Station 1: Power supplies

1. What input voltage does this supply require?
2. What output voltages are provided? List them all?
3. Using your deductive logic and basic knowledge about input and outputs, what type of electricity does a computer use? (DC or AC)
4. Why do you think the supply has so many cables coming out from it?
5. Diagram how you got the buzzer to run:
6. (If you have spare time) Do a FAST internet search for the difference between DC and AC electricity. Summarize your finding in one sentence (in your own words).

Station 2: Basic input-output system BIOS startup mode

1. After turning on the Panosonic ToughBook, what happened? What message is displayed? What does it mean?
2. How did you access the BIOS settings?
3. How much memory does this system have? How many 1s and 0s does this mean the system can store in Memory? (Hint: use a binary converter)
4. If you were going to store sensitive, secret documents on this computer, which of the security options would you enable, and why?
5. What button do you press if you want to restore the default boot sequence? (This would be handy if you were trying to install an operating system and screwed up the boot order settings beyond repair.)

Station 3: CPU and RAM

1. Who was the CPU? _____ RAM? _____
2. Use this table to record your trials:

Time per cycle	Number correct out of 12 cards	Percent correct (Num right / 12)
30 seconds		
Cycle time 2:		
Cycle time 3:		

3. How is the clock speed of a real computer measured? (What units?)

4. So, about how many times faster can a computer perform these operations compared to a human? (Don't work too hard on this)

5. Describe in your own words what role the RAM plays in the computing operation you modeled?

6. What is the clock speed RANGE of an Intel Pentium I processor?
7. What is the clock speed RANGE of a Pentium IV?
8. What can we say about how the clock speeds of computers over time?

9. Using the interwebs, what is the clock speed of the iphone 3GS? What is the clock speed of the iphone 7? Why can't we be sure?

Station 4: Storage

1. We are assuming that a single MP3 song is 5 MB in size. How many 1s or 0s is this song when stored in a computer? (Use the converter!)

Complete this table

Item	Size (correct units)	Number of 5MB songs
1 Card of RAM		
1 Compact Disc		
1 Internal hard drive		
1 external hard drive (in the white/gray plastic case)		
1 floppy disk (no disk, just the disk drive, and they stored 1.44 MB)		

2. Review the blog post linked in the session guide: Describe how the cost of storage has changed through time? What accounts for these changes? Do some research as needed.

Station 5: Component connection ports

As you explore the ports available on this motherboard or old laptop, record your findings in this table.

Device (Laptop or Mobo alone): _____

Port Name	**# of ports**	**# of pins**	**Connects which two components**	**Input, output, both**	**Still used today?**
Serial RS232	*1*	*9*	*Old mice, Kbs, other I/O devices to the MOBO*	*both*	*NO*

Thought Question: We know that computers can transfer data much, much faster than this sample motherboard from the 1990s is capable of. And yet, the modern ports have fewer pins to carry data. Brainstorm why it is that modern ports can have fewer pins (and fewer copper wires) but transfer more data/second than in older ports?

Station 6: Input devices

1. **Describe** the function of each layer of the keyboard:

Layer 1: Gray plastic keys

Layer 2: Plastic/rubbery nubs

Layer 3: Top plastic layer with “line wires”

Layer 4: Middle plastic layer with nothing on it

Layer 5: Bottom plastic layer with “line wires”

2. Make a diagram of how you were able to get a letter to appear on the screen with the two layers of line-wire plastic separated.

3. Explain in your own words how the computer can turn the connection of “line wires” into letters on the screen.

Station 7: Output devices

1. How many total pixels does our fake, plastic screen contain?

2. If each pixel can be represented by either a 1 or a 0, how much computer memory does a single frame of this display require? Answer in bits and convert it to kilobytes as well.

3. What if each pixel requires 8 bits to store a color--how much computer memory is required to store and display one frame?

4. What if each pixel requires 64 bits to encode a color? How much memory for a single image/frame?

5. Still using a 64-bit color encoding, how much memory is required to store 14 frames of this screen (about 1 second of video)? What about five minutes of video at 14 frames per second? Show your math.

Station 8: Component hunt

Complete this table using the Non-functioning Dell computer system. Use wikipedia's computer hardware and linked pages to help you out!

Clue	**Part Number/code**	**Name of part**
Carries out the primary math calculations that make a computer tick		
Helps to remove heat from the CPU		
Read-only memory input device		
Main device for connecting and coordianting component I/O		
Multi medium I/O component		
Printed circuit board to add extra display power		
Non-volatile storage with magnetic waves		
Carries data to and from components		