

# Supercomputer Teacher Enhancement Program

## STEP

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San Diego Supercomputer Center  
(SDSC)  
Lay Jolly, California

Sponsored by  
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### Goals:

Use computational resources to enhance the teaching of high school science.

Connect the high school classroom with the computational world outside.

Allow the high school teacher to develop an understanding of how science is currently done.

Introduce teachers to the tools of computational science and High Performance Computing and Communications (HPCC).

### Themes:

"S" of STEP refers to the San Diego Supercomputer Center's computational environment (i.e. the people), not just the computers that are there.

The more effort you can put in to STEP, the more you will get out.

We follow the model of the Internet, i.e. a cooperative, sharing endeavor.

Note, nothing that you develop while using the resources of SDSC can be used in a "FOR PROFIT" activity. We do not want to mimic Compu\$erve. This provision is dictated by the National Science Foundation, but is also at the heart of the academic spirit of collegiality.

Facilities we have that **no one else in the U.S.** has:

San Diego Supercomputer Center "locally"  
CERFNet "locally"

The rest of the world has Internet access to these facilities, but we can get together with the **people!**

The Big Picture of STEP Computing  
An Open Ended Box of Computing Power  
The Participant Defines the "Lid"

Equipment Available	Characteristics Capabilities	.
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**High-end:**

Cray Y-MP8/624	Unix Operating System
SGI Indigo	Some programming needed
SunSPARCStation	Matlab on workstations
	Scientific Visualization tools and power
	Discipline-specific application packages
	Use is possible, but user must be self-reliant.
	Also user would be required to purchase film or other visualization output media.

**Mid-level:**

sdcc14	Internet access electronic mail and information servers
	Matlab available as well as other software
	Practice Unix
	Practice programming
	Prototype High-end software
	Use/training provided by STEP

**Classroom:**

Macintosh or	Hands-on and accessible
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IBM/PC (clone)

Student Edition Matlab

provided by STEP

Zterm/Telnet communications

link to sdcc14 resources

Practice programming

Use/training provided by STEP

Note, access to the high-end machines is possible, but requires more computing background on the part of the user. Also users must travel to SDSC to use the Visualization Lab. (We're exploring the capability of the X-Window interface to allow the remote sites (high school classrooms) to have access, but this is a very powerful and nontrivial interface which is not recommended for casual users.)

The mid-level machine provides access to the Internet and its two main capabilities that we will use:

	<u>Tool (menu driven)</u>
electronic mail	elm
information services	gopher
(is.internic.net and ucssun1.sdsu.edu)	

The mid-level machine also provides a realistic test bed for users who may want to access the high-end machines. There are limitations on the amount of time any user is granted on the high-end machines, so you wouldn't want to "practice" there. Instead initial development can be done on the mid-level machine and once this is in suitable shape, the work can be easily transferred to the high-end machine over the Internet. This would only be for the interested STEP participants. The classroom machine is limited in capability, but it is a dedicated machine that both the high school teachers and their student have access to.

There is no provision for high school student's access to any of the mid- or high-end machines in the STEP grant. There is no provision for high school teachers access to the high-end machine through the STEP grant, but I am applying for these resources in case we have some interested STEP participants.

In trying to conceive of this as an exportable package, we must consider what would "typically" be available. Other high school areas would be able to find equivalent "mid-level computers" probably at nearby Universities. The other four NSF Supercomputer Centers, as well as state supercomputer centers could provide high-end access, though to different machines. Still, the unifier is the Unix Operating System once you leave the realm of the Mac or PC. And for the tasks we are envisaging, only a small subset of Unix. We can help minimize the difference between the different classroom environments by focussing on the mid-level computer. The tools we want the teachers to become facile with (elm and gopher) will be available on ALL mid-level computers across the U.S. If we focus on using sdcc14, then you also have the possibility of using the high-end machines, if a participant is interested. I then see the only difference between the two scenarios from Mac/PC to Cray is in how

to download files from the mid-level computer to the Mac/PC. This is where I think the Kermit as well as the Zmodem protocols will continue the transparency of the two high school systems which was begun by the choice of MATLAB as the computational tool.