Science Project Strategies

Strategy Guide

from Lansing Public Library

For additional information visit:

http://www.lansing.lib.il.us/scienceprojectstrategies.html

Background Reading

This is one of the most important steps in preparing your project and the one that most students have trouble completing. Your experiment illustrates a fact or explains a process. You need to read up on and become familiar with the underlying CONCEPT you are experimenting with, not the supplies.

For example, many students do their project about a consumer product such as paper towels. Many students will want books about paper towels. This is NOT what is needed. What is needed is information about how paper towels work, which is by capillary action. This is the topic you would need to read up on, and not paper towels.

BACKGROUND READING requires seeing the bigger picture. What principle is your experiment illustrating? Read up on that principle. What application does your experiment suggest? Read up on that topic.

One source for this background reading is the Reference Collection. These are the specialized science encyclopedia and handbooks that stay in the library. As you use reference books, also browse the general collection in the same call number area. Oftentimes you will need to use books in the general collection, checking the index in individual books. Sometimes the library has more books in the general collection on a topic than in the reference collection.

This is not a listing of every reference book. If you find a good source, look at the other books on the shelf around it.

500 NATURAL SCIENCES AND MATHEMATICS (General Science Reference)

- Macmillan Encyclopedia of Science. 12 vols. (J Ref 500 MAC)
- Science Explained: the World of Science in Everyday Life. (J Ref 500 SCI)
- Encyclopedia of Earth and Physical Sciences. 11 vols. (Ref 500.2 ENC)
- Gale Encyclopedia of Science. 6 vols. (Ref 503 GAL)

- Grolier Encyclopedia of Science and Technology. (J Ref 503 GRO)
- New Book of Popular Science. 6 vols. (Ref 503 NEW) Older editions in the general collection, available for checkout.
- World Book Encyclopedia of Science. 8 vols. (J Ref 503 WOR)
- Scientific Laws, Principles, and Theories: A Reference Guide. (Ref 509 KRE)

510 MATHEMATICS

- Quick Math Guide. (Ref 510 GLA)
- Mathematical Thought from Ancient to Modern Times. (Ref 510 KLI)
- Math on File (Ref 510 MAT)
- World Book of Math Power. 2 vols. (J Ref 510 WOR)
- Handbook of Mathematical Tables and Formulas (Ref 510.21 BUR)
- Facts on File Dictionary of Mathematics. 2005. (Ref 510.3 DAI)
- Mathematics Dictionary (Ref 510.3 JAM)
- Encyclopedia of Mathematics. (Ref 510.3 TAN)
- Universal Encyclopedia of Mathematics (Ref 510.3 UNI)
- The Story of Numbers. (Ref 510.9 MCL)
- Handbook of Probability and Statistics with Tables. (Ref 519.2 BUR)

520 ASTRONOMY & ALLIED SCIENCES

- Astronomy. (Ref 520 AST)
- How the Universe Works (J Ref 520 COU)
- The Solar System. 4 vols. 1998. (Ref 523.2 SOL)
- The Facts on File Dictionary of Astronomy. (Ref 520.3 FAC)

530 PHYSICS

- Handbook of Physics. (Ref 530 CON)
- The Facts on File Dictionary of Physics. (Ref 530.03 FAC)
- Macmillan Encyclopedia of Physics. 4 vols. (Ref 530.03 MAC)
- Physics matters! 10 vols. (Ref 530.03 PHY) and (J Ref 530 PHY)

540 CHEMISTRY

- ChemLab. 12 vols. (J Ref 540 CHE)
- McGraw-Hill Encyclopedia of Chemistry (Ref 540 McG)
- Macmillan Encyclopedia of Chemistry. 4 vols. (Ref 540.3 MAC)
- A Guide to the Elements. (Ref 541.24 STW)
- The Elements. 17 vols. (Ref 546 ELE) and (J Ref 546 ELE) also in general collection
- The Elements. (Ref 546 EMS)
- The History and Use of Our Earth's Chemical Elements. (Ref 546 KRE)
- Chemical Elements: From Carbon to Krypton. (Ref 546 NEW)

550 EARTH SCIENCES

- Earth Science. 8 vols. (J Ref 550 EAR)
- How the Earth Works. (J Ref 550 FAR)
- Magill's Survey of Science: Earth Science Series. 6 vols. (Ref 550 MAG)
- Macmillan Encyclopedia of Earth Sciences. (Ref 550.3 ENC)
- Air: The Nature of Atmosphere and the Climate. (Ref 551.5 ALL)
- Water: Its Global Nature (Ref 553.7 ALL)

560 PALEONTOLOGY / PALEOZOOLOGY

- Encyclopedia of Prehistoric Life (Ref 560 ENC)
- Encyclopedia of Dinosaurs (Ref 567.9 ENC)
- The Macmillan Illustrated Encyclopedia of Dinosaurs & Prehistoric Animals (Ref 567.91 MAC)

570 LIFE SCIENCES

- Biology Matters! 10 vols. (J Ref 570 BIO)
- Encyclopedia of Life Sciences. 11 vols. (Ref 574 ENC)
- Life Sciences on File. (Ref 574 LIF)
- Magill's Survey of Science: Life Science Series. 7 vols. (Ref 574 MAG)
- Encyclopedia of Genetics. (Ref 576.5 ENC)
- Ecology Basics. (Ref 577 ECO)

580 BOTANICAL SCIENCES

- Plants and Plant Life. 10 vols. (J Ref 580 PLA)
- Facts on File Dictionary of Botany. (Ref 580.3 FAC)

590 ZOOLOGICAL SCIENCES

- Magill's Encyclopedia of Science: Animal Life. 4 vols. (Ref 590.3 MAG)

600 TECHNOLOGY (APPLIED SCIENCES)

- Encyclopedia of Technology and Applied Sciences. 11 vols. (Ref 603 ENC)
- Exploring Technology. 11 vols. (J Ref 603 EXP)
- How it Works: Science and Technology. 20 vols. (Ref 603 HOW)

620 ENGINEERING

- Magill's Survey of Science. Applied Science Series.7 vols. (Ref 620 MAG)
- Macmillan Encyclopedia of Energy. 3 vols. (Ref 621.042 MAC)
- Magill's Survey of Science. Space Exploration Series. 5 vols. (Ref 629.4 MAG)

Books from the Youth Science Fair Collection (cannot be checked out)

- Rosner, Marc Alan. Science Fair Success using the Internet. J 507.8 ROS
- Perry, Phyllis J. Getting Started in Science Fairs: from planning to judging. J 507.8 PER
- Iritz, Maxine Haren. Science Fair: developing a successful and fun project. J 507.8 IRI

- Iritz, Maxine Haren. Blue-Ribbon Science Fair Projects. J 507.8 IRI
- Bochinski, Julianne Blair. The Complete Handbook of Science Fair Projects. J 507.8 BOC
- Amato, Carol J. Super Science Fair Projects. J 507.8 AMA
- Bombaugh, Ruth. Science Fair Success. J 507.8 BOM
- Gardner, Robert. Science Projects about Kitchen Chemistry. J 507.8 GAR
- Gardner, Robert. Science Projects about Plants. J 507.8 GAR
- Cobb, Vicki. Science experiments you can eat. J 507.8 COB
- Chapman, Helen. 101 Cool Science Experiments. J 507.8 CHA
- Fredericks, Anthony D. Simple Nature Experiments with Everyday Materials. J 507.8 FRE

Special Feature:
How to Prepare a Science Fair Project on DVD.
24 minutes.
J DVD 507.8 HOW

Do you already know what you're looking for? You might want to browse the collection by subject. The Dewey Decimal system organizes all the books in the library by subject (all the seed books together, all the recycling books together, and so on). Try looking at one of the Dewey Decimal numbers on the next page for information on your subject. If your topic isn't listed, please ask a librarian what the number would be!

DEWEY DECIMAL 500s NATURAL SCIENCE AND MATHEMATICS

500 Natural sciences & mathematics
- Science encyclopedias: 503
- Science project ideas: 507.8

510 Mathematics
- Algebra: 512
- Arithmetic: 513
- Geometry: 516
- Statistics: 519

520 Astronomy & allied sciences
- Telescopes: 522
- Planets: 532
- Stars: 523
- Comets: 523
- Earth: 525
- Time / Calendars: 529

530 Physics
- Forces and motion: 531
- Water and liquids physics: 532
- Air and gas physics: 533
- Sound: 534
- Light: 535
- Heat: 536
- Electricity & electronics: 537
- Magnetism: 538
- Atoms: 539

540 Chemistry & allied sciences
- Elements: 546
- Crystals: 548
- Minerals: 549

550 Earth sciences
- Geology: 551
- Volcanoes: 551.2
- Rivers, floods, caves: 551.4
- Weather: 551.5
- Rocks: 552
- Oil and natural gas: 553

560 Paleontology Paleozoology
- Dinosaurs: 567
- Fossil birds: 568
- Wooly Mammoths: 569

570 Life sciences
- Anthropology: 573
- Ecology: 574
- Evolution & genetics: 575
- Mold: 576
- Biomes: 577
- Rain forests: 577.34
- Coral reefs: 577.7
- Microscopes: 578
- Endangered species: 578.6

580 Botanical sciences
- Plants: 581
- Seeds: 582
- Trees: 582
- Cactus: 583
- Ferns: 587
- Fungi (mushrooms): 589
- Bacteria: 589

590 Zoological sciences
- Worms, slugs: 592
- Coral, sponges: 593
- Shells: 594
- Insects: 595.7
- Reptiles & amphibians: 597.6
- Fish: 597
- Birds: 598
- Mammals: 599

DEWEY DECIMAL 600s TECHNOLOGY (APPLIED SCIENCES)

600 Technology (Applied sciences)
Inventions: 608

610 Medical Science
Human body: 612
Blood: 612.1
Skeleton: 612.7
Senses: 612.8
Hygiene and Nutrition: 613.2
Poisons: 615
Diseases: 616
Cancer: 616.9
Dentists: 617

620 Engineering
Radios and TVs: 621
Mining: 622
Military planes and ships: 623
Trains: 625
Garbage and Recycling: 628
Flight: 629.1
Automobiles: 629.2
Spaceships: 629.4

630 Agriculture
Wheat and rice: 633
Apples: 634
Gardening: 635
Horses: 636.1
Dogs: 636.7
Dairy: 637
Fish tanks and pet fish: 639

640 Home economics & family living
Cookbooks: 641.5
Sewing: 646
Babysitting: 649

650 Management
Advertising: 659

660 Chemical engineering
Soda: 663
Sugar: 664
Oils and fats: 665
Ceramic and glass: 666
Plastic: 668
Gold: 669

670 Manufacturing
Iron and steel: 672
Wood: 674
Leather & fur: 675
Paper: 676
Textiles: 677

680 Manufacture for specific uses
Blacksmithing: 682
Carpentry: 684
Printing: 686
Toys: 688

690 Buildings
Plumbing: 696
Heating & air-conditioning: 697

DEWEY DECIMAL 100s PSYCHOLOGY

Optical Illusions: 152
Memory and mnemonics: 153

Ways to find a science fair project idea

There are many ways to find ideas for your project. Use the space on this page to take notes on sources you find interesting as they are presented to you.

Project Idea Websites

Science Books, such as the Science Fair collection at Lansing Public Library

Magazines, like Discovery Kids or Popular Science

Ways to find a science fair project idea

1. Look at the different **science categories** and pick one that you are interested in. Next, narrow it to a specific project. If you are interested in recycling, try a project about composting and backyard gardens.

2. Use **your experiences** Remember a time you noticed something and thought "I wonder how that works?" or "I wonder what would happen if..." then turn that into a project.

3. Think about **current events**. Look at the newspaper. People are hungry in Africa because of droughts - a project on growing plants without much rain, which types grow ok with little water? Or the ozone hole over Antarctica - how can we reduce ozone? -a project on nonaerosol ways to spray things. Or oil spills. how can we clean them up? -a project on how to clean oil out of water.

4. Watch **commercials** on TV. Test their claims. Does that anti-perspirant really stop wetness better than other ones? What are the real differences between Barbie and imitation Barbie dolls? Can kids tell the difference between Coke and Pepsi if they don't know which they are drinking?

Keep it specific!

- Make sure your project is well defined.
- Pick a project that is age appropriate.
- Pick a project that you can accomplish.
- Make sure you have enough time to complete your project!

The scientific method is often helpful when doing a science fair project.

So you have your project? You may like to carry out your experiment with the steps of the scientific method:

- Purpose: What am I trying to discover or prove?
- Research.
- Hypothesis: What do you think will happen?
- Procedure: How will I do this?
  Your steps of an experiment.
- Results: What your experiment showed.
  Organize your data into charts or graphs.
- Conclusion: Evaluate results into a summary.
  It's OK if your hypothesis was wrong if your results prove your experiment.

Final thoughts and tips

- Start as soon as the project is assigned.
- Don't wait until the last minute—plan ahead!
- Many of the titles in the library collection will give you a step-by step outline for completing a project, from when to do the experiment to when to write the report. If this is the first time you are doing a project, check one of these titles for information.
- Have fun! It will make your project so much easier.
- And don't forget to ask for help! If you can't find a book on your topic, or don't know what terms to search for, ask a librarian. We are always glad to help.

Instead of using Google, or Yahoo, or MSN search engines, start your internet research at trusted sites. All of these websites have links to good websites for science, science fair, or science projects.

●Lansing Public Library
http://www.lansing.lib.il.us/scienceproject.html

●Illinois Clicks!
http://www.illinoisclicks.org

●Internet Public Library
http://www.ipl.org

●Librarians' Internet Index
http://www.lii.org

Wikipedia may also be useful for some research http://www.wikipedia.org

Many FREE library resources can be accessed from home.

- Library website
- Lansing Library Catalog [request your items]
- SWAN Libraries Catalog
- OCLC WorldCat [request your items]
- EBSCO Searchasaurus & EBSCO Kids Search [magazine articles online]
- OCLC FirstSearch [magazine & journal articles online]
- NewsBank [newspaper articles]

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