

SCIENCE FAIRS	01	02	03	04	05	06	07
---------------	----	----	----	----	----	----	----

Computer science and mathematics

Project ideas in computer science

How would it be possible to communicate from Earth with a spaceship travelling at the speed of light?

How will we deal with long-term data storage given the limited operational life of a hard disk?

How does the Internet work?

How can data transfer be secured?

Understanding and designing a redundant security system for data management

Designing a compiler that directly translates human language into machine language

Designing a house plan

Creating an interactive game to teach children to read

Creating an interactive game that integrates all types of media (video, images, sound, text, writer and players)

Developing software that can perform calculations

Developing software that can prescribe medication

Creating algorithms that visualize fractals, geometric shapes of a variety of complex 2-D, 3-D or 4-D structures

Creating the perfect 3-D image

Developing software that will enable a robotized car to drive to a specific location in a minimum amount of time

Developing an optical microprocessor

Creating a science terminal for the Science Fair public

Creating a terminal to help with career choices

Is it possible to respond to a request even if information is missing in a database?

“I love you”—a self-modifying algorithm

Web-based distance learning

Studying the effects of spruce budworm infestation on the growth of the balsam fir

Studying leg motion

The evolution of Linux

The use of computers in the performing arts

Is the future of artificial intelligence close at hand?

Inventing a computer system that is immune from viruses, without the use of anti-virus software, through the intelligent recognition of attacking viruses

IRC (Internet Relay Chat)—a more accessible and safer party line

Using computers to control the environmental parameters in a house

Compression with or without loss of information

Compressing files: data, images, video clips

Designing an automaton to control the lighting in a house

SCIENCE FAIRS	01	02	03	04	05	06	07
---------------	----	----	----	----	----	----	----

Designing a software program that helps determine where a serial criminal lives
 Designing a software program that enables a two-legged robot to move forward
 Designing a software program that helps protect voice transmission (by code)
 Designing software that would make it possible to take courses at home at the same time as colleagues
 Designing software programs to help students with learning difficulties
 The 3-D configuration of a protein
 Constancy in celestial charting
 Designing a software program to help learn about science
 Dendrochronology
 Detection and correction of errors
 The management of open-source code projects on the Internet
 Managing all the data generated by projects in genomics or proteomics
 A representation of the human body
 Is computer security completely secure?
 Digital television: cable or satellite?
 Telemedicine
 Calculating moves in games using the algorithm A*
 High throughput screening in drug manufacturing
 Can today's Internet be modified?
 The RISQ network
 The file system of the different police forces
 Comparing the effectiveness of sorting algorithms
 Constancy in Tarot reading
 Computer-generated special effects for film
 Coding matrices
 The grasping motion of an artificial hand
 Immersion peripherals in computer-generated universes
 Past, present and future network protocols
 Neuron networks and expert systems applied to simulation games
 Systems for encoding and decoding CDs
 ATM and SONET network telephone management systems
 Technologies for storing past, present and future information
 Modelling object-based databases
 Can we expect another bug like Y2K?
 Can processors become even more miniaturized?
 What are the possible applications of artificial intelligence?
 What are the different processor design technologies?
 Creating a full-length or short film that is entirely computer animated
 An effective antidote for computer viruses
 A tutorial program to understand the periodic table
 A computer game to discover the cosmos
 A PC software program that explains about PCs

SCIENCE FAIRS	01	02	03	04	05	06	07
----------------------	-----------	-----------	-----------	-----------	-----------	-----------	-----------

- A software program to help learn about mathematics
- Can a computer participate in a conversation?
- Can a computer virus spread on its own?
- A computer virus that behaves like a human virus
- A virus for eliminating viruses
- Can a factory be entirely robotized?

SCIENCE FAIRS	01	02	03	04	05	06	07
---------------	----	----	----	----	----	----	----

Project ideas in mathematics

Calculating a way of improving basketball shooting efficiency
 In an ecosystem of herbivores and carnivores, how many of each are needed to maintain the populations?
 Drawing two lines that are both parallel and perpendicular
 Drawing an object in four dimensions
 Discussion on infinity (e.g. the infinite hotel)
 Is time linear or circular?
 Estimating the number of times you will receive a chain letter
 Estimating the number of times a bird will land on a given perch
 What if the Earth were donut-shaped?
 The study of errors resulting from the representation of numbers in a computer or calculator.
 The golden number according to which seashells grow, and leaves are arranged to get maximum sunlight
 Right angles and mathematics: demonstrations and the use of the Pythagorean theorem
 Medical imaging
 Population growth
 The decimals of Pi
 Quantum cryptography
 Is a line the shortest distance between two points?
 Law of large numbers
 Magic and mathematics—more closely related than you might think
 Modelling populations
 Modelling heart and brain function
 The relationship between music and mathematics
 Solving paradoxes (e.g. the barber paradox)
 The Fibonacci series and its implications
 The theory of knots and DNA chains
 Chaos theory
 Is the cosmos infinite?
 The relationship between the flow of atoms and the flow of information
 The myth of the golden section: it is wrong to claim that the great artists of antiquity used the symbolism of the golden section?
 The pattern of spirals of sunflower seeds, on pineapples
 Zenon's paradox
 Error correction codes
 Does every equation have a solution?
 Fractals—geometric shapes of a variety of complex structures
 Prime numbers and their use in encryption algorithms
 Probabilities related to gambling
 Simulations or imitating randomness (the Monte Carlo Method)

SCIENCE FAIRS	01	02	03	04	05	06	07
---------------	----	----	----	----	----	----	----

Are surveys accurate?

Modelling the development of society

Is it possible to predict cactus shapes?

What does $A + B$ signify if A and B each represents a group of numbers rather than a single number. In this case, how can we solve for X so that $A + X = B$?

What are complex numbers? Where do they come from? Are they “real” or only “imaginary”?

What are the applications of geometry in land surveying, triangulation, etc.

Finding a way of cutting a tarp in order to minimize tension when it is in place, using calculations and simulations with soap bubbles.

Finding a surface that minimizes energy expenditure in an engine

Will I become a lottery millionaire?