Science Lesson Plan

Summary of Lesson: Introduction to Matlab

This lesson was just the beginning of the series of tutorial type lessons on Matlab. The ultimate goal in the classroom is to have the students be able to write their own code to model labs both theoretically and experimentally.

The first lesson was an introduction to matlab, with two goals in mind. One was to understand the Matlab interface, command window, workspace, command history, etc. The other goal was to understand how the command window works like a big calculator mainly going over some basic commands for calculations. Some common commands they are going to be using are logs, trig functions, exponentials, etc. and how to name variables

Each student was set up with their own laptop in the classroom, which is great because each student can do their own work. I had a powerpoint presentation that had command that they would type into the command window and then had to tell me what each command does. As we went along questions came up that I would discuss with them the answer. For the most part the lesson went very well and had no major issues.

One other important piece for all of these lessons was that I had typed up a brochure with command math operations, some syntax on vectors, plotting, etc…that I gave to each of the students. I called this a "Quick Reference" and is for the students to be able to have a sheet of paper with some basic coding that they will be using throughout the year. I told the students that they can add other commands, write out explanations, and whatever they would need to remember. I have attached a copy of this to this lesson outline for reference

Science Lesson Plan

Teacher: Molly Clay
Period: **Class: Honors Physics Lowell High School**
Date(s): October 10, 2011

SETTING THE STAGE	
Essential Question	Why use Matlab?
Content Objective(s) (Student-friendly)	Understand the Matlab Interface and how to use the command window as a big calculator
Connection to previous or future lessons	This is the beginning of a series of tutorial type lessons for them to know the basics of Matlab and be able to use Matlab for modeling experiments that they will be performing in the classroom
Critical Thinking Questions	
Key Vocabulary	Command window Workspace Variable Command History
Materials Needed/Safety	Laptops Notebooks Pencil
ACTIVE INSTRUCTION	
• Launch (Engage)	The students will get the laptop outs…working with laptops directly in the classroom will grab the students attention
• Investigation (Explore)	The students will explore numerous mathematical commands (logs, sins, etc...) by inputting the commands and seeing the outputs. They will also become familiar with the Matlab Interface
TIME FOR REFLECTION	
• Summarization (Explain & Extend)	NONE
• Assessment (Evaluate)	NONE
• Homework	

MATLAB
Lesson 1: Introduction & Vectors

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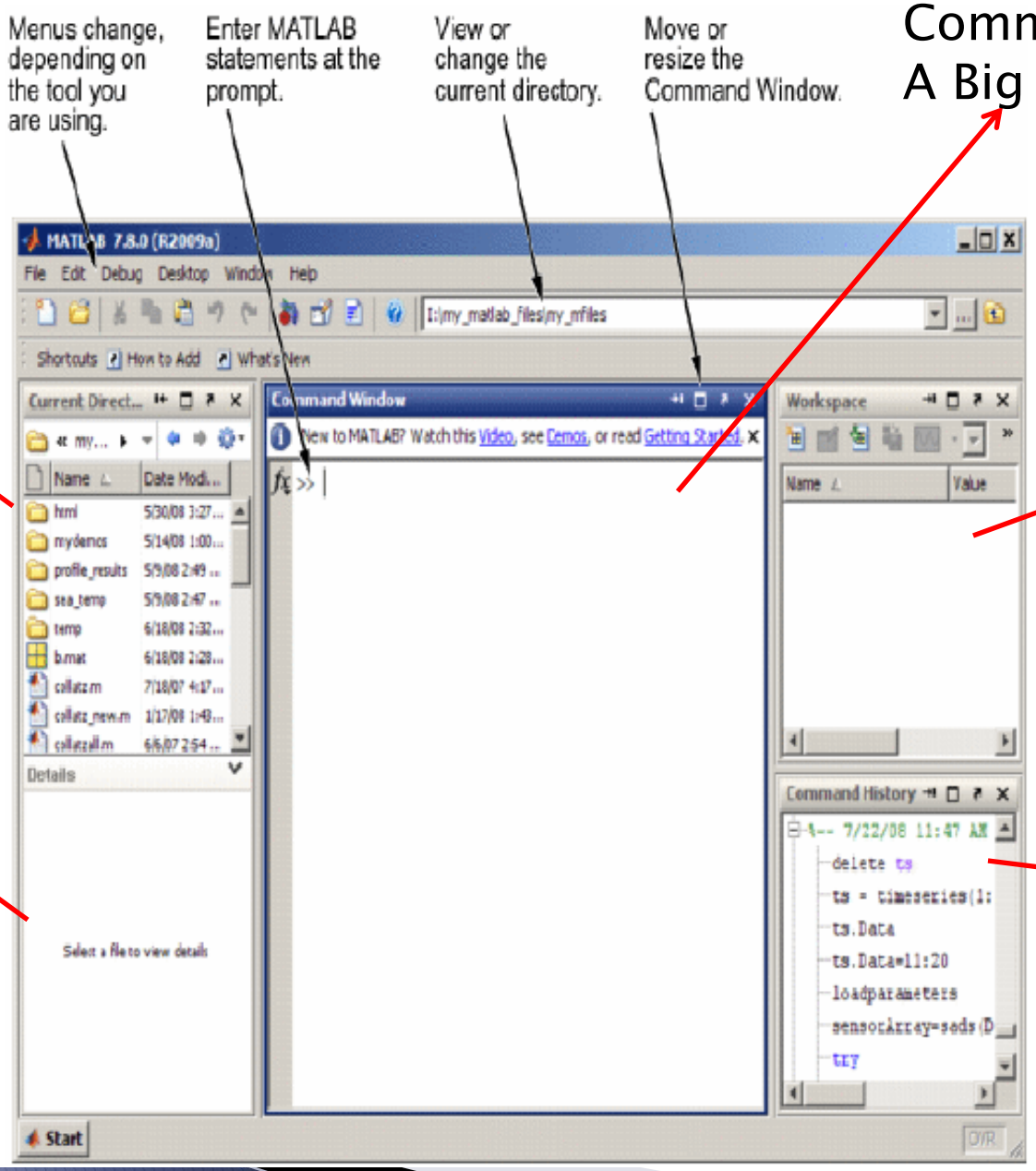
Goals for Today

1. Get to know the Matlab Interface
2. Variable Assignment
3. Saving M-Files

What is MATLAB?

- MATLAB is a software product
- Useful for:
  - 2D-3D Plotting
  - Computation/Calculation
  - Prototyping (An experimental model)
  - Creating models and simulations
  - Algorithms (Step-by-step procedure to solve a problem)
- Makes calculations easier when there are big sets of numbers

MATLAB Desktop



MATLAB Calculations

- Basic Operations: +, -,/, *
- Try on your own:

  5+4

  6-5+4*3

  Question: Does Matlab follow order of operations?

  sqrt(121)

  sqrt(10)

  nthroot(9,3)

  abs(-10)

  2^2;

  2^3;

  Question: What operation is ^ ?

MATLAB Calculations

MORE ON YOUR OWN:

exp(3)
log(1000)
log10(1000)
factorial(5)

TRIG FUNCTIONS:

sin(x) → sine of x in radians
sind(x) → sine of x in degrees
Same with cos(x) & cosd(x) and tan(x) & tand(x)

TRY EXAMPLES:

sin(pi/6)
cosd(30)

Variables Assignment

- Variable is a place holder for numbers
  - Must start with a LETTER!
    - Either letters or numbers
  - Case Sensitive
  - ***Be smart*** when naming variables!
- EXAMPLES:

  X = 4

  X1 =6

  T = 10-4

  Y = pi

  Z = 3+Y

Summary

- Be familiar with Matlab interface
- Know how to do basic calculation