Foundations of Math 11 - Research Project Ideas

Basic Project: Tell us about something
People, Ideas, and Controversies - Research & Present Facts
Srinivasa Ramanujan - unbelievable genius
Fermat's Last Theorem - hundreds of years to prove
Women in Mathematics
Development of the Computer
Monty Hall Problem and the "Ask Marilyn" controversy
Poincaré Conjecture & Grigori Perelman - crazy Russian mathematician
Goldbach Conjecture
Millenium problems
"New Math" controversy - how should we be teaching math?
Paul Erdos - travelling mathematician
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Cool Project: Show us something
Applications & Fields of Math - Research & Demonstrate
RSA Cryptography - How is your info safe online?
The Math of Sound – Fractions and what sounds good
Actuarial Science - How do companies/government calculate risk?
Game Theory - Strategy, betrayal, and winning.
Graph Theory - How does Facebook use your info?
Fractals - Self-similarity in nature
Multidimensionality - What does a fourth dimension look like?
Probability Theory - How much time will you spend at traffic lights?
Population Modeling - How many people?
Chaos Theory - Unpredictable?
Combinatorics - Counting possibilities.
Sound Synthesis & Design – Electronic & pop music.
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Awesome Project: DO something
Questions to Ask - Collect & Analyze Data
Are girls more social than boys?
Are girls better multitaskers than boys?
Are cities more dangerous now than 20 years ago?
Do video games increase reaction times?
Does music or noise affect concentration?
Do students involved with sport have greater lung capacity?
Is "beginner's luck" real?
Are certain song tempos more popular than others?
Does better education increase lifespan in a country?

Foundations Math 11 – Project Possible Topics

- Research a mathematician: Einstein, Newton, Pascal, Nash, al-Khwarizmi, Aristotle, Descartes, Copernicus, Neumann, Coxeter, Gould, Somerville, Curie, or pick your own
- Women in Mathematics (Gould, Somerville, Curie, Okikiolu, Noether, Germain)
- Mathematical Art (MC Escher, George Hart, Mandelbrot sets, mandalas, fractals)
- Fibonacci Numbers and the Golden Ratio
- Imaginary Numbers (also known as Complex Numbers)
- Chaos Theory (also known as The Butterfly Effect)
- Game Theory (Prisoner's Dilemma, Rock-Paper-Scissors, Stag Hunt, Monty Hall Problem)
- Cryptography and Code-Breaking
- Dyscalculia and the Psychology of Math
- The History of Zero
- The Math of Politics (polling systems, rep-by-pop, STV, the concept of 'majority')
- How GPS Works (triangulation, mathematics of satellites orbiting)
- Conics (ellipses, hyperbola, parabola, Apollonius)
- Navigational Mathematics (map-making, spherical projections, coordinates, GPS)
- Answer the question: "Why Do We Do Math?"
- Math in Nature: pine-cones, bee-hives, fractal coastlines, snail-shells, music
- Finance and Amortization (the mathematics of making money)
- Fermat's Last Theorem (the most famous solved problem in math)
- Proofs of the Pythagorean Theorem (there are over 300)
- Cultural Mathematics (Mayan, Egyptian, African, etc.)
- Diaphantine Equations
- Math in Science Fiction (Flatland and Sphereland)
- The Evolution of Counting (the abacus, slide rule, analog computers, calculators)

- The Square-Cube Law (measurement, biology)
- The Seven Bridges of Konigsberg Problem (graphs, geography, connections to WWII)
- Fibonacci Numbers and the Golden Ratio (numeracy, nature, art)
- Lo Shu's Magic Square (numeracy, history, art)
- Epimenides' Liar Paradox (logic, history)
- The Mobius Strip and the Klein Bottle (shape and space, measurement)
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