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!

Science Fair & 21st Century Skills

SF projects integrate Project Based Learning (PBL), Common Core Standards & 21st Century skills by:

- **teaching significant core content and key standards;**

- **requiring critical thinking, problem solving, collaboration, and various forms of communication;**

- **requiring inquiry as part of the process of learning and creating something new;**

- **organizing around an open-ended Driving Question;**

Science Fair & 21st Century Skills

SF projects integrate Project Based Learning (PBL), Common Core Standards & 21st Century skills by:

- **creating a reason to learn and understand essential content and skills;**

- **allowing student voice and choice, increasing student engagement;**

- **including processes for revision, retesting and reflection; and**

- **involving a public audience, increasing students' motivation to do high-quality work.**

Interdisciplinary

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

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

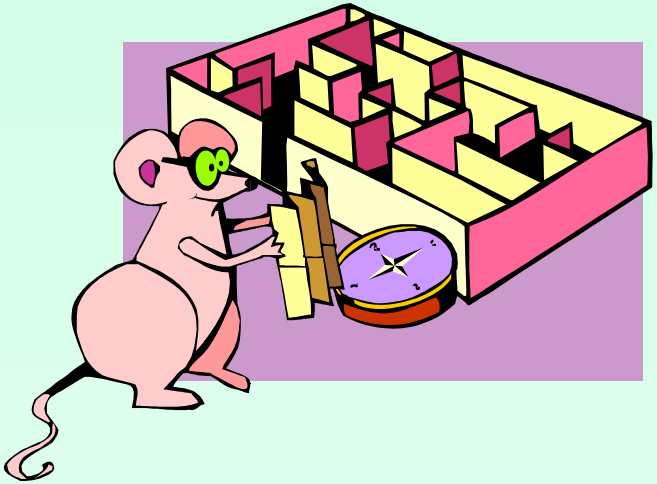
- ***Seniors with projects accepted to regional fairs are more likely to be accepted by schools of their choice***

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

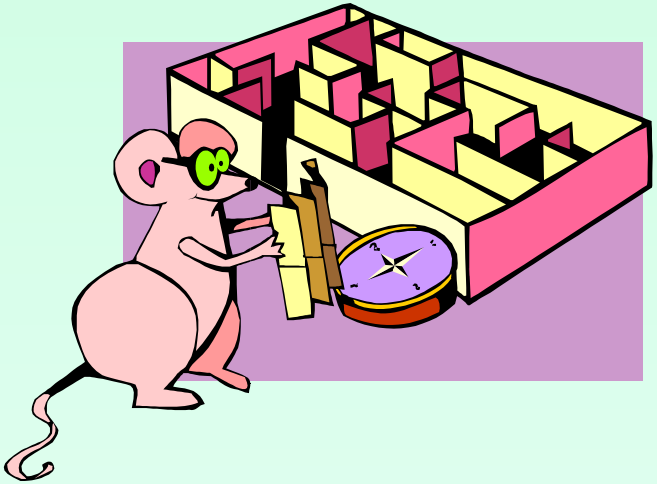


SR Science Fair Categories

- Engineering Research
- Environmental Management
- Mathematical/Computer Science
- Microbiology
- Pharmacology
- Physics
- Plant Biology
- Plant Physiology

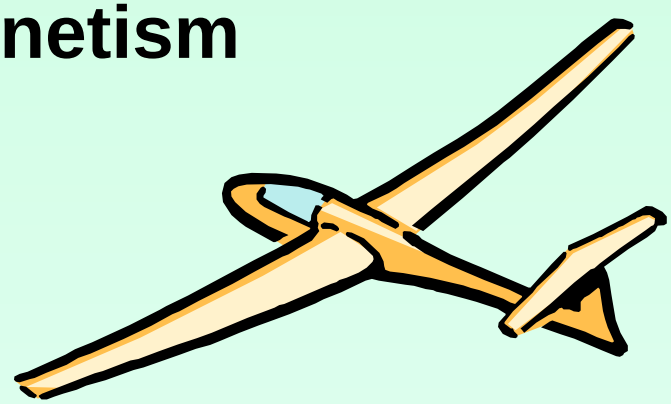
JR Science Fair Categories

- 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
- Mathematical/Computer Science
- Microbiology
- Pharmacology
- Physics-Aerodynamics/Hydrodynamics
- Physics - Electricity & Magnetism
- Physics - General
- Plant Biology
- Plant Physiology
- Product Science

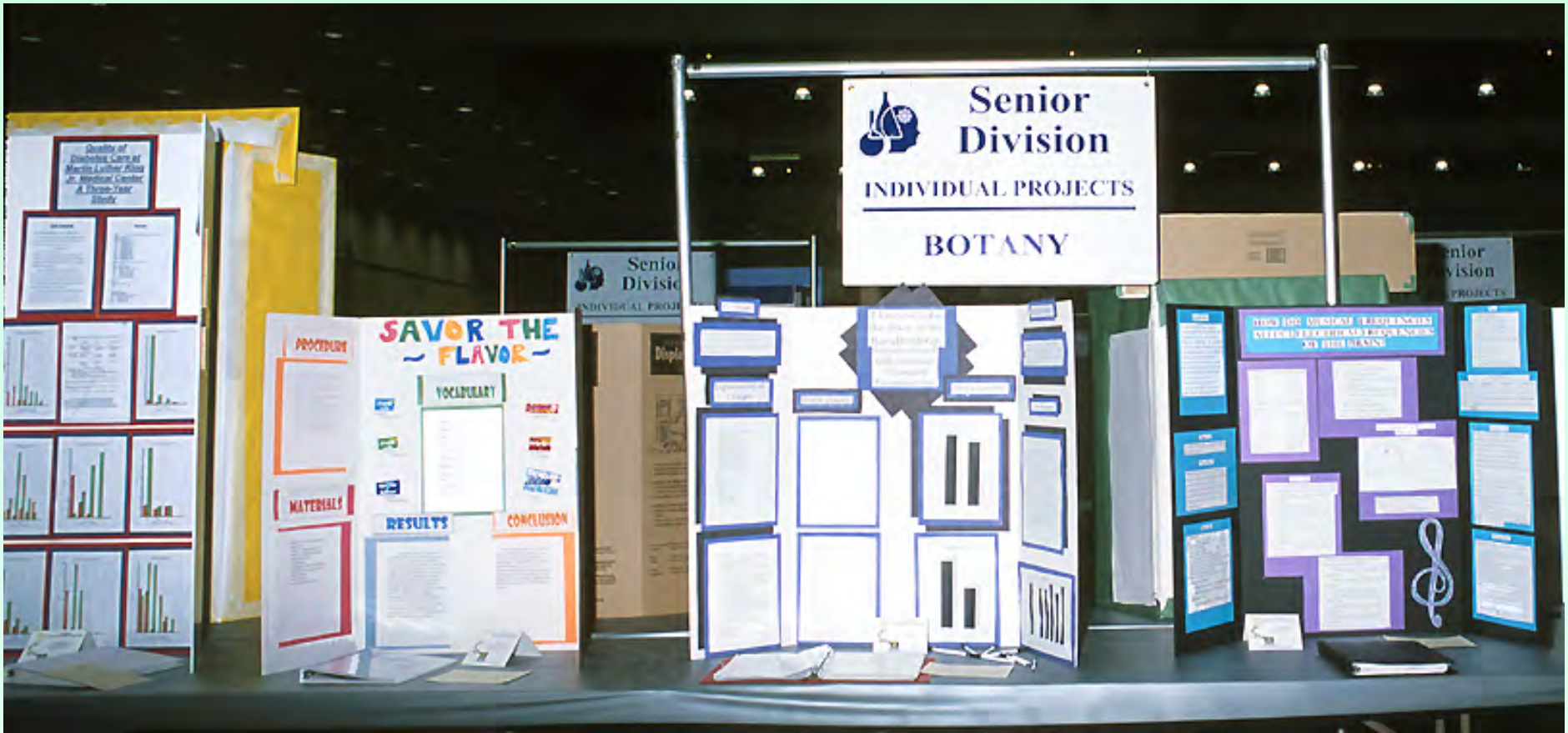


Begins with a School Science Fair

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

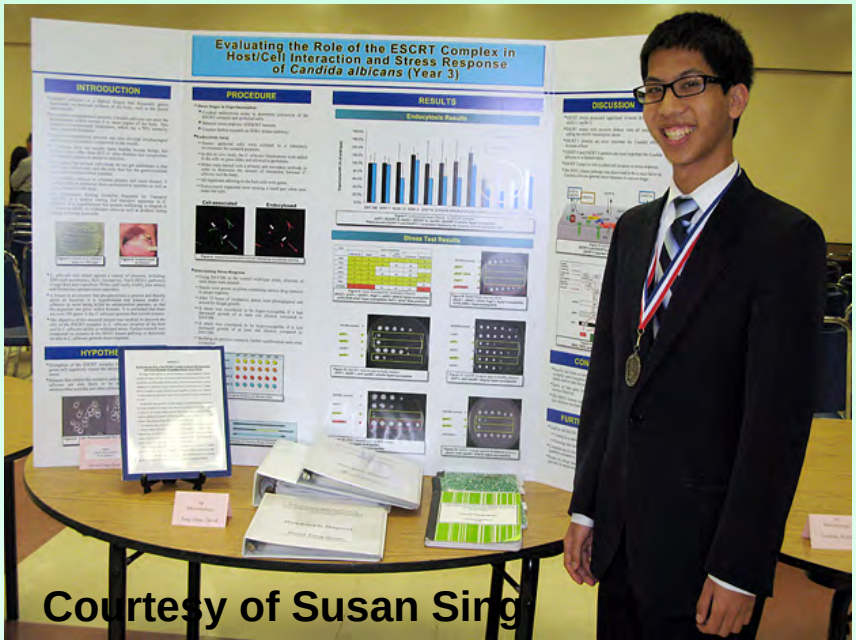
Top 1st, 2nd & 3rd in category per County Fair

State Science Fair

Awards Ceremony in Big Lab

International Science & Engineering Fair

- **Top 2-6 student projects in the Senior Division may be selected *for international* competition!**



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

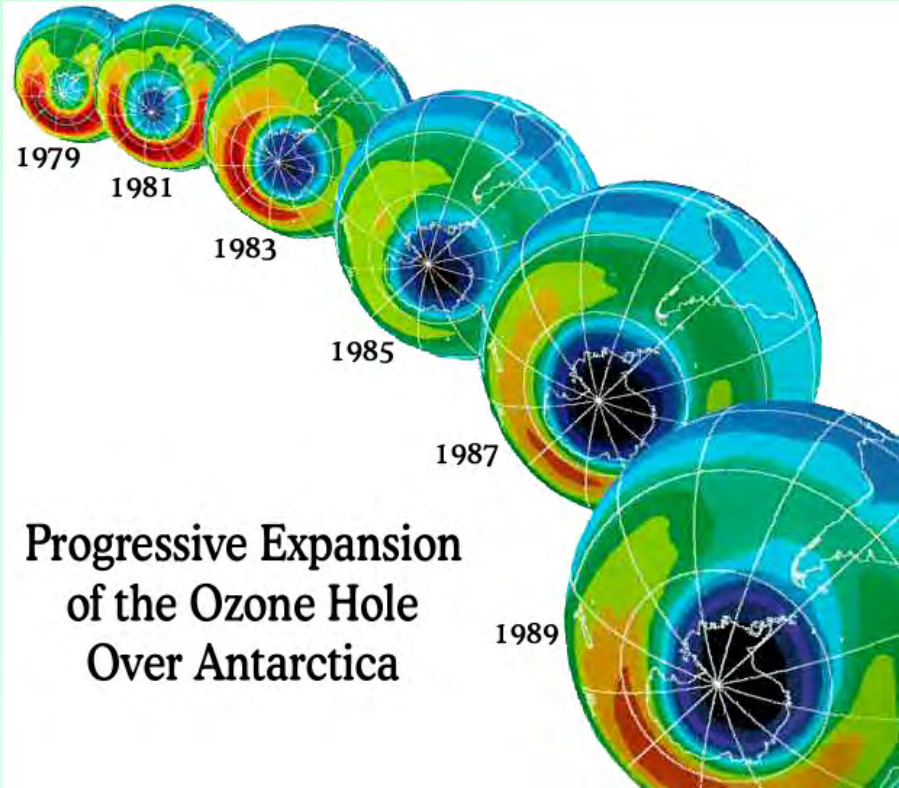
- **Step 3 - *Narrow your topic* so that it involves**

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

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

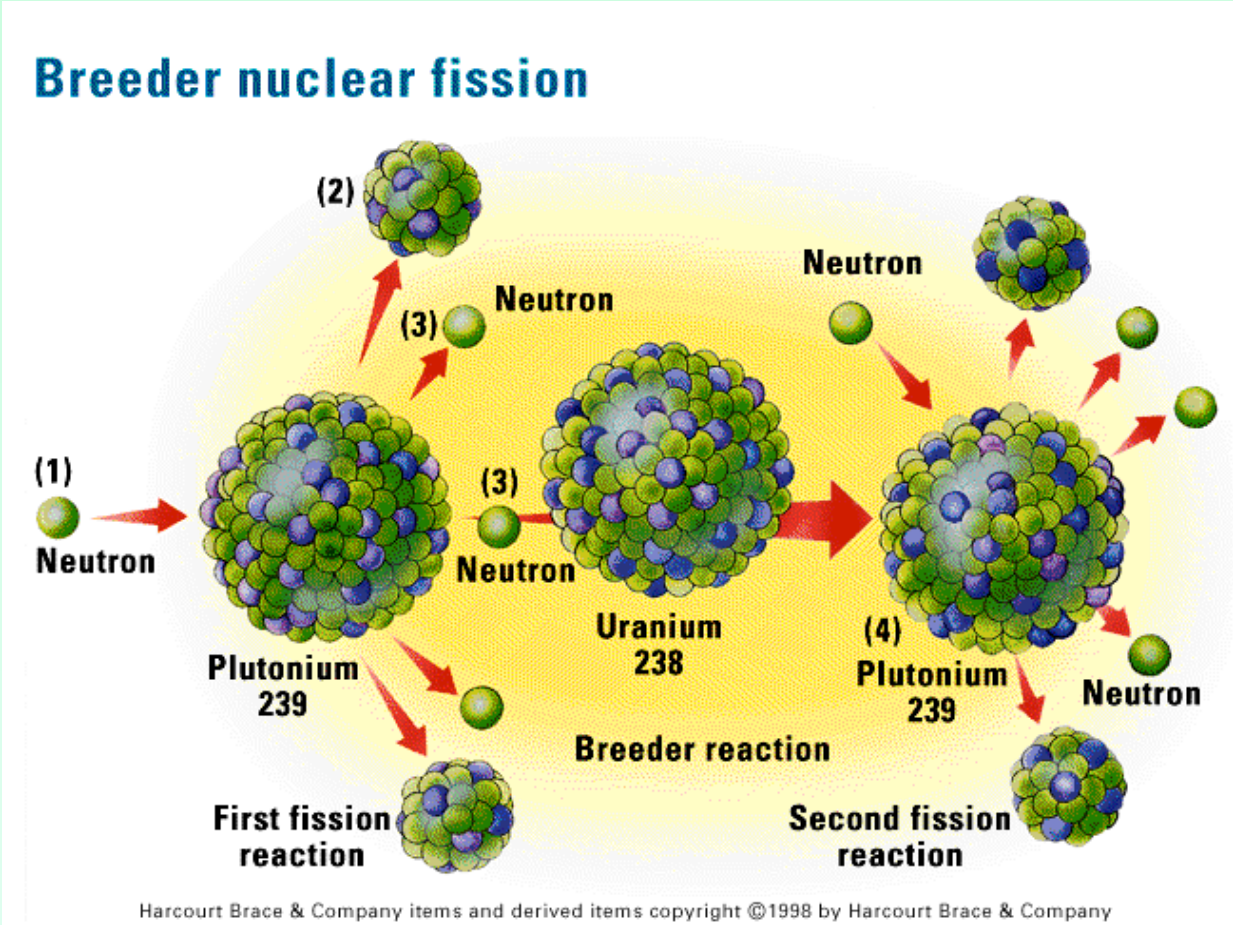
CAUTION!

- **Avoid topics that are too general since these cannot be made into a problem and an experiment**
  - ***Instead, make general ideas more specific***



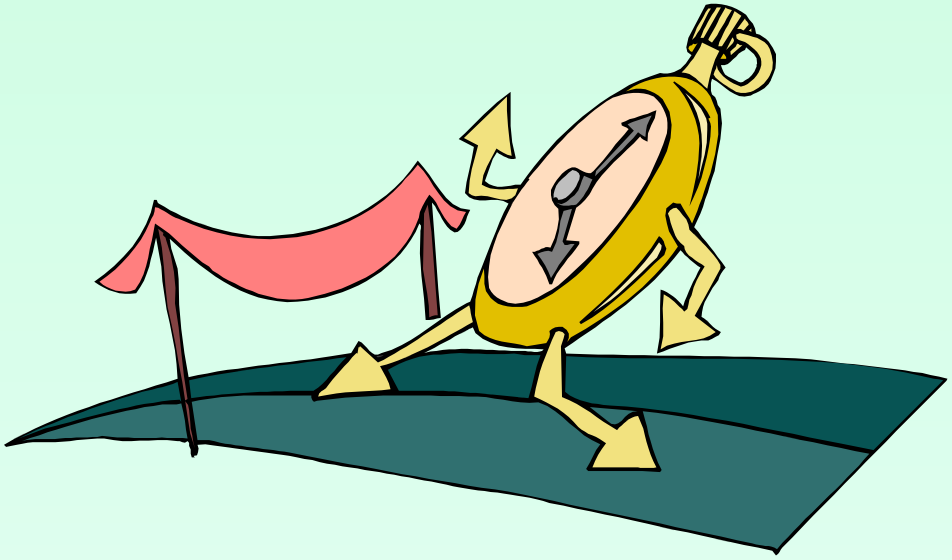
CAUTION!

- **Avoid topics that require unavailable resources**



CAUTION!

- Avoid projects that require **too much time**
  - Look at your overall schedule, pick a topic that's **reasonable**

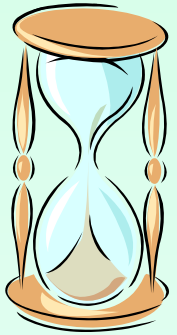


Sample Timeline

Get an early start (Sept-Oct)

Most school fairs are in March!

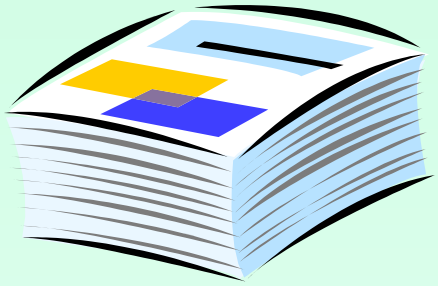
1. Decide on a project	**1 weeks**
2. Background research	**1 weeks**
3. Hypothesis/project design	**1 1/2 weeks**
4. Submit project proposal to teacher for approval *before* starting experimentation	**1 week**



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 creativity 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