the energy crisis?
- What does it take to make an atom bomb?

What Physics isn't

- Art
- Philosophy
- Engineering
- Religion
- Math
- Astrology
- Magic
- Boring and impossible to understand
- Done only by mad scientists



What Physics is

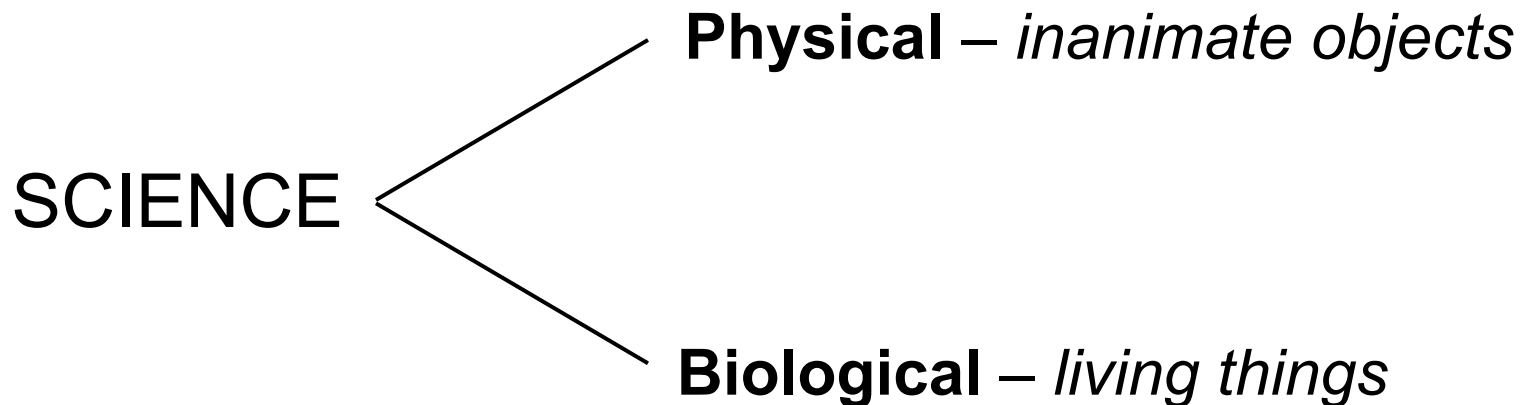
- The study of how objects behave (from the very tiny to the very big, and from the beginning of the Universe to its ultimate fate).
- A search for patterns or rules of behavior of the objects in the Universe.

Relation of Physics to the other sciences

Obviously, no one discipline can handle all the work outlined above, so long ago a division of labor was set up. This is referred to as *specialization*.

Specialization in Science

- Astronomy
 - Chemistry
 - Biology
 - Geology
 - Oceanography
 - Meteorology
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- All matter, living and non-living, is composed of the same basic ingredients- atoms and molecules
- At the most fundamental level the distinction between living and non-living disappears.
- Clearly, however, human behavior cannot be understood on the basis of either physical or biological science alone

Social Science

- Sociology
- Psychology
- Political science
- Economics

is the discipline that investigates
the interrelationships among people

The scientific approach

- Progress in understanding our physical surroundings comes about through observation and measurement

experiment

- Coupled with logic and reason

thought



What do I need to do (*to get a good grade in this course*)?

- Download the lecture material before class
- Come to class, observe, think, ask questions!
- Go over the lecture material
- Keep up with the reading assignments- all from the text
- Try to work the assigned problems