Research Projects and Science Fairs

Why Do Projects?

- Answers the question:
  - *"Why do I need to learn this stuff, anyway?"*

Real Research in the Real World!

Interdisciplinary

- **Integrates, into one activity**
  - *Reading*   *Critical Thinking*
  - *Writing*   *Computer Science*
  - *Spelling*   *Graphic Arts*
  - *Grammar*   *Scientific Methodology*
  - *Math*   *Logic*
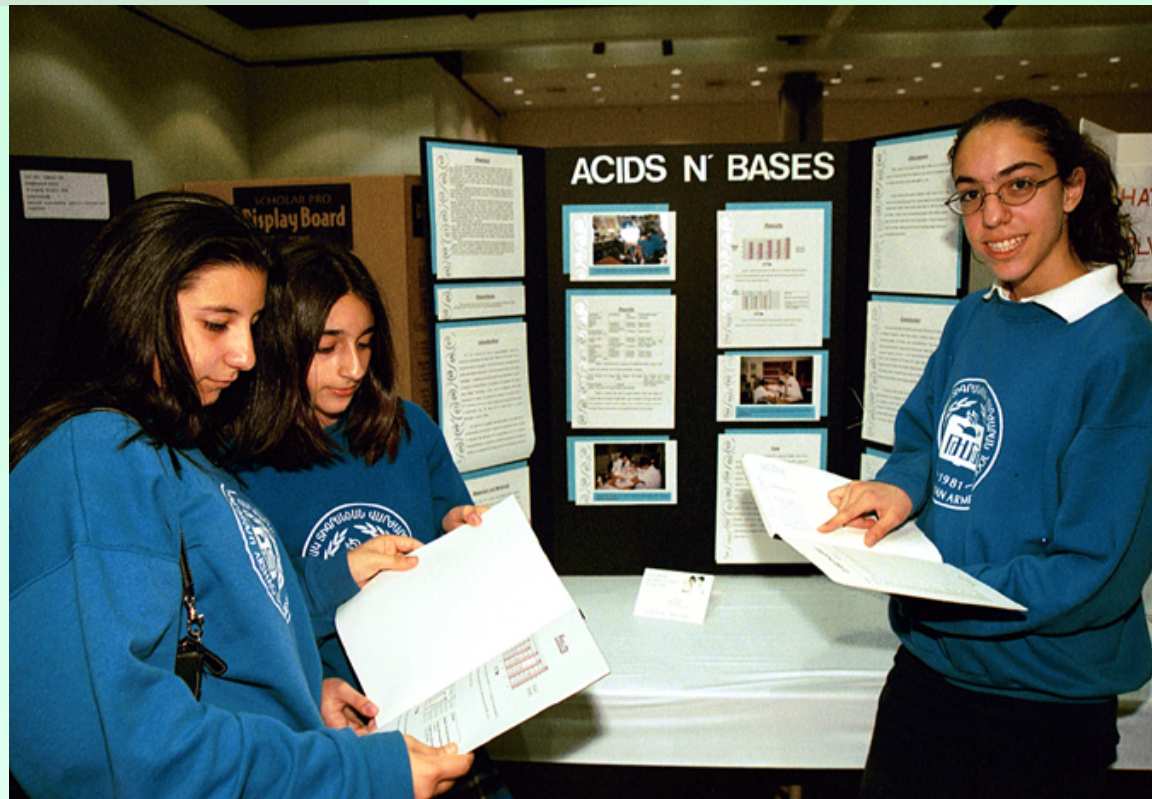 - *Statistics*   *Self-learning*
  - *Ethics*

Enhances Inquiry & Collaboration

- **Requires teamwork**

  - **Individuals work with advisors, university/industry mentors**

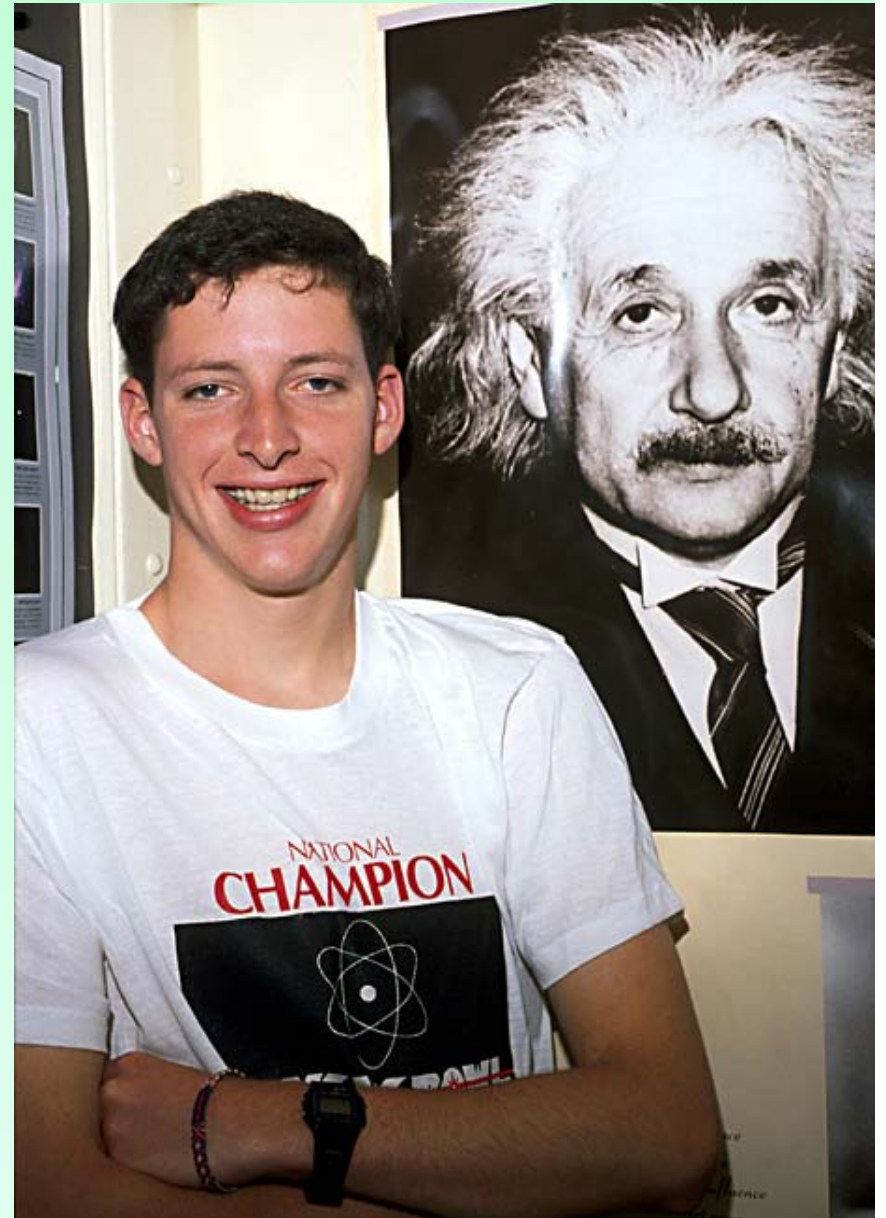 - **Teams combine skills to attain group goals**

Benefits for Students

- A chance to create **artistic displays**

- Increases confidence through **oral presentations**

Helps College Acceptance

- *Seniors with projects accepted to regional fairs are more likely to be accepted by schools of their choice*
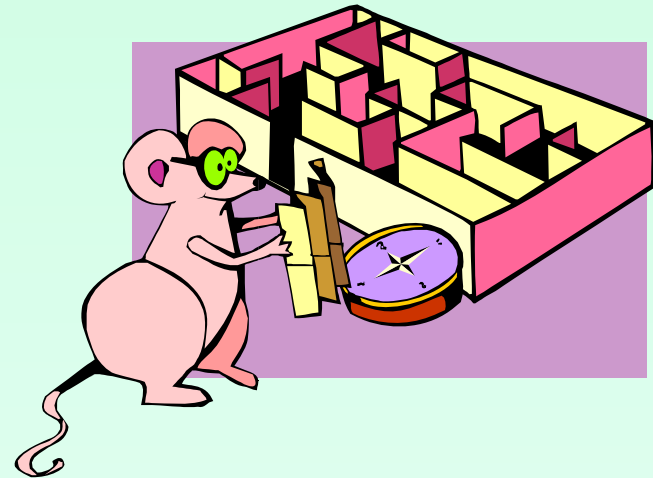
Win Prizes

- **Cash or Research Awards can open doors of academic opportunity**

SR Science Fair Categories

- **Animal Biology**

- **Animal Physiology**

- **Behavioral/Social Sciences**

- **Biochemistry & Molecular Chemistry**

- **Chemistry**

- **Earth/Space Science**

- **Ecology**
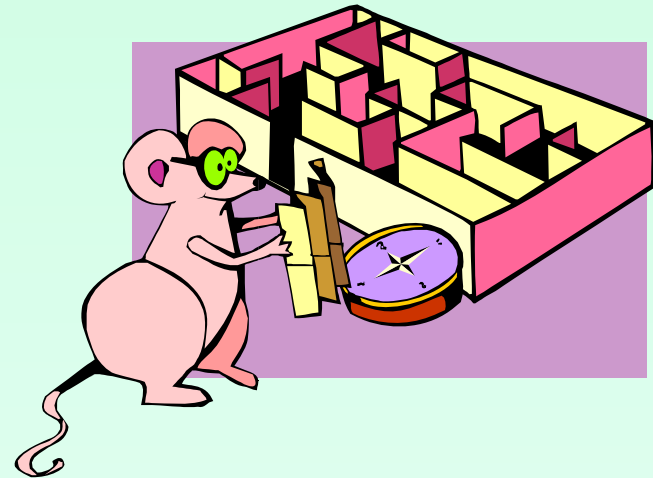
- **Engineering Applications**

SR Science Fair Categories

- **Engineering Research**

- **Environmental Management**

- **Mathematics/Computer Science**

- **Microbiology**

- **Pharmacology**

- **Physics**

- **Plant Biology**

- **Plant Physiology**

JR Science Fair Categories

- **Animal Biology**
- **Animal Physiology**
- **Behavioral Social Sci-Human**
- **Behavioral Social Sci-Non-Human**
- **Biochemistry & Molecular Chemistry**
- **Chemistry-Applied**
- **Chemistry–General**
- **Earth/Space Science**
- **Ecology**
- **Engineering Applications**
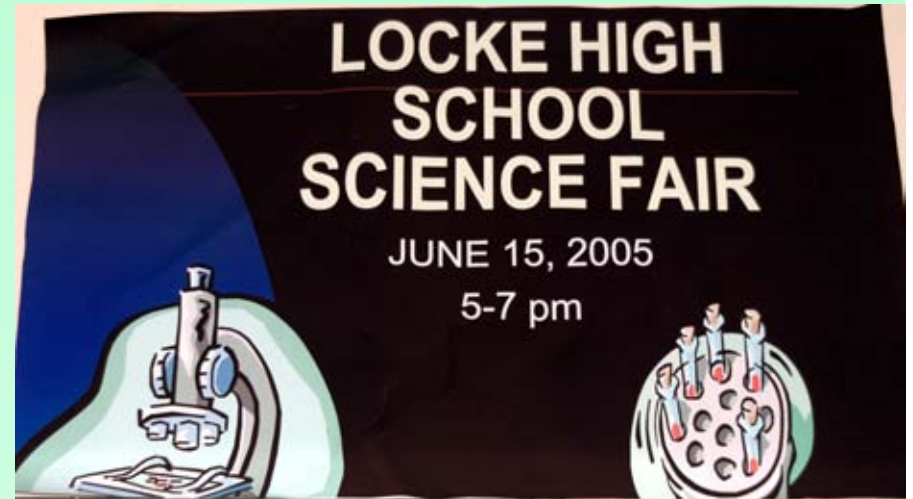- **Engineering Research**

JR Science Fair Categories

- **Environmental Management**
- **Materials Science**
- **Mathematics/Computer Science**
- **Microbiology**
- **Pharmacology**
- **Physics-Aerodynamics/Hydrodynamics**
- **Physics - Electricity & Magnetism**
- **Physics - General**
- **Plant Biology**
- **Plant Physiology**
- **Product Science**
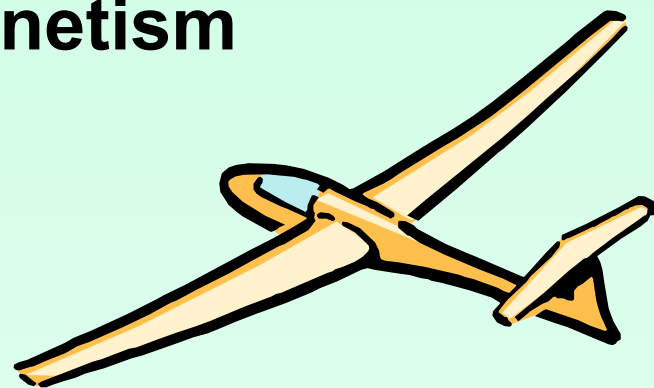
School & County Fairs

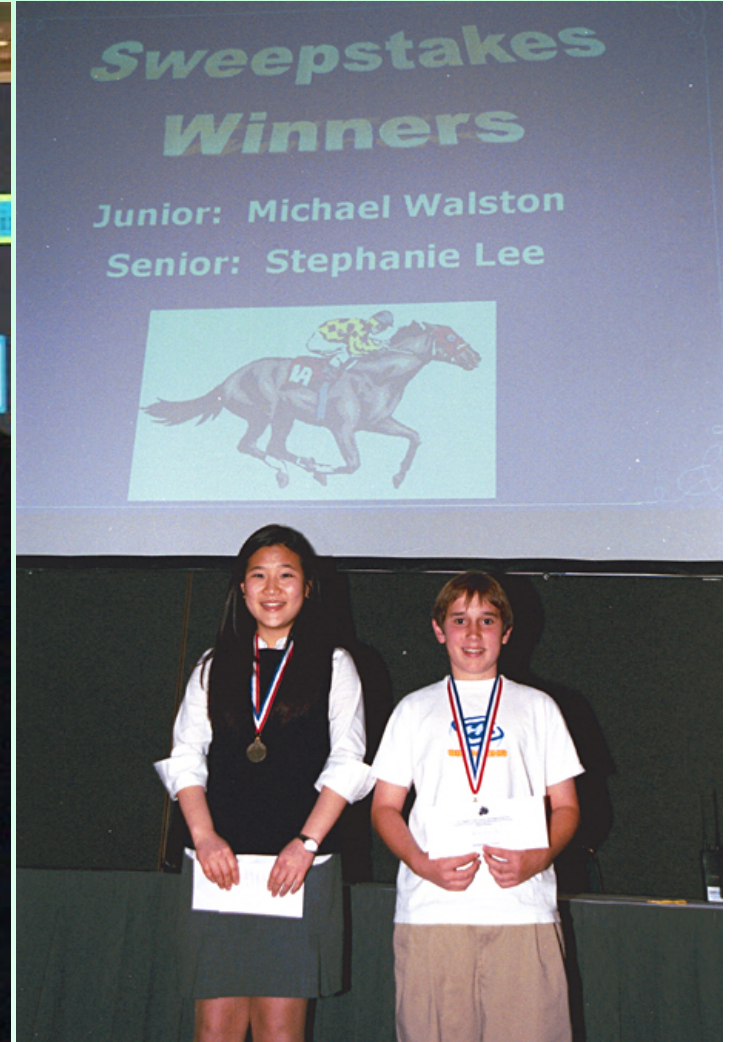# High School Science Fair

Judging & Awards

LA County Science Fair

Top 13 projects per school can register
Only 3 may be team projects of 2-3 students

More Competition, Dress for Success

State Science Fair

CA Science Center, Los Angeles, CA

Top 1st, 2nd & 3rd in category per County Fair

State Science Fair

Awards Ceremony
in Big Lab

International Science & Engineering Fair

- **Top 2 student projects in the Senior Division may be selected _for international_ competition!**
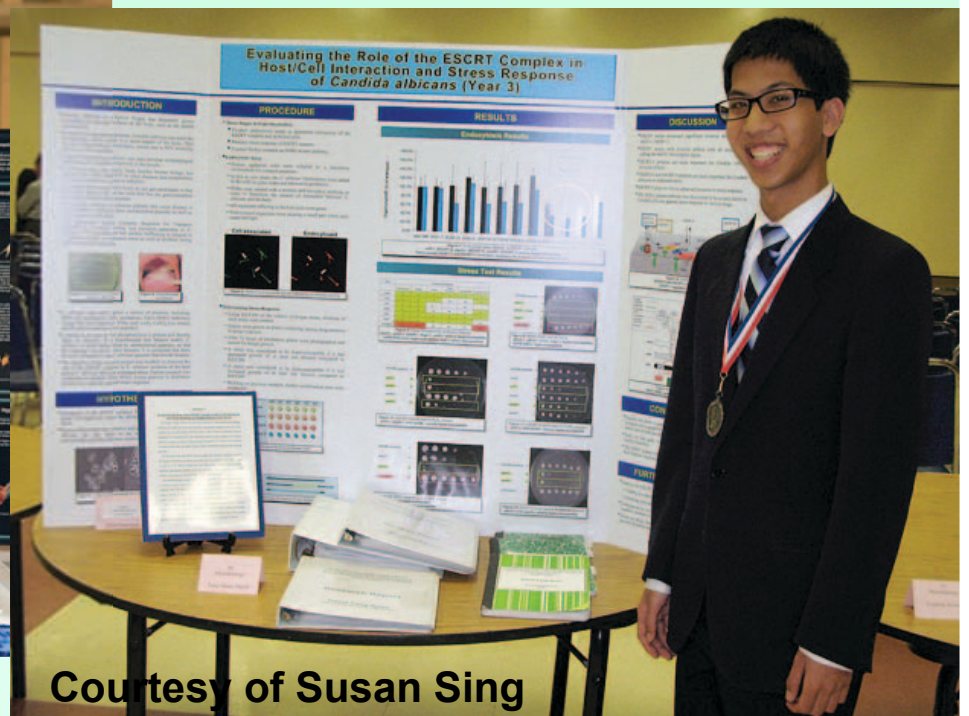

Courtesy of the Intel ISEF

International Science & Engineering Fair

Courtesy of the Intel ISEF

Courtesy of Susan Sing

Courtesy of Susan Sing

How Do You Choose a Topic?

Choosing a Topic

- **Step 1 -** *Library/Online Research*

  – **Make a list of <u>5 things</u> that seem interesting to you**

Choosing a Topic

- **Step 2 - *Pick a Topic That Matches Your Interests***

  – **NEVER have someone pick it for you! *It will seem like work***

  – **Decide what you are *PASSIONATE* about outside of school and design a project that matches**

    - ***It will seem like play!***

Choosing a Topic

- **Step 3 -** *Narrow your topic* so that it involves

  - *Experimentation or Engineering Design or Observational Comparisons AND*
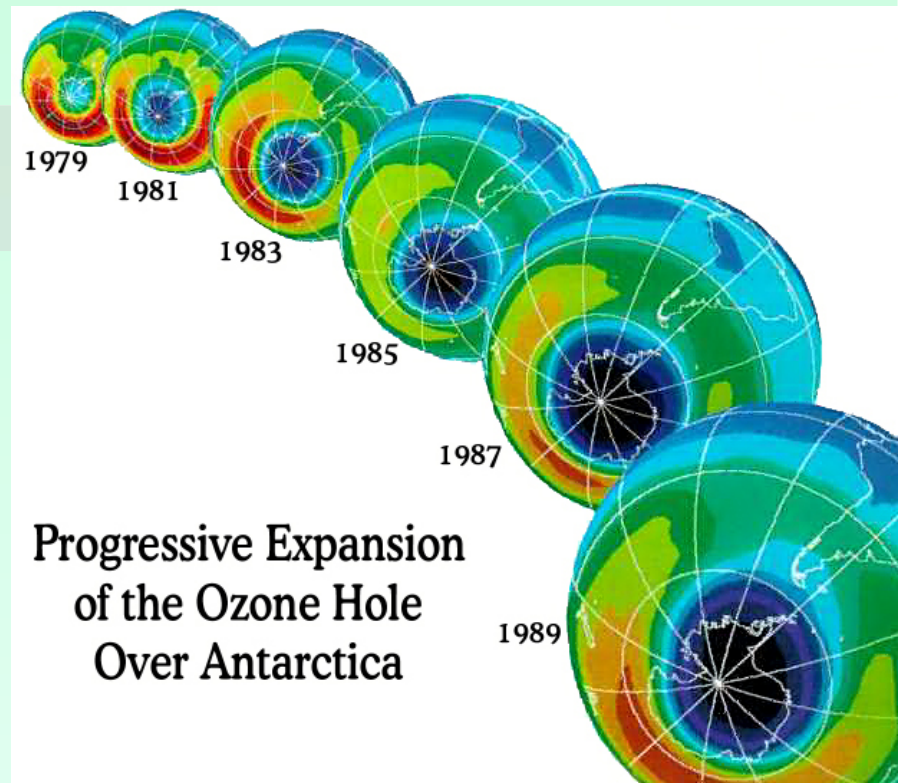
  - *Data collection*

- **Should be specific enough to make into a problem & a research study**

CAUTION!

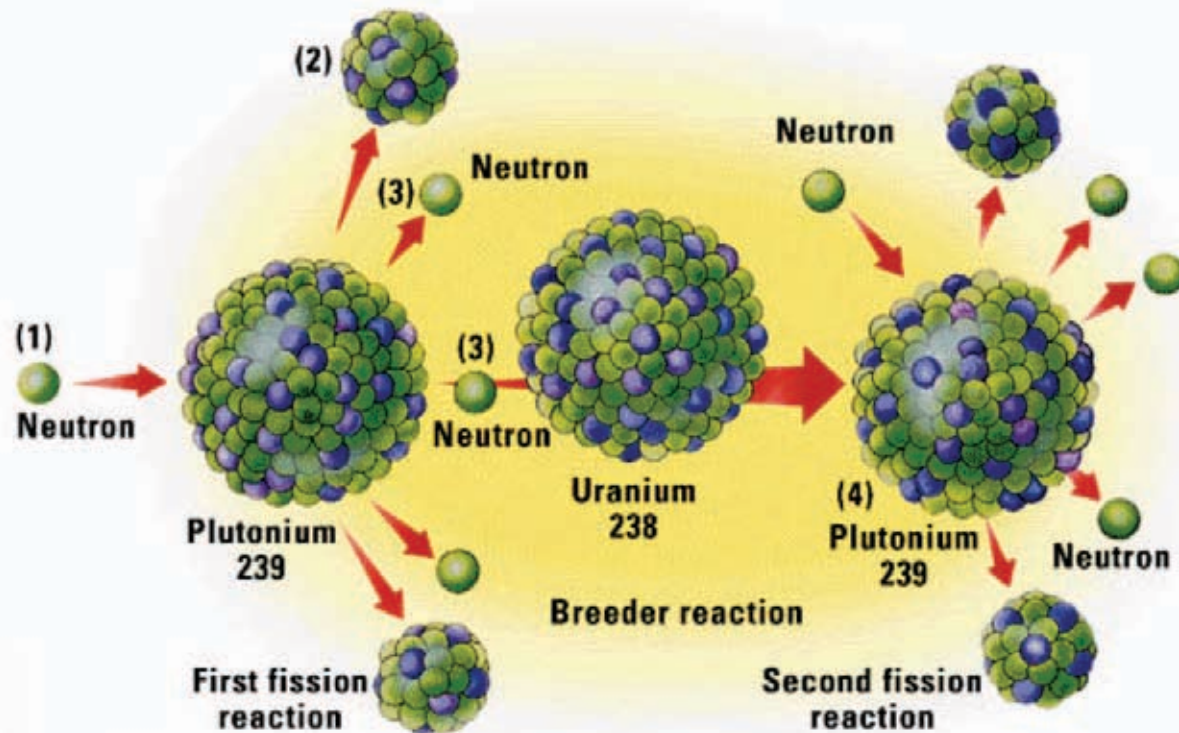- **Avoid topics that are too general since these cannot be made into a problem and an experiment**

  – *Instead, make general ideas more specific*

1979
1981
1983
1985
1987
1989

Progressive Expansion
of the Ozone Hole
Over Antarctica

CAUTION!

- **Avoid topics that require unavailable resources**

Breeder nuclear fission

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CAUTION!

- Avoid projects that require **too much time**

  – Look at your overall schedule, pick a topic that's **reasonable**
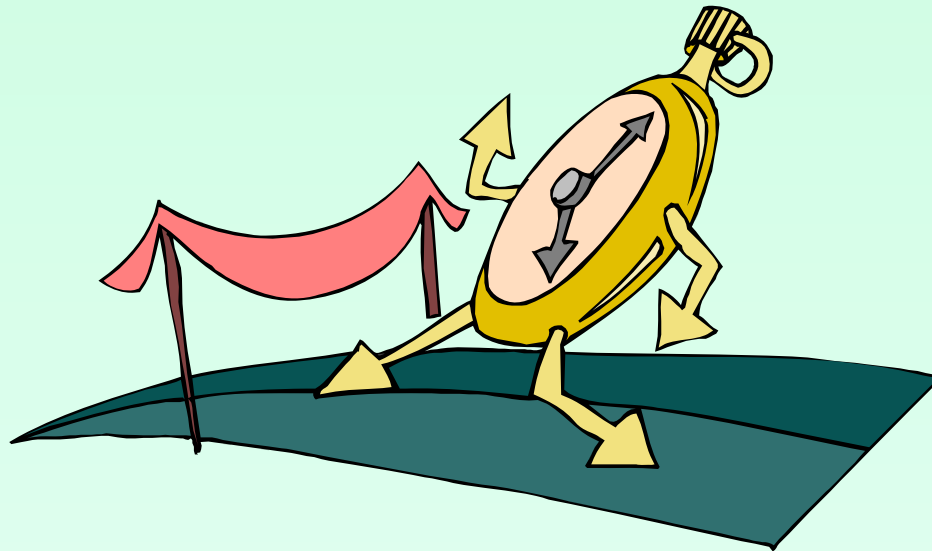
Sample Timeline
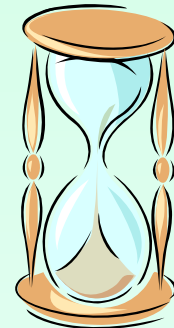
Get an early start (Sept-Oct)

Most school fairs are in March!

1. Decide on a project — **1 weeks**

2. Background research — **1 weeks**

3. Hypothesis/project design — **1 $\frac{1}{2}$ weeks**

4. Submit project proposal to teacher for approval *before* starting experimentation — **1 week**
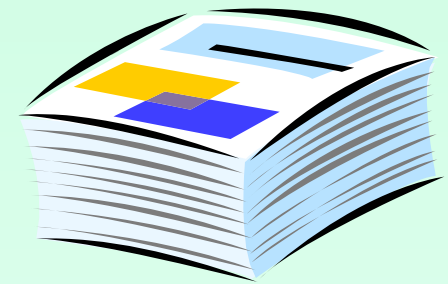
Sample Timeline

5. Completing the Certification Form to the teacher for approval *before* starting experimentation:

- *Certification Of Humane Treatment Of Live Vertebrate Animals*

- *Certification Of Compliance Of Research Involving Humans*

- *Certification Of Hazards Control*

- *Certification of Tissue/Cell Lines Source*

Sample Timeline

6. Experimentation   4- 8 weeks

7. Results, analysis   1- 2 weeks

8. Writing the project report   1- 2 weeks

9. Building a display board   2-3 days

Teacher's Role

- To help students create a workable, scientifically sound experimental design

- To set a **reasonable timeline** for completion

- To encourage <u>creativity</u> and independent thinking

- To periodically check on and/or grade progress

- To assist in applications to fairs

- To help coordinate between site and the LA County Science Fair

Designed & Photographed by

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for the

Los Angeles County Science Fair