G.Grambo

HOW TO HAVE A SUCCESSFUL

Science Fair

CONTENTS

Each year teachers of science encounter students who want to take a particular aspect of science (introduced in class) a little further. Others have rediscovered an area of science or specific topic they are already interested in and want to expand their knowledge of that topic. What better way is there to help a child really learn about something than to have the child work on a project chosen by that child. In addition, teachers can allow the children to demonstrate their project to their classmates and thereby, share newly acquired information about that topic or project. In this way you have enhanced their ability to retain what has been learned.

During the month of December we begin to prepare our students in how to make projects for the upcoming Science Fair. Exactly what is a Science Fair anyway? This fair is an annual event where student make projects on some scientific topic which are then placed on display for student and parent viewing. Before a child begins to make a Science Fair project, it's important to explain, right from the start, what constitutes a project. Some children ask if they can make just a poster. I explain that a poster is a poster and not a project. What about a report? A report is not a project either. It is a report. A model is only a model too. However, when you put a poster, a report, and a model together with an explanation, then you have a project. It is also important at the onset of the discussion on projects to talk with the children about projects you do not wish

them to do. These projects are not desirable either because so many people usually do them, or because they are too difficult for children to do. Moreover, it is important for you to set limits on the amount of money they can spend on equipment because children, that come from lower socio-economic families, should not have to compete against projects that cost too much to build. If a child wants to use animals, we ask that they fill out a form telling what they need the animals for, and that they will not harm the animals in any way.

It is important that children choose a topic which interests them and will ignite interest in others. Children should also pick topics which are doable. In this I mean they ought to avoid topics that are too broad, such as the Universe or The World of Electricity, may be impossible for one student to explain in five, ten or even forty-five minutes. The children should narrow in on the field they choose. For example, instead of the Universe, they might pick one particular planet. Instead of electricity, they might choose series or parallel circuits. The ultimate goal is that in doing the project, the child is able to finish what they have started, and that, both the person doing the project and those viewing it, learn something from the project.

Some students may want to work alone on this kind of endeavor. Others may wish to work with a partner. I have found that two students work well together on the projects. However, I ask that they bring a letter from their parents stating that

their parents will drive them to each other's homes so they can work on the project together. In doing this, you are assured that the parents are aware that the students are working together, and that they will need to be together in order to complete the project. Three weeks is ample time to work on a project such as this. The three week period contains also ample time for the child to prepare for a class presentation of their work.

As the three week period nears to an end, I randomly assign the children days on which they are to bring in, demonstrate, and discuss their project. During a forty-five minute class period, five to six projects are presented to the class. As a large group, we discuss current science events while the other students set up their projects. When the first presenter is ready, the class moves over to the table they set up on. The student explains their work to the class. After this explanation, the class is allowed to ask questions. The entire class gives the project a grade and also writes into their lab notebook a description of the project and the reasons for the grade they gave. After all the students' work has been viewed, over the course of several days, the class discusses the grades given and reasons for said grades. The class as a whole now assigns a mark or grade to the project. This allows the children to profit from everyone's input about all the presentations. It also allows the children to develop a real sense of what makes a good project and also what to look for in a good project. Items for the fair are

chosen on the basis of uniqueness, the use of the scientific method, thoroughness of subject and neatness. All projects selected for the Science Fair are labeled by name, class topic, and classroom teacher. This procedure provides students with their deserved recognition as well as the prompt return of their project after the fair is over.

You need to pick a large room with movable tables in which to set up the fair. I usually set up the tables in rows. Science Fair signs are hung up and projects are placed in the most favorable settings according to their subject matter. It is important to set everything up so that the students enter through one door and walk in one direction through the fair. Students should exit through another door. Two classes are signed up for viewing the fair during each class period. The first visits occur during the initial twenty minutes and the second during the last twenty five minutes.

Hundreds of small inquisitive hands will touch the projects. If a project can be broken, it will be broken. I have explained to the children at the beginning, before they ever start making the project, that everything has to be indestructible. Things need to be tied, glued and nailed, or they will be broken or moved about.

Teachers not in the Science Department are asked to judge the Fair, so as to be impartial. Judges use criteria such as the use of the scientific method, neatness, throughness of idea, and timeliness of topic to evaluate the projects. You could even

make a rating system in numbers for judges to use. Two winners on each grade were selected in my school. Ribbons and certificates were given to the winners. All those who were entered into the Fair received a Certificate of Achievement, and those who made a project but did not have it chosen to enter the fair received a Certificate of Participation. This gives all participants a tangible acknowledgement for a job well done.

The Science Fair is a good learning tool. It allows a child to select a project and go with it. Furthermore, the Science Fair provides students with an opportunity to develop an idea and to teach that idea to others.

LETTER TO PARENTS

Helping Your Children with Their Science Fair Projects

Things a parent may do:

1. Give encouragement, support, and guidance. (Be positive!)
2. Make sure your child feels it is his or her project. Make sure the project is primarily the work of the child.
3. Realize that the main purpose of a science fair project is to help your child use and strengthen the basic skills he or she has learned and to develop higher level skills.
4. Realize your child will need help in understanding, acquiring, and using the major science process skills (researching, organizing, measuring, calculating, reporting, demonstrating, experimenting, collecting, constructing, presenting). Your child may not have been taught these skills. Therefore, it may not be fair to expect him or her to know how to do them.
5. Realize that your child may be using reading, writing, arithmetic, and social skills for the first time in a creative way to solve a problem.
6. Realize that the teacher works with 20-30 students and this may make it difficult to give a large amount of individual attention to your child.
7. Understand that the teacher may need your help. If you have the interest and the time, you might contact the teacher and volunteer to help or judge at the school's science fair.
8. Help your child plan a mutually agreed upon schedule, to prevent a last minute project and a disrupted household. A 4 to 8 week plan that uses a check-off sheet is best. The following steps (you may want to add more) should be on your schedule.
   a. find a topic.
   b. narrow down the topic to a specific scientific problem that is appropriate to the child's ability level.
   c. research what is already known about the problem.
   d. develop a hypothesis. (What outcome do you expect?)
   e. develop a procedure/investigation to test the hypothesis (if experimental).
   f. make observations and collecting appropriate data.
   g. interpret the data and other observations.
   h. state and display the results.
   i. draw appropriate conclusions.
   j. create the exhibit.
   k. write the research paper and the abstract.
   l. present the project.
9. Help your child design a safe project that is not hazardous in any way.
10. Provide transportation to such places as libraries, nature centers, universities, etc. that can help the child find project information.

11. Help your child write letters to people who can provide help on the science project and be sure the letters are mailed.
12. Help the child develop the necessary technical skills and/or help the child do the technical work such as building the exhibit and doing the photography.
13. Help your child understand that science is not a subject but a "way of looking at the world around us."
14. Be sure that the child states in the paper and/or exhibit the help he or she has received from you or others. This will help judges to make a fairer evaluation of the project.
15. Look over the project to check for good grammar, neatness, spelling, and accuracy. Make suggestions on how it can be corrected .
16. Buy or help find the necessary materials to complete the project.
17. Realize that a good project doesn't have to cost a lot of money. Many times a simple project that is well displayed and explained is the best.
18. Help the child understand that a weekend chore, or one or two posters, is not a project.
19. Help the child to keep a record (log book) of all he or she does and a list of references used.
20. Find an area in the house where the child can work on the project and not have to worry about pets or brothers and sisters.
21. Explain to the child that he or she should consult with you or the teacher when problems arise. Set aside time for help sessions. Make them short and constructive. Be an interested and enthusiastic listener.
22. Have your child present his or her science project to you before he or she takes it to school.
23. Help transport child and the science fair project to and from the school/district/regional science fairs.
24. Do not worry or get upset if your child doesn't win a prize at the science fair. The skills the child has gained are worth all of the effort. Help your child to begin to plan for next year.
25. Feel a sense of pride and satisfaction when the project and the science fair are finished. Share this with your child, you have both earned it.

THE LOUIS ARMSTRONG MIDDLE SCHOOL

32-02 Junction Boulevard, E.Elmhurst, N Y 11369 (718) 335-7500 \ Fax (718)779-7186

Dear Parents,

This years Science Fair will take place Wednesday, January 8, [illegible] from 7:00 to 9:00 in room 142. There will be a variety of projects on display from the fifth, sixth, seventh, and eighth grades. We invite all parents to attend this years fair. We are sure you will be delighted.

Thank you for your time and consideration.

Sincerely,

The Louis Armstrong Middle School
Science Department

The Louis Armstrong Middle School
Intermediate School 227 Queens

718-335-7500

32-02 Junction Boulevard
East Elmhurst, New York 11369

Alfred D. Herman
Principal
Beverly Holman-Sheidy
Sybil Silberman
Lawrence J. Weinberg
Assistant Principals
Dr. Sidney Trubowitz
Director, Queens College

Dear Parents:

The I.S. 227Q Science Department is happy to announce that this year's Science Fair will be held On , and

During these days the best projects from each class will be on display in the Gymnasium. All students will view the projects and parents are welcome to come to the Fair on from 7:00 to 9:00 P.M.

All students are encouraged to participate. No more than two students may work together. Your child's idea must be approved by his science teacher before he begins the project. Completed projects must be finally submitted between and .

We would like to make this year's Science Fair our best yet. Please encourage your child to participate.

Sincerely,

GETTING STARTED BOOKLET

Sci fair

What is a science project?

A science project is simply a study of something, a solution to a problem. In Science Fair competition, however, a project is usually a three-dimensional display that shows the observations and results of your study of some area or problem of science. Projects take many forms and cover many subjects.

Getting started

There are many ways to start a science project. Here is one way that other students have used successfully.

a. Decide on an area of science that interests you which has been covered in class. Your project must be an outgrowth and enrichment of classwork topics.

b. Read what your textbook or encyclopedia says about the topic.

c. Narrow your interest to a specific area on the basis of your reading.

d. Get a book from the school or public library on your specific subject.

e. As you read the book/books, look for questions you'd like answered. Write them down.

f. Choose just one of your questions and read more about it.

g. Ask your teachers, parents and friends for their help in developing your information.

h. Visit museums, zoos and botanical gardens. Write to government agencies and scientific societies for their printed information on your specific topic.

i. Do more reading. Keep notes on all information related to your problem.

get started

Cautions

Exhibits should not:

Use open flames

Use 120 volt circuits

Use hazardous or poisonous chemicals

Display any living animals

Use any gas filled cylinders

Use expensive equipment (the school cannot be responsible for any materials that children bring in)

Cautions

Building your exhibit

.1 Decide on the area of science that interests you from work covered in class.

.2 Select the specific problem you are going to solve.

.3 Decide what you want people to learn from your exhibit. Everything in your project should relate to the problem you are solving.

.4 Exhibits should be no more than 1 meter wide by 1 meter high. Check with your science teacher if there is any question of safety in your exhibit. Your display must be transported so you will want to use strong, light construction materials. Two good portable exhibits are pictured below to help you.

Building it

Judging

Your project will be judged on:

.1 Originality

.2 Ingenuity.

.3 Amount of pupil work shown

.4 Scientific thought and procedures

.5 Thoroughness

.6 Neatness

.7 Timeliness of idea.

.8 Appreciation of idea originating in class

Judging

The Science Fair : Your Project

Working Up A Project

Once you have an idea for a project, you must figure out how to present it. In general, you should show only one idea. It should be a simple one, for example, "what makes a neon sign light up?"

Building Your Project

A project that is well done and presented in good fashion will give you a great deal of satisfaction. It also greatly increases your chances of winning. There are several things you should remember before you build:

1. Draw your project first. This will give you an idea of how big it will be and what it will look like. It's easier to erase a mistake here than to rebuild the entire project later.

2. KEEP IT SIMPLE! Use a center of interest and base the rest of your points around it.

3. Limit the amount of reading that viewers will have to do. Most of what you write is not read anyway. Use simple sentences and avoid long descriptions. A headline is very effective.

drawing by Cary Williams

4. Check your exhibit for spelling and accuracy of definitions and statements of scientific law.

5. Use durable materials.

6. Lettering should be done neatly. Take extra time if you must.

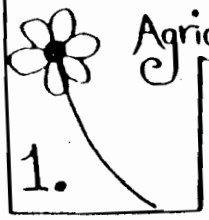
7. Encourage visitor participation. Let viewers push buttons or do something.

8. Present only material that you have prepared.

9. Acknowledge any assistance, advisors, and sources of material.

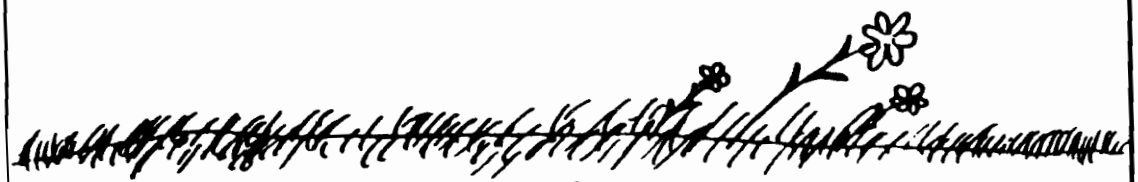
This Section By ROBERT KALISH

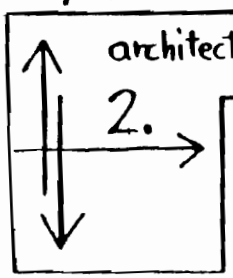
Types of Projects



Agriculture and Botany

1. Take three different soil samples and try to grow three similar bean seeds in them. Give each equal water and sunlight. Compare the growth of each bean.
2. How does water supply affect the growth of plants? Put three similar beans into similar soil. Give each bean a different amount of water.
3. How does the amount of sunlight affect a plant's growth?
4. Will the sea provide food for the population explosion?
5. Does pollution affect plants? Water flowers with soapy water.
6. How are sheep bred to give different kinds of wool?
7. Is sunlight necessary to grow plants? Can you use a 100 watt light bulb instead?
8. Does the color of light affect the growth of plants? Grow plants in red and green light and compare.
9. How do farmers improve egg production?
10. Plant some seeds in a large fish tank. Fill the tank with air containing a large amount of sulfur dioxide. How does this polluion affect the plants?
11. How do various sugar solutions affect bacteria?
12. Do plants sleep?
13. How do plant hormones affect plants?





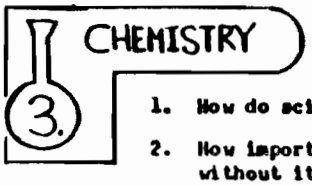
architecture + planning

1. Design your own dream house.
2. Solve a neighborhood traffic problem.
3. Design a school or community center.
4. Is it possible to design a wall so that you can't hear your neighbors through it?

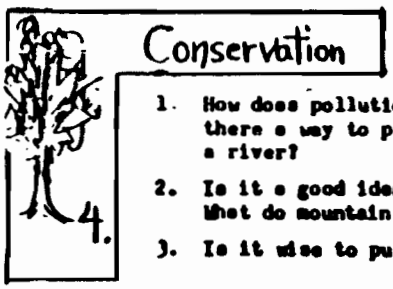
This Section By ROBERT KALISH

Architecture + Planning (cont'd)

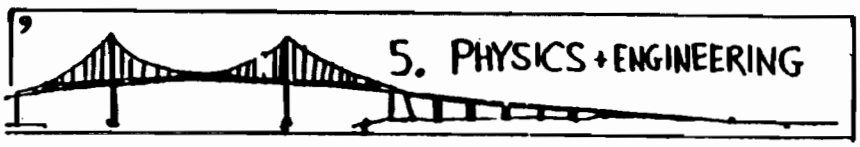
5. Does the color of a building or the material it's made out of affect the temperature inside of it? Build models.
6. How high can a building be built? What affects the height?
7. Should subways and busses be free?
8. How can cars and pedestrians be separated? Design a three-dimensional neighborhood.



1. How do scientists identify unknown chemicals?
2. How important is water to the chemist? Can he do without it?
3. Build models of chemicals. How do we know the way it looks?
4. How would you make a solution that would be almost like blood?
5. How are foods preserved? How harmful are these preservatives?



1. How does pollution affect the fishing industry? Is there a way to prevent pollution or "unpollute" a river?
2. Is it a good idea to shoot every mountain lion we see? What do mountain lions do? Are they just pests?
3. Is it wise to put everything in disposable packages?



1. What prevents the George Washington Bridge from falling? Why is it shaped the way it is?
2. How does gravity affect astronauts and their rockets?
3. How is the speed of light measured?
4. What are freeze-dried foods? How are they made?
5. How does a rocket ship work? Build a model.
6. Why do certain substances glow in the dark?
7. What is the difference between compression and tension? How is each used in buildings and in bridges?
8. How does a police radar trap work on the highway?

5

This Section By ROBERT KALISH

9. Is it possible to invent a lamppost that, when struck by a car, will not do damage to the car or injure anybody?

10. How many different colors are there? Are black and white colors?

11. What is an atomic explosion?

12. How does an electron microscope work?

13. How does the fare collection box on a bus separate coins? Build one.

The Medical Sciences

1. How many cold viruses are there? Will a cold vaccine ever be made?
2. How many blood types are there? Which is the most common? Which is the worst to have? Why?
3. Do skinny people get better grades? How does fat-ness affect school work?

4. What is a virus?

5. Does smoking slow down athletes?

BIOLOGY

Show the evolution of embryos (unborn animals).

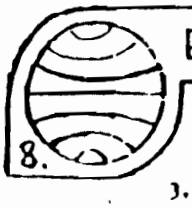
What defense systems (like camaflage) has nature provided animals with? Does man have any?

3. What is immunity? How do you get it?

4. Make slides of different cells to show under a microscope.

5. What is a gene?

6. What is a protein?



EARTH & ASTRONOMICAL SCIENCES

1. Construct a working model of the solar system.
2. How can geologists tell one rock from another.
3. How many different kinds of maps are there? What is the purpose of each kind?

4. Why are diamonds so valuable?

5. How do oil companies know where to dog for oil?

6. Why should we know what the moon is made of?

7. What is a space suit? How does it work?

8. How can you measure distance from one place to another? How many ways of doing this are there?

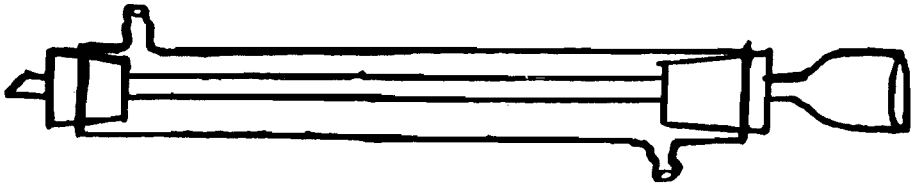
9. Will it snow tomorrow?

6

This Section By ROBERT KALISH

How To Do Research for your Science Fair Projects

by Grambo



7

Books, Magazines and Encyclopedias are excellent sources of information on science projects. In order to present an effective and meaningful project, one must first researce a topic. It is helpful to know something about the topic you chose to do your project on.

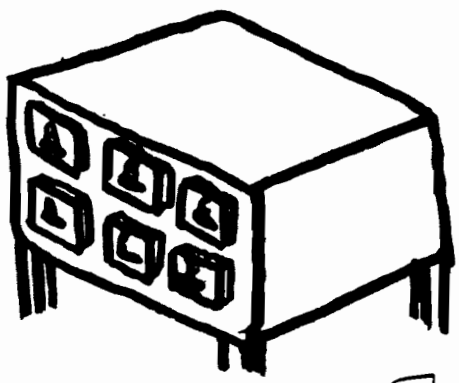
In doing research, you should look for basic information on your topic(don't get too technical).Background information(like history) might be helpful to you also.

Encyclopedias are alphabetically listed according to subject.Some encyclopedias have an index volume which is also alphabetically listed by subject.

Books in a library are listed according to Dewey Decimal Classifications. Certain numbers stand for certain subjects (ie 973= American History, 543=Chemistry, 551=Geology).Books are in numerical order on the shelves according to their subject. To find a non-fiction book in the library,look in the card catalog for it's Dewey Decimal number. Each book has an author card, a title card and subject cards. This means you can look up the title of a book, the author of a book, or you can find a book by looking up different subjects, Most libraries have all the cards filed together, in the CARD CATALOG, in alphabetical order. The school library has separate title, author, and subject catalogs.

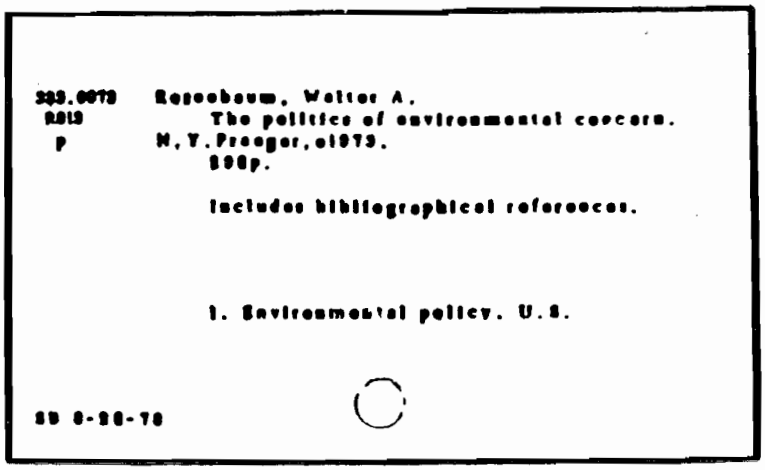
8

Card Catalog

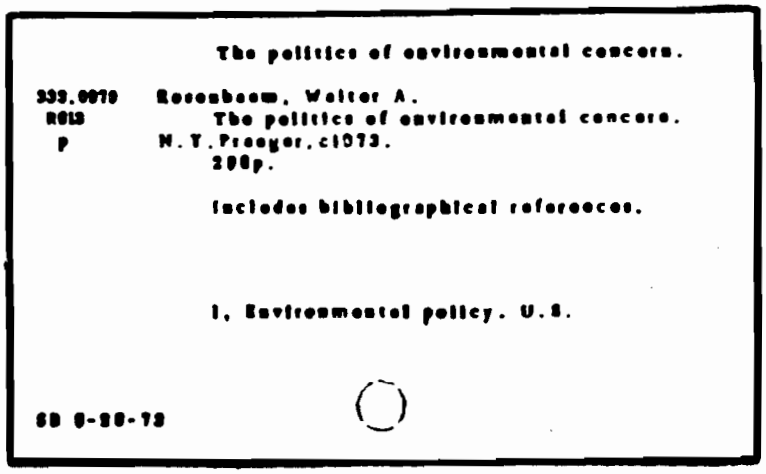


CATALOG CARDS

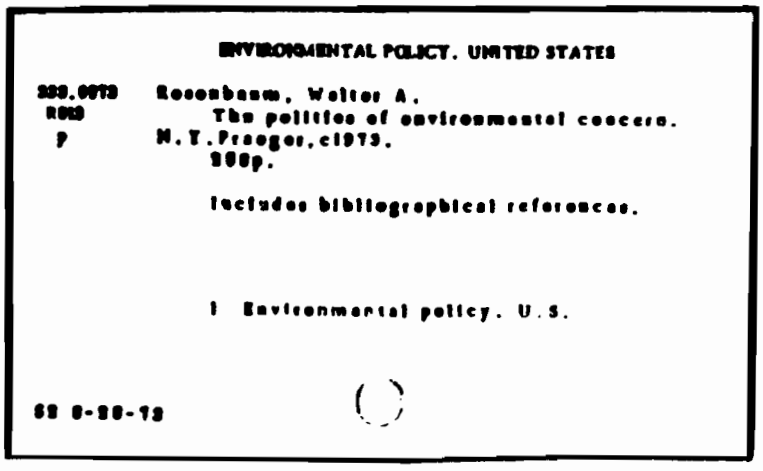
Author Card



Title Card



Subject Card

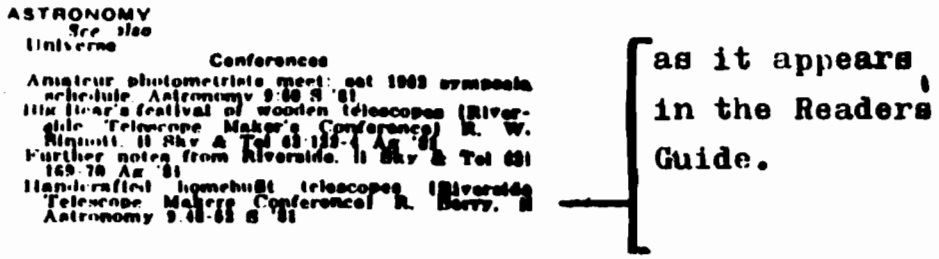


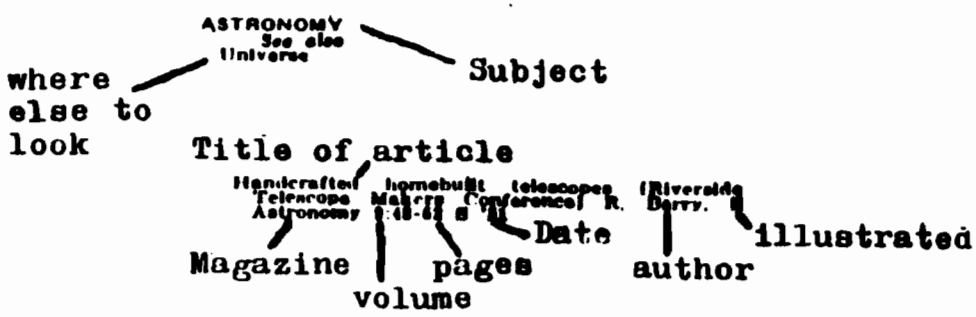
9

Magazines offer a great deal of information. The Readers' Guide can help you locate magazine articles. The Readers' Guide is an alphabetical index of subjects(and authors) of articles in over 160 popular magazines. The monthly issues keep one up-to-date, while an annual volume appears at the end of the year.

Under each subject, you will find a list of articles on that topic. Each entry will provide the title, author, name of magazine, volume, pages, and date of magazine.

READERS' GUIDE TO PERIODICAL LITERATURE





10 Abbreviations for names of magazines, dates, etc. are explained in the front of each volume.

experiments

how to write them

HOW TO WRITE UP A SCIENTIFIC EXPERIMENT

Use this form when you write up a scientific experiment.

PROBLEM: (Always in question form)
(What do you expect to find out, prove or disprove)

Materials: (List materials and/or equipment)

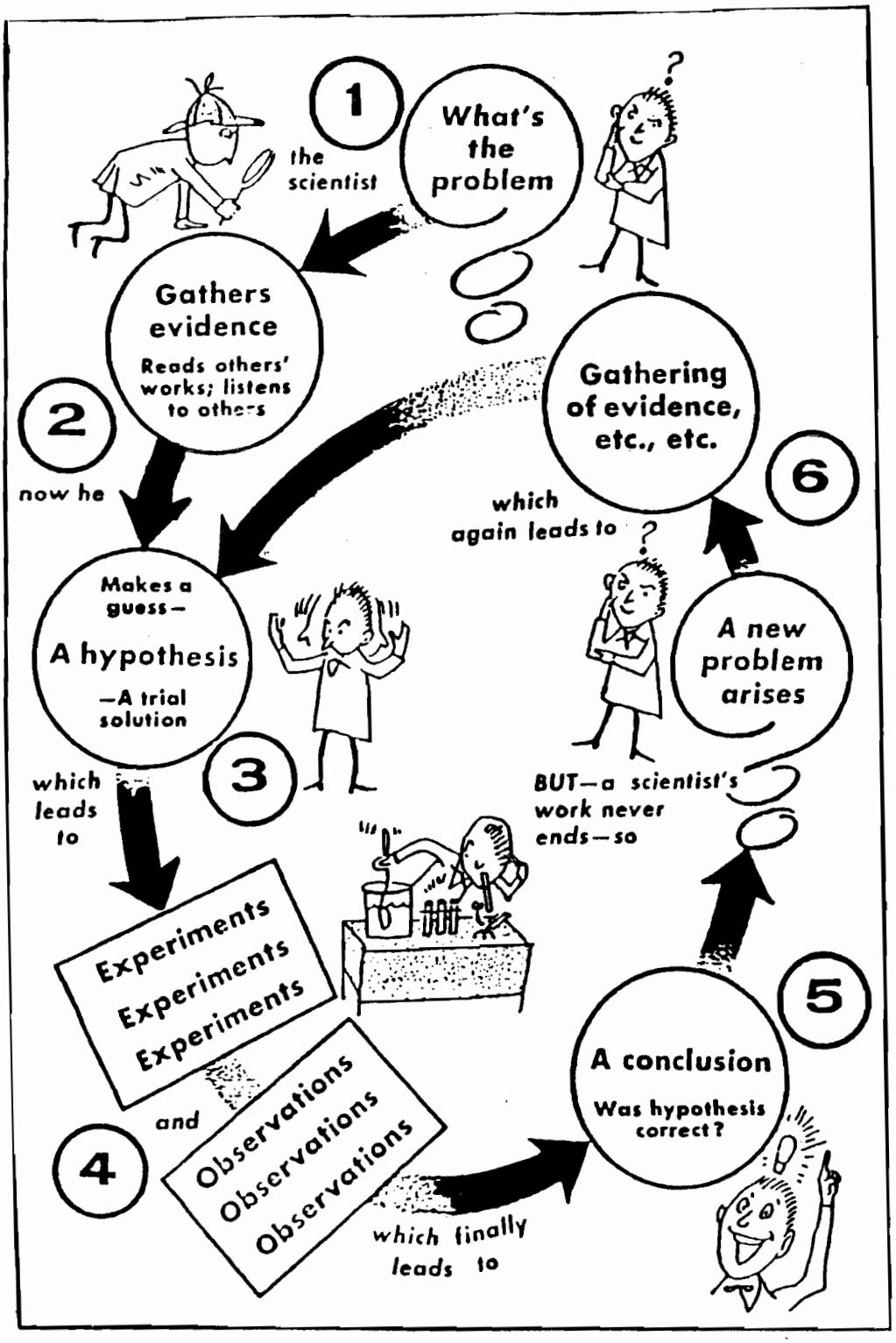
Hypothesis: (Guess as to what might happen)

Diagram (Optional):

Procedure:	**Observations:**
What you do!	(There should be an observation for every procedure)

Conclusion: (Answers to question asked in "problem")

Scientific method



Scifair

STUDENT FORMS AND REGISTRATION CARDS

Science Fair Project Application

Name _____ Date _____

Teacher _____ Grade _____

Project Title _____

Project Description (be brief) _____

_____

_____

PROJECT AREA (circle one):

Biology Chemistry Physics Mathematics Behavioral General Science

PROJECT TYPE (check one):

_____ ***Experimental***—Forming a hypothesis (question) about something the student doesn't know the answer to, doing an actual scientific experiment, making observations, collecting data, and reaching conclusions.

_____ ***Demonstration***—Science in a show and tell format. The student knows what is going to happen when he or she begins. Includes models, kits, collections, posters, etc.

_____ ***Biological***—A project involving living things such as insects, birds, food, people, diseases, etc.

_____ ***Physical***—A project involving things not living such as chemicals, stars, air pressure, weather, etc.

Will you require electricity? _____ YES _____ NO

Your project should include the following items:

1. Exhibit that can stand by itself.
2. Research paper with bibliography.
3. Abstract (one page summary, with bibliography).
4. Materials necessary for the exhibit.
5. Oral presentation (3 to 5 minutes).
6. Logbook of daily work.

Return this completed form to your teacher by _____

Student signature _____

Parent's signature _____

Teacher's signature _____

Science Fair Project Contract

I _____ will do the following project by _____
If I fail to do the project I realize that _____

Title of project:

Problem to be investigated:

Materials you will probably use:

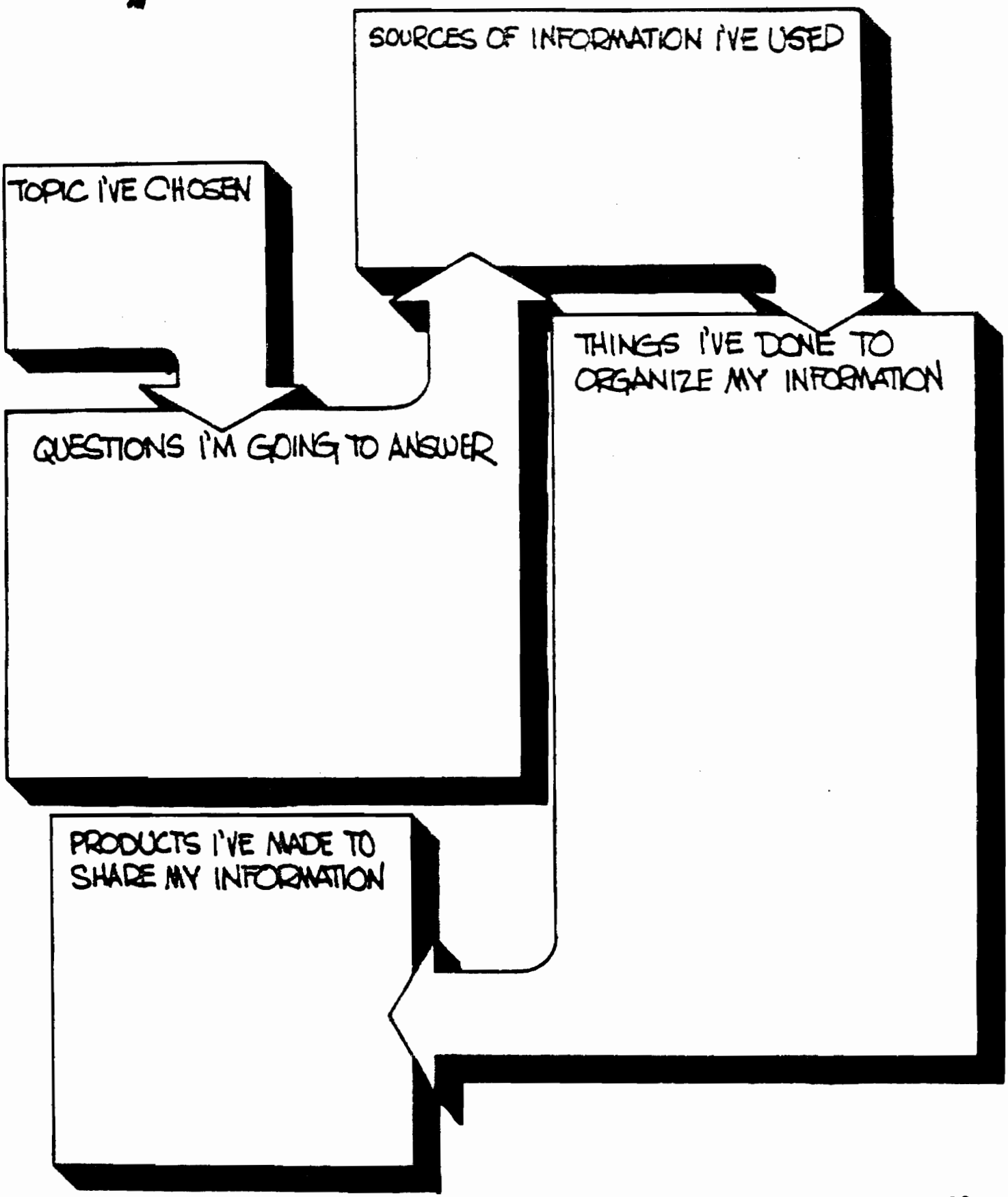
Description of what you will do:

References you will use (books, magazines):

your signature _____
parent's signature _____
teacher's signature _____
class _____

Sci fair

project flow chart



science fair registration card

name _____

class _____ teacher _____

attach this portion of the card to the upper right hand corner of the back of the project

cut here

name _____

class _____

teacher _____

Send this portion of this form to Mr Grambo in room 246

science fair registration card

name _____

class _____ teacher _____

attach this portion of the card to the upper right hand corner of the back of the project

cut here

name _____

class _____

teacher _____

Send this portion of this form to Mr Grambo in room 246

science fair registration card

name _____

class _____ teacher _____

attach this portion of the card to the upper right hand corner of the back of the project

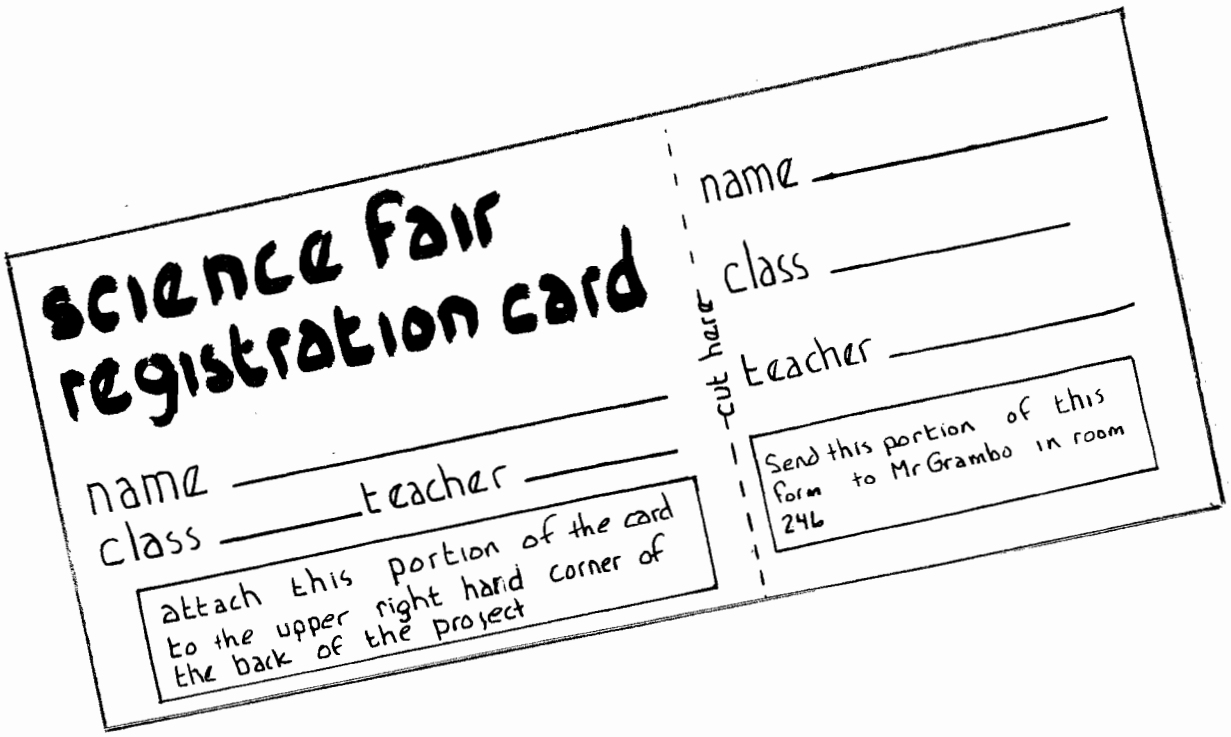
cut here

name _____

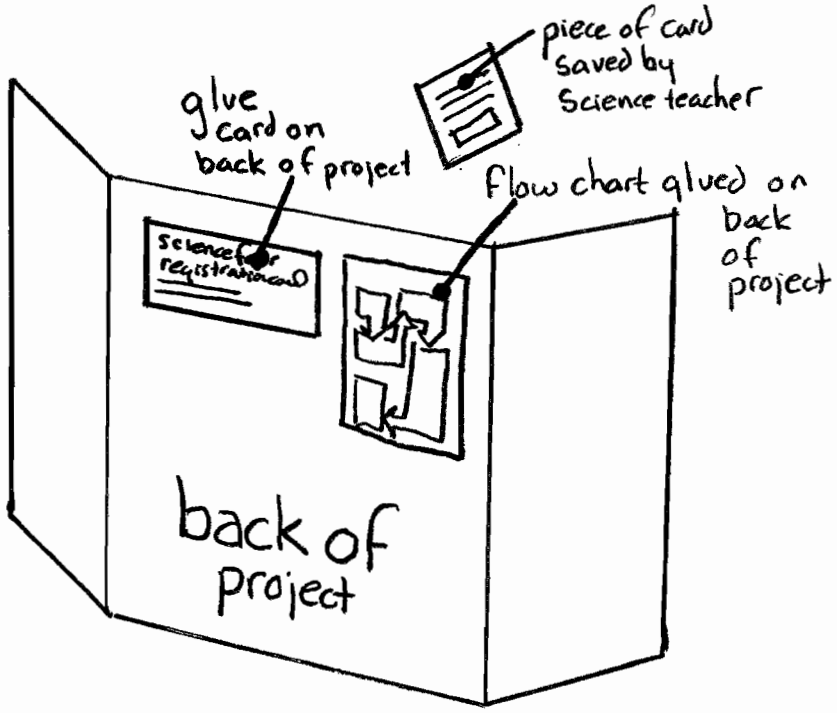
class _____

teacher _____

Send this portion of this form to Mr Grambo in room 246



glue ½ of the registration card and the flow chart on the back of the project.



SCIENCE LAB NOTEBOOK WRITE-UP SHEET

Sci-fair

Science Fair

Date _____

Student _____

Project Title _____

Description _____

_____

_____

_____

What did you like? _____

What didn't you like? _____

Grade _____

Date _____

Student _____

Project Title _____

Description _____

_____

_____

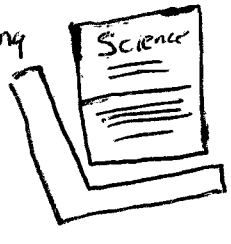
_____

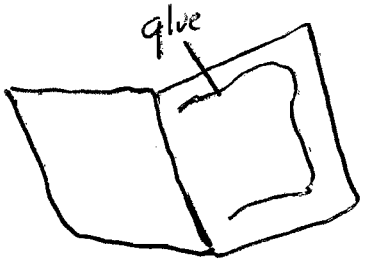
What did you like? _____

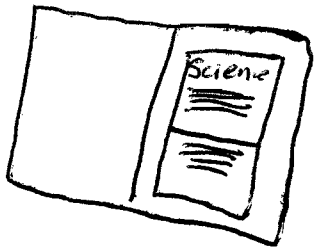
What didn't you like? _____

Grade _____

trim along dotted line

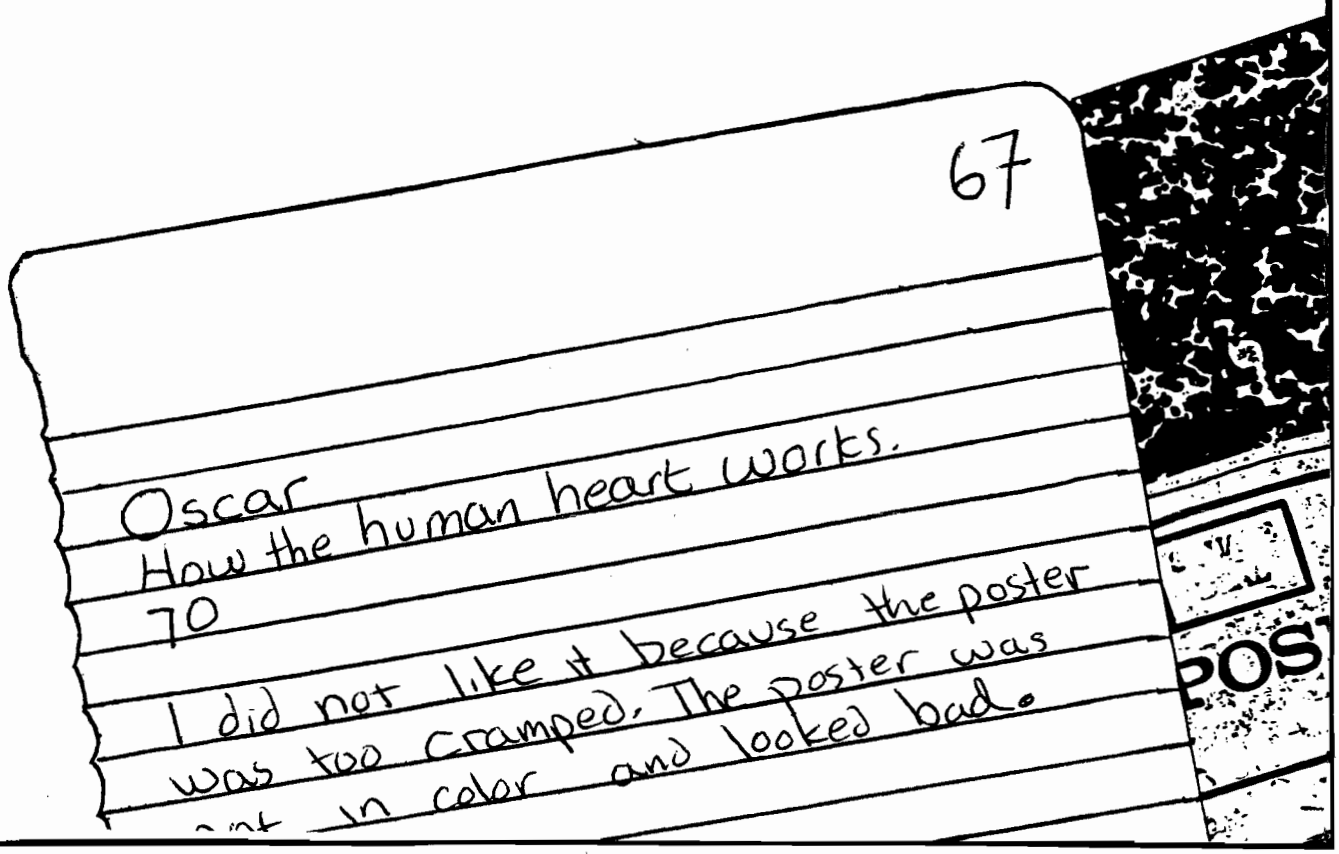


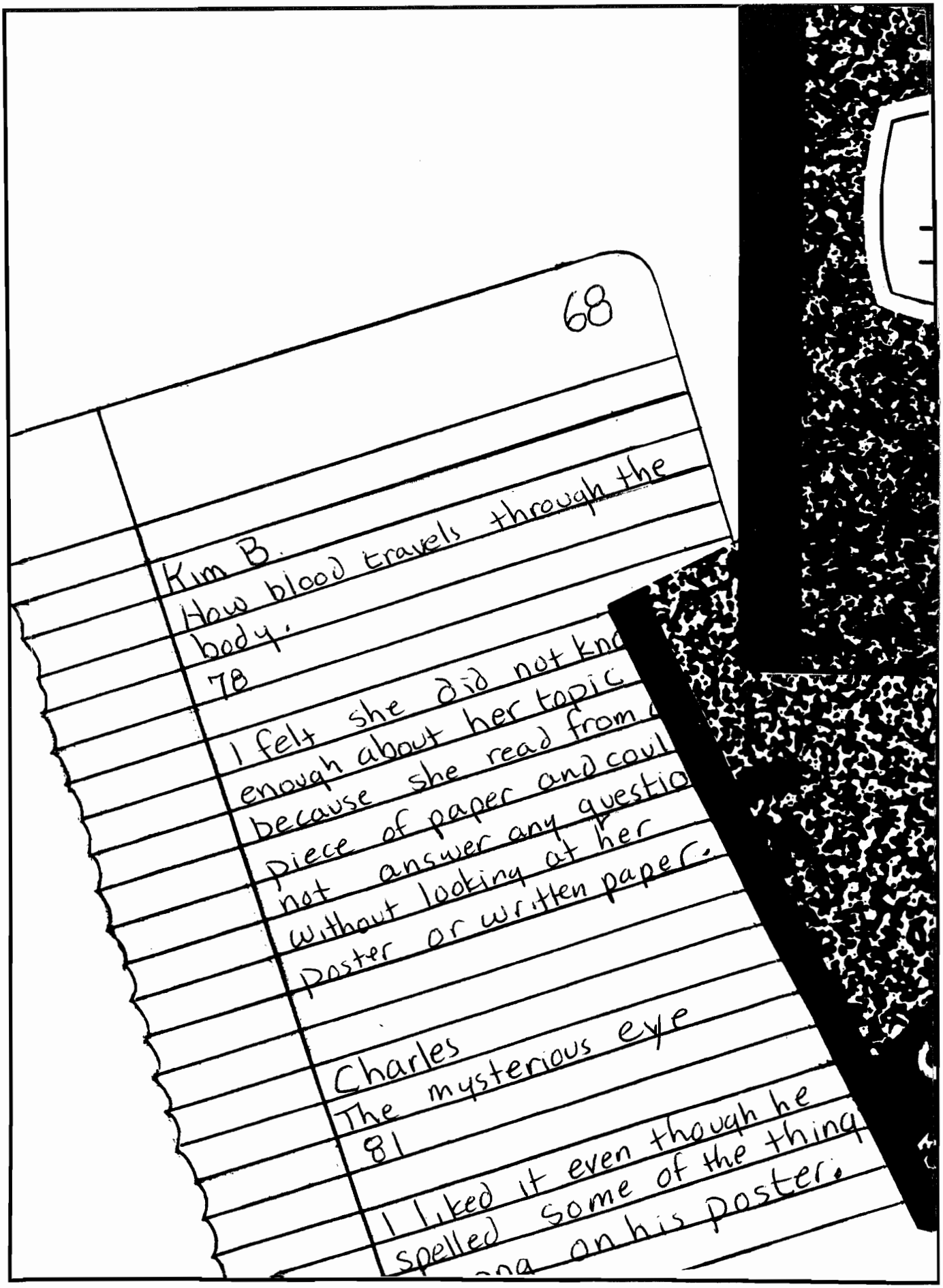


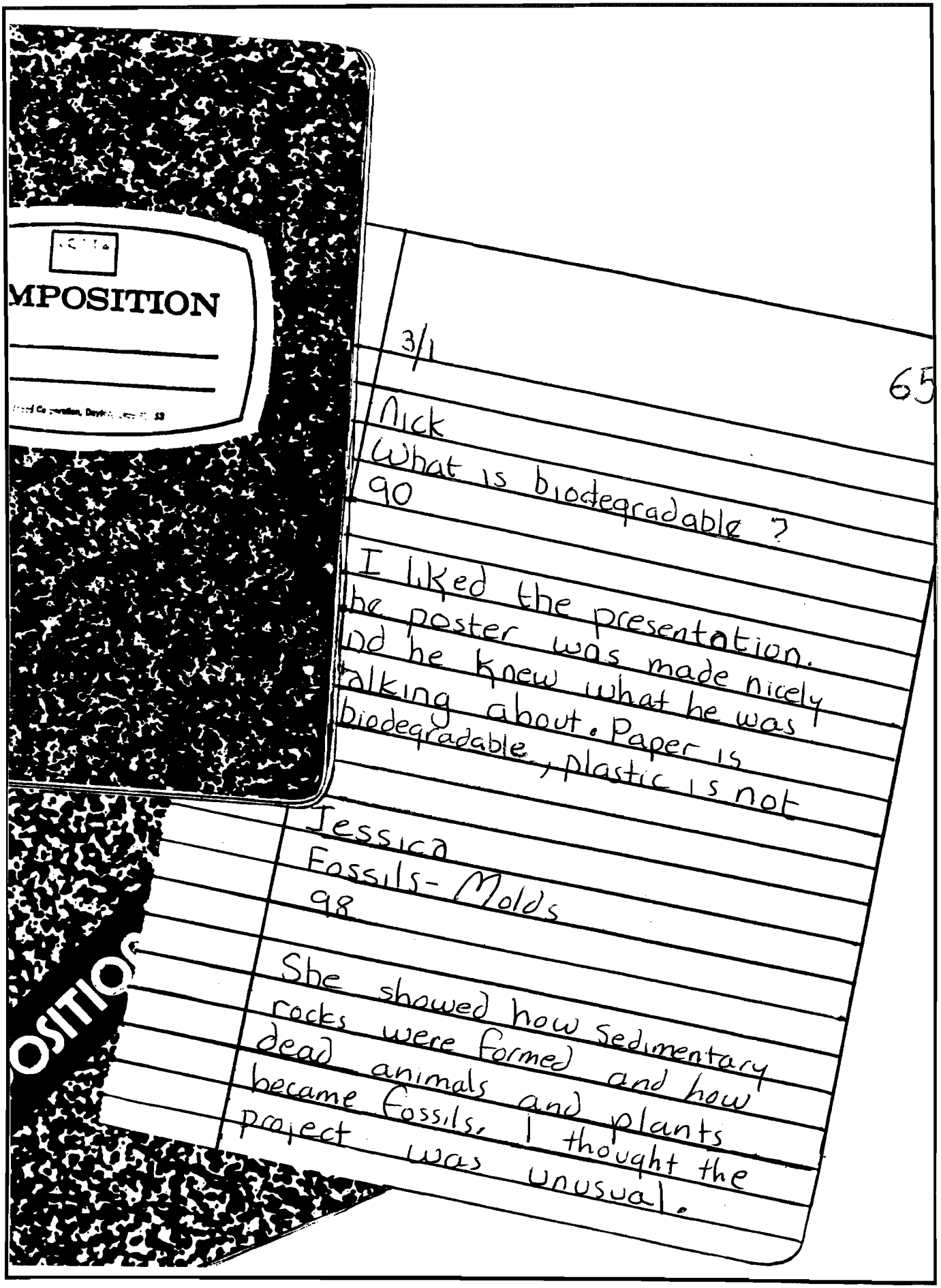


glue sheet into notebook

these are sample pages from student lab notebooks. These pages show what the students thought and felt about the projects the students presented.




68
Kim B.
How blood travels through the
body.
78
I felt she did not kno
enough about her topic
because she read from
piece of paper and coul
not answer any questio
without looking at her
poster or written paper.
Charles
The mysterious eye
81
I liked it even though he
spelled some of the thing
on his poster.

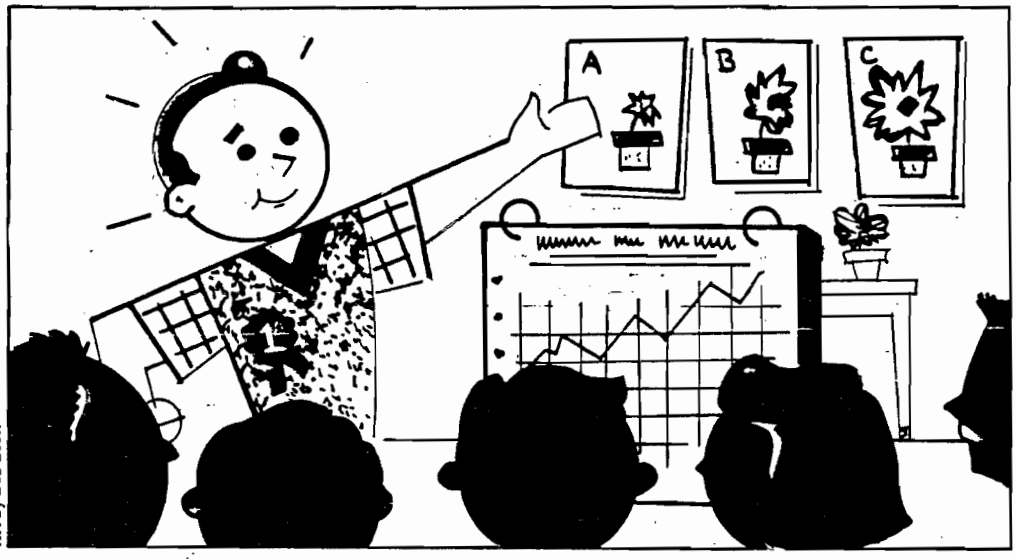

MPOSITION
3/1
65
Nick
What is biodegradable ?
90
I liked the presentation.
he poster was made nicely
nd he knew what he was
alking about. Paper is
biodegradable, plastic is not
Jessica
Fossils- Molds
98
She showed how sedimentary
rocks were formed and how
dead animals and plants
became fossils, I thought the
project was unusual.

READING ASSIGNMENTS

SCIENCE FAIR HINTS

There are questions on the back.
Answer them on Loose Leaf

Creating a Winning Display



Art by Bob Scott

by Carl Proujan

In order for the results of any scientific effort to be useful, they must be communicated to other people. Normally, scientists do this by writing papers and publishing them in scientific journals. While this won't be possible for you to do for your science fair project, you'll still be faced with the challenge of communicating what you have done to fellow students, teachers, and science fair judges.

There are lots of ways you can display your work. And it is a very good idea to plan your display very early in the development of your project. Why?

Let's say your project involves *phototropism*. This is the bending of a plant stem toward the light. What better way to illustrate your work than by showing a series of photographs. But, if you don't take photographs during your experiment, you won't have pictures to beef up your display.

What if your project involves the study of different bird calls and your interpretation of their meanings? Clearly, such a project calls for a tape recorder, a sound motion picture camera, or a TV camera. You could set up your display so that the sounds of the birds are heard. And you might even add narration to the tape. This can be done if the bird calls have been recorded on only one band of a stereo tape. You can record your voice on the other band. When played back on a stereo system, your voice and the bird calls will be heard at the same time. You can prepare similar presentations using sound film or video tape. But, again, you've got to plan ahead.

ORGANIZATION

Your display can be very simple as well as effective. Drawings, posters, charts, and models are relatively easy to make. And they help communicate your ideas if they are well organized.

Speaking of organization, somewhere in your display you should show the sequence of events that are the bases of your project. These can be shown in a numbered chart. Your results should be shown in charts or graphs too. Don't hesitate to use color in your charts and graphs. But don't use color just as a decoration. Use it to present different sets of data so they can be seen and easily understood.

For example, if you have a single graph that shows the growth rates of four different kinds of plants over a period of time, use a different color for each plant. Provide a "key" at the bottom of the graph that tells the viewer which color goes with which plant.

PLAN AHEAD FIRST!

If your project involves an invention or a working model that requires electricity, make sure that power is available to run the invention or model. Your best bet is to use dry cell batteries since you won't have to rely on an outside source for electricity. CAUTION: DO NOT RUN YOUR EXPERIMENT AS PART OF YOUR DISPLAY IF THERE IS ANY DANGER TO YOURSELF OR TO VIEWERS. DO NOT USE ANIMALS IN YOUR DISPLAY UNLESS YOU CAN PROPERLY CARE FOR THEM THROUGHOUT THE SCIENCE FAIR. ALWAYS CHECK WITH YOUR TEACHER BEFORE SETTING UP YOUR DISPLAY!

Be sure you understand the rules of your science fair. You might have a perfectly fine project. But, if it doesn't meet the requirements of the judges, or obey the rules of the fair, all your hard work may be wasted. On the other hand, if your work has been imaginative, meets the science fair requirements, and is displayed in a clear, neat, and attractive way you might just have a winner! SW

Questions -

1- What is a display?
2- Why should you plan your display early?
3- Should you include graphs and charts in your presentation? WHY?
4- Why should your project be organized?
5- How can you keep it organized?
6- Why should you know and understand the rules of the Science Fair?
7- Explain how you are going to present your project.

There are questions on the back. Answer them on loose leaf

SCIENCE FAIR HINTS

SCIENTIFIC METHOD—
1. Collecting Data
2. Organizing Data
3. Stating a Conclusion

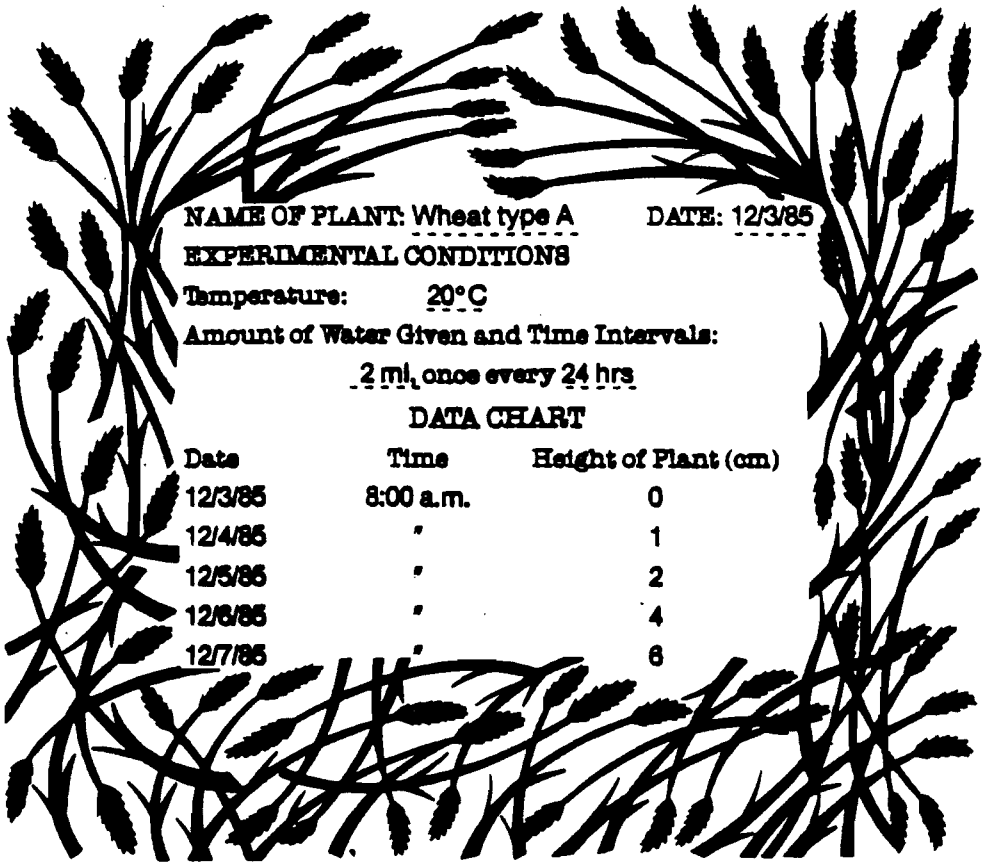
Sci fair

In many parts of the world, people are starving because they do not have enough food to eat. In some cases, this is because the land on which the people live is too dry or too hot to support most food crops. How can food production in these areas be increased?

Scientists might approach this problem in a number of ways. One way might be to try to develop a food crop that could grow well where there is not much water and where the temperatures are high. To find such a crop, scientists would—among other things—perform experiments, with different kinds of plant seeds.

The scientists would try to discover how well the plants grew under different watering and temperature conditions. To do this (and for you to do something similar for a science fair project) the scientists (and you) would have to collect and organize *data*.

Data are observations, many of which include making measurements. For example, in the experiment we just discussed, a variety of careful measurements would have to be made.



Art by Bill Silbert

by Carl Proujan

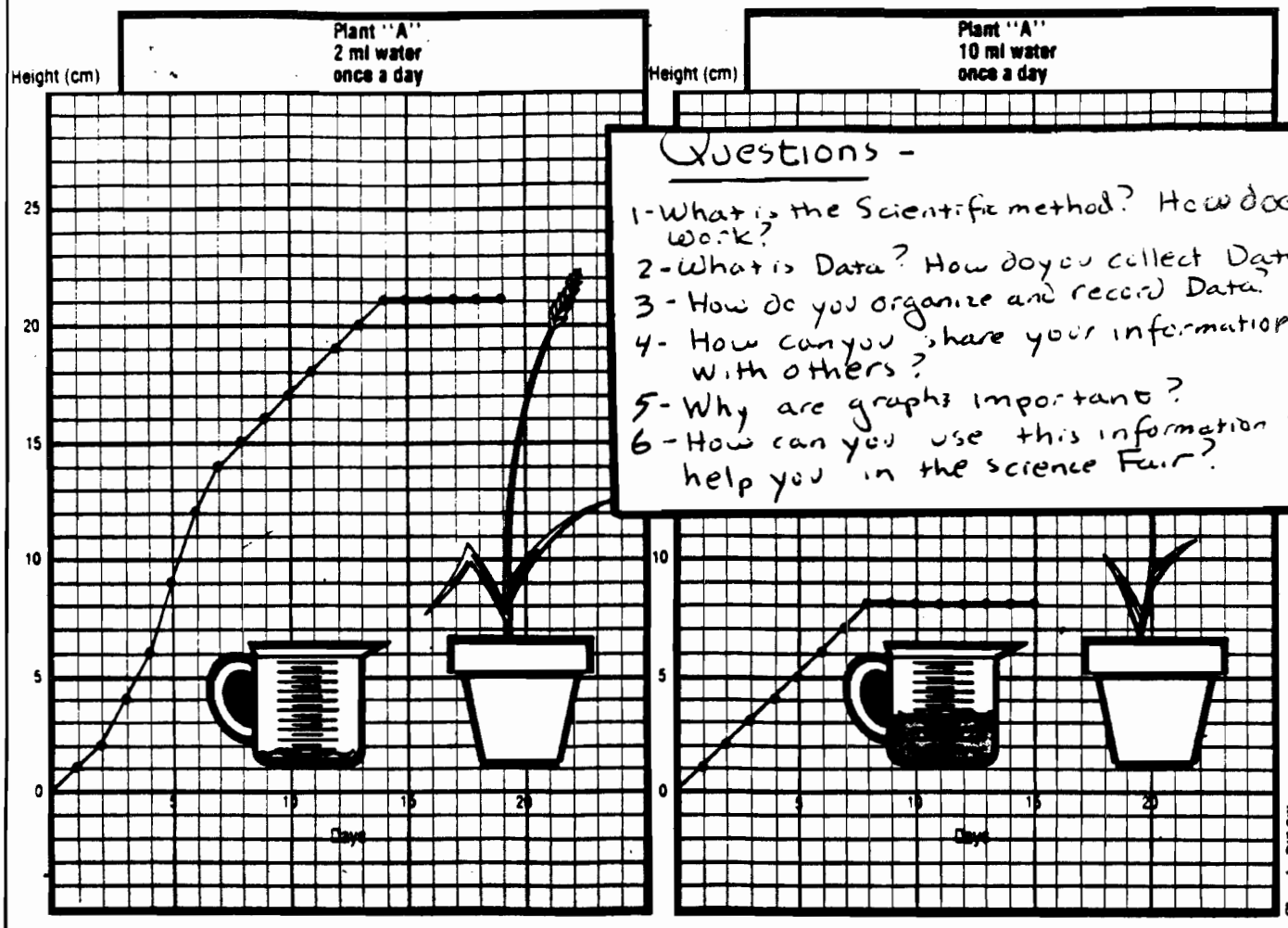
COLLECTING DATA

These measurements would include the *volume* of water given to the plants. Volume is measured in milliliters (ml) or liters (l). As the plants grew, their heights would have to be determined at regular intervals. This would require two kinds of measurements: *length*, which is measured in millimeters (mm) and centimeters (cm) and *time*, which is measured in seconds, hours, and days. Finally, the *temperature* around the plants would have to be carefully controlled and measured. Temperature is measured in degrees Celsius (°C).

All this data would have to be collected in an organized way in a notebook. (See the chart on this page for a sample.) Each chart would show the data for only one *variable*. That is partly because each variable in the experiment is tested separately.

In the plant experiment we've described, you would end up with two basic sets of data: One where the *volume of water* varied; the second, where the *temperature* var-

SCIENTIFIC METHOD—
1. Collecting
2. Organizing Data
3. Stating a Conclusion



Questions -

1- What is the Scientific method? How does it work?
2- What is Data? How do you collect Data?
3- How do you organize and record Data.
4- How can you share your information with others?
5- Why are graphs important?
6- How can you use this information to help you in the science Fair?

ied. And you would collect this data for each seed or plant you grew.

ORGANIZE YOUR DATA

Now, how could you make sense of all this data? There are a number of ways to do this. One very useful way to organize your data is in the form of *graphs*. Your graphs would have to be designed so that even at a glance you could draw some conclusions from the data you had collected and organized.

To get a very practical idea of how this would work, examine the graphs on this page and answer the following questions:

1. Would Plant "A" grow better where the land is drier or where the land is wetter?
2. On what day did the plant given 2 ml of water per day stop growing taller?
3. On what day did the plant given 10 ml of water per day stop growing taller?
4. What was the greatest height reached by the plant getting 2 ml of water per day? The plant getting 10 ml of water per day? (*Answers on this page.*)

CONCLUSION

The graphs provide answers to all these questions, which shows you how data you have collected can be organized so that you can reach meaningful conclusions accurately and quickly.

In this series of experiments, you would make similar graphs for other volumes of water, for various temperatures, and for many different kinds of plants. By studying all the graphs, you would be able to determine which plant(s) might become the best food crop(s) in a dry, hot area such as Ethiopia in Africa. And by doing this, you might help to provide information that could save thousands of lives.

Answers:
1. Drier 2. Day 8
2. Day 14 4. 21 cm, 8 cm

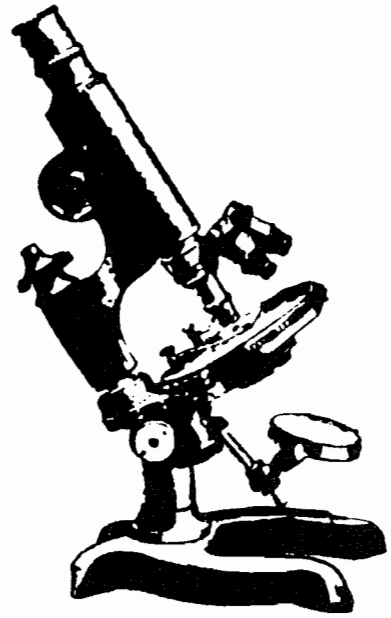
AWARD CERTIFICATES

The Louis Armstrong Middle School

City of New York.

This Certificate is Awarded to

A Science Fair Honors Recipient



BOARD OF EDUCATION CITY OF NEW YORK

Grade | Year | Teacher | Principal

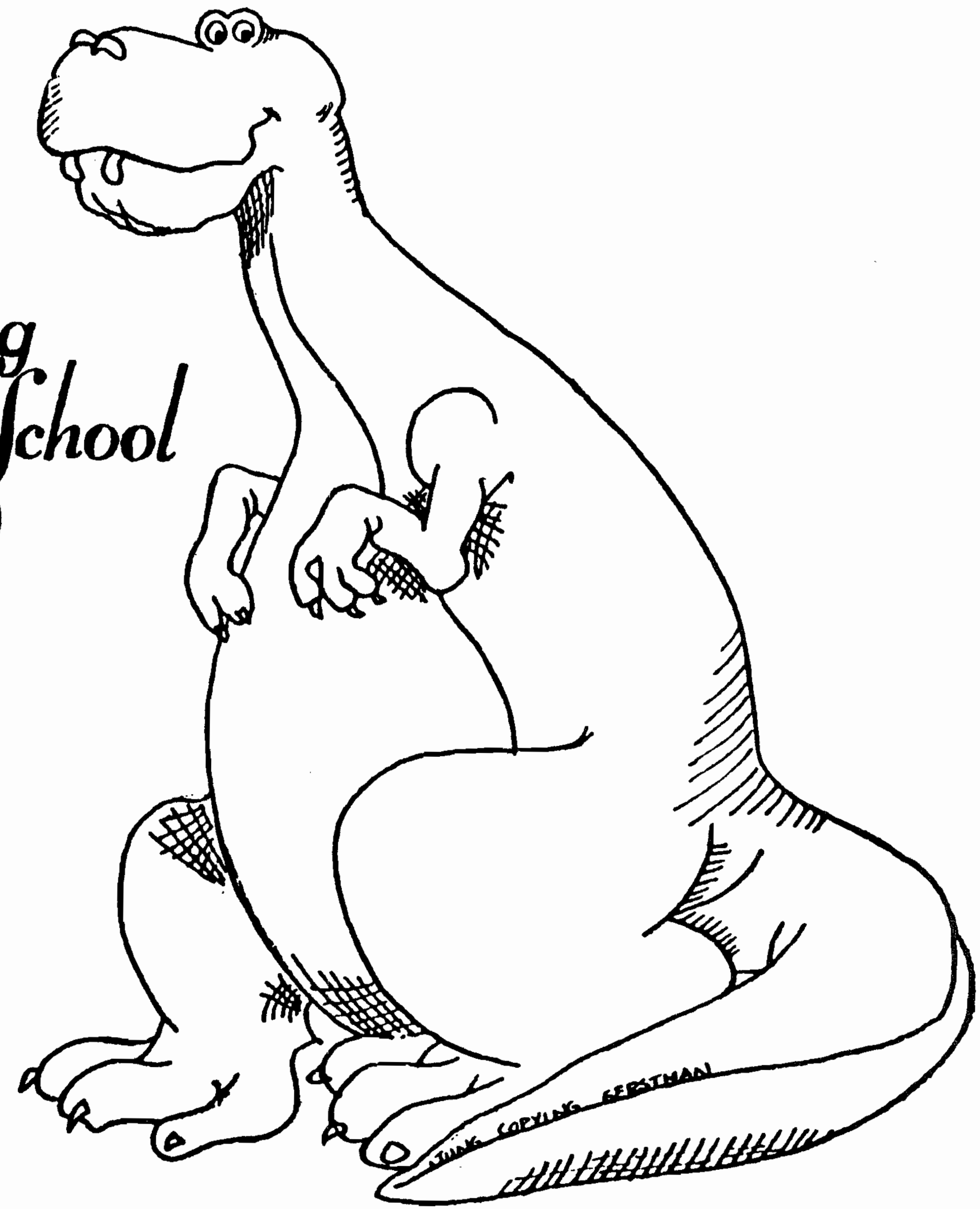
Award Designed By ROBERT KALISH

Sci fair

SciFaire

The Louis Armstrong Middle School

I.S. 227 Q



In Appreciation to

For Participation in the

I.S. 227

Science Fair

Award Designed By JOAN JUNG

Award Designed By Gregory Grambo

glue award ribbon here

The Louis Armstrong Middle School

This Certificate Is Given To

For A First Place Entry
In This Years
Science Fair

_____

_____

_____

_____

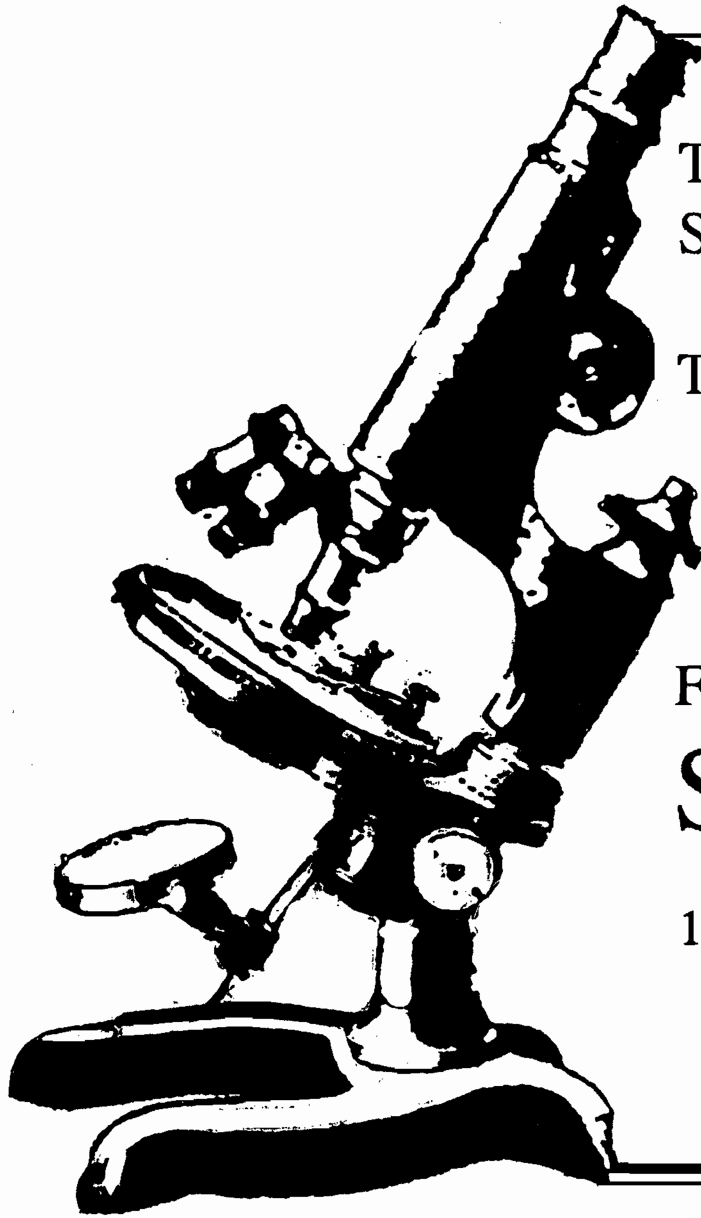
The Louis Armstrong Middle School

This Certificate Is Given To

For Helping To Set Up And Run Our

SCIENCE FAIR

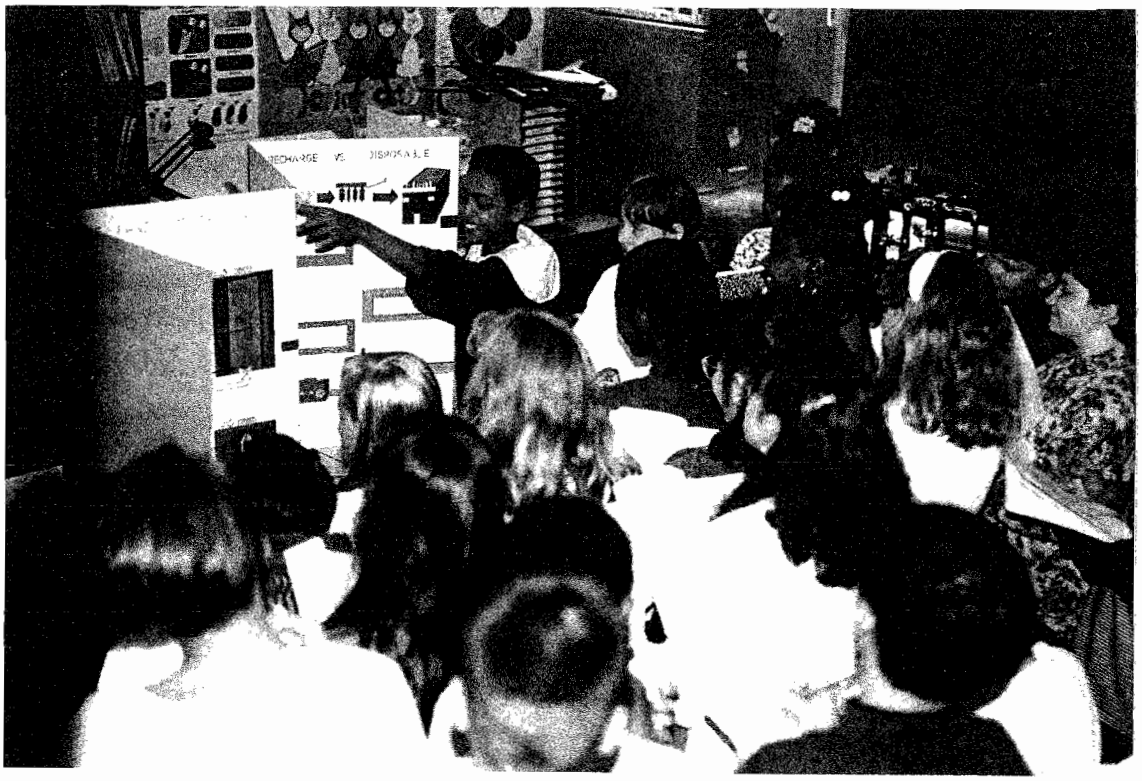
199



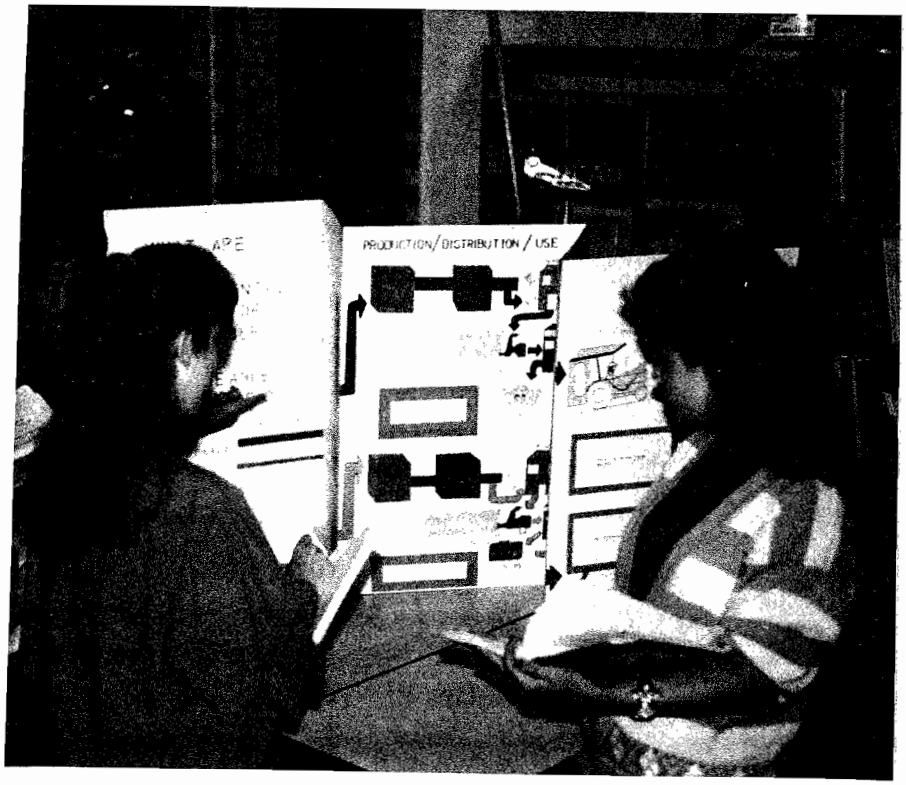
SciFair

Award Designed By GREGORY GRAMBO

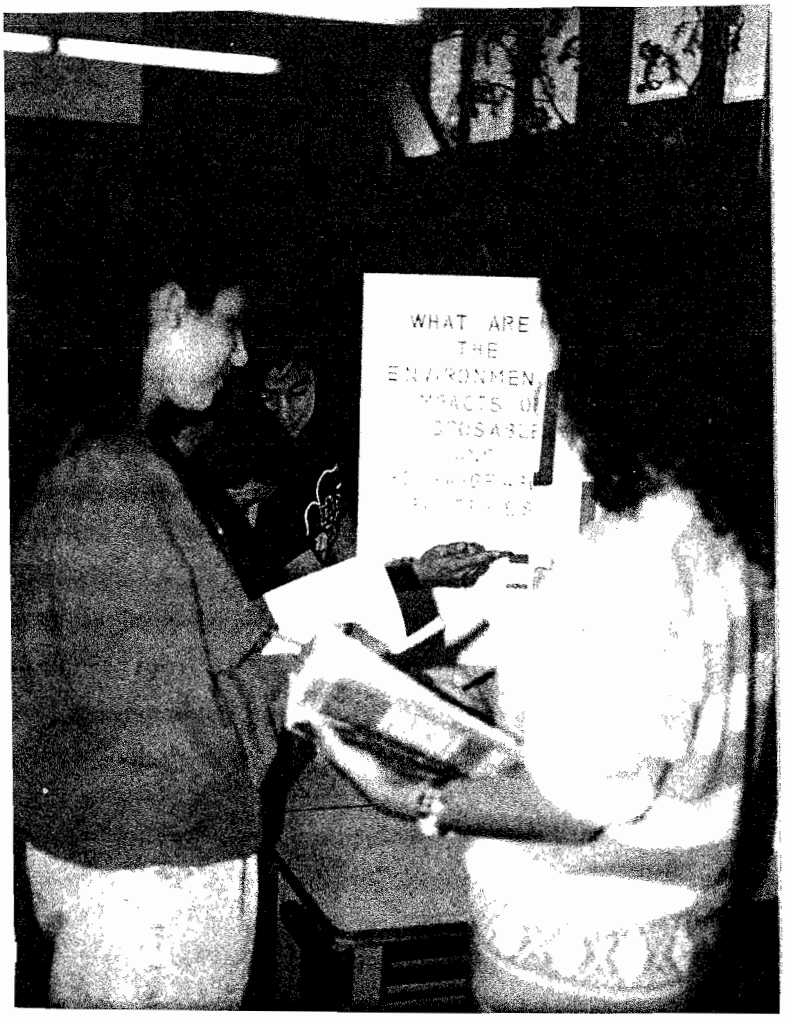
PHOTOGRAPHS



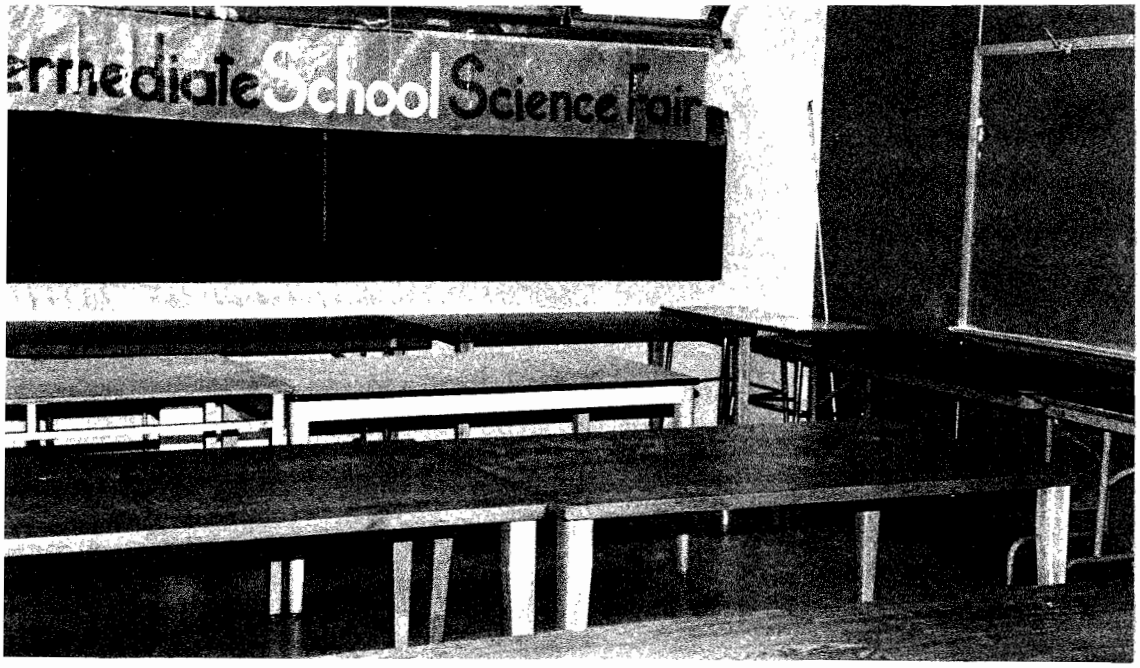
A Student Explaining His Project To The Class



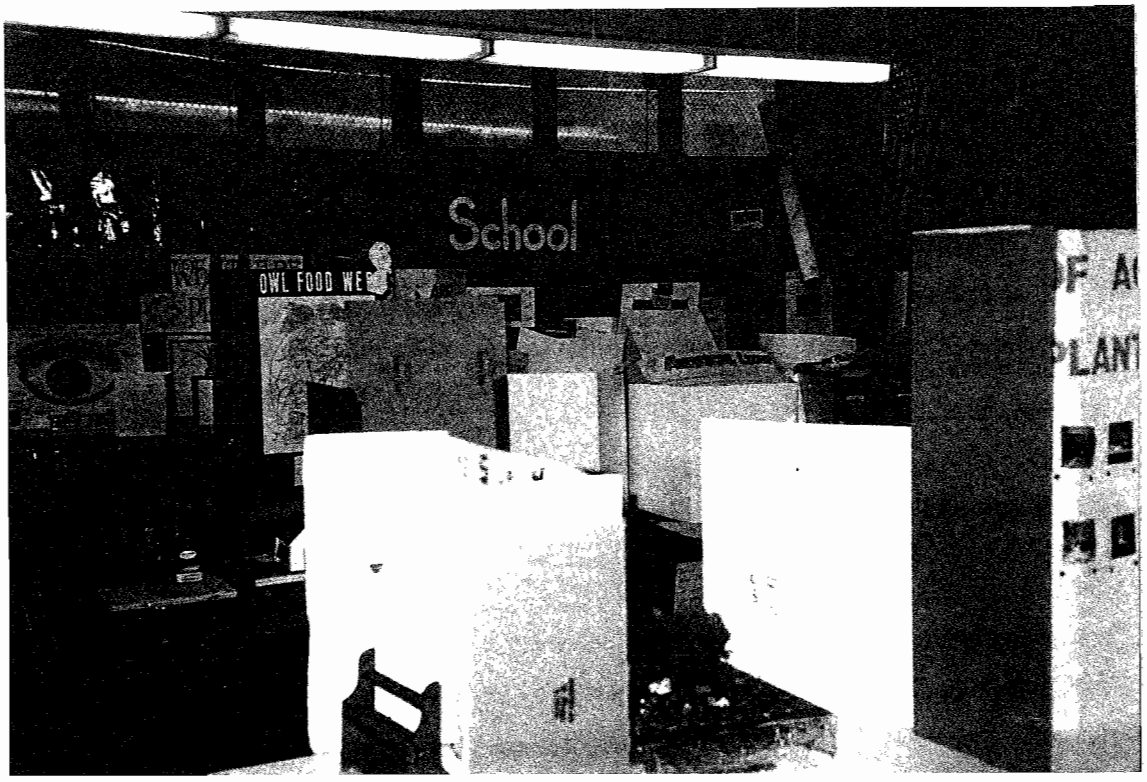
The Class Looking Over A Student's Project



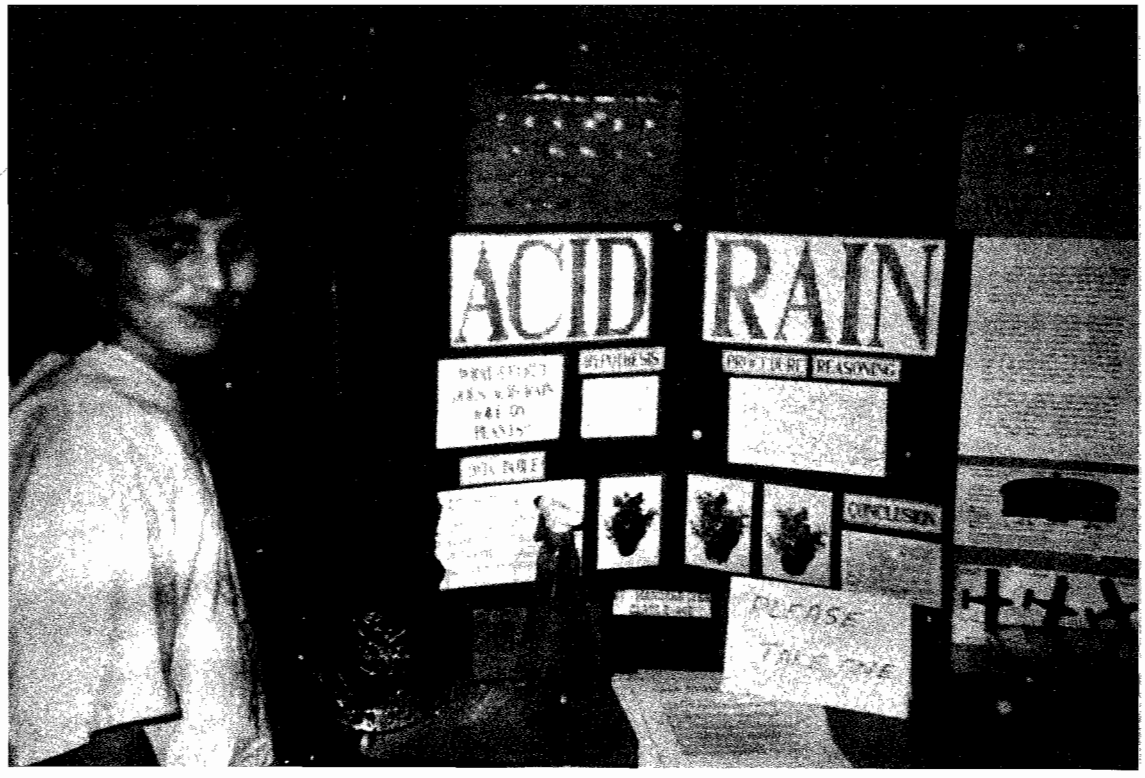
Looking Over The Projects In Class



Setting Up The Science Fair

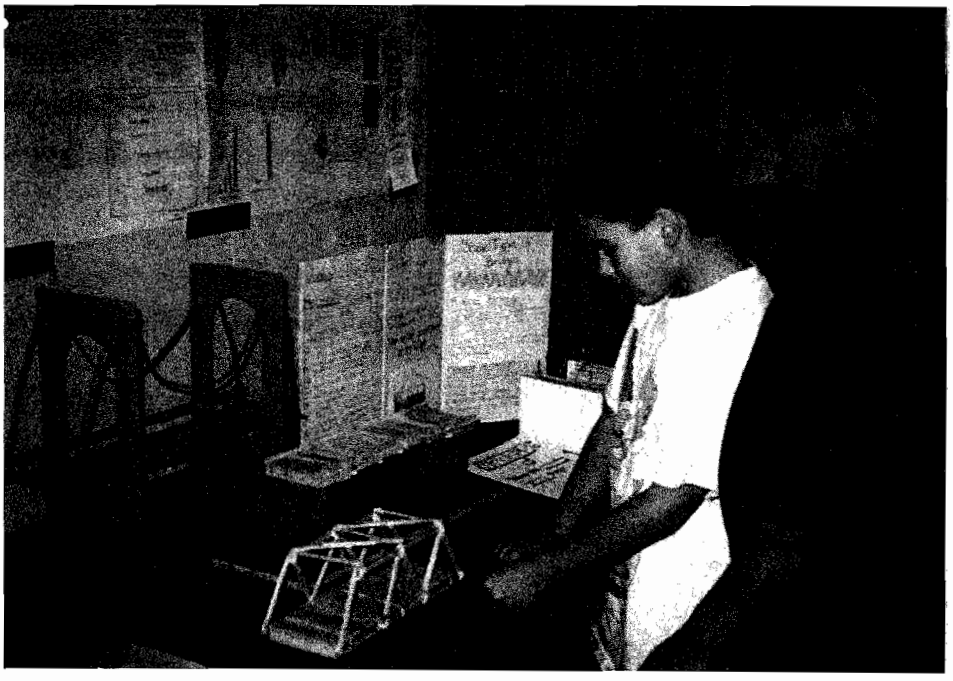


At The Science Fair

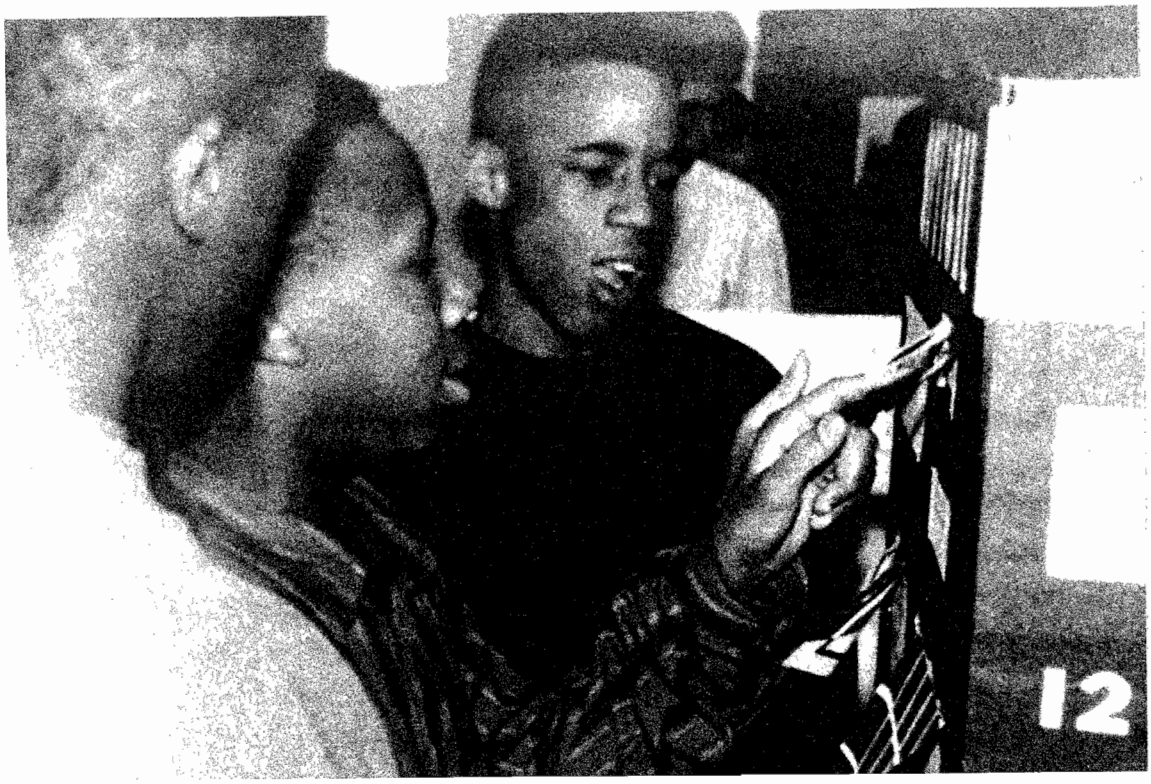


A Project On Acid Rain

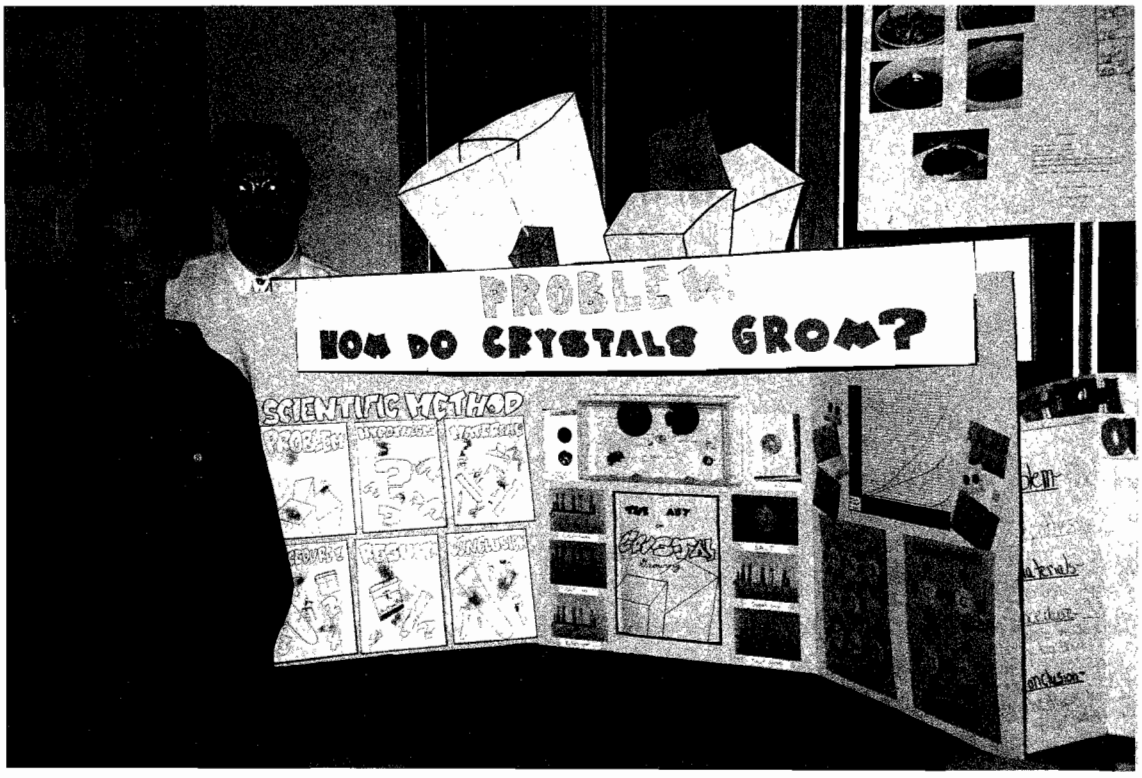
A Project Showing The Scientific Method



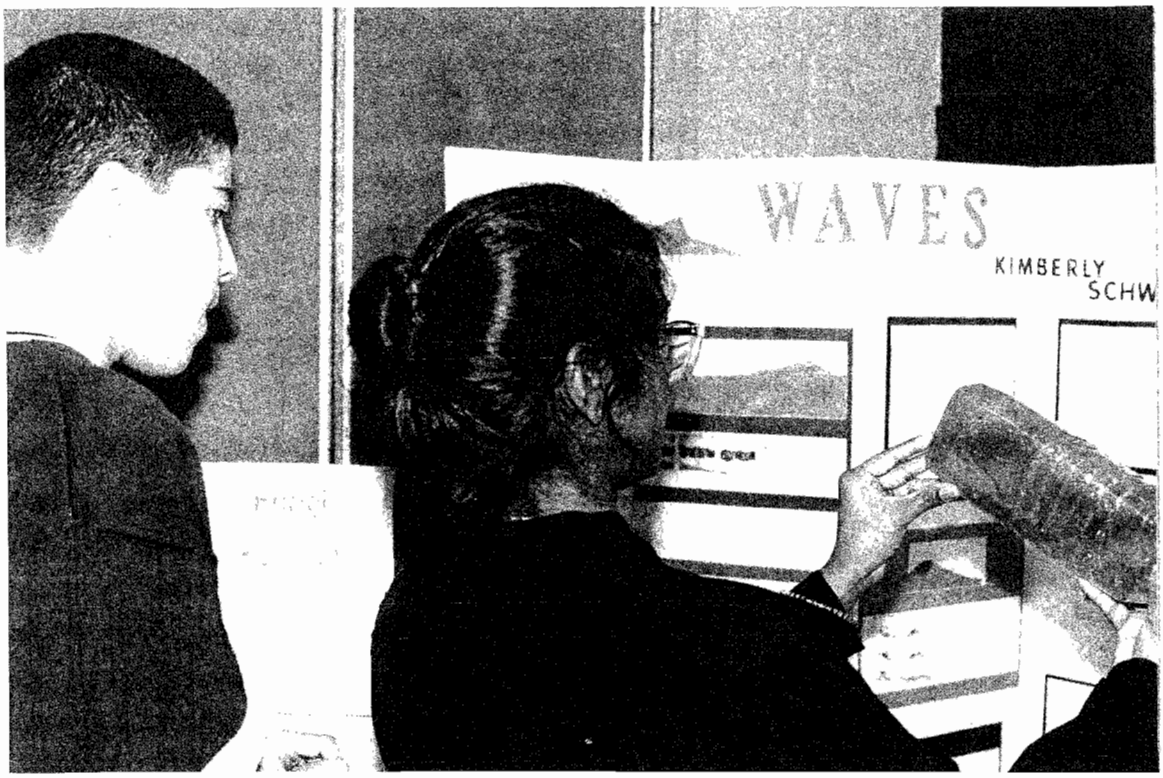
A Project On Bridges



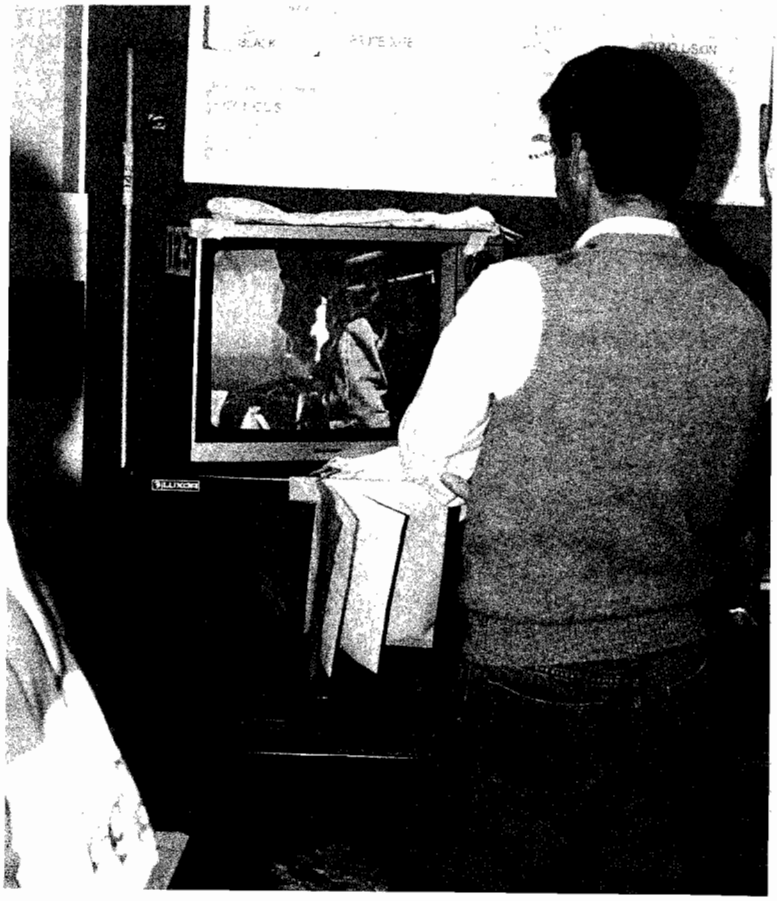
Examining A Project At The Fair



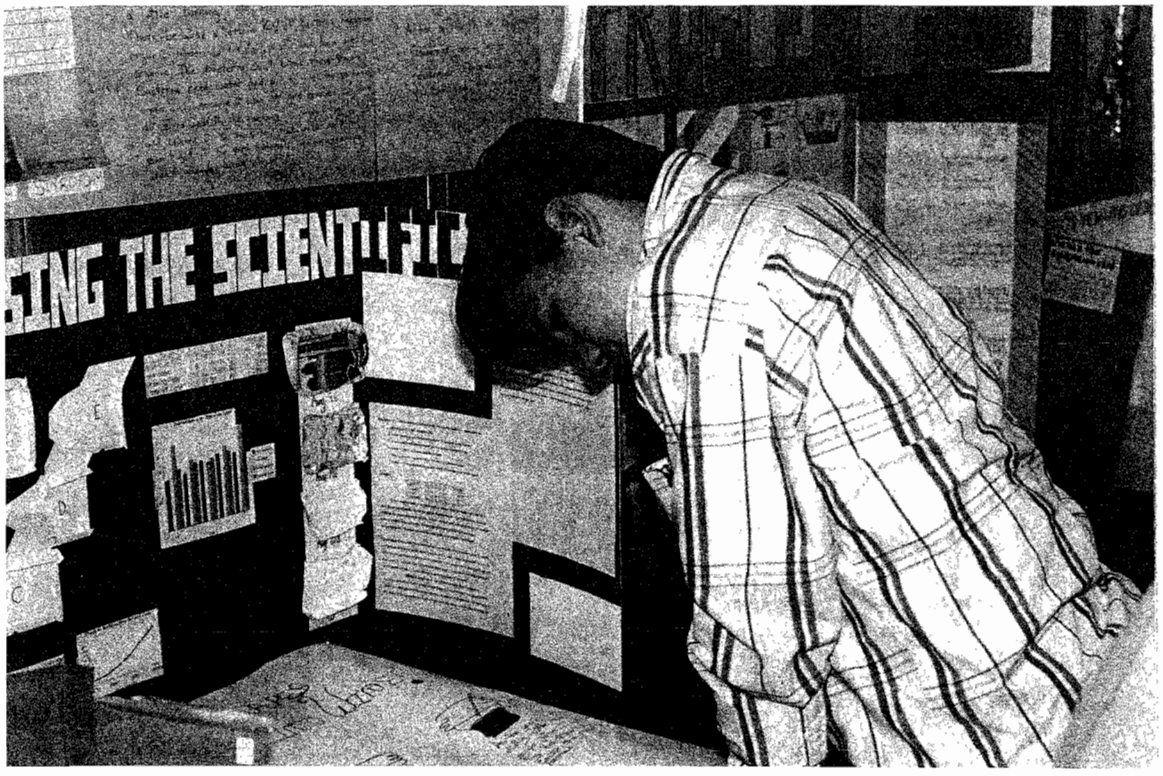
Mr. Grambo With A Student And His Project



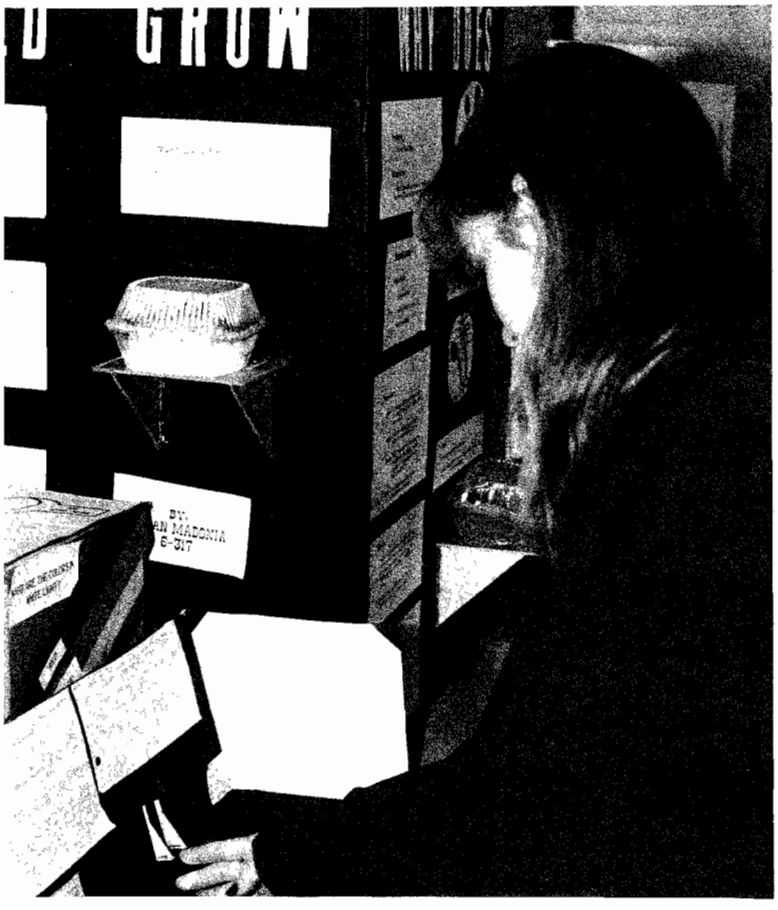
Mrs. Sundri Looking At A Project On Waves



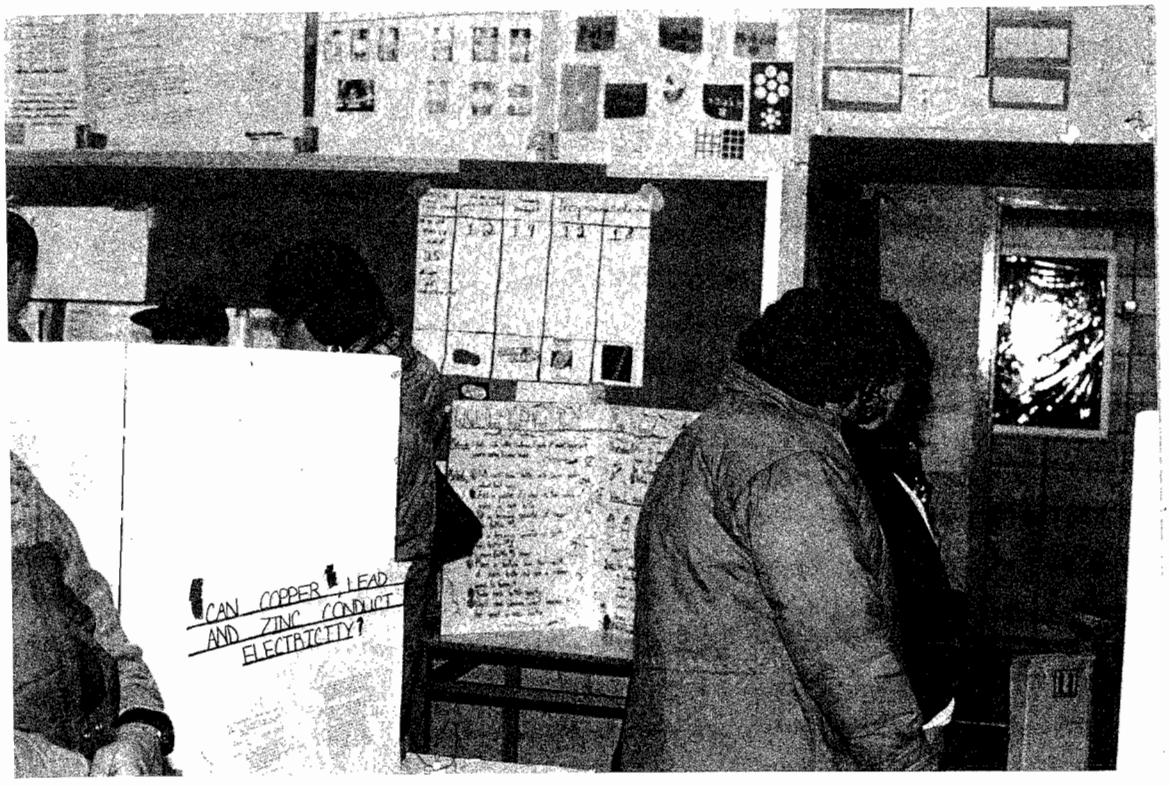
Mr. Troy Looking At A Student Video Project



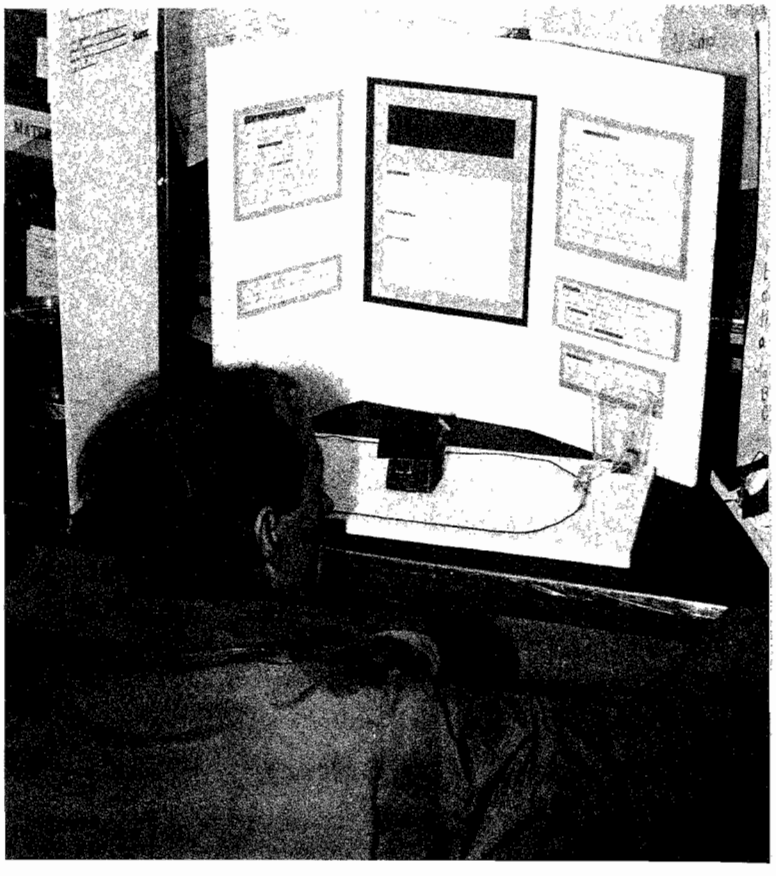
Looking At The Projects In The Fair



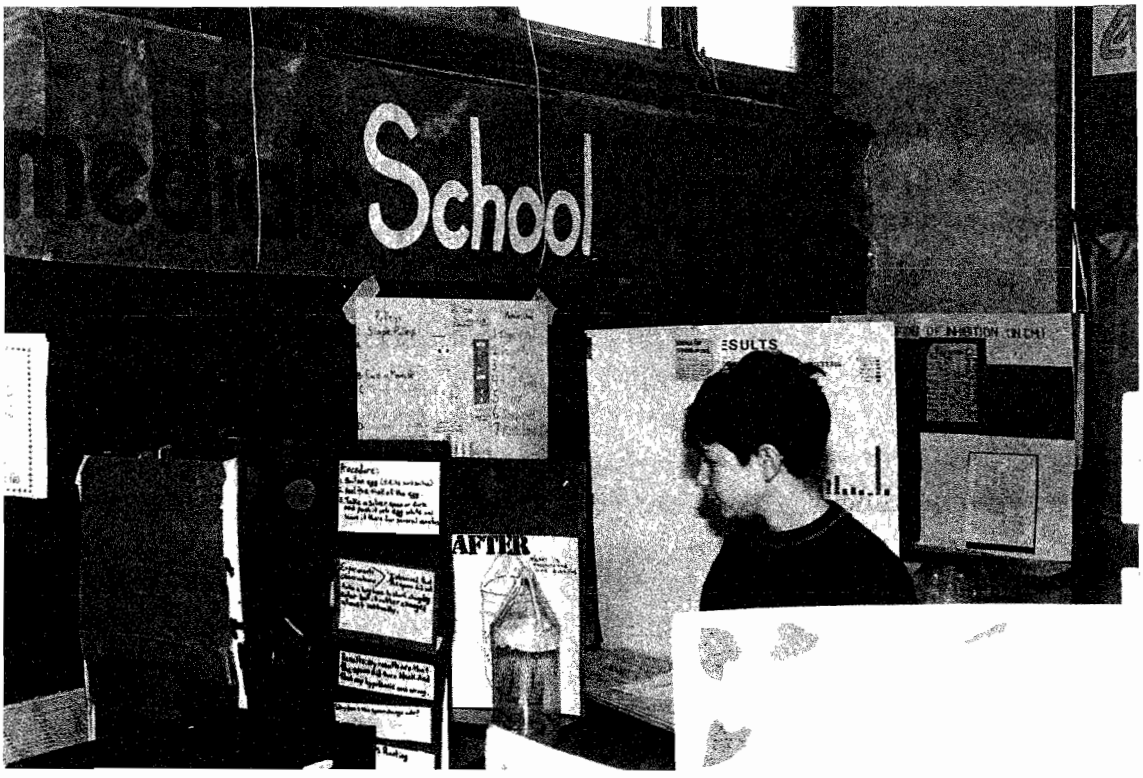
Looking At The Projects In The Fair



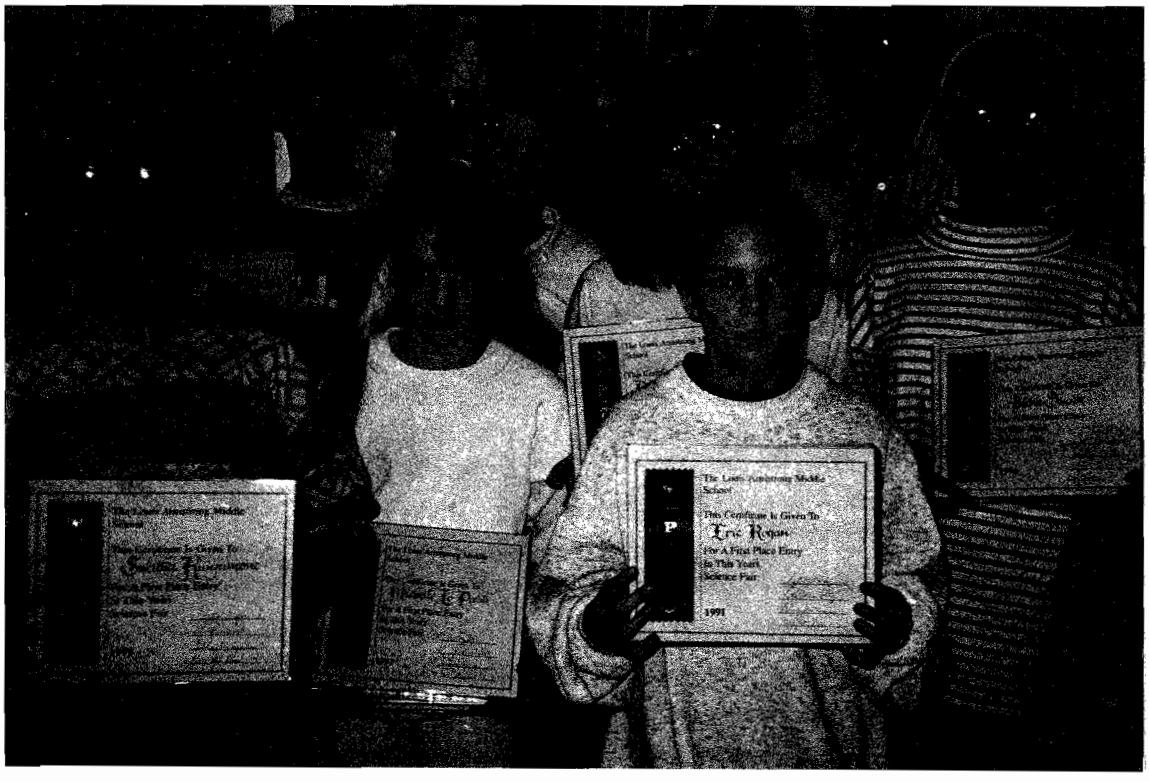
Parents At The Science Fair



Parent Examining A Project On Conductors



Looking Over The Projects



Winners In The Fair

CHILDREN'S COMMENTS ABOUT THE SCIENCE FAIR

Pantelis
Class 6-417

F.A.M.S.
Jan. 7

Science - Ms
The Science
Fair

The Science Fair is obviously given for a very important reason. I think it's to kill all the kids ind the school, but I don't think the science teachers put it that way.

You have to do a lot of research for a science project. Let's just say that your science project is Magic Liquids (I did that)! When you do the experiment, you can't just say the liquids and how you put them in. Nooooo! You have to research density and why the liquides layered like that. That a true science project, along with the scientific method. The scientific method explains your project, how did you do it, your material and all that kind of science stuff. In our science fair, to top it all of, our science teachers gave us a sheet to fill out and stick it on the back of our project. If you don't have that sheet on the back, 25 points off Your project.

After you finish the project, you have to bring it to class and talk about it. If you make a mistake, the whole class here's the mistakes you make and they make you feel stupid. It was absent for my turn to talk about my project so Mr Granbo did.

After that, if your project is good it gets put into the science fair. Now I know why Mr. Granbo arranges those

Rennita
Jan. 8

L.A.M.S
6-421

The Science Fair

The thing I hated about the science project is because when I was doing it my room was a mess. The room had papers everywhere. The other thing I hate is when I went to the library and almost all the good books were gone. I also hate when you do a little work and you get a good grade and when you do a lot of work and you get a bad grade. I hate when that happens.

The things I liked about doing my project is when I got a chance to learn something new. I also like when people like my

project. It makes me feel good. I also have another reason for liking the science project. While I was doing it, it made me feel like a real scientist. When I was researching and doing the experiment I felt like a scientist. The thing I really liked most of all was when I worked real hard and I got a good grade. Those are the things I liked about the scientist fair.

There are somethings that I felt I could improved after the science fair. I felt I could have wrote the things neater, and paste the picture better. I also left out some parts on how the lemon generates electricity, and now I wished I putted it because then I could have gotten a better grade. And that is the things I thought I could have improved.

Judith
5417

HAMS
1/7

Composition

What I liked about the projects was that I learned a lot about more things that I haven't learned and haven't tried. Some of them had a lot of details which I liked. But the one I liked the most was the one about magic colors. I liked this one because it was interesting. I found it interested because I would want to try this project.

What I didn't like about the projects was that some of the projects did not have a model. Others did not have the scientific method. I don't like the projects because some of them didn't have enough details. They did not talk loud

though so the kids in the back could hear them. Sometimes they repeated the same answer over and over again. Some talked fast. The worst thing of all was the some of the kids did it last night which is very disapointed for those people.

The

End

Louis Armstrong
Class 6-235

Yulissa
January 8

What you liked and what you didn't like about the Science Project

What I Liked:
I liked when people deminiestrated it. I got to think what I would do next year. You got to know whats a good project and what was not a good project. You got to know what thay thought about your project.

Some things were sloppy but people told you what is was about good. And some wher nice but weren't wall explained.

absent January 7

What I didn't like?

I didn't like it because people asked to many questions or crisied the project when discussing the grades. Also I didn't like discussing the grades. People were hard on you, asking the same questions over and over. Also people would walk away from the project.

Things were stealable. and some were to big like big boxes.

Louis Armstrong Trevor
6-235 Jan 8,

I liked doing the science fair project and I didn't like doing it. There were a lot of reasons why I did and didn't like it. Here are two.

I like doing the science fair because at my old school I did have a science fair but you had a choice to do it or not, this year I didn't have a choice to do it I had to so it was my first time.

I didn't like doing the science fair project because I was very nervous.

Next year I hope it would be better because I'll have more experience.

Name   Mary
6-235   1/7

Science

The science fair was good. I like
all of the of the project some
of the project was kind of bad but
some of them was still alike.
What I did not like was the
one that just had a dictionary
because it look like it was done
in one hour. Some of the project
did not have the method. To the
rest of the stuff they were good.
I like the one with the test
tubes and the light bulb that one
was the best and half of the
class liked the only thing was
that the test tubes were stillable.
The other project that I like
was the ones with the butterfly
she did a very good job the
only thing is that she did not
have a scientific method. And to
the other projects they were
very good too. To the one
that wasn't so good they
could have did better and
I think that the rest and
including the bad one they did goo

Tamika
Jan 7

LAMS
6-417

Science

I liked doing science projects. It was a nice experience. My project was on "What is decomposable?" Which means what is able to break down. Although I didn't get to have the experience of sharing my project with the class my project was entered in the fair.

Personnally, even though it was fun I would rather not have done it. The reason because science projects take three major things: ① time, care, and effort. If you don't take consideration of these three factors your project will turn out a flop. Also you should pick a topic of interest so that you won't get bored with it and the people listening won't either.

L.A.M.S.
6-235

Alexa
1/7/

Science - Likes and Dislikes

The science fair was a very good thing to do. Last year I didn't have an individual science fair. So it felt like there was no science fair. This years science fair was a very nice experience for me. I liked the fact that people could ask me questions, in this way I could learn more about my own project by answering their questions.

We had a good amount of time to do it. Also the slides that were shown, gave us a good idea of what it should be. Mr. Grambo was very specific in the qualities it should have. He also made a checkup on what we were doing before we did. It was also very nice of Mr. Grambo to not bill us with classwork while we had to do the project. In my oppinion I thought Mr. Grambo very carefully ~~pl~~ planned out the science fair

Marque L.a.m.b.
Class 6-417 Jan. 7

Science

I liked working on the science fair project for a couple of reasons. I liked it because I had a chance to work with malick also she spent the night over my house. It was very easy because we already knew what we were going to do. The only thing that I didn't like was the pressure, teachers kept saying don't forget you only have a few days left for the science fair.

The things I didn't like were that we had three other projects due that week. But all in all it was fun after all with a science teacher like Mr. Gramba why wouldn't it be fun! (That's a compliment)

Giuseppe
6417

LAMS
1/7

Sci.

What I liked about the sci. fair was some of the Project. What I hated about the Sci. Fair was that when it was your turn to talk you got nervous. What I also hated was when everybody got in a crowd and you couldn't see. Sometimes the Kids didn't talk loud enough. Other times they hardly knew anything about there Project. Some People didn't care and just foolid around. I was absent for 2 days and missed some of the Projects. When it was my turn to go, I went in Saparitly and nobody had to see my project except Mr. Grambo. Some of our Projects are going to the Sci. Fair. I liked a project with these rocks and see which liquid eats away the rock faster. I also liked a project that makes electricity out of waves of the sea. My Project was about what heats up faster Desert, Ocean, or rocks.

Sonia Del
S.A.M.S.

6-7-17
1-7-

Essay
Science

I liked doing the science projects. The thing I didn't like was going up in front of the class and giving my presentation, I was really scared that you would give me a low mark. Everything else was great. Marking people's paper, working on the project, & then finishing it off. Even working on it alone it was fun coloring it, drawing it, and writing it. All I know is I tried my best and worked hard on it. I also didn't like other projects, but I should be talking about other people's project when mine wasn't so hot. I loved it so much. It was a great experience for me to learn.

Jessica
6471

L.A.M.S.
Jan. 8.

Science

One thing I enjoyed about the Science Fair was getting my information for my project. I went to the Hall of Science to take out a book that had a lot of projects in it. I liked learning about my project, too.

I didn't like that we only had three weeks for the Science fair. I think next year, we should have about a month and a half. I also didn't like that we had projects from other teachers at the same time. Next year we could ask them to postpone the other projects.

Trisha L.A.M.S.
January 8th 6-421

The Science Fair

The things I liked about the science projects was that they were very colorful and the people who made those projects really had a brain to think of such projects like those I also liked the way they did the scientific method because some of them had really nice drawings on the big peace of construction paper and most of them deserved a really high grade. Most of the projects mad me laugh because of the way they did it, but it was fun looking at them.

The things I hated about the projects was that some people had better projects than me, but the people would not understand why I made a project like that, but I think

I did a really nice project even though I got a low grade. I got that idea from my mother, but because I did not look up what the project was about is because my mother saw this experiment being done by some scientists, but I still think that others did better projects than me. I am always going out to places and my brothers a trouble-maker that's why my project did not form. It will take days for it to form if you move it around alot, but if you leave it still it will take days for it to form but less days.

Doing projects is boring, but sometimes you have to do it, that's why when I hear the word projects I go crazy. That is why it hate doing projects and I think I can do better next time I have a project. today

Marc
6-421

LAMS

The things I liked about the projects were that we got to grade them and the people represented them nicely. Another reason I liked them is that the projects were new to me, so not only did I grade them I learned from them.

The things I didn't like about the projects were that the not all the people knew what they were talking about, so I didn't get to learn from all the projects. Also if two people said they did the project together it was supposed to look like two people did do it together.

The only way I could think of making projects better is find out what you are doing.

Belissa L.A.M.S.
6-421

Science Fair

I really liked doing my project. It was kind of fun. Sure there were some bad stuff like that fact that we had to go to the library and wait for some good books to come in. We also had to wait for the grass to grow, and I was nervous because all these questions were in my head: Why wasn't it growing faster?, What would happen if it didn't grow?. But it grew, and my worries were over.

Then there was all I liked, like working together with my

friend, and learning somany things. Also checking and grading other projects was exciting. The fact that we learned so much was good. Some people were excited the decided to try it at home.

What I would do to improve my project, is maybe give more information, and sound more confident when I say my summary about my project. Well I guess I going have to take these things next I plan one doing a science project.

Carbi-
6-417

L. A. M. S.

Science

I think that this years Science Fair is going to be really great because most of the projects I have seen so far in my class, but I can't say that they are all great because I have not seen the ones in other classes. I think most of the project took a lot of time and effort. The best one I have seen so far I think was P. K's because I have neve seen nothing like liquid layers. I liked the way he put different color liquids layers without them sinking to the bottom, I think I have learned a lot more things than I have learned last year in fifth grade and I just can't wait to see projects from different grades and classes in the Science Fair.