

□ PHYSICAL SCIENCES 112

YOU ARE SITTING IN SECTION 3

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1 HANDOUT

SYLLABUS - 5 STEPS FROM STARS TO ATOMS
- ALSO LAB SCHEDULE **GO THIS WEEK**

QUESTIONS FOR REVIEW + STUDY

- WEEKLY READING ASSIGNMENTS
- QUESTIONS TO PREPARE (WRITE)
- EXAM SCHEDULE WEEK OF **March 7**
WEEK OF **April 18**
- FINAL EXAM THURS. **May 19** 8-10 AM
- SCHEDULE FOR TAKE-HOME EXPTS.
"THEXP"

□ COURSE ADMINISTRATION

1. FULL, OR NEARLY FULL SECTION - SEATS!

- NEED TO TAKE ATTENDANCE TO FIND OUT WHO'S NOT COMING + MAKE ROOM.

2. OFFICE HOURS:

PROPOSE TUESDAY: 9-10 AM PH3-103

I WILL ALSO MAKE MYSELF AVAILABLE AFTER CLASS ON THURSDAYS - BUT...

3. WHAT YOU NEED FOR CLASS:

1. TEXTBOOK "PHYSICS, THE REASONING"

2. LAB BOOK "PHYSICAL SCIENCE LABORATORY"

3. CALCULATOR WITH "SIN" "COS" "TAN" FUNCTIONS

GRADING FOR THE COURSE:

45% "BEING A SCIENTIST"	30%	— LABS YOU DO IN SECTIONS
	15%	— TAKE HOME EXPERIMENTS
55% "UNDERSTANDING SCIENCE"	15%	— EXAM 1
	15%	— EXAM 2
	25%	— FINAL EXAM

ALSO, PERIODICALLY I WILL ASSIGN EXTRA-CREDIT
"MINI" EXPERIMENTS TO BE APPLIED TO EXAM GRADES.

THERE IS ONE FOR TODAY, DUE THURSDAY!

□ TODAY'S MINI-EXPERIMENT - DUE THURSDAY.

1. How THICK IS A PIECE OF PAPER?

2. What is the VOLUME of your piece of paper?

WRITE A SENTENCE TELLING HOW YOU INTEND TO DO THE MEASUREMENT, + THEN TELL ME

How THICK IS A PIECE OF PAPER?

YOU CAN WORK TOGETHER - BUT EACH HAS TO DO THEIR OWN WORK - + TELL ME WHO YOU WORKED WITH.

WORTH: +5 EXTRA-CREDIT POINTS ON EXAM 1.

□ RATIONALE FOR GRADING:

45% IS EXPERIMENTS : LAB AND THEXP:

START THEXP. 1: NAKED EYE ^{OBSERVATION} OBSERVATION OF STARS

THEXP. 2: MEASURING THE SIZE OF THE EARTH

START! THEXP. 3: THE MOON (THIS ONE TAKES A MONTH)
THEXP. 4: START NOW

THEXP. 5: BOUNCING BALL

THEXP. 6: ELECTRICITY

THEXP. 7(A): IMAGES OF THE SUN

PHYSICAL SCIENCE IS **NOTHING** WITHOUT A REFERENCE
TO NATURE!

ASKING QUESTIONS IS, OF COURSE, AN IMPORTANT HUMAN
ACTIVITY.

GETTING ANSWERS FROM NATURE IS WHAT MAKES SCIENCE
SCIENTIFIC.

ONLY WAY IS TO THINK UP, DO, + THINK UP MORE EXPERIMENTS.

☐ ORGANIZATION OF SYLLABUS:

ONE CONNECTED STORY EXPLANATION

● WHERE ARE WE?

10,000
YEARS

WHAT CAN WE TELL BY LOOKING AT PATTERNS IN THE SKY? DAY/NIGHT, SEASONS, CHANGING SHAPE OF THE MOON? PLANETS

● WHAT ARE THE RULES?

500
YEARS

IS THERE ONE SET OF RULES THAT WORKS ON A TABLE TOP, ON A SHIP, OUT IN SPACE - EVERYWHERE - OR DO WE NEED TO SETTLE FOR "THAT'S JUST THE WAY IT IS"

300

● ENERGY TRAVELS! SAME RULES FOR PLANETS + PEOPLE?

"EMPTY SPACE" FILLED WITH GRAVITY?!! WAVES ~~~~~

500-200

● DOES ALL THIS WORK EVEN WHEN YOU CAN'T "SEE" ATOMS?

100
YEARS

● WHAT HAS HAD TO CHANGE IN THE STORY BECAUSE OF ATOM BOMBS + THE SPEED OF LIGHT?

HOW WILL ANY OF THIS AFFECT YOU - YOUR CHILDREN ETC.?

□ EXPERIMENT? WHY? WHAT?!

WHAT: A CAREFUL ATTEMPT TO SET UP A SIMPLIFIED SET OF CIRCUMSTANCES THAT WILL HAVE AN UNEQUIVOCAL RESULT.

WHY: WHEN NATURE IS ANSWERING THE QUESTIONS, YOU WON'T GET TRICKED, FOOLED, BAMBOOZLED, TAKEN ...

DECIDE A QUESTION: DOES A PIECE OF CHALK ALWAYS FALL IF YOU RELEASE IT? IS THERE A WAY TO "DROP" IT "UP"?

EXPERIMENT: TRY IT. — LETS.

□ So, WHAT WENT WRONG?

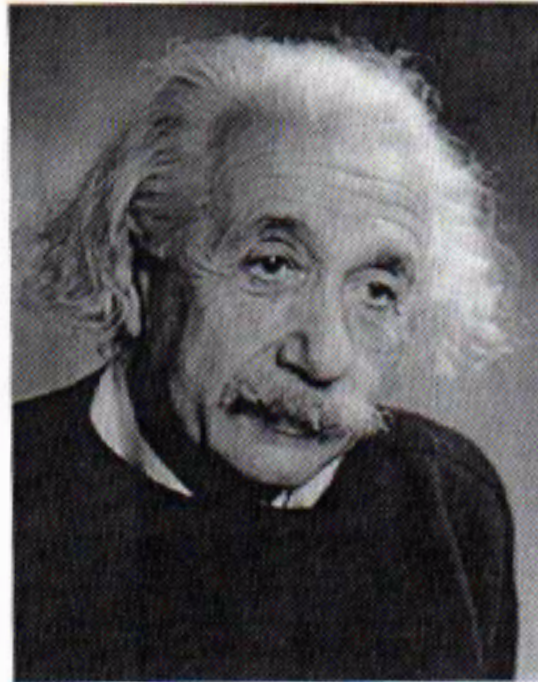
YOU DID NOT HAVE ALL THE FACTS.

YOU JUST CAN'T "THINK ABOUT IT" + COME UP
WITH THE ANSWER - YOU HAVE TO DO IT.

I TRIED TO FOOL YOU - BUT NATURE CAN'T.

YOU DON'T HAVE TO RELY ON - EXPERTS - OR
ANYONE ELSE - YOU CAN GO + DO THE EXPERIMENT
FOR YOURSELF. DEMOCRATIC

“Nature is not malicious.” ---
A. Einstein



“But, I am!” --- G. Pickett

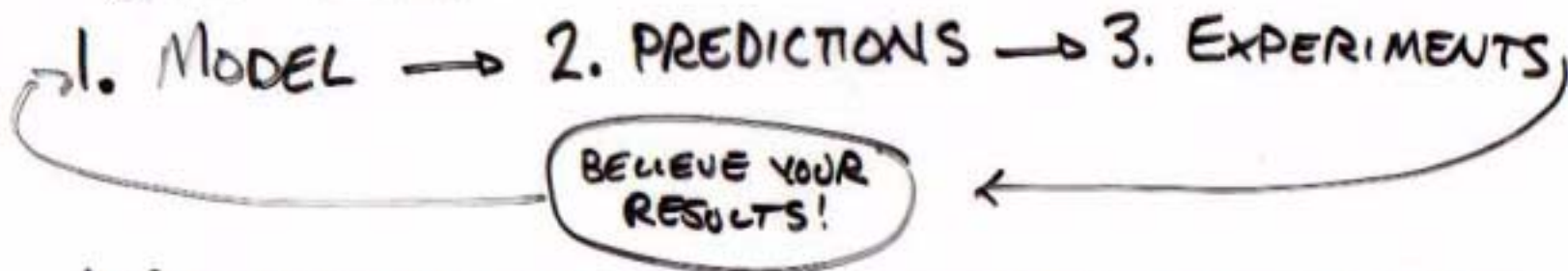


THIS CLASS IS ABOUT LEARNING THE METHODS OF SCIENCE

- EXPERIMENT - GETTING ANSWERS
- THEORY - ASKING QUESTIONS

IDEAS CHANGE FAST:
EINSTEIN NOBEL PRIZE IN 1904 ^{"PHOTO ELECTRIC EFFECT"} → RICHARD FEYNMAN 1948 →
IN 1967 A THEORY PROPOSED TO CORRECT IT.
1983 THE EXPERIMENT WAS DONE.

IDEAS CHANGE FAST BUT METHOD HAS STOOD FOR
5000 YEARS:



IMPORTANT FOR YOU, YOUR STUDENTS, THIS COUNTRY —

□ TAKE-HOME EXP. # 1: NAKED-EYE OBSERVATION OF STARS



WHAT IS THE
ANGLE BETWEEN
THESE STARS?



" PINKY = 1° WIDE "

" KNUCKLE-TO-KNUCKLE = 10° WIDE "

" INDEX-TO-PINKY = 15° WIDE "

