Classroom PC Troubleshooting

Computers that won’t boot, confusing error messages, programs that lock up or printers that suddenly won’t print are all common symptoms reported for repair by classroom teachers. These problems, and others, are either hardware-related or software-related problems. There are some basic troubleshooting techniques that you can do to diagnose and fix problems but you must keep in mind that troubleshooting requires persistence and patience. If you keep plugging away you will almost always come to a solution. So, where do we begin? Since computer hardware problems are usually the easiest type of problems to solve that’s where we’ll start.

Hardware Troubleshooting:

1. Why won’t my computer or printer come on?

The first thing you need to check is what most would consider “the stupid stuff”, the peripherals. You’d be amazed how many “problems” are solved by connecting the cables, or turning on the power switch that you swear you already did. Beyond that, double-check the connections to assure that they are tightly inserted—jiggling a card, pushing (never rock connections from side to side) in a connection, or screwing in a cable connection can make a difference.

When looking at the back of a computer, you should be able to identify the following peripherals (See your “Computer Basics” handout):

   a) Power cable connection
   b) Mouse and keyboard connection
   c) Monitor connection
   d) Ethernet connection
   e) Microphone (usually has a picture of a microphone on it)
   f) Speaker connections/power supply
   g) Printer connection/power supply
   h) Surge protector (make sure that it is turned on)

Some computers have the same connectors for the keyboard and mouse, and possibly the COM (serial communications) ports.

   • If a computer has no power, and you are sure that you turned the power switch on, you should check to see that all power cords are plugged into the electrical outlet and/or surge protector.
   • If a computer has no power, and all power cords are plugged into a surge protector, double-check to see that the surge protector power switch is on.
   • If the surge protector power switch is on, disconnect one plug (say the monitor or printer) and plug it directly into the electrical outlet. If the equipment comes on, the surge protector could be faulty and it should be replaced.
   • If you’ve checked all connections and power supplies but power is still not restored, you may want to check with your school’s head custodian to see that there is not a problem with the power supply (flipped breaker switch) to your classroom.
   • Follow your districts technology department procedures for requesting technical/repair assistance if all else fails.
2. I turned the computer on and a blue screen came up saying that the computer was not properly shut down. It started doing a scan for errors, what does this mean?

If the computer was IMPROPERLY SHUTDOWN by just turning the power switch off on the desktop or tower case then you will get this message. The system will scan for errors that could have occurred when the system was improperly shut down.

- To properly shutdown your computer you should ALWAYS go to Start on the task bar and Shutdown from the pop-up menu.

3. The computer monitor is black.

Many computers have a built-in energy saving feature that puts the system to sleep after a specific amount of idle time. The monitor will appear to be off, showing a black screen and the power light will be amber.

- To awaken the system, move the mouse around or hit any key on the keyboard. Allow a few seconds for the system to power up.
- If the system is not in sleep mode, make sure that the monitor’s power switch is on (the power light will show green or yellow).
- Check to see that the power cord is plugged in tightly in back of the monitor and that the power strip (surge protector) is on. Also make sure that the monitor cable is tightly connected to the tower/desktop.
- If your monitor’s power is on and the cables are all OK but there is still nothing on the screen, the cause could be that the monitor's brightness and/or contrast control have been turned down and just need re-adjusting. These controls are on the monitor (location depends on manufacturer).
- Before assuming the monitor to be faulty, it is worthwhile to substitute another monitor that is known to work in order to establish that the video card of the PC is working. Normally such faults as intermittent assortment of odd characters, perhaps some flashing in vivid colors on the screen are indicative of a video card fault.
  1. If the other monitor works properly then the monitor in question may be faulty.
  2. If the other monitor does not work properly then the video card may be the fault. Follow your district technology department’s procedure for reporting repair needs.

4. I turned my monitor on and there was a box with red, green and blue stripes that said “No Signal Input,” what does this mean?

Don’t panic, this simply means that the monitor is on but it is not receiving a signal from the system. Turn your desktop/tower on at the power switch.

5. You can't access your printer - does the fault lie in the computer or the printer or the cable in between?

- Is the printer shared?
  - YES – be certain that the computer sharing the printer is turned on before the others in the room. Example: The computer that the printer is connected to is being shared by the other computers for printing purposes and must be on for printing to be successful.
  - NO – then
• Are you trying to print to the default printer?
  ➢ YES-see next bullet.
  ➢ NO-select the print option from the File menu, change the printer by clicking on the drop-down arrow by the printer “name” box and select the desired printer from the list.

• Does a different cable (preferably one known to work elsewhere) fix the problem?
  ➢ YES - your original cable was faulty or not connected properly.
  ➢ NO - then...

• Does the printer work with a different computer?
  ➢ YES - the problem is probably within the computer—see (a) below.
  ➢ NO - the problem is probably within the printer—see (b) below.

a) If the problem seems to be within the computer:

• Is the problem confined to just one application?
  ➢ YES - the problem is with the installation/configuration of that particular program.
  ➢ NO - then.

• Uninstall the printer and reinstall.

b) If the problem seems to be with the printer:

• Most manufacturers include a troubleshooting diagnostic program with their printers. Run this program to determine if the printer is functioning properly.
• Does it print its internal test page?
  ➢ YES - there may be a fault with the printer's communication port.
  ➢ NO - the printer may have its paper/ink/toner incorrectly inserted or may have more serious internal problems.
  ▪ Remove and reinsert/replace the ink cartridge(s). Be careful not to touch the metal foil contacts on the cartridge(s) while handling.
  ▪ Remove the paper from the feed tray and reinsert it.
  ▪ Turn the printer off, wait about 30 seconds, and turn it back on.
  ▪ Restart the computer (make sure you have saved the document you are trying to print before restarting) and try printing again.

6. My number keypad does not work.

• The Num Lock must be on (indicated by green light) for keypad to work.
  ➢ To turn the Num Lock on, push the Num Lock key in the upper left corner of the keypad. The green light should then be on.

7. My keyboard is frozen.

• Shut the computer down by going to Start on the task bar, then Shut Down from the pop-up menu. Unplug the keyboard connection from the port and reinsert tightly.
• Wait about 60 seconds and then turn the power back on.
  ➢ If you did not save prior to the keyboard freezing you will probably lose all of the data entered since the last save.
8. My mouse is frozen.

- If you have installed a new mouse, you must install the mouse software.
- You can continue working using the shortcut keys, the control keys, and the arrow keys (see page 5).
- Save the document using Ctrl + S keys. Shut the computer down by going to “Start” on the task bar, then Shut Down from the pop-up menu. Unplug the mouse cable from the port and reconnect tightly. Wait about 60 seconds and then turn the power back on.
- Check to see that the mouse ball is present (students love these balls!).

  ➢ If there is no mouse ball, you must use the shortcut keys on the keyboard to shut down, access programs or move around within a document. The mouse ball must be present for the mouse to function.
  ➢ Contact your technology department about replacement of a missing mouse ball and/or mouse.

Below are some Windows 95 or 98 shortcut keys to assist you should your mouse or system become frozen:

<table>
<thead>
<tr>
<th>KEYS</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows logo keys or Ctrl +Esc</td>
<td>Opens the Start menu located on the task bar.</td>
</tr>
<tr>
<td>Ctrl + Alt + Delete (Del)</td>
<td>In Microsoft Windows 95/98, opens the Close Program dialog box that contains a list box of applications to be closed and command buttons for Ending Task, Shutting Down, and Cancel.</td>
</tr>
<tr>
<td>Alt + F4</td>
<td>Closes all open programs and shuts down.</td>
</tr>
<tr>
<td>Windows logo key + R</td>
<td>Opens the Run dialog box</td>
</tr>
<tr>
<td>Windows logo key + M</td>
<td>Minimizes all open windows</td>
</tr>
<tr>
<td>Shift + Windows logo key + M</td>
<td>Undo minimize all, tile horizontally, tile vertically, or cascade windows</td>
</tr>
<tr>
<td>Windows logo key + E</td>
<td>Opens Windows Explorer, My Computer</td>
</tr>
<tr>
<td>Windows logo key + D</td>
<td>Minimize all and Undo minimize all</td>
</tr>
<tr>
<td>Tab</td>
<td>Moves focus to next option in open window</td>
</tr>
<tr>
<td>Press ENTER</td>
<td>Chooses the OK button,Opens a windows selected using Window key + tab</td>
</tr>
<tr>
<td>ESC</td>
<td>Closes a dialog box, cancel</td>
</tr>
<tr>
<td>Windows logo key + Break</td>
<td>Opens the System Properties box</td>
</tr>
<tr>
<td>Windows logo key + Tab</td>
<td>Focus on task bar buttons,</td>
</tr>
<tr>
<td>Ctrl + N</td>
<td>Opens a new document</td>
</tr>
<tr>
<td>Ctrl + O</td>
<td>Opens the Open File dialog box</td>
</tr>
<tr>
<td>Ctrl + S</td>
<td>Opens the Save dialog box</td>
</tr>
<tr>
<td>Ctrl + P</td>
<td>Opens the Print dialog box</td>
</tr>
<tr>
<td>UP ARROW or DOWN ARROW</td>
<td>Selects the previous or next item.</td>
</tr>
<tr>
<td>PAGE UP or PAGE DOWN</td>
<td>Selects the item up or down one screen.</td>
</tr>
<tr>
<td>HOME or END</td>
<td>Selects the first or last item in the list box.</td>
</tr>
</tbody>
</table>

9. My computer is frequently freezing, hanging, or crashing.

Freezing, hanging, crashing and bombing are all terms that people use to describe a computer that suddenly stops working while in use. These terms are not totally consistent in how they are used but broadly speaking:
• **Freezing** - usually describes a system that has suddenly become completely inactive while running. There are no error messages on the screen, the mouse pointer does not move, and pressing keys has no effect whatsoever - not even producing beeps etc.

• **Hanging** - usually describes a less severe form of freezing. Things have ground to a halt, there are no error messages, but the machine is not completely dead. The mouse pointer may still move and, on a PC system, pressing the Ctrl/Alt/Del key combination produces a response.

• **Crashing** - usually describes a situation where a program has terminated abnormally, often with some kind of error message. The machine may still be usable.

Freezing is usually symptomatic of a hardware fault, or of a non-Plug-and-Play device that is internally misconfigured. If it occurs erratically, the problem may be due to a component that fails when it gets warm after the machine has been in use for a little while. If you turn the machine off and let it cool down, it may work normally for a while. Keep a log of its behavior and how soon after powering up it misbehaves.

Hanging or crashing are generally more likely to have other causes that SHOULD be investigated further by your districts technology department. If you suffer from these, then note whether the problem always occurs at precisely the same point, or only with certain documents, or only after having run certain other software etc.

10. **My computer is very slow to load or run programs.**

   a. **Delete “FindFast”**
   • Click the Start button, Find, select and click Files or Folders. The Find: All Files dialog box opens.
   • Enter “FindFast” in the Named: box.
   • Click the Find Now button. Once completed, the files located will be displayed in a window. Highlight all files found and delete them (use the delete key or right click and select delete from the pop-up menu).

   b. **Check the C: drive on the computer to see how much space is available.**
   • Double click on My Computer
   • Right click on the [C:] drive icon
   • Go to Properties
• The \textbf{(C) Properties} box opens

This window shows the capacity of the C: Drive as well as how much space is used and how much space is still available (free).

If most of your C Drive is used this can cause the system to be sluggish. Perform the following tasks to clean up your hard drive and free up space.

1) Click on the \textbf{Start} button on the task bar.
2) Go to \textbf{Programs, Accessories, System Tools, Disk Cleanup}.
3) The \textbf{Select Drive} window will open. Choose the \textbf{(C:) drive} and then click the \textbf{Okay} button. Windows checks the drive and then the \textbf{Disk Cleanup} Window will open.
4) The \textbf{Disk Cleanup} Window tells you how much space can be freed. Files to delete are displayed in a checkbox list, you can select which files you want deleted or uncheck files that Disk Cleanup checked but you do not want deleted. Click the \textbf{OK} button to delete the files.
5) To perform a Disk Cleanup automatically, click on the \textbf{Settings} Tab and check the box next to the statement \textbf{“If this drive runs low on disk space, automatically run Disk Cleanup.”} Please note that at this point the disk space is critically low.
6) You \textbf{SHOULD} manually perform this operation at least once a month, every other week if your students are doing a lot of Internet searching.

\textbf{Shortcut:} Right-click on the C: Drive and click on \textbf{Properties}. When the dialog box opens, click on the \textbf{Disk Cleanup} button (option not available in Windows 95).

c. \textbf{Defragment the C: Drive}.

Over time files become fragmented on the hard drive. When a program is installed on your computer, the program's files may be broken up over multiple locations on your hard disk. This is called fragmentation. If fragmentation occurs on your hard disk, the performance of programs on your computer is slower. The Disk Defragmenter tool optimizes the performance of your computer by reorganizing the files on your hard disk into contiguous blocks. You should defragment the hard drive a minimum of once a month (before performing this operation run ScanDisk). When the Disk Defragmenter tool completes the defragmentation of files on your hard disk, the performance of your programs is faster because the files are arranged closer together.
NOTE: You can use your computer while Disk Defragmenter is running. However, your computer operates slower and the defragmentation process restarts if the contents of the drive you are defragmenting changes. We recommend that you do nothing while defragmenting.

- To start the Disk Defragmenter tool, use the following steps:

  1) Exit/close all programs and turn off the Screensaver--Right click on a blank spot on the desktop, select Properties, the Properties window will open. Click on the Screen Saver tab, click the drop-down arrow to select None, click the Apply button and then click the OK button.

  2) See 10a and Run Scan Disk 6-8 in #11.

  3) Click Start, point to Programs, point to Accessories, point to System Tools, and then click Disk Defragmenter.

  4) Click the drive you want defragmented, click OK, and then click Yes. Once completed, the Disk Defragmenter window opens asking if you want to quit the utility, click Yes to exit the utility.

  5) Turn the screen saver back on (can follow steps in 1 above).

Another method of accessing the Disk Defragmenter tool:
- Follow steps 1 and 2 above then double click on My Computer.
- Right click on the [C:] drive icon and select Properties from the menu. The [C:] Properties window opens.
- Click on the Tools tab.
- Scan the drive for errors by clicking on the Check Now button in the first box titled “Error-checking status”
- Once the error scan is completed, click on the “Defragment Now” button. Once completed, the Disk Defragmenter window opens asking if you want to quit the utility, click “Yes” to exit the utility.

11. When I started my computer it came on in Safe Mode and my desktop looks funny (not the usual desktop).

The Safe Mode is essentially a limited, or minimal version of Windows that loads when your PC is having problems. Thankfully, in many situations Windows is smart enough to know when a problem has occurred and will automatically start in Safe Mode (or at least give you the option to start in Safe Mode) the next time you restart.

- In some situations you may want to force your computer to start in Safe Mode. To do that, hold down the F5 key when you start up and keep holding it until you see that your PC has booted to Safe Mode. You can easily tell this because your screen resolution will be reduced to the VGA standard 640 x 480 resolution and you’ll see the words "Safe Mode" all over the screen. (Another way to do this is to hold down the F8 key during boot time until you’re presented with the Windows Startup Menu and then chose Safe Mode from the list of options presented there.)
- When you’re in Safe Mode Windows skips the Config.sys and Autoexec.bat files and loads a minimal set of drivers that lets your PC function at a basic level. However, usually you can’t
print, use your modem or do lots of other things you would normally otherwise be able to do. You can, however, run most of your applications, so if you’re desperate to get some work done and your machine keeps crashing, you may want to consider simply working in Safe Mode for a while.

- To get out of Safe Mode restart your computer.

Run Scan Disk

The ScanDisk utility included with Windows 95/98 is a powerful disk-fixing utility. If your computer was not shutdown properly or when an error occurs on one of your hard disk drives, ScanDisk normally runs automatically. ScanDisk tests and checks drives for errors (which could slow the system down). You can perform a “Standard” Scan which checks files and folders for errors or a “Thorough” Scan that will test files, folders and the disk surface (including free space) for errors.

- To start the ScanDisk tool:

6) Exit/close all programs and turn the Screensaver off--Right click on a blank spot on the desktop, select Properties and the Properties window will open. Click on the Screen Saver tab, click the drop-down arrow to select None, click the Apply button and then click the OK button.

7) See 10a.

8) Click Start, point to Programs, point to Accessories, point to System Tools, and then click ScanDisk.

   ➢ Select the drive you want scanned.
   ➢ Click the radial button next to “Thorough.”
   ➢ Click in the box to select (place a check) “Automatically fix errors” (the utility will fix any errors found) and then click Start.

- When running ScanDisk for the first time, click on the “Advanced” button and make sure the following ScanDisk Advanced Options are checked:

   ➢ Display summary: Always
   ➢ Log File: Replace log
   ➢ Cross-linked files: Make copies
   ➢ Lost file fragments: Free (you do not want them converted to files)
   ➢ Check files for: you don’t have to make any choice here
   ➢ Click “OK” button when selections are completed.

- ScanDisk can also be accessed by right clicking on the [C:] Drive icon in My Computer, select Properties from the pop-up window, and then select the Tools tab. In “Error-checking Status” the last time a ScanDisk was performed is reported, click the “Check Now” button to begin.
Software Troubleshooting:

12. What version of Windows is installed on my computer? What type of processor does the computer have? How much RAM does the computer have?

- Right click on the My Computer icon on the desktop.
- Select “Properties”
- The System Properties window opens displaying general information about the version of Windows installed on your computer.
- To close the window, click the Close button.

If the computer has one of the very first versions of Windows 95 (does not have an A or B after the Windows version number) call your Technology Department to ask them if they can update the operating system to Windows version A or B (if available for your computer).

This window also tells to whom the software is registered. The number under “Registered To” is the license number. This number must match up with the number on the Windows CD that you have for the computer. If it does not, call your Technology Department.

Below the license number is the model of the computer (manufacturer), the type of Processor, and the amount of RAM in the machine.

13. The program I am working in has frozen.

- Press Ctrl + Alt + Delete simultaneously. This opens the Close Program dialog box that contains a list box of applications running. It will also identify what program is “(NOT RESPONDING).”

  ➢ **End Task:** Closes the program that is highlighted in the Close Program window. Please note that the data entered since your last save will be lost.
  ➢ **Shut Down:** Shuts the entire system down.
  ➢ **Cancel:** Closes the Close Program window and brings you back to the application in use without performing any operation.

14. I was working on a document from the 3.5 Floppy Drive and my system froze. I hit Ctrl+Alt+Delete to “End Task” and a blue screen came up with a Fatal Error Message. There were two options for me to choose:

  a. Hit any key to continue.
     ➢ If you chose this option you may or may not get back to the document that you were working on prior to this error occurring. Chances are you will hit any key and the
screen will go black—if you are very, very patient you can wait to see if the system
will get you back to where you were. This probably will not happen and you will be
forced to reboot by entering Ctrl+Alt+Delete.

b. Enter Ctrl+Alt+Delete.
   Ø This will reboot the system causing it to restart.
   Ø If you did not remove the 3.5 Floppy Disk from the (A:) drive before you rebooted,
you will get a black screen with the message “Operation system can not be found.”
   This happens because the system is reading your floppy disk. You will have to eject
the floppy disk before rebooting/restarting the system. If you already rebooted, and
did not eject your diskette, you can eject the diskette and then hit ENTER. The
system will then continue its startup process. You may again get a Fatal Error Blue
Screen, but if you hit any key this time it will go back to the desktop.

15. I was running a program and got a full blue screen with a Fatal Exception Error.

This is the so-called BSOD or the "Blue Screen of Death". It is a full screen Fatal Exception Error and
the only way out is to reboot. This usually points to duplicate or incompatible DLL files being called
into memory. This can also occur if you were working from a diskette or CD-ROM and removed it
before the system completed reading from it.

   • Hit ENTER and try to get back to the Desktop, save your work under a different file name and
   reboot.
   • If you cannot get back to the Desktop reboot the system by pressing Ctrl + Alt + Delete
   simultaneously or pushing the “reset” button, not the power switch, on the desktop/tower case.

In the future try to notice patterns or particular combinations of programs that cause the error. Look for
software patches at the vendor's web sites. It could also be a problem with your memory or its settings.
You might want to try setting your memory settings to default. Other than that, there is not a whole lot to
be done; shut down or reboot.

16. When I try to start a program from its shortcut I get a "Missing Program" error.

A "shortcut" is a path from the icon to the actual location of the program files for that program. If this
path is absent or invalid, you will get this error. This is usually caused by having deleted or moved the
program. If this is the case, delete the shortcut.

   • If you moved the program, delete the old shortcut and create a new shortcut to the new location.
   • The program may have been deleted without being properly uninstalled. Go to the
   Control Panel and properly delete the program through the Add/Remove
   Programs option.
   • The Add/Remove Programs Properties window will open. In the second part of
   the window you will see a list of the programs installed on your hard drive.
   Scroll down the list until you find the program whose shortcut you were trying to
   use. Highlight the program and then click the “Add/Remove” Button.
• Another common reason is that your shortcut is trying to access the program from the CD-ROM drive but the needed program is not in the drive. Insert the program CD into the drive and click the **Retry** button.

• A second hard drive or another drive has been added which kicked the CD-ROM letter up to a new letter. In this case, open **My Computer** and write down the letter assigned to the CD-ROM drive. On the desktop locate the icon for the shortcut, right click on the shortcut icon and select **Properties** from the pop-up window. In the **Target** box delete the old drive letter and enter the new drive letter. Click the **OK** button.

15. **One of my students has put a picture from the Internet on my desktop. How do I get it back to the regular desktop?**

This is a common problem for classroom teachers but it is easily remedied so do not panic.

• Go to **Start** on the task bar.
• Select **Settings, Control Panel**.
• The **Control Panel** window will open. Double click on the **Display** icon.
• The **Display Properties** window will open (Background Tab should be active in the window).
• Select **None** in the Wallpaper window, Click the **Apply** button
• Click the **OK** button.
• You may want to adopt a “**No Download**” policy to avoid this in the future. This could cause a virus problem on your system (Nimbda can spread from Internet web sites).

Another method of accessing the **Display Properties**:

• Right click on the desktop, select **Properties** from the pop-up menu.
• Follow the steps above once the **Display Properties** window opens.

16. **Somebody has changed my desktop, the mouse pointer and the sounds are different too. How do I go back to the original settings?**

Children will play around and change the settings on your computer; many of them have a greater knowledge of technology than those of us teaching them. This, like #15 above, is not difficult to change but it does require several steps in the process to make the necessary changes.

• See #15 to change the desktop back to the default setting.
• **To Reset the Mouse Pointer:**
  - Go to **Start** on the task bar.
  - Select **Settings** then **Control Panel**.
  - The Control Panel window will open. Double click on the **Mouse** icon.
  - The Mouse Properties window will open. Click on the **Pointers** tab.
  - In the **Scheme** box, click the downward arrow and select **None**.
You will have to select each individual category and click the Use Default button for each one until all settings have been returned to the default setting.

Once the task is completed, click the Apply” button and then click the OK button.

- **To Reset the Mouse Speed or Cursor Trails:**
  - In the Mouse Properties window select the Motion tab.
  - Here you can reset the speed of the cursor movement on the screen.
  - If the cursor trails the box next to Enable will be checked. Deselect the box by clicking in it.

- **To Reset the Sounds:**
  - Go to Start on the task bar. Select Settings then Control Panel.
  - Double click on the Sounds icon.
  - The Sounds Properties window will open. Click on the down pointing arrow in the last Schemes section of the window. Select Windows Default, click the Apply button, and then click the OK button.
  - Sounds will return to the original default settings.

17. I was inserting text into my document and it was erasing the text as I typed rather than inserting.

Your “Insert” key has been toggled off. Push the “Insert” key on the keyboard. Go to “Edit” on the Menu Bar and select “Undo” until you get back to the point where you were trying to insert text and try again.

- If working in Microsoft Word, you can “Undo” unlimited times but other programs only “Undo” the last action performed.
- Another method to toggle “insert” on, double click on the letters “OVR” or “OUS” on the bottom of the program window.
  - If the letters “OVR” or “OUS” are greyed out, insert is toggled on.
  - If the letters “OVR” or “OUS” are black, insert is toggled off.

**VIRUSES**

Viruses are unwanted programs that spread from computer to computer, much the way real viruses do in humans and animals. They are sometimes very dangerous and can in fact wipe out your entire hard disk if you are unlucky—and if you don't protect yourself. Taking steps to protect your computer from viruses is an essential part of any data problem prevention routine.

What is a virus? A computer virus is a program that attaches to other pieces of code, so that when the user tries to run the original they also unintentionally run the virus code as well; the virus code is designed to replicate itself and "infect" other programs, possibly in a modified form, and may also exhibit other behavior as well. So, in order to be a virus, the program must have the ability to do all of the following:

- Run without the user wanting it to and/or create effects that the programmer wants but that the user did not want or request.
- Have the ability to "infect" or modify other files or disk structures.
• Replicate itself so it can spread to other files or systems.

Note one thing that is not on this list: a virus does not necessarily have to trash your hard drive or exhibit other malicious behavior, in order to be a virus. While many viruses do damage files and disk structures, many are just nuisances or exhibit "prank" behavior such as playing music on the PC speaker or putting funny phrases on the screen when the system is booted. However, the risk of damage from viruses is substantial. Many can cause serious data loss; sometimes the virus writer doesn't even intend some of the effects that the virus produces (viruses can have bugs!). Damage can also occur from program files being altered when the virus infects them. Often it is not possible to repair the damage, even when the virus is removed.

There are many different types of viruses. In addition to the classical virus, there are other virus-like programs that are similar to viruses in terms of how they work and what they do, but differ from them in one or more respect:

• **Worms**: A worm is a program that is self-contained and when run, has the ability to spread itself to other systems. In essence, a worm is a virus that doesn't infect other programs. Instead, it acts independently, seeking to spread to other computers connected to its current host. They tend to spread over network connections. They can have other undesirable effects when run.

  Note: The acronym "WORM" is also used as a short form for "write once, read many", a storage technology that is used by devices such as CD-R drives. The concepts are totally unrelated.

• **Trojan Horses**: A trojan horse is any program that, once run, does something that the user doesn't want or request. The program doesn't necessarily infect other files or spread to other systems. It is the generic term to refer to any software that is intentionally coded to do something other than what it is supposed to. Some people think of viruses as a special form of trojan horse: one that can infect other files (thus turning them into trojan horses) and duplicate itself. Trojan horses are sometimes just called "trojans" for short.

• **Bugs**: A bug is an error in a program. It is included here even though it really isn't in the same class as viruses and trojans, because it is similar to a trojan horse in that it causes behavior other than what the user wanted. The difference of course is that with a bug, the aberrant behavior is unintentional! With a trojan horse the author is doing it on purpose.

• **Droppers**: A dropper is a program designed to install or deliver a virus or trojan horse onto a target system. The dropper is specially designed to avoid detection by standard virus detection programs, because the virus is specially encrypted so that the dropper itself doesn't appear to the virus scanners like a regular infected program file would. In some ways, a dropper is like a "virus egg", waiting to be hatched. They are uncommon.

• **Virus Impostors (Joke Programs)**: Some oh-so-clever programmers have devised cute programs that mimic the effects of true viruses when they are run but are not considered viruses themselves, or even trojan horses, because here the user of the file knows that the program is going to do something strange. These are often installed by someone as a practical joke on his/her coworkers or friends for a good laugh.

**How do viruses infect your computer and how are they spread?**

The fact of the matter is that you can get a virus by reading email messages and by downloading an attachment infected with the virus. You must be careful of files attached to email messages that must be downloaded. If the attached file is an executable program (has the extension "*.exe"), a Word document or any other file that is capable of being infected with a true virus, it may have a virus in it. REMEMBER, the email itself can carry a real virus therefore the best practice (if you do not have a virus protection program) may be NOT to open emails from someone that you do not know or that have been forwarded ("FWD" in the subject line) since many viruses attach to a user’s email address book and forward themselves to others, unknowingly to the user.
How can I protect my computer from a virus?

As the saying goes “the best defense is a good offense,” install and update an anti-virus program IMMEDIATELY. We recommend using AVG Anti-Virus from Grisoft but there are other anti-virus programs used so contact your district’s technology department if you do not have such a program installed on your classroom computer. You can download a FREE version of AVG by going to the URL: www.grisoft.com. Grisoft does not provide technical support for users of the free version.

Before downloading any software, close all running/open programs. If downloading from the Grisoft web site, follow the instructions as given on the site:

- Grisoft emails the Registration Number for each program therefore you must have an email account to install AVG.
- Once you select the download button, the AVG License Agreement is displayed. Read through the agreement and the click “Yes, I Agree” button.
- Next the Registration page opens. Fill in the Questionnaire Form and then click the “Continue” button at the bottom of the page.
- You will be prompted to choose the path where the program is going to be stored. The default window option is to “Save this program to disk”, click “OK”.
- The “Save As” window will open. In the “Save In” box click the down arrow and select the desktop (if this is not the default on your computer). Click the “Save” button. Download will begin.
- Once download is completed AVG will have sent you an email with the program’s registration number. Check your email after downloading the program. Open the email sent from Grisoft, highlight and copy the Registration Number from the email message. You must insert this number during setup.
- Once you have obtained the registration number click on the “Open” button at the bottom of the download window, OR locate the icon on your desktop and double-click it, the AVG-6.0 Anti-Virus System Setup window opens. Click on the “Setup” button and follow the instructions from the Setup screen, pasting the Registration Number (that you copied from the email) in the appropriate dialog box.
- Once installed, delete the .exe icon from your desktop. Right click on the icon and select “delete” from the menu. It will tell you that you will be unable to run the program if you delete that file, ignore this and click “Yes” or “Continue.” You already have the program installed therefore you no longer need this file.

Follow the steps below to configure the program after installation is complete:

First Phase of Setup

1) Once the program is installed you MUST configure your virus protection.

2) Double click on the shortcut icon on the desktop to open the program and choose the Control Center. In the “Resident Shield” tab window, check all three boxes in the “Check Viruses” box. Also, check “Confirmation” and “Ask what to do next” options. Click the “Apply” button.

3) Click on the “Email Scanner” tab and check all boxes. Click the “Apply” button.

4) Click on the “Update Manager” tab. This is crucial to the configuration because this is where you will set AVG to download updates to the program. If you do not update the program on a regular basis it is pointless to have it installed.

   a. Click the box next to “Allow scheduled update”. Set “Update to start at.” The program cannot update when the computer is off so set it to update at a time when you first turn your computer on, enter the time (use the up/down arrows to the right of the box to select a time).

   b. The next option is “Update if the database is older than:”. We advise updating every 5 days. The system must be restarted after update is completed.
c. The next option is “If not successful than repeat in:” set this at 1 to 5 days.

d. Click the “Apply” button.

5) Click on the “Scheduler” tab. Click to check the box “Enable scheduled tests.” Click the “Apply” button. Click the “OK” button. The window will close.

6) If you need to know what version of AVG you installed and/or the serial number, click on the “Information tab.” This also is where you will find the date of the last virus update performed.

Second Phase of Setup

It is imperative that you run an AVG “Complete Test” on your system because it will intercept viruses entering through email but it will NOT intercept a virus obtained through browsing a web site until it runs the “Complete Test.”

7) Right click on the AVG icon in the system tray on the task bar, select and click Run AVG Anti-Virus or double click on the AVG shortcut icon on the desktop.

8) Click on the “Scheduler” button. Set the time that you want AVG to automatically run the complete test. Click in the box to check “Enable scheduled tests” and then click the “OK” button.

   ➢ Enter a time when the computer will not be in use (when at lunch, recess or on duty). The computer MUST be ON for AVG, or any other virus protection program, to scan for viruses!

Final Step of Installation:

9) Click on the “Virus Database” button. The AVG Center window will open (see #4).

10) Click on the “Update Now!” button.

11) Once completed retrieving updates, a window opens displaying all of the new update files, you must restart your computer in order to install and update the AVG Anti-Virus program. (Make sure that you do not have any open files before you restart your computer, if so you must save all work and exit the programs first.)

12) Uninstall, properly, any other virus protection program if going to use AVG.

Below is a list of common methods of virus infection and steps to take to avoid them. While the numbers of viruses continues to grow in leaps and bounds, a few smart moves to protect the system can help keep the problems at bay.

- **Garbage In, Garbage Out**: This is one of those old computer clichés that is so true in the computer world and elsewhere. The only way to get a virus infection is by allowing infected software into the PC or through email and Internet sites. Viruses cannot spontaneously generate on a PC.

- **More Connections Means More Risk**: The more ways you interface your PC to others, the more chances there are of a virus making its way onto your system. A standalone PC with a stable software base has much less chance of becoming infected by a virus than a PC shared by multiple users that is connected to a large network.

- **Piracy Has Its Price**: While infections from store-bought software happen, they are extremely rare. On the other hand, software that is shared from PC to PC, or worse is obtained from illegal sources, has a much higher chance of being infected.

- **Use Backups**: If you have the ability and the discipline to maintain multiple backups of your system over a period of time, this is a useful "last ditch" defense against virus infection. It doesn't really prevent viruses from striking your system, but it can save you in the event that you are unlucky and suffer data loss due to viruses. (Note that you need to have a reasonably long
retention period in your backup cycle for this to work. If you just backup your entire disk onto the same backup tape once every week, then you only have one week at most to catch any given virus before you end up copying it onto the backup tape as well.)

- **Control Access to Your PC:** You should be careful about who uses your system. Generally speaking, a PC in an open area used by dozens of people, such as in the classroom, will develop viruses far more often than one on an individual's desk. The reasons are obvious.

**Here are few precautionary steps to follow in your efforts to avoid viruses:**

- If students, or you, bring diskettes from outside (home) implement a “SCAN FIRST” policy. This means that all diskettes or CD-ROMS (even those purchased from a store or distributor) **MUST** be scanned for viruses prior to running applications from them or installation of a program.
- Insert the diskette/CD ROM/Zip disk into the appropriate drive but **DO NOT** open any files. Go to your AVG Anti-Virus icon on the task bar or shortcut on your desktop and right click:
  - Select “Run AVG Anti-Virus”. The AVG Anti-Virus System window opens (see picture on page 16). If using the FREE version this window automatically opens.
  - If using AVG Anti-Virus Professional Edition, double click on Program from the menu bar, select and click **Switch to Basic**.
  - Double click on **Removable Media Test** button.
  - Select the device you wish to test (i.e. 3.5 floppy drive, zip drive, CD-ROM drive)
  - Click on the **Run** button. The program scans the designated media for viruses. If a virus is found on the media being scanned, a warning notice will be displayed on the screen and then the program will prompt you to choose what you want the anti-virus program to do. Use the help menu if you are unsure.
- Be selective about what email messages you decide to read. If your district provides email service via a district server, by opening an infected email message you **could** infect the server. Check with your district’s technology department regarding this issue.
- **DO NOT** download an attachment that is an executable file (.exe as the file extension) and be very cautious of .zip files as well. You may not want to open email messages that have been forwarded since viruses are known to attach and send themselves through a user’s address book.
- Update your anti-virus software DAILY and set your anti-virus program to scan the system DAILY. Make sure that the computer will be **ON**, it cannot scan when the system is off.
- Update the operating system directly from the Microsoft web site (www.microsoft.com). You can set your computer to do this automatically but again, the system must be on. Note: Microsoft does not send email updates.