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S M A r T

SCIENCE & MATH ACHIEVER TEAMS

Yale University

VOLUNTEER GUIDE

FALL 2006

SMArT

This **volunteer guide** is intended to help you to be a better volunteer, mentor, and teacher to your student-partner.

Please note that in order to conserve paper, we have not included all of the resources for you in this guide. In addition to the volunteer guide, by next week we will also have a compiled list of **past successful and unsuccessful projects** on our website. Please visit *SMArT Online* some time before your SMArT day. Go to “Volunteer Resources.”

www.yale.edu/prgsmart

Please read through the following pages and contact your day coordinator if you should have any questions.

CONTENTS:

- Quick Basics
- Fall 2006 SMArT Calendar
- The Job: Volunteer!
- The First Day
- The Second Day & Beyond
- SMArT Safety

SMArT

Quick Basics

What is a Day Coordinator?

A Day Coordinator leads each SMArT team of volunteers to the middle school. Having worked previously with a student, your Day Coordinator is the “SMArT Expert” of the day, and is there to help you develop a creative and innovative project. The Day Coordinator is also responsible for ordering any supplies you may need and maintaining a cooperative working environment for the kids. Please **utilize** your Day Coordinator by asking questions about project ideas.

Going to the school

2:50 @ Phelps Gate (Sheridan) 2:55 @ SSS (Troup) or 2:15 @ Phelps Gate (Clemente)

Each SMArT day travels **to and from** the middle school as a group – no exceptions. **Please be on-time** when meeting your SMArT day as the middle schools finish classes at 2:30, 3:00, or 3:15, and it is important to be at the school just after their school day ends. If you are unable to be on-time, please contact your Day Coordinator so that he/she knows whether to wait a couple of minutes.

The first and second weeks

The first and second weeks of SMArT are atypical. The first week is intended for getting to know the students and to get them to start thinking about science. Therefore, the Day Coordinator leads the group in solving some scientific inquiry through a small demonstration. It is during the discussion of the demonstration when students usually pair with their volunteers; project ideas may emerge at this time as well. **Make sure to get the telephone number of your partner before leaving the first week.** The second week is when the students and volunteer become specific about project ideas, decide on a creative and innovative project, and then order the supplies (via your Day Coordinator). The third and following weeks involve more typical project research and work.

Developing a SMArT project

One of the greatest concerns of new volunteers is creating a project. **DO NOT WORRY** – it is much simpler than it may seem. There is no need to approach the school the first week with a specific idea. Project ideas emerge through discussion with the student during the first and second weeks. It’s important to center the project around their interests in order to maintain their attention and enthusiasm throughout the semester. Therefore, creating the project is a matter of developing the core idea using your Day Coordinator, other project aides (Project Journal etc.), and SMArT On-Line as resources. It is crucial to plan the project through the semester when developing the idea in order to have a creative and innovative project by the end of the semester when students and volunteers display their projects at the Science Expo, an open house to which parents, administrators, and the community are invited. **Focus on the Scientific Method as a guide to the project process, and record your progress in the Project Journal.**

The essential phone call

SMArT students love to come to SMArT. However, kids will be kids, and they might forget. Therefore, it is **NECESSARY** to telephone your student **the day before SMArT each week** to remind him/her about SMArT. During your first phone call (the second week), please introduce yourself to the parents. Use the phone call as a time to develop your friendship and discuss your project.

SMArT

The Job: Volunteer!

What does it take to be a SMArT volunteer?

One common misconception about volunteering in SMArT is that you need to be a science or math major. However, a high school science and math background is adequate to work with the middle school students. The most important qualities needed to volunteer are enthusiasm and the desire to pique a student interest in math and science through a “hands-on” project.

Each week, the volunteer meets with the student for approximately two hours. In addition, the volunteer may want to spend a small amount of time preparing material related to the project. This is a very manageable time commitment. However, this commitment is **serious**. It is very disappointing for a middle school student to remain after school only to find that their partner does not arrive with all of the other volunteers and will not attend that afternoon's session. If a conflict should arise, making it impossible for a volunteer to work with his/her partner on the regularly scheduled day, it is often possible for the volunteer to make prior arrangements with the student to reschedule their meeting on another day of the week.

To ensure that both the volunteer and student are present for each after school session, communication between students, volunteers, and day coordinators is crucial. Volunteers are encouraged to call their partners every week, preferably the day before their set meeting, to remind the student to stay after school for SMArT. These weekly calls are designed to prevent the volunteers from being frustrated when they take the time to go to the school only to find that their partners are not there. SMArT experience has shown that a brief telephone call the evening before greatly increases the chance that the student will remember to be at SMArT. A five minute call lets the student know that the volunteer is enthusiastic about the project, and this often helps keep the student interested in the project. Communication with the coordinator by the volunteer will ensure that the pair will be able to continue their project without missing an afternoon session.

A large number of volunteers have even met with their student outside of SMArT to visit a lab at the college or university. Professors enjoy giving tours of their labs to middle school students. Other volunteers have met with their students to go to baseball games, to the movies, or on a picnic. Although this is not required of volunteers, it does help the volunteer and student get acquainted with one another. A true partnership is the result of a successful SMArT experience; this relationship grows over the course of the semester, providing the middle school student with a role model and the volunteer with a special friend.

SMArT

The First Day

Program SMArT begins with a brief orientation meeting for all of the volunteers in a team usually the evening before the first day. At this time, volunteers meet the team/day coordinator and discuss what to expect for the semester. The coordinator also will set a place to meet the volunteers each day before walking/driving to the middle school. Throughout the semester, the volunteers will meet at this location and then arrive at the school together. Everyone also returns to campus together. This not only provides safety, but also creates an opportunity for volunteers to get to know each other and their coordinator.

The first day of SMArT usually begins with everyone sitting in a circle. For the pairing process, it helps if volunteers and students alternate themselves in the circle so that each volunteer is sitting between two middle school students. To start, everyone plays a name game. Then, the coordinator will tell the students a little about SMArT and how the program works. Next, everyone participates in a “hands-on” science demonstration, and then they break into smaller groups to discuss which principles were demonstrated in the activity. This provides a way for volunteers and students to start talking and also helps in the pairing process.

At this point, each volunteer should begin talking about science and/or math with a student and asking questions to find out what the student’s interests are. Often, students do not have a firm idea of an area of science that they want to concentrate on and they usually do not know what kind of project they want to do. So, creativity is required. If a volunteer does not have any ideas for a project, they can always ask the coordinator for help.

The following questions may be helpful in starting a dialogue:

- 1) If you could invent anything in the world, what would it be?
- 2) Which animal do you like best? Why?
- 3) Do you know how your household appliances work?
- 4) What is your favorite sport? Do you know how the equipment works?
- 5) Do you do any cooking and cleaning around the house? Do you know how the stove works, why cakes rise, how cleaning solutions work?
- 6) Do you like to look at the stars? Do you know their names?
- 7) Which class is your favorite? What have you done in them?
- 8) Do you have any hobbies?

By asking such questions, the volunteers attempts to pinpoint where the students’ interests lie and what kind of projects would suit them best. The volunteers should also aim to figure out how much experience the students have had in order to help select a project which is neither too advanced nor too basic. The following questions serve this purpose:

- 1) What are you doing in your science class right now?
- 2) What kinds of experiments have you done before and liked?
- 3) Do you ever do any projects outside of school? (e.g. building models, bird watching, etc.)
- 4) What are you doing in math class right now? Do you know your arithmetic? Can you do long division? Do you know how to do any algebra?

NOTE: These are just a few examples of possible questions that volunteers may wish to ask. This is not an interview, however, and volunteers should use personal judgment to tailor them to stimulate a conversation.

These questions are designed to help the volunteer and student begin to learn a little about each other as they try to devise potential project ideas.

At the end of the first day, everyone will discuss the science demonstration together in order to discover what each group's ideas were and to see what actually did occur. Then, everyone will help clean up. Students will be reminded when SMARt will meet next. It is a good idea to exchange phone numbers at this time.

The Second Day: Creating your Project

In order to create a project, each volunteer should discuss the student's interests while thinking of ways in which a project can be related to these interests. The following is an example of a conversation similar to one that led to a past successful SMARt project:

Volunteer: What is your favorite subject in school?

Student: Art.

Volunteer: What do you like to do in art?

Student: I like to paint.

Volunteer: Do you like colors?

Student: Yes.

Volunteer: Do you know why we see colors?

From this point, the volunteer and student created a project studying the structure of the eye and how it sees color. The student also dissected a sheep's eye and was able to study its parts, including the lens. This pair also discussed visual light and prisms. (Refer to the curriculum on light, vision, and color that are readily available for additional project ideas in this area.)

As another example, if a student is interested in music, a project could involve studying sound waves and creating simple drums and stringed instruments. The student could experiment to see how differences in the tautness of the drums and lengths of the strings alter the sounds produced by these instruments.

A large part of the value of Program SMARt is that the student gets to design his/her own project. So, it is important for the volunteers to try to encourage the students' creativity and originality. For additional project ideas, volunteers may go to a Public Library. In the children's section, there are many books with fun projects in all areas of science and math. Volunteers may also search the web for ideas using a guide prepared by SMARt.

Volunteers are **strongly encouraged** to use and to stress the SCIENTIFIC METHOD:

1. Observation
2. Hypothesis
3. Procedure (Materials & Methods)
4. Experiment
5. Results
6. Discussion / Conclusions

If the volunteers and students decide upon projects requiring materials that need to be ordered, they may use any remaining time to begin perusing the equipment catalogues provided by the coordinators. Volunteers should try to keep the project expenses as low as possible (around \$30) by comparing prices in catalogues. All orders should be given to the day coordinator.

Note: often the best projects are "home made ones" that involve household supplies – the day coordinator can be given a list of such supplies to pick up.

The Rest of the Semester:

This will be the rough guideline for the rest of your semester. Your Day Coordinator will make sure you and your partner stay on track.

WEEK 3 Examine research gathered (OBSERVATION)
 Refine HYPOTHESIS
 Refine PROCEDURE

WEEKS 4-8 Doing the project (EXPERIMENT)
 Gathering RESULTS
 Forming CONCLUSIONS

WEEK 9/10 Presentation Preparation
 Poster Planning

WEEK 10/11 Complete poster

Final Week Expo!

Safety in SMArT

Being safe mainly involves common sense. The coordinator will discuss general safety rules with the middle school students the first day of meeting. However, it is also important that each volunteer practices and helps to enforce these rules in order to ensure that no one gets hurt during the semester. We have never had a problem with safety in the past, and with everyone's cooperation, hopefully we can continue this.

General Rules:

- 1) Think safety and act responsibly.
- 2) Always alert the coordinator if there has been an accident or injury.
- 3) Read directions before starting experiments.
- 4) Never perform unauthorized experiments. (For example, do not perform experiments with chemicals unless you are guided to do so by a chemistry manual.)
- 5) Think of your neighbors. . . be courteous.
- 6) Be sure you know where the fire extinguisher is kept and how and when one should be used.
- 7) Be alert if you or someone else is working with chemicals or a flame. Often, people move around the room, and they may not be aware that you are working with these materials.

General Safety Procedures:

- 1) Wear safety glasses or prescription glasses at all times when handling chemicals.
- 2) Always wear rubber gloves when handling chemicals or dissecting.
- 3) Use proper equipment for handling chemicals and setting up experiments.
- 4) Wear gloves to pick up hot materials.
- 5) Tie back long hair and restrain floppy clothing while working with chemicals or flames.
- 6) Clean up and dispose of materials properly.
- 7) Be weary when you or the student handles sharp objects.

First Aid Techniques:

- 1) In the event of an accident, remain calm and notify the coordinator and volunteer immediately.
- 2) If someone receives a burn, flood the burned area with cold water.
- 3) For acid or alkali burns, neutralize the affected area by washing with lots of water.
- 4) If acid or base splashes in the eyes, flush the area with flowing water from a sink for a minimum of five minutes. By this time the coordinator should have been notified.
- 5) For cuts:
 - a. Be careful! To avoid the possible transmission of HIV, do not touch the wound. There are rubber gloves in the closet which will provide some protection if it is necessary to aid a person who has been cut.
 - b. Flush the area with water to remove foreign matter.
 - c. Try to reduce the bleeding by placing pressure on the cut area.
 - d. Notify the coordinator.
 - e. The coordinator will clean up any spilled blood with bleach.

NOTE: THERE IS A **FIRST AID KIT** IN THE CLOSET. BE SURE YOU KNOW WHERE THIS KIT IS LOCATED SO THAT YOU CAN GET IT IN THE EVENT OF AN EMERGENCY.

HAVE FUN, and ENJOY THE SEMESTER!