Contents

Let Computers Have a Hand In Your Future

The Challenge

Welcome to the 1998–99 Challenge, where technology will "have a hand in your future!"

What It's All About

I'm thinking about trying this Challenge thing, but it sure would be nice to check out just what I'm getting myself into...

Good idea! We hope you'll talk to any kids you know who tried the Challenge last year. We also hope that you'll read this information, because it can fill you in on most of what you need to know to take the plunge. If it doesn't, let us know (our names, numbers, and addresses are on the inside front cover of this user's guide)—we'll answer any questions for you. We'll also be sure to include your question in next year's information!

What if I'm not a computer jock—does that mean I'm not cut out for this stuff?

You don't need a particular grade point average, previous computer experience, or to be enrolled in particular classes (unless your school has its own rules for participation). The most important thing you need to take part in the Challenge is a real interest in learning more about science and computing. In the nine years of the Challenge, more than 4000 high school students have found that out.

Once you and your buddies (or soon-to-be buddies) decide to join up as a Challenge team (you can go solo, but a team of up to five people is preferable), you'll need to enlist a teacher sponsor (any interested teacher from any discipline is fine). Your next task: choose an interesting scientific problem from an approved area of science (see Appendix A) to research and solve using computational science, perhaps on high-performance computers. Note that your project can't involve live vertebrate animal experimentation and that you need

special approval to conduct studies on human subjects.

You'll run your project from your school's or school district's existing computer equipment connected by the New Mexico Technet network to high-performance computers at various sites (see Appendix B). If your school doesn't have access to computer equipment and supporting network equipment, contact New Mexico Technet (see phone number on inside front cover).

Teams can be made up of any mix of students (from different grades in your school, or from a couple of schools in small communities) who are enrolled as full-time high school students in the district.

Your school can field no more than four teams.

How on Earth will we ever figure out what kind of science problem to choose, and what if it's too hard or the Challenge people think it's dumb?

"Dumb" isn't an issue, but choosing something appropriate, or turning an idea into something that's appropriate is important. That's where your teacher can help. You can also use the Adventures in Supercomputing (AiS) textbook at

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http:/
ais.cs.sandia.gov/
AiS/textbook/unit2/
projdev2.3.1.html
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to help you select a project. Even a teacher sponsor with an unrelated background could be very helpful. And there's sure to be a science, math, or computer teacher at your school who could help you get started with thinking about what your interests are and how you could make those the topic of a science problem.

As for us, that's what we're there for—to make the Challenge work for you. Just don't wait for us to read your mind—if you need answers or help, take the initiative and let us know! (See the inside front cover for our names and how to reach us by phone, e-mail, fax, or snail mail!)
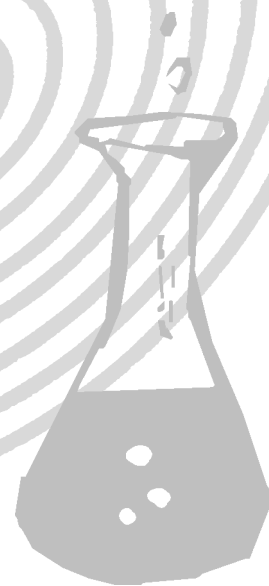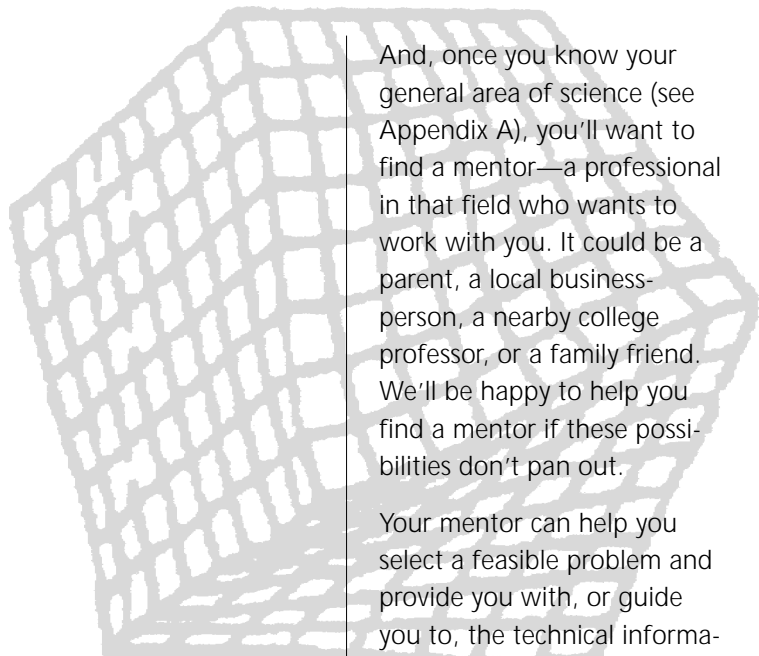
And, once you know your general area of science (see Appendix A), you'll want to find a mentor—a professional in that field who wants to work with you. It could be a parent, a local business-person, a nearby college professor, or a family friend. We'll be happy to help you find a mentor if these possi-bilities don't pan out.

Your mentor can help you select a feasible problem and provide you with, or guide you to, the technical informa-tion you need. He or she can also help you develop a mathematical model, select the best software for developing a computational model, and act as a sounding board through-out the project. Teachers and students from previous years say that having a mentor makes or breaks a team.

Only your team can do its own thinking, researching, and deciding, but there are lots of people ready to do some steering throughout the whole Challenge process (for help with computer issues see Appendix B).

What's next?

It's time to get online and register! Point your Web browser to

`http://`
`www.challenge.nm.org`

and follow the links to register yourself and your team by 5:00 p.m. on Tuesday, September 22, 1998. Technet needs the signed copy of the Team Entry Authorization Form by 5:00 p.m. on Tuesday, September 29, 1998. The Team Entry Authorization Form requires your signature, which shows that you and your parents have read and agree to abide by the Acceptable Use Policy (AUP), which is pro-vided in Appendix C. If you have questions or problems, send us e-mail, and if you don't have Internet access, give us a call or send us a fax.

I was reading the registra-tion form and it asks if I'm planning to attend the Kickoff at Glorieta. The what? And then it asks

which track I want to sign up for — am I supposed to know what that means?

The Kickoff is held at the Glorieta Conference Center near Pecos. At least one member of each registered team needs to come to Glorieta. The Kickoff includes an overnight stay, workshops and seminars on computational science and mathematical modeling, meetings with scientists to plan your project, and computer lab sessions to practice research and pro-gramming skills. You will choose one of four instructional tracks based on your experi-ence and interests. We hope your team will cover several different tracks so you can pool your new information. For all the details about the Kickoff, start at

`http://`
`www.challenge.nm.org`

and click on Current, then on Glorieta Kickoff Conference, then on the Glorieta schedule, and finally on Tracks, which takes you to

`http://`
`www.challenge.nm.org/`
`Archive/98-99/`
`Glorieta/tracks.stm` .

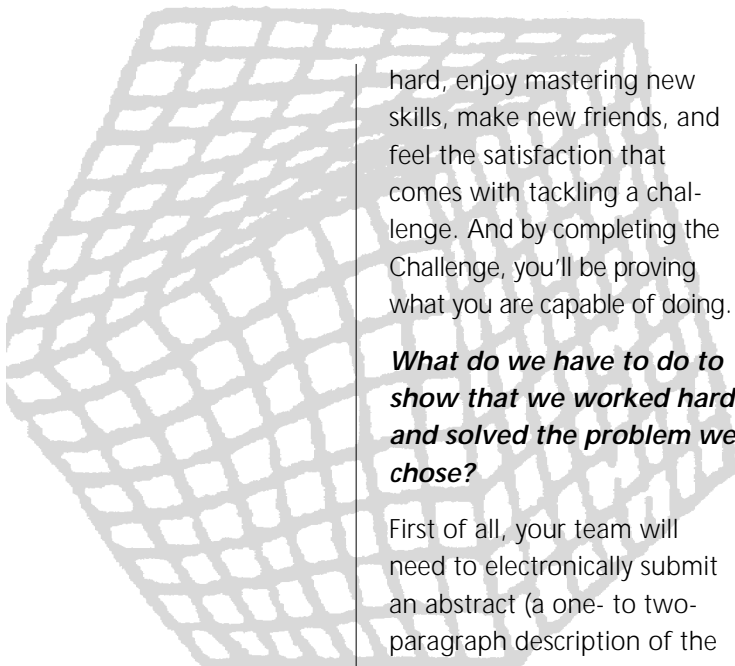***What if we just need one more weekend to get it together?***

Sorry—that's a hard and fast deadline! It needs to be in Technet's hands by that precise moment. It's not because we want to be a pain, but because we want you to get a real working-world experience in the Challenge, and that's how it often goes in the real world.

Teams from public, nonpublic, and home-based schools all over New Mexico will be gearing up to make these same decisions and turn in these same forms by that same deadline.

Your experiences during the year will be different from those of other teams because of your unique topic and your team's level of experience with computers and with the Challenge. But you'll all work

hard, enjoy mastering new skills, make new friends, and feel the satisfaction that comes with tackling a challenge. And by completing the Challenge, you'll be proving what you are capable of doing.

What do we have to do to show that we worked hard and solved the problem we chose?

First of all, your team will need to electronically submit an abstract (a one- to two-paragraph description of the problem you have chosen, its scope, and how you plan to proceed in solving it) at the Glorieta Kickoff Conference. Your abstract and your project must fall under the general area of science that you stated on your registration form, but you can change your specific project until you submit your interim report. Your final report must address the problem described in your interim report.

Just like in the working world, you will turn in an interim report (a short paper, due on January 8, that describes the project, your progress on it, and the results that you expect to get) for evaluation (see Appendix D). That means that you can't wait till two weeks before the Challenge is over to start working on your project.

Sometime between February 6 and February 20, your team will make a thirty-minute oral presentation to a team of Challenge judges at a college near you (see Appendix E). This preliminary Project Evaluation will help the judges understand your project so that they can give you advice and guidance on how to tackle the rest of your work on the project.

Finally, by noon on April 7, 1999, you will turn in a written final report that includes the results of your work (see Appendix D). If you are selected as a finalist team, you will present your project to a panel of Challenge judges during your visit to LANL for the Awards Day activities later in

April. (See Appendix F for judging criteria.)

If you and your teammates wish to compete for one of four in-state college scholarships (one's for $2400 per year for four years!), you can each submit an application to Technet by noon on April 7, 1999. The four scholarships recognize excellence in things like leadership, scientific or mathematical achievement, research, programming, and project development within a team.

This thing sounds like lots of work — it's not that I'm lazy, but I already do lots of stuff. How do I know this'll be worth my time? What's in it for me?

Yeah, all those "new skills and friends" and "satisfaction" things sound corny, but they're very true in this case! Still, there are more tangible reasons to compete in the Challenge. The world's changing: nowadays a smart kid thinks ahead to things like jobs, careers, college and its cost . . .

The Challenge sponsors have a great answer to your question about what's in it for you: monetary awards (up to $1000) awarded for outstanding projects. You can also win computer equipment for your school and software and books for yourself.

Yeah, but what if my team doesn't win? I'll bet the competition's tough. Then

what do I have to show for my hard work?

Depends what you mean when you say "win." We really believe that anyone who completes the Challenge is a winner! And you don't have to have the very best final project report or presentation to win a scholarship or award. Besides the four in-state college scholarships that you and your teammates can apply for, there's a randomly chosen $500 award!

Also, this year, for the first time, two Challenge judges, both of whom are also Challenge Executive Board members, are each offering $100 to whoever creates the winning poster design! This design will
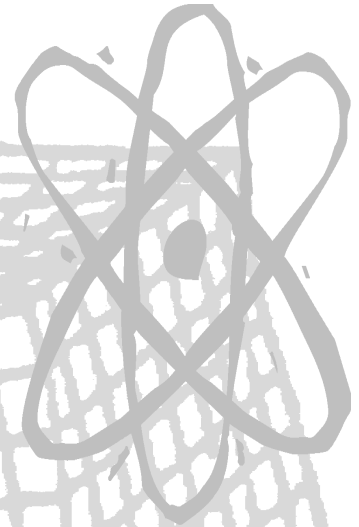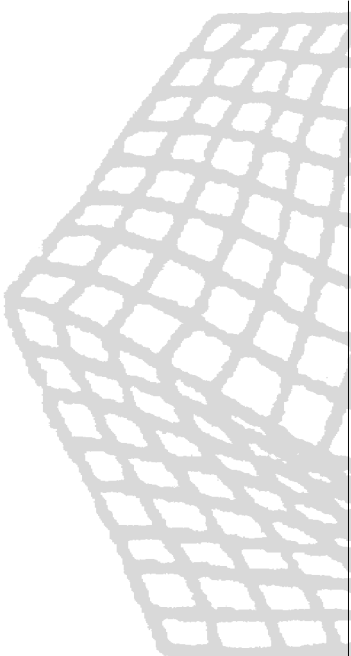
appear on the 1999–2000 Challenge Web page, T-shirt, and publications. Start planning your entry now and imagining all the ways you could spend that prize money.

There are other rewards for participating in the Challenge. As a result of the Challenge, you might get a summer job at a lab, business, or university— several of the 1997–98 Challenge participants did. Some earlier Challenge participants have converted their old summer jobs at national laboratories into permanent jobs now that they've graduated from college. You'll meet lots of people in the Challenge, and you never know where a seemingly minor conversation with a scientist or computer scientist will take you.

The computer, research, group-work, and communication skills that you'll develop in the Challenge are nothing to sneer at either. No matter what you decide to major in, what kind of summer job you try to land, and what career you pursue, these skills will help you do better—in school, in job interviews, and on the job. You're trading some hard work and a lot of fun now, for a huge jump-start later on.

What happens if we work our tails off, and we just can't get the project to come out right?

When you've finished your project in April, your team can choose whether to submit your final report in Category A to compete for awards and prizes or in Category B to just get feedback that will be helpful if you want to work on the same project again next year. We do expect your team to wrap up and submit your project in one of these categories.

What kinds of teams and projects have won the Challenge in the past?

On the Challenge Web page, located at

`http://www.challenge.nm.org` ,

you will find a link to a list of the winning teams from the previous competitions. You will notice that finalist teams have come from all parts of the state and from both large and small school districts. They also have come to the Challenge with very different computing resources, technical backgrounds, and academic experiences.

Look in your high school's library for the final reports of the Challenge finalists. For the past several years, the 10–15 finalist teams' reports have been bound and sent to all high school libraries in the state.

### What if my school isn't willing to foot a big bill for my team to do the Challenge?

Your school can participate in the Challenge for a minimal cost. Your school will be asked to provide phone lines for connecting to the Internet and transportation and substitute teachers so that you and your sponsoring teacher can attend program events. If you attend the Glorieta Kickoff Conference, you will be responsible for your own $20 registration fee.
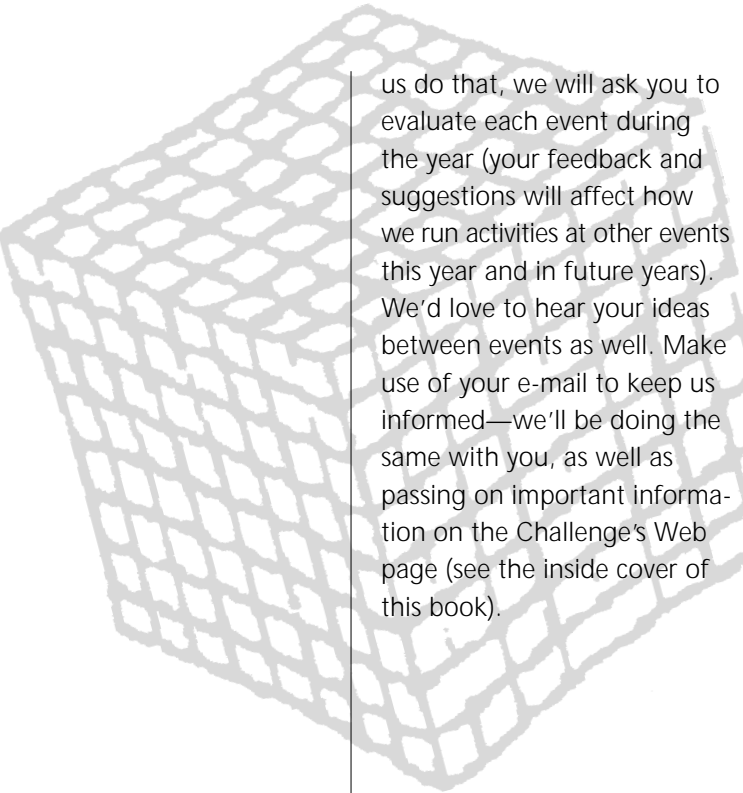
So who does pay for the Challenge? It must cost a mint!

Los Alamos National Laboratory/DOE and New Mexico Technet sponsor the Challenge program in partnership. Universities, businesses, and other national laboratories (all listed in on page 24) contribute major funding for the Kickoff Conference in the fall and the Awards Day in the spring; provide time on the computers for your project work; and provide employees who conduct training sessions and advise Challenge teams throughout the year. Be sure to look for sponsor representatives at the Challenge activities during the year so that you can thank them!

The Challenge Executive Board, made up of people from the sponsoring organizations, is always looking for ways to improve the program. To help
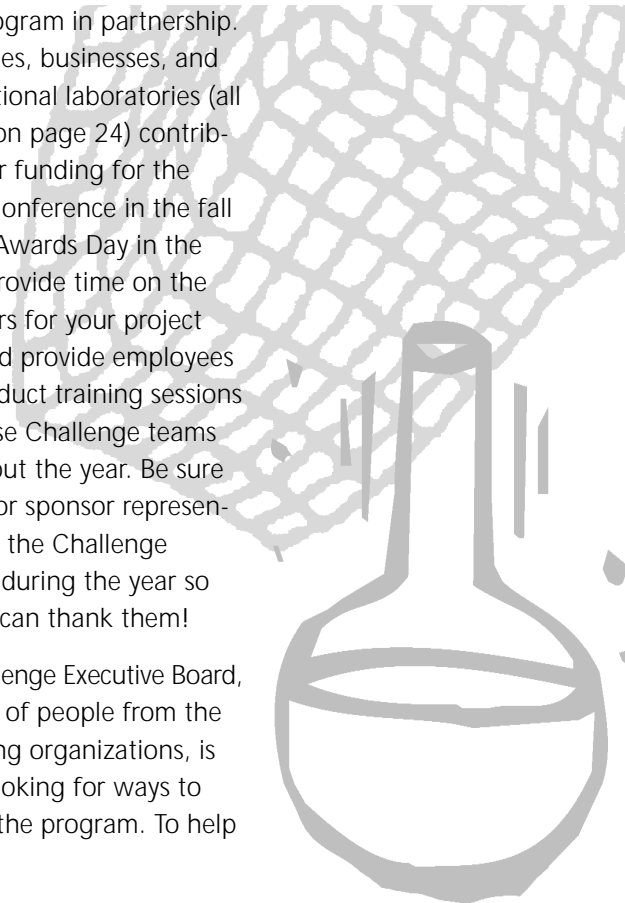
us do that, we will ask you to evaluate each event during the year (your feedback and suggestions will affect how we run activities at other events this year and in future years). We'd love to hear your ideas between events as well. Make use of your e-mail to keep us informed—we'll be doing the same with you, as well as passing on important information on the Challenge's Web page (see the inside cover of this book).

What We're Shooting For

What's the catch—what do you expect from me?

We want you to

• learn to develop mathematical and computational models to solve original scientific problems;

• prepare for the adult working world by developing leadership, organizational, teamwork, and communication skills; and

• develop self-confidence and enthusiasm about your expanding skills and about potential careers in science.

But we don't expect you to manage all of that on your own. We do our part, which includes

• giving you access to high-performance computers,

• teaching you more about science-related careers,

• helping you develop the skills to solve complex problems,

• setting up electronic networking for your school, and

• giving you a unique educational experience.

We're all in this together!

Phases of the Challenge

Phase	Challenge Activity	Dates	Description
1	Registration	September 22–29	Forms due electronically, by fax, or mail at New Mexico Technet by 5:00 p.m., September 22. Original hard-copy signature sheets must be received at New Mexico Technet by 5:00 PM on Tuesday, September 29, 1998. The registration URL is http://www.challenge.nm.org .
2	Kickoff Conference, Glorieta, NM	October 18–19 or October 19–20	Training, geared to your level of experience, on learning to use the Internet and computers, on how to approach your project, and on details about the Challenge. $20.00 fee to be paid by each student and teacher (for food, housing, etc.) Please bring Project Abstract. *(Note that the first dates are for schools approx. >100 from Glorieta. The second dates are for those approx. <100 miles from Glorieta.)*
3	School Visits	November	On request (not at the last minute!), Challenge reps. will visit your team at your school to help with computer lab problems, teach programming skills, or provide guidance with your project.
4	Project Refinement and Interim Reports	Friday, January 8	You electronically submit a report that describes your team's project, tells about your progress to date, and states the expected results of your work.
5	Regional Workshops	for one day, January 12–22	One-day workshops held at locations around the state. You can ask lots of questions and get guidance on your project.
6	Project Evaluation	each for one day, February 6–20	After you make a short oral presentation to a team of Challenge judges, they will give you advice and guidance on how to approach the rest of your project work.
7	Submission of Final Report/Scholarship Applications	deadline: noon, April 7	Before NOON on April 7 you will complete and run your project and submit a final report.
8	Final Judging and Awarding of Prizes	April 28–29	Based on judges' evaluations of final reports, a number of teams are selected as finalist teams; they are invited to come to Los Alamos on April 28, 1999, to describe their projects to the judges. During the 30- minute presentation, the judges question team members about project details. If you complete the Challenge, you will be invited to the April 29 Awards Day. You will get to hear talks about the many kinds of work going on at LANL, see many parts of the Laboratory, attend the ceremony, and enjoy a reception feast.

The Challenge year is divided into eight phases.

These brief descriptions give you an overview of the year.

Your Responsibilities

After reading that Acceptable Use Policy, I'm worried about all of the rules—what if I break a rule and I don't even know it?

As a Challenge participant, you do have some responsibilities. We'll fill you in on them right here. It's your job to read through this information and to contact us with any questions about them that your sponsoring teacher can't answer for you.

It's pretty simple, really. We hope you'll enjoy and benefit from all of the resources and experiences that the Challenge provides, and we expect you to be responsible and ethical throughou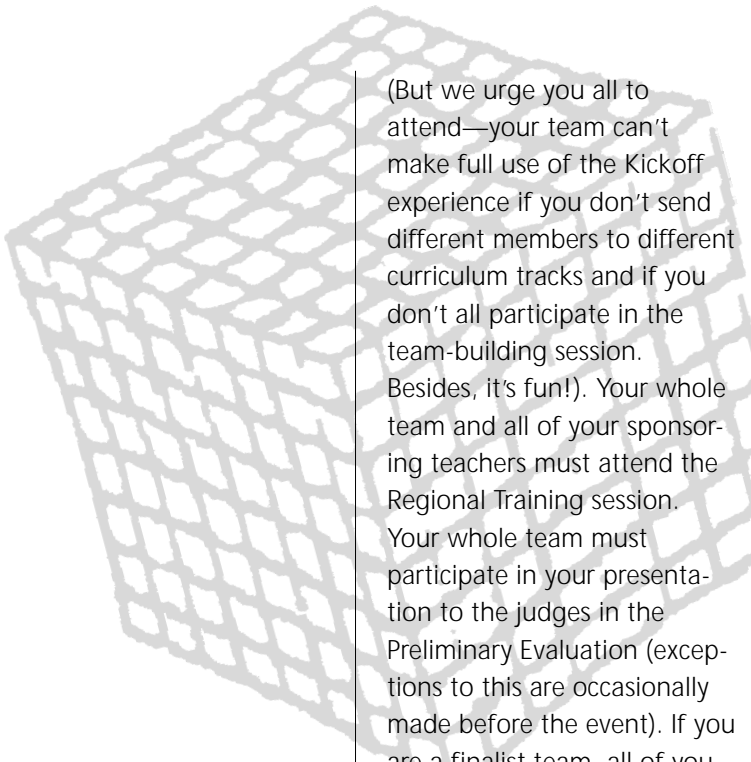t the Challenge year. As in the real working world, you must be ready to accept the consequences if you choose to act irresponsibly. Consequences for SERIOUS offenses will include your expulsion from the Challenge program, immediate termination of your computer account, and a letter of explanation being sent to your principal. In addition, you might be subject to criminal prosecution or held accountable for the cost of any damages or misuse of resources that are involved.

When it comes to Challenge activities, what do you expect of me?

We want you to do the following things.

• Be completely honest and ethical in your letters of application, your research and programming, your references, your project reports, and any other Challenge documents.

• Know and follow the rules of the Challenge Executive Committee and of the various institutions hosting Challenge functions.

• Obey all laws during Challenge functions, including those about drug and alcohol use.

• Make sure your team meets the attendance requirements for Challenge activities. At least one teacher and one student from each team must attend the Kickoff at Glorieta
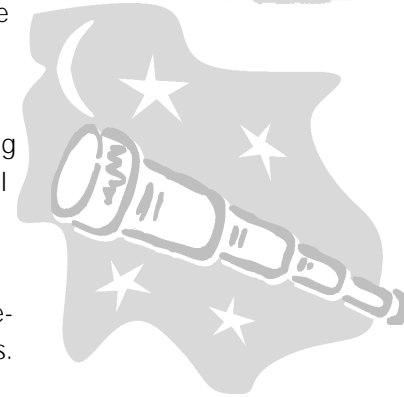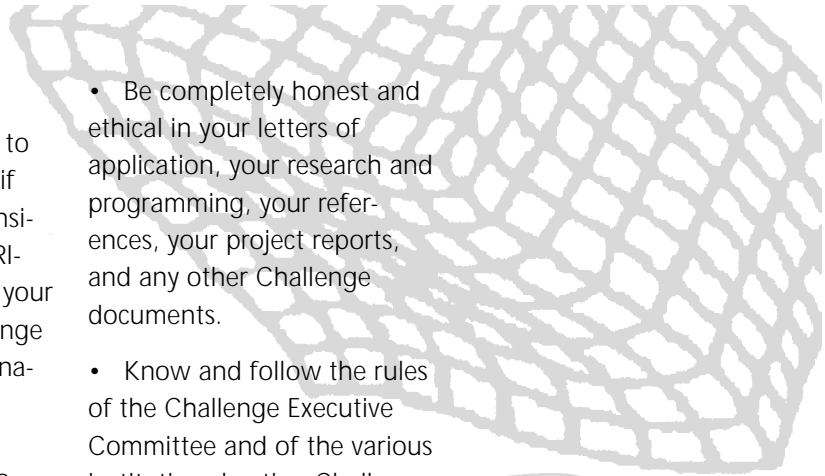
(But we urge you all to attend—your team can't make full use of the Kickoff experience if you don't send different members to different curriculum tracks and if you don't all participate in the team-building session. Besides, it's fun!). Your whole team and all of your sponsoring teachers must attend the Regional Training session. Your whole team must participate in your presentation to the judges in the Preliminary Evaluation (exceptions to this are occasionally made before the event). If you are a finalist team, all of you will need to present your project to the judges at the Awards Day activities.

• Attend all assigned classes, talks, or activities at the Kickoff conference, the Regional Workshop, and Awards Day. (Your attendance is required and absences are recorded. If you do not attend your scheduled classes, you might be asked to leave the conference.)

• If you need help, ask for it. Start with your sponsoring teacher, your team mentor, and others at your school. Then move on to other resources, such as local universities or related businesses or the crew at New Mexico Technet or LANL (see inside front cover).

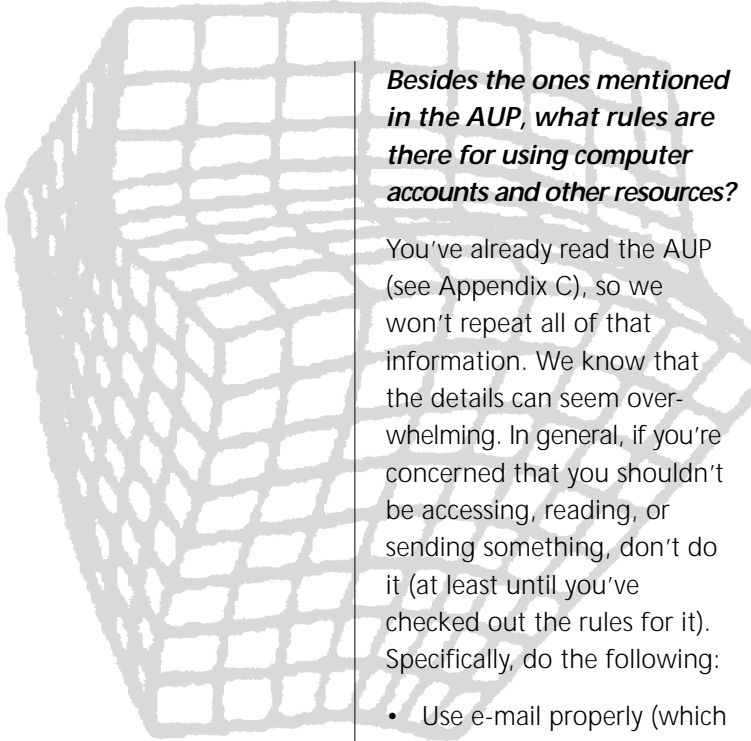### What are my responsibilities when it comes to written reports?

The written reports are your opportunity to organize and display your progress, your problem-solving methods, and your solution. Whereas your research and modeling are the core of your Challenge work, that aspect will be relatively useless if you don't accurately and thoroughly document your work so that others can understand it and learn from it. Even missteps and mistakes may be worth documenting if they end up answering relevant questions or were in directions that originally seemed logical and useful.

- Be sure to budget your time throughout the year—don't wait till just before a deadline to complete the work for that deadline. Pace yourselves.

- Consider writing up rough drafts of the introductory or research-related sections of the report as soon as you have made the necessary decisions or found the information you want to include in those parts. Starting to write is the hardest part of the writing process.

- Take deadlines seriously—we do.

- Take careful notes on your work throughout the year so that you don't need to recreate it all by memory when it's time to write the final report.

- Submit a project abstract (a short description—at least 250 words and not more than one typed page) of your planned project at the Kickoff conference. Include the following: team number, school name, area of science, project name, the problem that you'll solve, and what you hope the outcome will be). If you don't bring your abstract, you will not be allowed to participate. Your abstract will be reviewed and accepted at the Kickoff, and then it will be submitted to the Challenges judges for their information.

- Submit an electronic (preferably) or hard-copy interim report at least 500 words long to the New Mexico Technet office by 5:00 p.m. on Wednesday, January 13, 1999 (see Appendix D). This report should expand on information from your original abstract. You can change your project topic or problem until the interim report deadline, but it must be in the same area of science as your original project. For instructions on electronic submission and report cover specifications, see Appendix D.

- Submit a hard-copy final report in either Category A (competitive) or Category B (noncompetitive) by NOON on Wednesday, April 7, 1999.

Besides the ones mentioned in the AUP, what rules are there for using computer accounts and other resources?

You've already read the AUP (see Appendix C), so we won't repeat all of that information. We know that the details can seem overwhelming. In general, if you're concerned that you shouldn't be accessing, reading, or sending something, don't do it (at least until you've checked out the rules for it). Specifically, do the following:

• Use e-mail properly (which does not include chain letters, vulgar language, pornography, or harassment of anyone).

• Stay out of unauthorized areas of any computer system—breaking in is illegal.

• Use the network only for project-related purposes (which should not include personal business or business related to illegal activities; publishing unsolicited advertisements of goods or services; publishing abusive, profane, or sexually offensive material; publishing information that violates the rights of others; or playing Internet games).

• Get the author's permission for online distribution before you electronically download or distribute any copyrighted material. (Permission can be specified in the document itself, can appear on the network, or can be obtained directly from the author.) For your legal protection, keep a hard copy of the author's consent.

• Respect all Challenge participants and their right to use and enjoy the Challenge computing and networking systems (in other words, don't try to keep the other participants from accessing the available network resources).

• Be aware that security managers at all computing sites DO READ your electronic mail on a regular basis and that New Mexico Technet, LANL, and other institutions that provide Challenge computing services can monitor your online activities.

(Please don't take this as an attempt of adults to control kids who should be old enough to make decisions for themselves. Recognize this as a fact of the working world, where employers monitor their adult employees in a similar manner.) These organizations will fully cooperate with any local, state, or federal officials investigating materials transmitted on New Mexico Technet computers.

And, of course, treat all of the resources that the Challenge provides with respect. Although the long-distance 800 numbers, circuits, computer accounts, and loaned equipment are free to you, your use

of them costs the Challenge program alot of money. Please help us stay within the Challenge budget by not wasting or misusing these resources (for example, use the local dial-in number rather than the long-distance 800 number).

If you have any problems or questions related to Internet access, if you think that someone might have unlawfully entered your account, or if your password is lost or stolen, contact New Mexico Technet (505-345-6555) or the LANL Consulting Office (505-667-5746, or **consult@mode.lanl.k12.nm.us**).
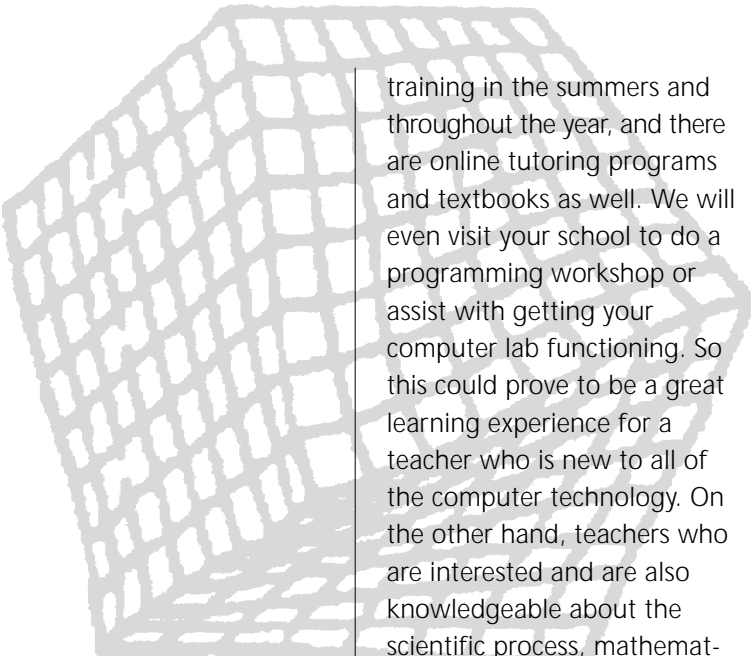
Your Sponsoring Teacher's Responsibilities

What kind of teacher should we get to sponsor our Challenge team? What does the sponsoring teacher need to do during the year? What can we count on the teacher for?

Any interested and committed teacher who is employed at your school or authorized by your school district can serve as a team sponsor. You can even have two teachers who share that role. Note that a teacher may not be the sponsor of more than three teams.

The Challenge program provides textbooks and

training in the summers and throughout the year, and there are online tutoring programs and textbooks as well. We will even visit your school to do a programming workshop or assist with getting your computer lab functioning. So this could prove to be a great learning experience for a teacher who is new to all of the computer technology. On the other hand, teachers who are interested and are also knowledgeable about the scientific process, mathematics, or computer science and modeling will clearly have an advantage, at least in terms of their initial comfort level. Past Challenge sponsoring teachers have been a very diverse crew, including elementary teachers and librarians.

The sponsoring teacher will serve as your advisor and supervisor throughout the competition. He or she will make sure that you have submitted all forms, reports (abstract, interim, and final), and applications before deadline; arrange for and ensure your attendance at Challenge activities and supervise you (or arrange for an authorized substitute) at the activities (supervision to include setting standards for appropriate dress, behavior, and preparation for the event); help you find a project mentor; access the network and use email throughout the year to keep in touch with Challenge administrators about changes, deadlines, and helpful tips that will affect you.

The time commitment involved for the teacher will depend on the complexity of your project and on your team's experience. Please recognize that participating in the Challenge as your sponsoring teacher means extra, often unpaid, responsibilities for your teacher. Rather than using their time to pursue personal interests, your teacher is willingly making it possible for you to pursue yours. Appreciate their commitment to your future, and make sure you put out your best efforts—that's the

best possible way to show your thanks.

Your Team Mentor's Responsibilities

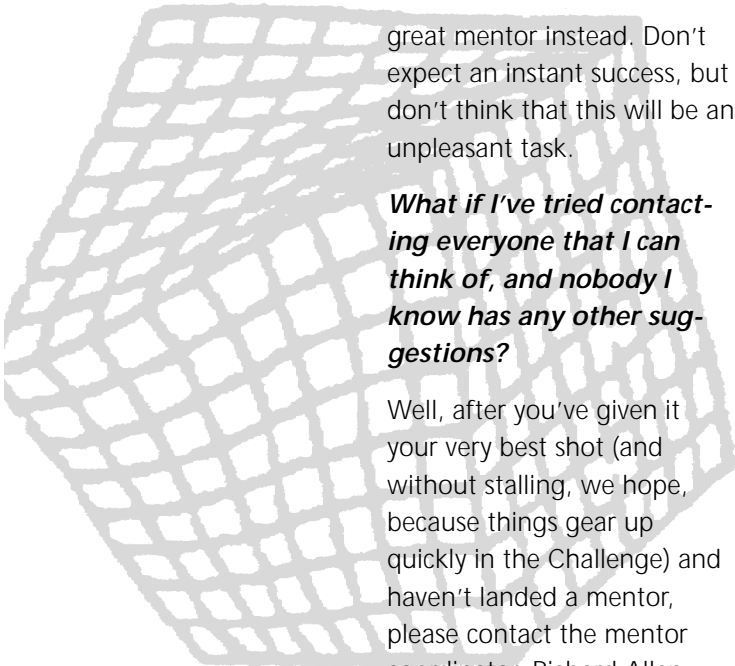*I keep hearing the term "team mentor." What is that, and how do we get one?*

A project mentor, or expert in the area of science that you have chosen for your project, can be a great tool to you throughout the year. Ideally, a mentor serves as a sounding board, a reality check, a guide, and an inspiration. Hopefully he or she doesn't provide you with all related research information, pick your project, or develop your program model.

We'd like you to try to take a hand in getting one or more mentors for your team. Mentors can be parents, neighbors, employees in local businesses, school teachers or college professors—the possibilities are endless. How do you turn the possibilities into actual mentors? First, recognize that many people are already familiar with the Challenge and will be happy to be involved in helping dedicated kids like you. Those who haven't heard of the program are generally thrilled to hear about a program that's got so much going for it. There are very few adults in the world who don't care if high-school kids are involved in good activities. We all

know that you guys are our future, so we'd be fools not to care how you're spending your time and energy. And guess what! There are very few people who can resist sharing information and help about a topic that they know alot about, especially if they have an interested audience.

The point here is that you don't need to feel reluctant about asking an expert to serve as your mentor. That person might be so overloaded with work that he or she can't serve as your mentor, but the person will likely feel pleased to have been asked. And perhaps he or she will be able to suggest somebody else who will be a

great mentor instead. Don't expect an instant success, but don't think that this will be an unpleasant task.

What if I've tried contacting everyone that I can think of, and nobody I know has any other suggestions?

Well, after you've given it your very best shot (and without stalling, we hope, because things gear up quickly in the Challenge) and haven't landed a mentor, please contact the mentor coordinator. Richard Allen, from Sandia National Laboratories, will try to hook you up with a mentor. You can reach him at (505) 845-7825 or

`rcallen@cs.sandia.gov` .

If no mentor is available in your chosen area, we will try to help you out through our own resources or across the network.

What do mentors do? Why on Earth would I want one?

We consider mentors to be very valuable contributors to a team's success in the competition. Your mentor can

• help you brainstorm prospective problems to solve within the area of science you have selected and help you eliminate or redefine unfeasible ones (unfeasible projects could be too complex for your

capabilities or for the time limits of the program);

• help you find resources (literature, network information, data, and people) related to your chosen project;

• provide information about the math and science that you need to used in your project;

• help you select the proper platform and software for the computations involved in your project;

• ask you lots of questions about the code to get you to think through the problem and possible solutions (here's a perfect spot for mentors to be guides and motivators rather than doers—your team

needs the chance to develop the code for itself); and

• monitor your team's progress and make sure you set and meet milestones to keep the project on track (no, not hassle you, just remind you—and, obviously, only if it's necessary).

We expect that your mentor will

• show interest in your project and meet with you at regularly scheduled times;

• ask you to explain your project often (to be sure you're staying on track and not losing sight of the original problem as you wade through the research and code);

• keep sight of the mile-stones and deadlines and help you to meet them; and

• keep in mind that you are high school students rather than professionals or college students and simplify the highly technical information appropriately.

We hope your mentor will be at Glorieta for at least part of the Kickoff conference to get to know you and to begin talking about the project. After that, you will probably use a combination of e-mail, phone calling, and meetings to communicate with your mentor. In the past, teams who have met with their mentors regularly have done well in the Challenge.

Who's going to decide whether we've "done well" on our project? And how can they judge what we've done—won't we know more about the project than they will?

The Challenge judging panel is made up of scientists and computer professionals who work throughout New Mexico in universities, government laboratories, and private industry. The judges will evaluate your project at three different stages so that you get feedback you can use to make improvements and to refocus your work if neces-sary. This system also lets the judges get familiar with your project and observe your
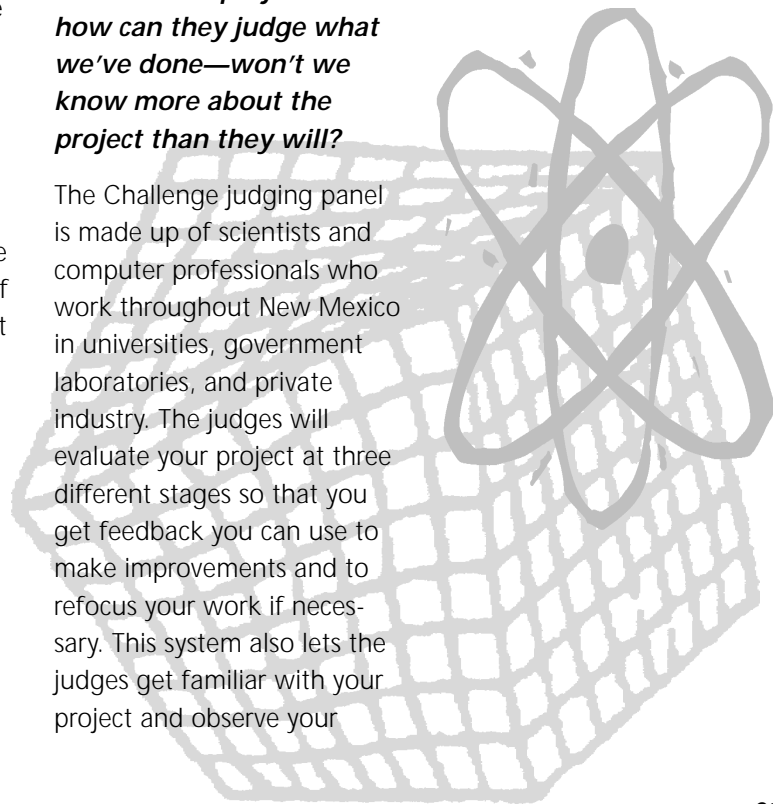
progress as the project develops. The judges' three reviews occur at the following times:

• In October they all read the online project abstract that you place on the Web site at the Kickoff conference. This first impression of your project gives the judges a baseline from which to measure your progress during the year.

• In January, they do the preliminary project evaluation of your interim report. We divide New Mexico into six regions, with two or more judges assigned to each one. The judges for each region read all of the reports from the teams in their region; on a scheduled day they meet with each of the teams for a 30-minute evaluation session (see Appendix E for the schedule).

During the session, you will discuss your project, your progress, and your plans for completing your work. You will need to be prepared to answer the judges' questions. You can view this session as good practice for your final presentation, with all of your team members contributing to the preparation and the oral presentation. You should plan to use the full array of equipment that you expect to use in your final presentation (including a network connection to the computers at Los Alamos).

The judges will evaluate both the project itself and your presentation. They will make comments and suggestions, and they will give you a brief written assessment of your project. The expectation is that your project will not be completed at the time of this evaluation session.

• In April they do the final judging for Category A (competitive) projects. The final projects for both Categories A and B are due at New Mexico Technet by noon on Wednesday, April 7, 1999. The entire panel of judges will receive copies of the Category A reports for their review. Each judge places brief

comments about each report at a selected Web site. After all of the judges have reviewed the comments about all of the reports, they all participate in a conference telephone call to determine the list of finalist teams based on the judging criteria (see Appendix F). The finalist teams are then invited to make a presentation of their projects to the full panel of judges on the day before Awards Day in Los Alamos. This marks the end of the first of two phases of the final judging.

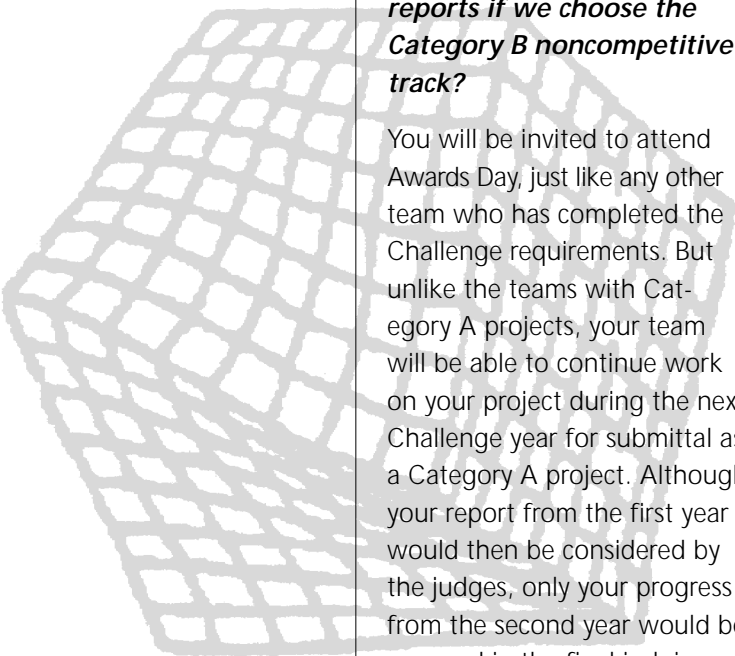During each finalist team's presentation, the various members of the team describe the project, demonstrating their teamwork and shared work responsibilities. Remember, practice makes perfect, so if you make it to the finals, be sure you take the time to carefully plan out the presentation text, visual aids, program graphics, and code and to practice doing the whole presentation together, using the various tools. Work out the kinks ahead of time—you'll feel well prepared, and that'll help with the pre-show jitters.

There will need to be a few minutes left at the end of the 30-minute session to allow for questions from the judges. Again, some practice could help. Try to imagine what questions the judges might ask. If you can't include that information in your presentation, be sure to prepare answers in case the questions are asked. Decide ahead of time what topics will be covered by which team members.

After hearing all of the presentations, the judges will use the judging criteria (see Appendix F) to arrive at a consensus about the top teams (the number of which will be one more than half the number of finalist teams). Each judge will then rank the top teams. Each team's rankings will then be averaged. The top teams' averages will determine the first and second place and honorable mention winners.
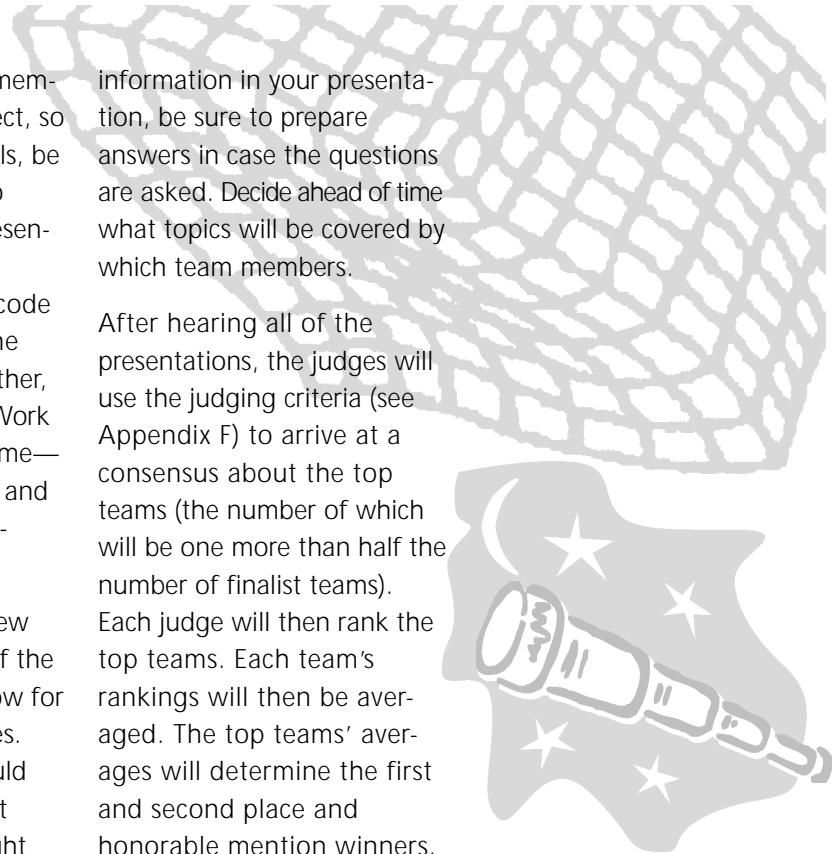
What happens to our reports if we choose the Category B noncompetitive track?

You will be invited to attend Awards Day, just like any other team who has completed the Challenge requirements. But unlike the teams with Category A projects, your team will be able to continue work on your project during the next Challenge year for submittal as a Category A project. Although your report from the first year would then be considered by the judges, only your progress from the second year would be assessed in the final judging.

Sponsors

Los Alamos National Lab/DOE
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Benefactors

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Albuquerque Tribune
Eastern New Mexico University
CHECS
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New Mexico Institute of Mining and Technology
New Mexico State University
New Mexico State Department of Education
Phillips Research Site
Sandia National Laboratories
San Juan Community College
Santa Fe Community College
SGI
University of New Mexico

Appendix A
Areas of Science Appropriate for Challenge Projects

Behavioral and Social Sciences:

Psychology, sociology, anthropology, archaeology, ethnology, linguistics, animal behavior (learned or instinctive), learning, perception, urban problems, reading problems, public opinion surveys, educational testing, economics, political science.

Biochemistry

Molecular biology, molecular genetics, enzymes, photosynthesis, blood chemistry, protein chemistry, food chemistry, hormones.

Botany

Agriculture, agronomy, horticulture, forestry, plant biorhythm, laboratory plant anatomy, plant taxonomy, plant physiology, plant pathology, plant genetics, hydroponics, algology, mycology.

Chemistry

Physical chemistry, organic chemistry (other than biochemistry), inorganic chemistry, analytical chemistry, materials, plastics, fuels, pesticides, metallurgy, soil chemistry.
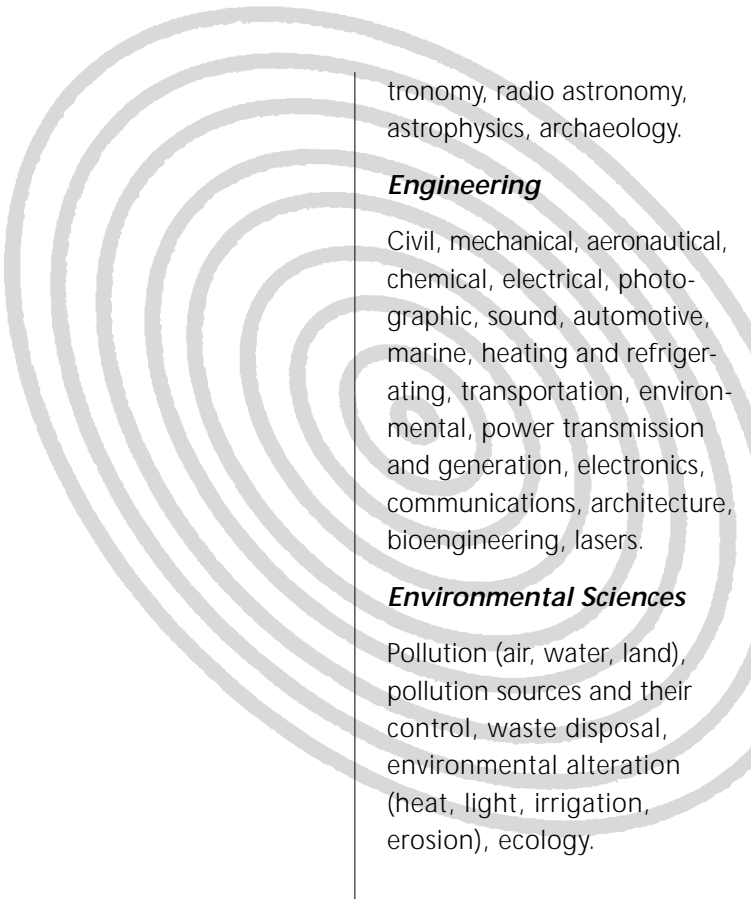
Computer Science

New developments in software or hardware, information systems, computer systems organization, computer methodologies and data (including structures, encryption, coding and information theory), artificial intelligence, graphics modeling, graphics art.

Earth and Space Sciences

Geology, geophysics, physical oceanography, meteorology, atmospheric physics, seismology, petroleum, geography, speleology, mineralogy, topography, optical as-

tronomy, radio astronomy, astrophysics, archaeology.

Engineering

Civil, mechanical, aeronautical, chemical, electrical, photographic, sound, automotive, marine, heating and refrigerating, transportation, environmental, power transmission and generation, electronics, communications, architecture, bioengineering, lasers.

Environmental Sciences

Pollution (air, water, land), pollution sources and their control, waste disposal, environmental alteration (heat, light, irrigation, erosion), ecology.

Mathematics

Calculus, geometry, abstract algebra, number theory, statistics, real/complex analysis, probability, topology, logic, operations research, game theory, other topics in pure and applied mathematics.

Medicine and Health

Medicine, dentistry, pharmacology, veterinary medicine, pathology, ophthalmology, nutrition, sanitation, pediatrics, dermatology, allergies, speech and hearing, optometry.

Microbiology:

Bacteriology, virology, protozoology, fungal and bacterial genetics, yeast.

Physics

Solid state, optics, acoustics, particle, nuclear, atomic, plasma, superconductivity, condensed matter, fluid and gas dynamics, thermodynamics, semiconductors, magnetism, quantum mechanics, biophysics, aerodynamics, fluid mechanics.

Zoology

Animal genetics, ornithology, ichthyology, herpetology, entomology, animal ecology, anatomy, paleontology, cellular physiology, animal biorhythms, animal husbandry, cytology, histology, animal physiology, neurophysiology, invertebrate biology.

Appendix B
Computers, Connections, and Sources for Help

Computers

As a participant in the Supercomputing Challenge, you have access to LANL's Pi machine, an SGI O200 running the IRIX operating system. You will also have an account on the Mode machine, which runs the LINUX operating system.

Machines at New Mexico State University, Sandia National Laboratories, and the Maui High Performance Computing Center in Hawaii may also be available for your use with special permission. Only those students working on projects with extraordinary computation requirements will be given access to the other machines. If you want to request an account on an additional machine, please send an e-mail message justifying your need for an account on that machine to
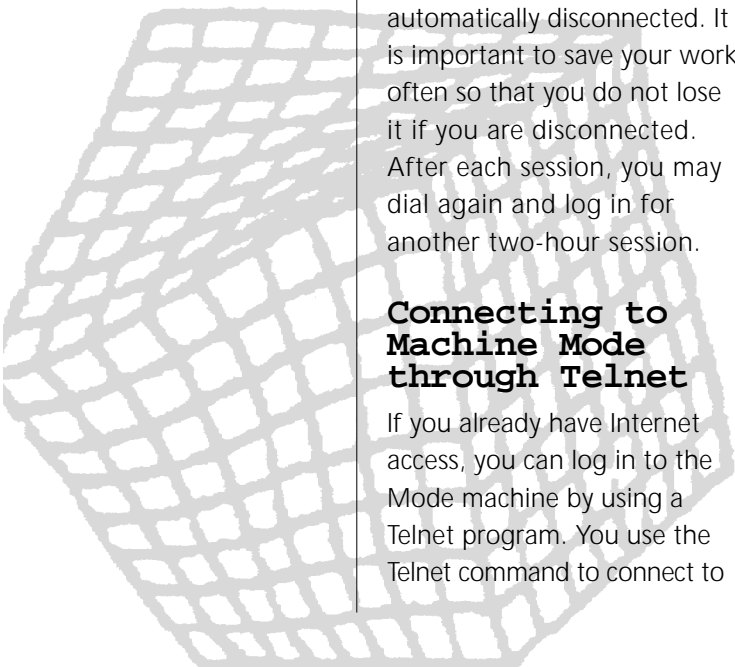
`consult@mode.lanl.k12.nm.us`.

Connecting To Machine Mode through the New Mexico Technet Network

As a participant in the Supercomputing Challenge, you have access to the New Mexico Technet network, which connects you to the various computer sites. Ordinarily, to log in to a remote computer, you must first dial and log in to the New Mexico Technet terminal server. The Challenge dial-up service is a standard Internet PPP dial-up connection. Technet will provide networking software for your type of computer. You will also receive instructions for connecting to and using the network for your Challenge project.
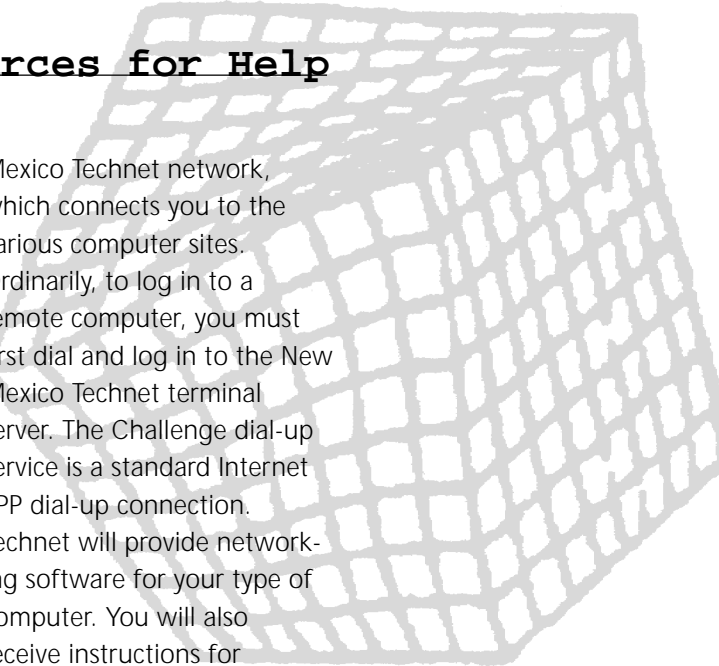
When you log in to the Technet Machine, you establish a "session." Each session may last no longer than two hours. If you have not disconnected within two hours, you will be automatically disconnected. It is important to save your work often so that you do not lose it if you are disconnected. After each session, you may dial again and log in for another two-hour session.

Connecting to Machine Mode through Telnet

If you already have Internet access, you can log in to the Mode machine by using a Telnet program. You use the Telnet command to connect to `mode.lanl.k12.nm.us`.

Check with the person in charge of the facility where you are working to find out if you are connected to the Internet. The following example shows you how to Telnet from your computer.

You key in

```
telnet
mode.lanl.k12.nm.us
```

and the screen will show you a message box that says

```
Trying 198.59.100.1
Connected to
mode.lanl.k12.nm.us
Escape character is
'^]'
```

At the prompt, key in your account name, then at the password prompt, key in your password:

```
login:
your_Challenge_account
name Password: your
password mode>
```

Useful commands

bbs	To enter the student bulletin board
ftp	To transfer files between two Internet sites
logout	To log out of mode.lanl.k12.nm.us
man	The program to access pages from the UNICOS MANual
menu	Redisplays this text file
news	To read the Challenge news file, for old news use news -a
parti	To view the list on NMHSSC participants
pine	The electronic MAIL program
telnet	To log on to other computers

Please report all problems to consultants at **consult@mode** (505) 667-5746 .

To send e-mail to the Challenge support staff enter **pine consult** .

When you are finished with a computing session, you can log off the Mode machine by typing **logout** or pressing the control key and **d** .

Machine Pi

The Pi machine is the computer you'll use to do the work for your Challenge project. From the Mode machine prompt, you can get to the Pi machine

(**pi.lanl.k12.nm.us**) by entering **pi** .

The disk space on the machines is limited, and you must keep your file space clean. Please remove unnecessary files, especially executable files, as soon as possible. You can use the command **rm** (remove) to do this.

When you are finished with a computing session, you can log off machine Pi by typing **logout** or pressing the control key and **d**

(**<CTRL-D>**) .

Please note that e-mail should be sent and received on the Mode machine.

Dial-In Phone Numbers

Whenever possible, please use local telephone numbers to call the Technet computer. Teams from areas that have local dial-in numbers will not be authorized to use the long-distance 800 numbers. (Whereas using the 800 numbers costs the Challenge a substantial amount of money, using the local dial-in numbers costs much less.)

If you have a problem getting through on the local dial-in numbers, you should contact New Mexico Technet Customer Support at (505) 345-6555. In some cases, Technet will authorize a team to use the

This chart shows the phone number that you should dial from your home area to reach the Technet computer.

For 800 Service (surcharge applies) call (800) 283-2638.

The ISDN Dial-up Number (Albuquerque only) is 346-2135.

A Technet ISDN account is required.

All modems are 28.8 kbps, v.34 capable. If entering ATDT phone number does not work, call Customer Support at New Mexico Technet, (505) 345-6555.

City	Local Number
Alamogordo	437-4209
Albuquerque	345-8751
Artesia	746-3081
Aztec/Bloomfield/ Farmington	334-1532
Carrizozo	648-5561
Clovis	762-8673
Crownpoint	786-5602
Cuba	289-2009
Des Moines	278-2610
Española	753-3836
Gallup	726-0429
Hobbs	391-9131
Las Cruces	525-8688
Portales	356-8633
Raton	445-3395
Roswell	347-2568
Ruidoso	257-3441
Santa Fe/Los Alamos	827-6780
Socorro	835-6900
Taos	737-0870
Tucumcari	461-3852
Zuni	782-4409

800 service even if they have access to a local dial-in number. If very heavy usage is a problem, additional local dial-in numbers may be added. The Message of the Day on machine Mode will tell you when new lines have been added in your area.

Online Help and Information

Many sources of information are available to help you during the Challenge. You can do research at your school or public library, and information is also available through your computer. From your computer you can access the news services and bulletin boards on the Internet, which can lead you to valuable sources of information.

Both the New Mexico Technet machine and the LANL machines have a program called LYNX information, which allows you to access the Internet and all of the sites available through it. To use the program, key in the word **lynx** .

Once you are in LYNX, you will find details about using the Internet, about the various networks that make it up, and about the kinds of information that are available.

When you are logged in to a machine using the UNIX operating system, you can access a number of different

types of information. MAN pages can give you quick reference information to refresh your memory or help you through some of the rough spots in programming.

The following suggestions will help you use MAN pages

• For information about the MAN command, type **man man** .

• If you want to know what options to use with a command (for example LS), type **man ls** .

• To get a list of MAN pages with information about a certain topic (for example, Fortran), type **man -k Fortran** .

You will get a list of commands that pertain to Fortran along with the function of each command.

• To search for a keyword (for example, Fortran), type **man -i Fortran**. You will get a list like the following:

Function:
f90
Fortran compiler

Description:
Invokes the CF90
Manual Entry
f90(1)

• You can type **q** to quit the MAN pages.

If you need printed output from either Mode or Pi, send e-mail indicating what file you would like to have printed and the address where it should be sent to

`consult@mode.lanl.k12.nm.us` .
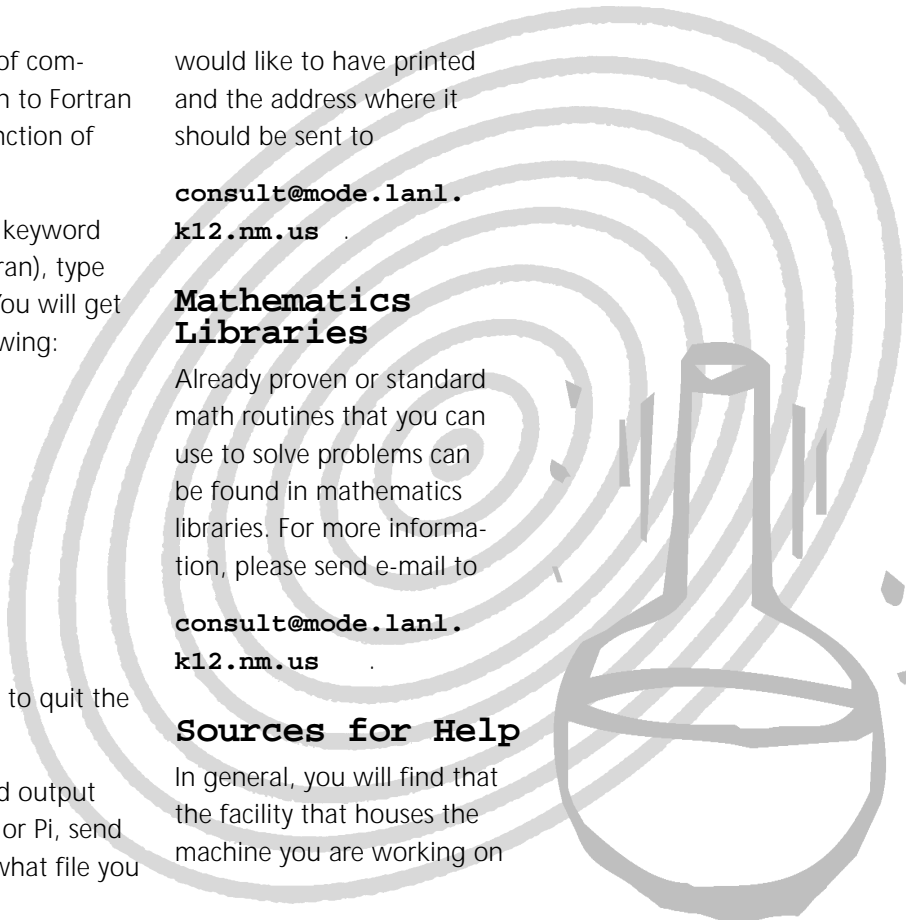
Mathematics Libraries

Already proven or standard math routines that you can use to solve problems can be found in mathematics libraries. For more information, please send e-mail to
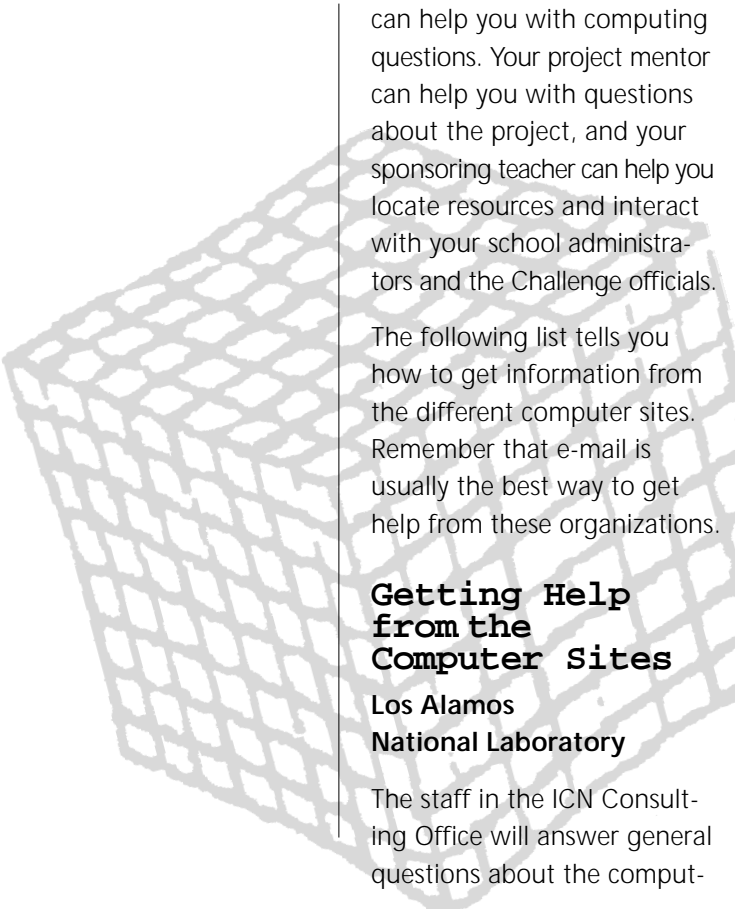
`consult@mode.lanl.k12.nm.us` .

Sources for Help

In general, you will find that the facility that houses the machine you are working on

can help you with computing questions. Your project mentor can help you with questions about the project, and your sponsoring teacher can help you locate resources and interact with your school administrators and the Challenge officials.

The following list tells you how to get information from the different computer sites. Remember that e-mail is usually the best way to get help from these organizations.

Getting Help from the Computer Sites

Los Alamos National Laboratory

The staff in the ICN Consulting Office will answer general questions about the computers, logging in to the computers, or security problems. Office hours are from 8 a.m. to 5 p.m., Monday through Friday. Messages sent after work hours will be answered the following work day.

e-mail:
consult@mode.lanl.k12.nm.us
Phone: (505) 667-5746

New Mexico State University

If your team is using the computer at New Mexico State University can receive help by contacting Don Connell.

e-mail:
dconnell@nmsu.edu
Phone:
(505) 646-8068

Sandia National Laboratories

If you are working on a computer at Sandia, use the following e-mail address and phone number to get assistance.

e-mail:
rcallen@cs.sandia.gov
Phone: (505) 845-7825

Maui High Performance Computing Center

If you have an account at the Maui Center can get use the following e-mail address and phone number to get assistance.

e-mail:
info@mhpcc.edu or
brobey@arc.unm.edu or
uideng@arc.unm.edu
Phone:
(505) 277-8249
(local office)

New Mexico Technet Customer Support

The New Mexico Technet staff will take care of general questions, problems with your connection, or problems with logging in to New Mexico Technet. The office is open from 8 a.m. to 5 p.m., Monday through Friday. After regular hours, you can leave a message on the phone recorder. In your message, state what your problem is, and someone will call you back as soon as possible.

If you are calling long distance, be sure to mention that to the staff member, and New Mexico Technet will call you back so your school does not incur a large long-distance charge. Remember, e-mail is faster and cheaper. With e-mail, you can also include a detailed description of your problem and examples of error messages.

e-mail:
`consult@technet.nm.org`
or
`consult@mode.lanl.k12.nm.us`
Phone:
(505) 345-6555

Regional Graphics Support

By contacting the graphics support centers in each region of the state, you can work on graphical output of your project data. Please identify yourself as a Challenge participant when you contact any of the centers. Computers and software vary at each site.

Region 1.

Portales area: To arrange for your team to work at Eastern New Mexico University, please call Ron Obenhaus or Richard Bradfute at (505) 562-2694 or send e-mail to

`obenhaur@enmu.edu or`
`bradfutr@enmu.edu` .

Region 2.

Las Cruces area: To arrange for your team to work on the graphics devices at New Mexico State University, call the computing hot line at (505) 646-1840.

Region 3.

Santa Fe area: Please call Sandra Taylor at (505) 438-1223 to make arrangements.

Las Vegas area: To arrange for your team to use the computing facilities at New Mexico Highlands University, please send e-mail to Dr. Wayne Summer or Dr. Catherine Stringfellow at

`wsummer@venus.nmhu.edu`
`stringfellow@venus.nmhu.edu`

Region 4.

Albuquerque area: At UNM, you can use an X-terminal or a Silicon Graphics Workstation (SGI). Both computers have various graphics software packages including Khoros.

The X-terminals are located in the CIRT Computer Pod, the Lobo Lab, and the Engineering and Science Computer Pod (ESC) on UNM's main campus. The SGIs are located only at the ESC Pod.

The computers are available on a walk-in basis, but UNM computer science students have priority in using the SGI machines. You can check on machine availability and Pod hours by calling the Pod consultants:

CIRT Pod, (505) 277-8143
Lobo Lab, (505) 277-8813
ESC Pod, (505) 277-0459

To use the graphics devices at the University of New Mexico, get a special UNM account by calling Sandy Carter-Mayes at (505) 277-2627 or sending e-mail to

`scarter@unm.edu` .

Region 5.

Farmington area: To arrange to work at San Juan College, please call the help desk at (505) 599-0266.

Gallup Area: Participants may work at UNM-Gallup during open lab periods. For details, call the university at (505) 863-7608.

Region 6.

Socorro area: To obtain an account and access to the facilities at New Mexico Tech, call Dr. Mike Topliff at (505) 835-5735.

Appendix C
Registration Forms and Information

## Acceptable use policy (AUP) for your Supercomputiing Challenge Account

As a participant in the New Mexico High School Supercomputing Challenge, you will have 60 HOURS of MONTHLY access to the New Mexico Technet, Inc., dial-up lines, computing systems and networks, to Machine Pi at Los Alamos National Laboratory (LANL), and to the Internet. Use of these facilities is a PRIVILEGE, and you MUST act in a responsible and ethical way at all times.
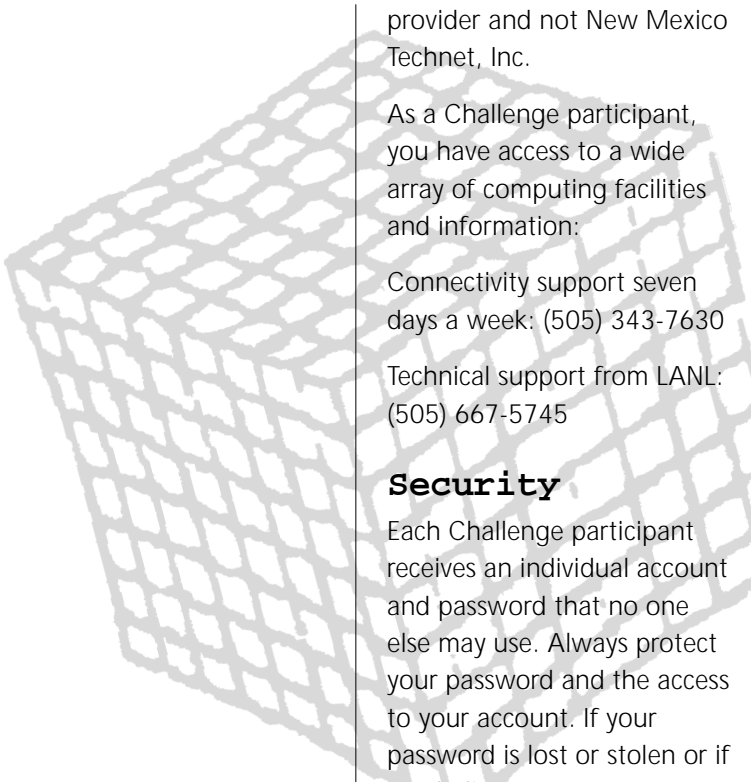
Through these facilities, you will be able to access information on computer systems around the world. Challenge participants, their parents, and their schools must understand that New Mexico Technet, Inc., and the Challenge sponsors and their employees have NO control over the access to specific systems or the content of information on any system. Some systems may contain material that may not be appropriate for high school students. New Mexico Technet, Inc., bans the use of inappropriate materials; Challenge participants are strictly prohibited from accessing and using inappropriate materials. Parents of participants are asked to monitor home use of the computer systems.

Challenge participants are encouraged to seek help for their projects through network contacts. However, the information, opinions, advice, and services provided via the New Mexico Technet, Inc., computing and networking systems are those of the
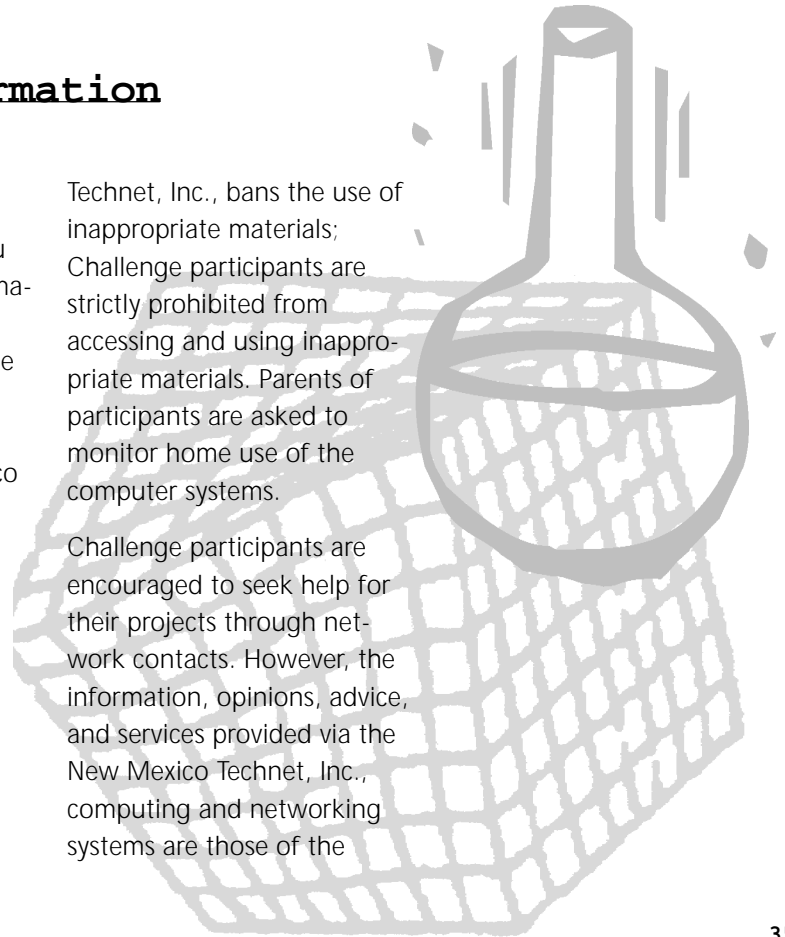
provider and not New Mexico Technet, Inc.

As a Challenge participant, you have access to a wide array of computing facilities and information:

Connectivity support seven days a week: (505) 343-7630

Technical support from LANL: (505) 667-5745

Security

Each Challenge participant receives an individual account and password that no one else may use. Always protect your password and the access to your account. If your password is lost or stolen or if you believe someone may have unlawfully entered your account, you must immediately notify New Mexico Technet.

e-mail:
`consult@mode.lanl.gov`
phone:
(505) 343-7630

Online Conduct

Your actions while online must always be at the highest ethical level. System and network administrators monitor all activity. Any inappropriate actions may result in your being dismissed from the Challenge and your account being terminated.

Any inappropriate behavior or attempt to restrict or inhibit other Challenge participants from using and enjoying the Challenge computing and networking systems is strictly prohibited.

You may not publish over the system or network any information that violates or infringes on the rights of other people or that is abusive, profane, or sexually offensive.

You may not publish information that contains unsolicited advertising or that solicits other participants to use goods or services.

You must not use the facilities and capabilities of the system or network to conduct any non-Challenge business or activity or to solicit the performance of any activity that is prohibited by law.

Only public domain files and files which the author has specifically approved for online distribution may be transferred by Challenge participants.

You must have the author's permission to place copyrighted material on any system connected to or used for Challenge activities. If you download copyrighted material for your own use, permission must be specified in the document or on the network or be obtained directly from the author. For your protection, be sure to keep a copy of the permission.

New Mexico Technet, Inc., and Los Alamos National Laboratory reserve the right to monitor the activities of Challenge participants and to fully cooperate with local, state, or federal officials in any investigation concerning or relating to information transmitted on any system connected to or used in Challenge activities.

Enjoy your 60-HOUR MONTHLY Challenge account, but keep in mind that it will be terminated immediately for ANY inappropriate actions, not just those listed here. You or your agent may request the

termination of an account by sending a notice to a system or network administrator. The termination will be effective on the day the notice is received or on a date specified in the notice. Accounts that are inactive for more than 180 days may be removed along with all files, and no notice will be given to the Challenge participant.
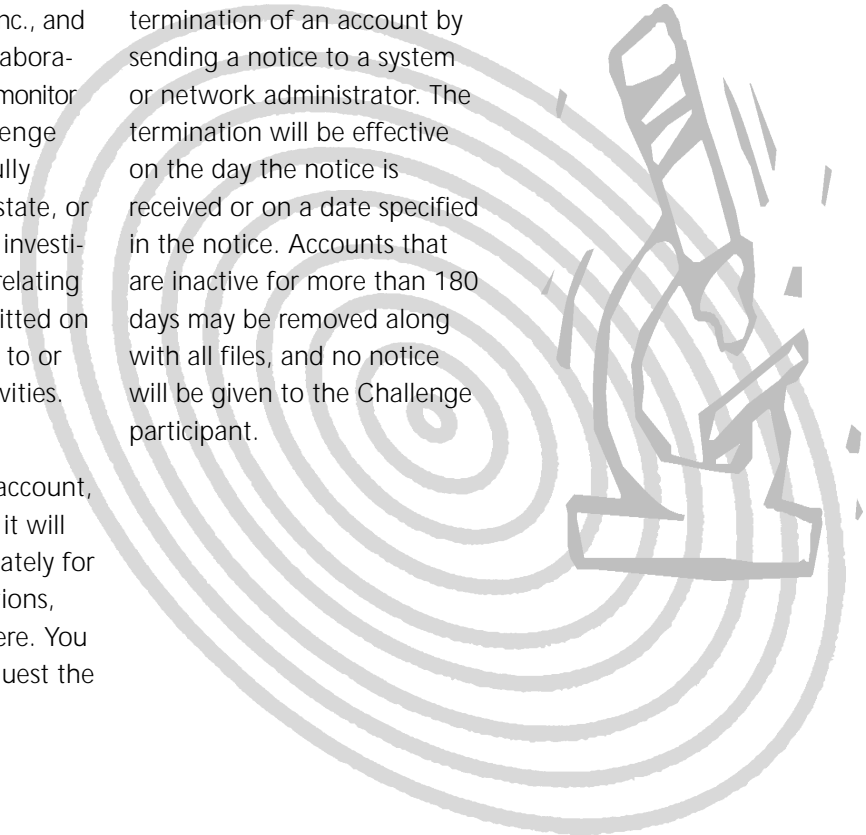
Appendix D
Report Specifications

Project Requirements

• Your project problem MUST represent a real science or mathematics problem from the approved list of appropriate science areas for the Challenge (see Appendix A), and you must clearly demonstrate that the solution requires the use of a high-performance computer.

• The final version of your computer application software must be written in FORTRAN, FORTRAN 90, C, or C++ programming language.

• Your project cannot involve live vertebrate animal experimentation.

• If you choose the Category B (noncompetitive) track this year, you can work on the same project again next year; you must submit a final report each year.

• If you want to use human subjects in your Challenge project, you must get approval beforehand from the Challenge Executive Committee.

Software submitted during the course of the Challenge competition will be the exclusive property of each participant. Each participant does grant the sponsoring organizations a nonexclusive right to reproduce, modify, use, display, and distribute such software.

Specifications for the Interim Report

We would like each team to submit an electronic interim report by 5 p.m. on Friday, January 8, 1999.

To submit the report electronically

- Enter your interim report in the directory

public_html .

- Review the text and check the spelling. Interim reports with spelling or typographical errors will be returned for correction.

- Submit the report with the command

submit interim.html .

If you must instead submit a hard-copy report by mail, please use the following address:

New Mexico Supercomputing Challenge
New Mexico Technet, Inc.
5921 Jefferson, N.E.
Albuquerque, NM 87109

The interim report, which must be at least 500 words in length, should expand on the information in your abstract. Please note that the interim report may not be a copy of the abstract that you submitted at registration.

On the report cover, be sure to identify your school, team number, and team members. The report should include the following information:

- the definition of the problem

- your plan for solving the problem computationally

- a description of the progress you have made up to this time

- the results you expect to get

For the hard-copy report's cover page, follow the format shown on the last page of this appendix. This format should be used for both a hard-copy interim report and the final report. Note that you do not need to declare a judging category for the interim report.

Specifications for the Final Report

Every team must submit a final report in either Category A (to compete for prizes) or Category B (to get feedback to use toward completing the project the following year). Each team that registers in the fall must submit either a Category A or Category B report. All reports must arrive in HARD-COPY form at New Mexico Technet no later than NOON on Wednesday, April 7, 1999.

Your report should focus on your project rather than on the experiences of your team. The report must show that you conducted a scientific investigation, obtained results, and arrived at some conclusions. Be sure to include the following:
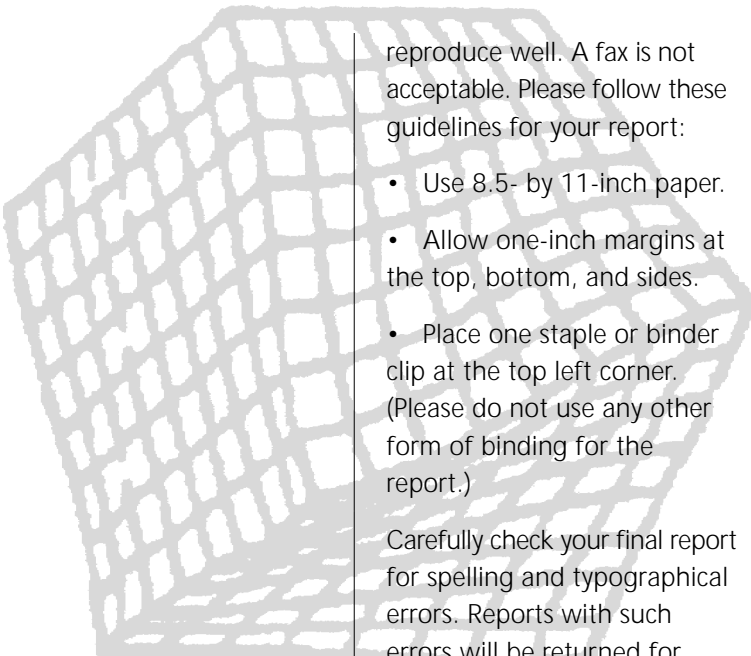
- an executive summary that is shorter than one page

- a statement of the problem that you have investigated

- a description of the method you used to solve your problem

- the results of your study

- the conclusions you reached by analyzing your results

- the software, references, tables, and other products of your work

- your most significant original achievement on the project

- an acknowledgment of the people and organizations that helped you

Be sure to follow the rules that govern the submittal of final reports so that your team is not disqualified. Please keep a copy of your report in case any problems arise in delivering it or copying it for the judges. Also note that, if you are selected to be a finalist team, you will need to bring a camera-ready copy of your report to Los Alamos when you do your presentation for the judges. Camera-ready means that the printing is of good enough quality to
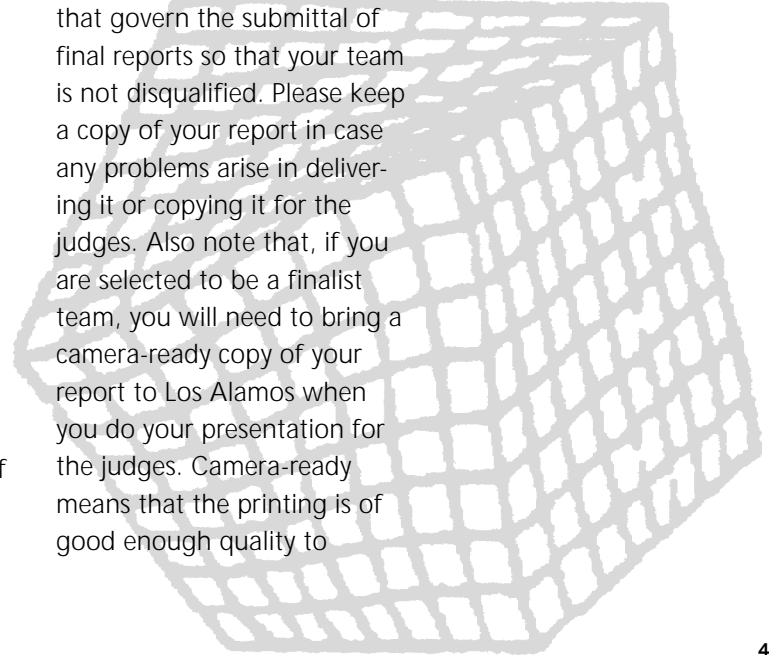
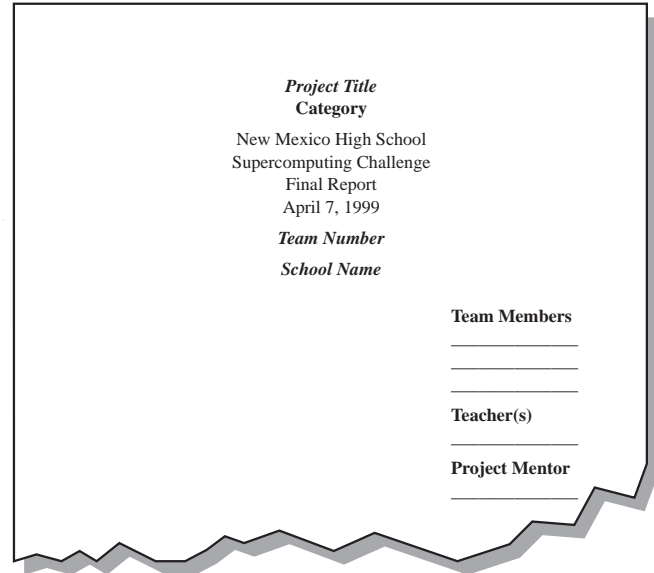reproduce well. A fax is not acceptable. Please follow these guidelines for your report:

• Use 8.5- by 11-inch paper.

• Allow one-inch margins at the top, bottom, and sides.

• Place one staple or binder clip at the top left corner. (Please do not use any other form of binding for the report.)

Carefully check your final report for spelling and typographical errors. Reports with such errors will be returned for immediate corrections.

• Include a cover page in your final report with the following information: your project name, team number, school, team members, sponsoring teacher, project mentor, and your statement of intention about what track you expect to submit your report for.

The sample cover page that follows shows you what information you should give and how you should arrange it. When you prepare your cover page, you will change

Project Title
Category

New Mexico High School
Supercomputing Challenge
Final Report
April 7, 1999

Team Number

School Name

Team Members
_____
_____
_____

Teacher(s)
_____

Project Mentor
_____

the words shown in italic type face to the proper information for your team and project. Please follow this example for both the interim and the final report.

Poster Specifications

Your team must prepare two posters: (1) a technical poster that describes your project (a sort of photograph that shows your entire project at a glance and (2) a graphics poster whose artwork and catchy slogan creatively embody the Challenge program. You will need to bring both of these to display at Awards Day. The posters may be no larger than 22 by 30 inches (standard poster-board size) and can be hand-drawn, designed on a computer, or created by a combination of methods.

At Awards Day, all of the Challenge participants will judge the poster entries and select the winners for both categories. The poster that best displays the technical information about a project will serve as the cover for the publication of the compiled finalists' reports. The best graphics poster will serve as the Challenge logo for the next year, appearing on things like the Challenge's letter-head, T-shirts, book bags, and Web site. This year there is a $200 award for the individual(s) who design the winning graphics poster.

Midyear Challenge Activities

Project Refinement and Interim Reports

After the Kickoff Conference, you will have until Friday, January 8, 1999, to refine your project and electronically submit your interim report. This report should describe your project, your progress to date, and your expected results (see Appendix D for report specifications).

Regional Workshops

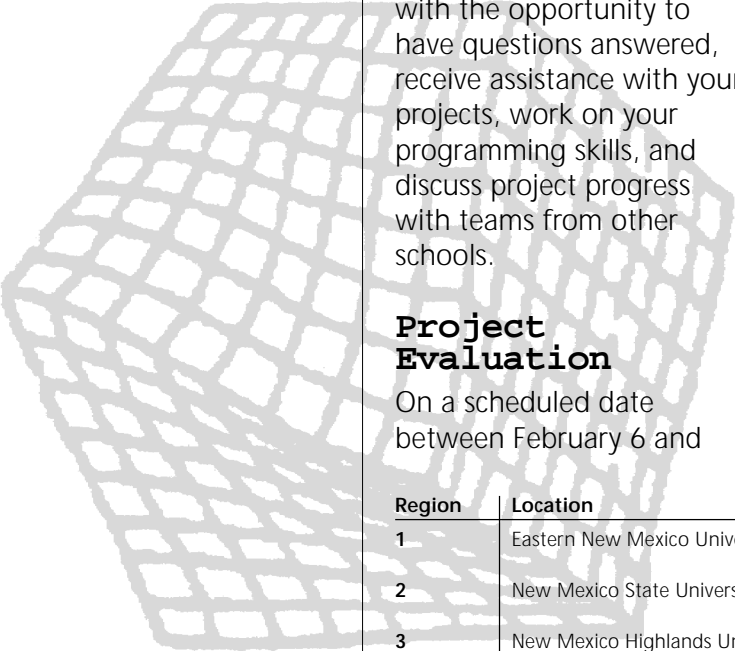One-day workshops will be held at locations around the state from Tuesday, January 12, 1999, through Friday, January 22, 1999. You will be invited to attend the session nearest your school. In the case of a schedule conflict, you can let us know that you will need to attend a different session on another date. Your Regional Training

Region	Location	Date	Host
1	Eastern New Mexico University - Portales	Tuesday, January 12, 1999	Ron Obenhaus
2	New Mexico State University - Las Cruces	Thursday, January 14, 1999	Shaun Cooper
3	Santa Fe Community College	Wednesday, January 20, 1999	Sandi Taylor
4	University of New Mexico - Albuquerque	Tuesday, January 19, 1999	Terry Babbit
5	University of New Mexico - Gallup	Friday, January 22,1999	Tom Gonzales
6	New Mexico Tech - Socorro	Friday, January 15,1999	Mike Topliff

Session will provide you with the opportunity to have questions answered, receive assistance with your projects, work on your programming skills, and discuss project progress with teams from other schools.

Project Evaluation

On a scheduled date between February 6 and 20, you and your team members will make an oral presentation, not to exceed 30 minutes, to a team of Challenge judges. This lets the judges get a better understanding of your project, review your progress, and offer advice and direction on overcoming obstacles or finding additional resources. We plan to provide you with a copy of the judges' written comments to take with you.

The table below provides the dates and locations for the Project Evaluation Sessions in the state.

Region	Location	Date	Host
1	Eastern New Mexico University - Portales	Saturday, February 6, 1999	Ron Obenhaus
2	New Mexico State University - Las Cruces	Saturday, February 6, 1999	Shaun Cooper
3	New Mexico Highlands University - Las Vegas	Saturday, February 13, 19999	Wayne Summers
4	University of New Mexico - Albuquerque	Saturday, February 13, 1999	Sandy Carter Mayes
5	San Juan Community College - Farmington	Saturday, February 20, 1999	Paul Holmes
6	New Mexico Tech - Socorro	Saturday, February 20, 1999	Mike Topliff

Note: All of your team members do not NEED to attend, but it is highly recommended that they do.

Appendix F
Judging Criteria

Projects are judged on overall quality and on the progress that your team makes during the Challenge year. Remember that it is important to submit a project that is complete. Modest but complete results are more impressive than a grand scheme with no solid results.

When examining projects, the judges consider the scientific content; the effectiveness of the computational approach; the creativity, innovation, and initiative that you showed in developing and carrying out the project; and the clarity of your presentation.

As you prepare your project for the judging, you might want to use the following checklist of items that the judges will consider.

Checklist

1. Scientific Content

• Is the scientific content significant?

• Do you have a plan or procedure for getting a solution?

• Do you clearly recognize and define the variables?

• Do you recognize when controls are needed and use them correctly?
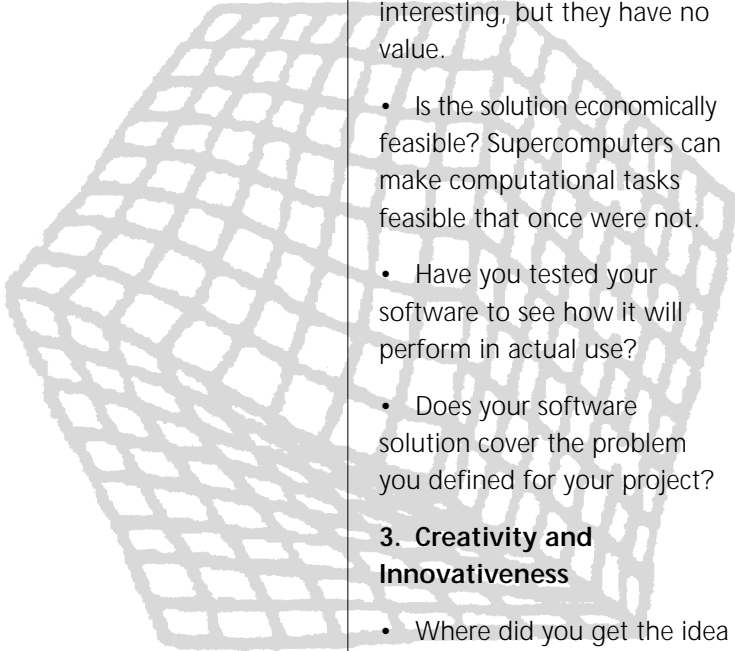
• Do you have adequate data to support your conclusions?

• Do you recognize the limitations of the data?

• Have you shown how the project ties in with related research?

• Do you know what additional research is indicated?

2. Effectiveness of the Computational Approach

• Is your computational approach appropriate for the project?

- Is the solution workable? Unworkable solutions may be interesting, but they have no value.

- Is the solution economically feasible? Supercomputers can make computational tasks feasible that once were not.

- Have you tested your software to see how it will perform in actual use?

- Does your software solution cover the problem you defined for your project?

3. Creativity and Innovativeness

- Where did you get the idea for the project? Was it an original idea that you developed from reading or work that you have done, or did you derive it from a text book?

- To solve the problem, did you devise a new solution or use a known solution in a creative way?

- In interpreting the data, have you contributed new insights or shown new intuitions?

4. Clarity, Conciseness, and Organization

- Did you state the problem clearly?

- Did you clearly explain the purpose of the project, the procedures used, and the results or conclusions of your work?

- Did you clearly show your data and results?

- Is your software documented, and have you included sufficient comments in your source code?

- Have you presented the material in a forthright manner, without tricks or gimmicks?

- Did you acknowledge all of the help that you received?

`Original Code versus Borrowed Code`

You must decide whether to write your own computer code or borrow an existing code. The judges might give credit to a team for writing an

original program; however, teams who use existing code are not downgraded. In making this decision, you should look at your team's programming strengths, the type of code you need for the problem you are working on, and the approach that will give you the best overall solution.

If you do use borrowed code, be sure to acknowledge the originator of the code. Indicate any modifications that you make to the code and explain the purpose of the modifications.
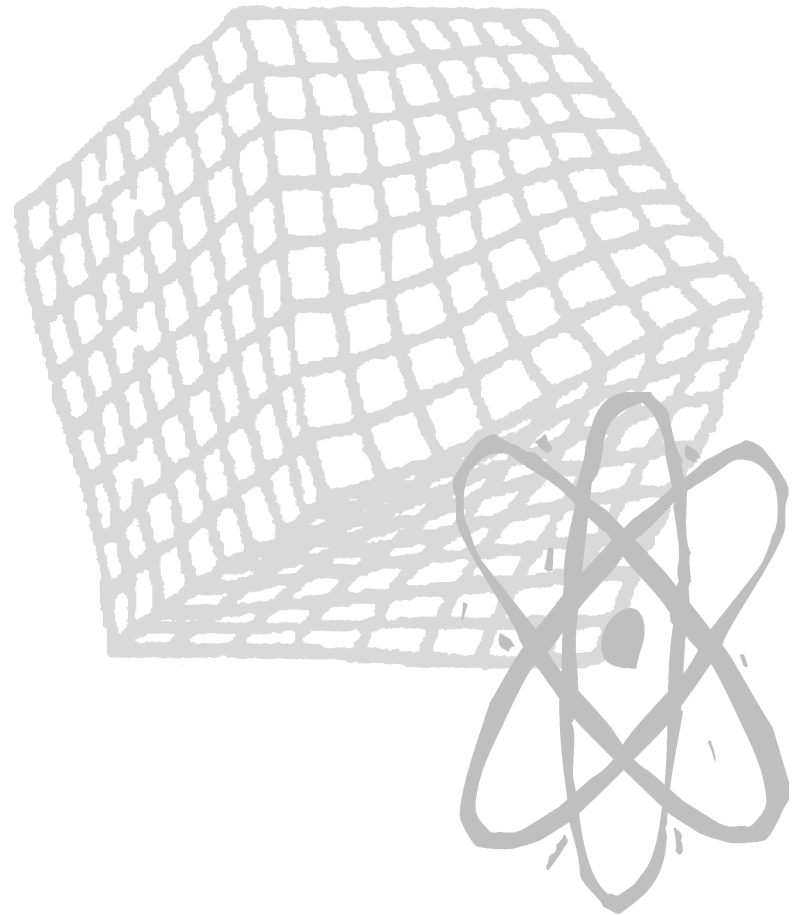
Appendix G
Awards and Scholarships

This Challenge year, scholarships and financial awards will be awarded for excellence in such areas as leadership, scientific or mathematical achievement, research, programming, and project development within a team. If you feel that you have demonstrated superior skill in one or more of these areas, you should apply for a scholarship. Students wishing to be considered MUST complete the process described further on in this appendix.

The following scholarships are available:

• Amy Beth Boulanger Memorial Scholarship: Four years/$2,400 per year, restricted to seniors only. This scholarship is awarded by the Board of Directors of New Mexico Technet, Inc.

• One-year full-tuition scholarship to NMSU

• One-time $2,400 financial award to UNM

• One-time $2,400 financial award to NMIMT

• One-time $2,500 financial award from Intel to any accredited institution of higher education in New Mexico

• One-time $500 financial award to attend any member institution in New Mexico given by the Council for Higher Education Computing Services, Inc. (CHECS); awarded by random drawing to a student or teacher present at Awards Day

If you apply for the Amy Beth Boulanger Memorial Scholarship, you will automatically be considered for the one-time scholarships.
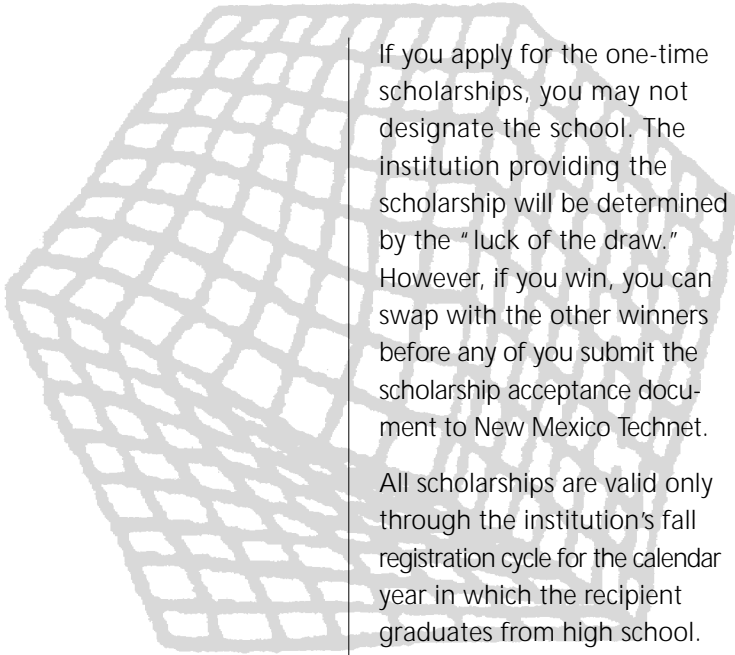
If you apply for the one-time scholarships, you may not designate the school. The institution providing the scholarship will be determined by the "luck of the draw." However, if you win, you can swap with the other winners before any of you submit the scholarship acceptance document to New Mexico Technet.

All scholarships are valid only through the institution's fall registration cycle for the calendar year in which the recipient graduates from high school.

Scholarship Application Process

To apply for a scholarship you must

- be an active member of a Challenge team,

- plan to attend a four-year university in New Mexico (any CHECS member institution),

- be a New Mexico resident,

- plan to pursue a science, engineering, or mathematics major, and

- meet the university GPA requirements.

If you want to be considered for a scholarship award, you MUST submit a letter describing your contribution to the team project with an emphasis on the specific skill that you felt you demonstrated to a superior level.

The sponsoring teacher MUST endorse your letter and outline the superior skill or quality under consideration, providing examples of situations in which you exhibited it and discussing the impact that your superior skill or quality had on the project. Whereas multiple students from your team can apply for scholarships, only one student on your team should apply for a scholarship for outstanding leadership.

Your project mentor and/or other team members may also provide statements that support the superior nature of your particular skill or quality and your contribution to the team effort. It is the responsibility of the teacher to ensure

that all documentation, including supportive statements, are mailed in an envelope to:

NM Supercomputing Challenge
c/o New Mexico Technet
5921 Jefferson, N.E.
Albuquerque, NM 87109
Attention: Scholarship Competition

NOTE: Do not include any other team project documentation with this application. Both interim and final reports MUST be submitted for any member of that team to compete for a scholarship.

The scholarship applicants will be invited to appear before a panel of Challenge judges to discuss their outstanding quality or skill in the context of their team project. This question-and-answer session will take place on Wednesday, April 28, 1999, in Los Alamos.

Other Awards

Awards are presented for outstanding scientific projects, team leadership, and excellence in many different categories. The following awards are available to the competing teams in the 1998–99 Challenge.

Awards for Outstanding Projects

The following awards for outstanding projects are available to participants in this year's Challenge and are presented to both the team members and their sponsoring schools:
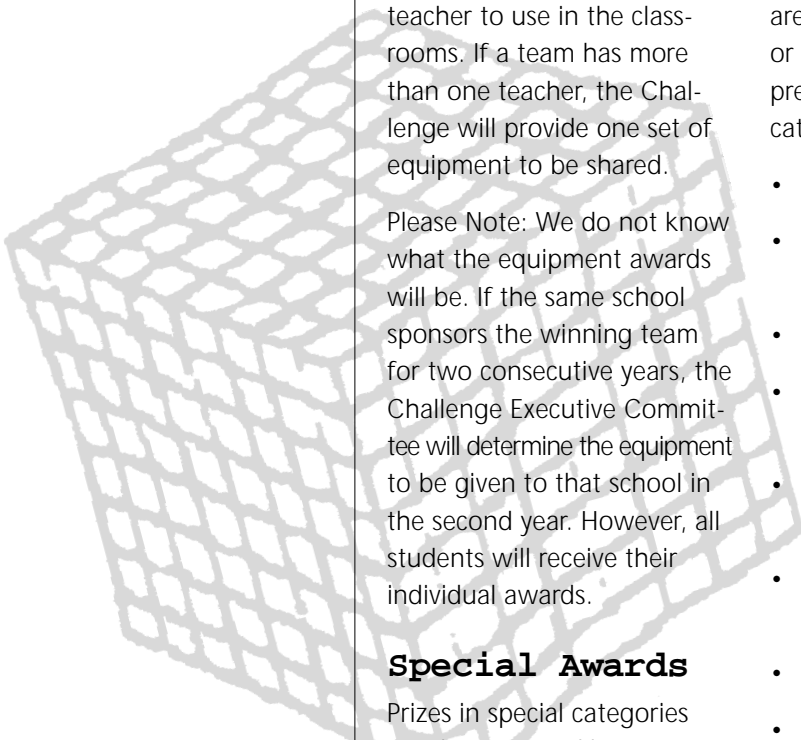
Awards to Team Members

• 1st Place: Each student on the team will receive a $1000.00 savings bond.

• 2nd Place: Each student on the team will receive a $500.00 savings bond.

Awards to the Schools

The schools sponsoring the first- or second-place teams will receive computer equipment for the teacher of the winning team to use in the classroom. The schools sponsoring the honorable mention teams will receive computer or networking equipment for the sponsoring

teacher to use in the classrooms. If a team has more than one teacher, the Challenge will provide one set of equipment to be shared.

Please Note: We do not know what the equipment awards will be. If the same school sponsors the winning team for two consecutive years, the Challenge Executive Committee will determine the equipment to be given to that school in the second year. However, all students will receive their individual awards.

Special Awards

Prizes in special categories may be presented by sponsors, contributors, or professional organizations. These awards are usually trophies, plaques, or medals. Awards may be presented in the following categories:

- Creativity and Innovation

- Electronic Search and Browse

- Environmental Modeling

- High-Performance Computing

- Hot-Shot Team at Regional Training

- Judges' Special Recognition

- Multimedia Presentation

- Oral Presentation

- Poster (technical presentation)

- Poster (graphical presentation)

- Teamwork

- Written Final Report

- Best Use of a Microsoft Product

If they wish, the panel of judges may award a special Judges' Recognition Award to a team that impresses the judges by the quality of its work. Any team that submits a final report in Category A or Category B will be eligible.
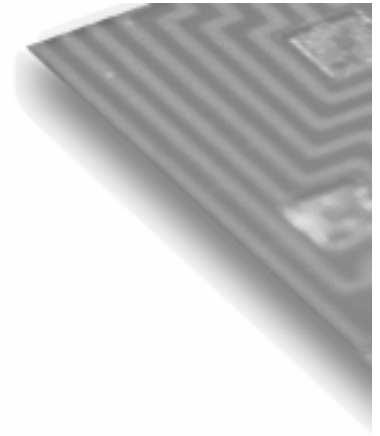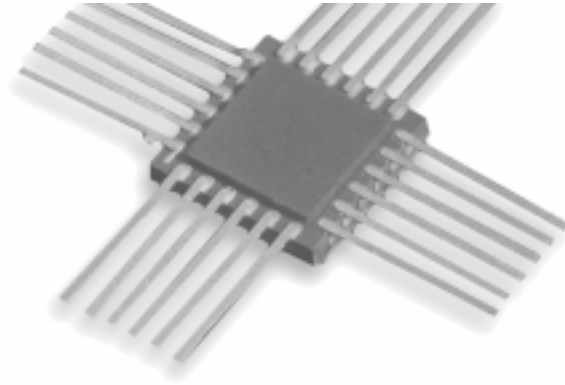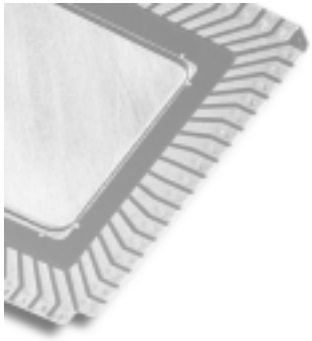
Visit the Supercomputer Challenge Web site at http://www.challenge.nm.org
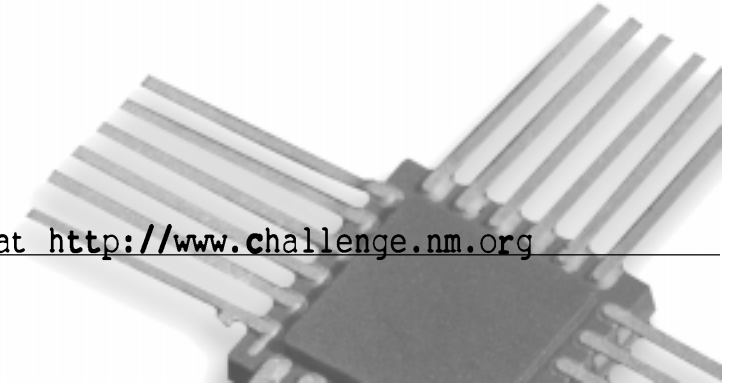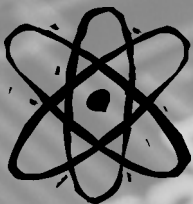
New Mexico High School
Supercomputing
Challenge
User's Guide to the '98-'99 Challenge

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