



La Statistica nella Scuola

Modelli di valutazione e autovalutazione

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La Società Italiana di Statistica

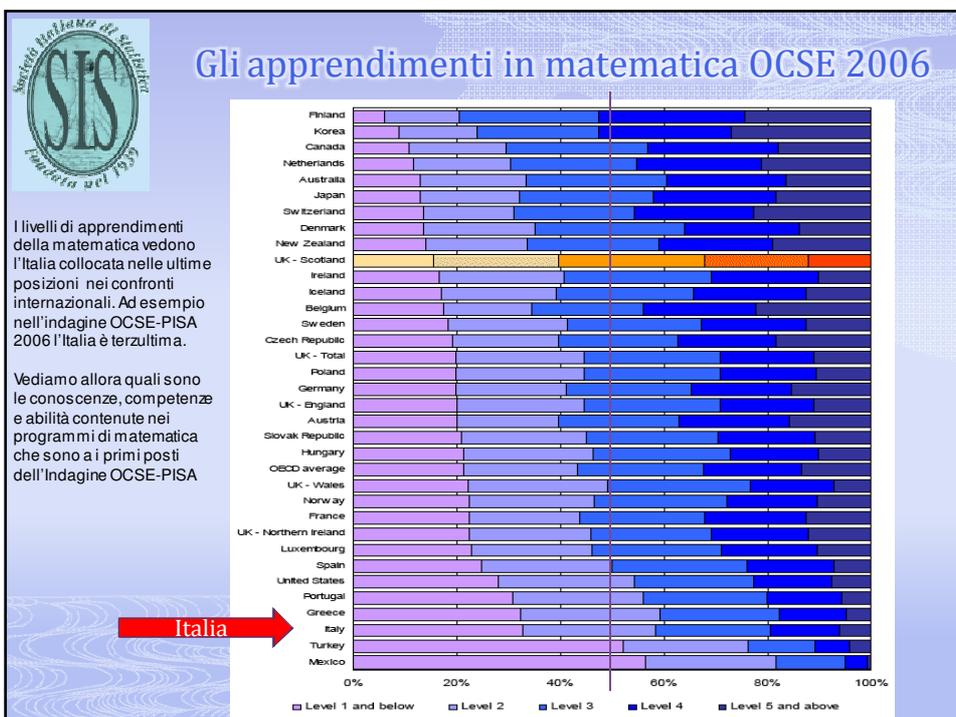
- ❑ SIS è la più ampia associazione nel campo della Scienze Statistiche
- ❑ Obiettivi comuni **SIS -Mathesis** per la Scuola
- ❑ Studiare percorsi di insegnamento della matematica
(per la SIS gli aspetti statistici e le interdipendenze con la matematica);
- ❑ Metodi e strumenti per la valutazione nella scuola;
- ❑ La preparazione dei docenti in ingresso (in ambito statistico);
- ❑ La formazione dei docenti in servizio (in ambito statistico)



La statistica a Scuola

Questa presentazione è divisa in tre parti:

- La statistica nella scuola
competenze, abilità e conoscenze
- La statistica per la valutazione
apprendimenti
didattica
- La statistica nella *governance delle scuole*





CANADA

3th OCSE-Pisa 2006

In Canada oltre agli argomenti classici (numeri algebra e geometria) gli apprendimenti riguardano "l'analisi dei dati e la probabilità". Le abilità richieste sono quelle di saper risolvere problemi che riguardano la rilevazione, la rappresentazione e l'analisi di dati; ma anche problemi che includono l'incertezza.

La moderna matematica

CURRICULUM OUTCOMES

STRANDS AND GENERAL CURRICULUM OUTCOMES

The outcomes for the mathematics curriculum are organized in terms of four content strands:

- number concepts/number and relationship operations
- patterns and relations
- shape and space
- data management and probability

One or two general curriculum outcomes (i.e., statements which identify what students are expected to know and be able to do upon completion of study in a curriculum area) are identified for each of these strands. The general curriculum outcomes (GCOs) are then further elaborated (pp. 12-25) in terms of key-stage curriculum outcomes (i.e., outcomes at the end of each of grades 3, 6, 9 and 12). As emphasized at the outset, these key-stage outcomes provide a framework for further curriculum development, with outcomes for key points in New Brunswick's program structure (e.g., the High School Foundation Program) being developed in harmony with them.

The content strands and general curriculum outcomes are detailed as follows:

Number Concepts/Number and Relationship Operations

- Students will demonstrate number sense and apply number theory concepts.
- Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations.

Patterns and Relations

- Students will explore, recognize, represent and apply patterns and relationships, both informally and formally.

Shape and Space

- Students will demonstrate an understanding of and apply concepts and skills associated with measurement.
- Students will demonstrate spatial sense and apply geometric concepts, properties and relationships.

Data Management and Probability

- Students will solve problems involving the collection, display and analysis of data.
- Students will represent and solve problems involving uncertainty.

It is critical that the unifying ideas outlined in the previous section (i.e., problem solving, communication, reasoning and connections) strongly influence, in fact permeate, the outcomes articulated for the content strands. As indicated in the diagram following, this integration of the strands and the unifying ideas takes place in the development of the key-stage curriculum outcomes.

It must be noted that, while the key-stage curriculum outcomes are intended as targets for all students, all students will not be expected to achieve them at a single level of performance. As well, there will be an additional small percentage of students who will see their outcomes significantly altered in individual educational programs.



UK

La moderna matematica

Strands	Sub-strands
1 Mathematical processes and applications	1.1 Representing
	1.2 Analysing – use mathematical reasoning
	1.3 Analysing – use appropriate mathematical procedures
	1.4 Interpreting and evaluating
	1.5 Communicating and reflecting
2 Number	2.1 Place value, ordering and rounding
	2.2 Integers, powers and roots
	2.3 Fractions, decimals, percentages, ratio and proportion
	2.4 Number operations
	2.5 Mental calculation methods
	2.6 Written calculation methods
	2.7 Calculator methods
	2.8 Checking results
3 Algebra	3.1 Equations, formulae, expressions and identities
	3.2 Sequences, functions and graphs
4 Geometry and measures	4.1 Geometrical reasoning
	4.2 Transformations and coordinates
	4.3 Construction and loci
	4.4 Measures and mensuration
5 Statistics	5.1 Specifying a problem, planning and collecting data
	5.2 Processing and representing data
	5.3 Interpreting and discussing results
	5.4 Probability

2008 revision to the National Curriculum programmes

La statistica è già da molti anni presente nei programmi di matematica della scuola del Regno Unito di ogni ordine e grado. Recentemente c'è stato un ulteriore potenziamento e il programma di matematica include un modulo di statistica, nel quale si richiede di saper organizzare e collezionare dati, elaborarli e rappresentarli graficamente ed infine si richiede di sapere interpretare e discutere i risultati. E' anche introdotta la probabilità



I percorsi formativi di matematica negli USA

USA

michigan

Nello stato del Michigan in ogni ordine e grado Sono inseriti moduli di Statistica, di Analisi dei dati, di Probabilità

Vision Statement Maths
The fifteen content standards have been categorized into the following six strands:

- I. Patterns, Relationships, and Functions
- II. Geometry and Measurement
- III. Data Analysis and Statistics
- IV. Number Sense and Numeration
- V. Numerical and Algebraic Operations and Analytical Thinking
- VI. Probability and Discrete Mathematics

Strand III. Data Analysis and Statistics
We live in a sea of information. In order not to drown in the data that inundate our lives every day, we must be able to process and transform data into useful knowledge. The ability to interpret data and to make predictions and decisions based on data is an essential basic skill for every individual.

Standard III.1 Collection, Organization and Presentation of Data
Students collect and explore data, organize data into a useful form, and develop skill in representing and reading data displayed in different formats. Knowing what data to collect and where and how to collect them is the starting point of quantitative literacy. The mathematics curriculum should capitalize on students' natural curiosity about themselves and their surroundings to motivate them to collect and explore interesting statistics and measurements derived from both real and simulated situations. Once the data are gathered, they must be organized into a useful form, including tables, graphs, charts and pictorial representations. Since different representations highlight different patterns within the data, students should develop skill in representing and reading data displayed in different formats, and they should discern when one particular representation is more desirable than another.

Standard III.2 Description and Interpretation
Students examine data and describe characteristics of a distribution, relate data to the situation from which they arose, and use data to answer questions convincingly and persuasively. Students must be able to examine data and describe salient characteristics of the distribution. They also must be able to relate the data to the physical situation from which they arose. Students should use the data to answer key questions and to convince and persuade.

Standard III.3 Inference and Prediction
Students draw defensible inferences about unknown outcomes, make predictions, and identify the degree of confidence they have in their predictions. Based on known data, students should be able to draw defensible inferences about unknown outcomes. They should be able to make predictions and to identify the degree of confidence that they place in their predictions.



USA

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Prima parte, collezione e organizzazione e presentazione dei risultati

III. Data Analysis and Statistics

Content Standard 1: Students collect and explore data, organize data into a useful form, and develop skill in representing and reading data displayed in different formats. (Collection, Organization and Presentation of Data)

Elementary	Middle School	High School
<ol style="list-style-type: none"> 1. Collect and explore data through counting, measuring and conducting surveys and experiments. 2. Organize data using concrete objects, pictures, tallies, tables, charts, diagrams and graphs. 	<ol style="list-style-type: none"> 1. Collect and explore data through observation, measurement, surveys, sampling techniques and simulations. 2. Organize data using tables, charts, graphs, spreadsheets and data bases. 	<ol style="list-style-type: none"> 1. Collect and explore data through observation, measurement, surveys, sampling techniques and simulations. 2. Organize data using tables, charts, graphs, spreadsheets and data bases.

56 Section II • Michigan Content Standards and Draft Benchmarks

<ol style="list-style-type: none"> 3. Present data using a variety of appropriate representations and explain the meaning of the data. 4. Identify what data are needed to answer a particular question or solve a given problem, and design and implement strategies to obtain, organize and present those data. 	<ol style="list-style-type: none"> 3. Present data using a variety of appropriate representations and explain why one representation is preferred over another or how a particular representation may bias the presentation. 4. Identify what data are needed to answer a particular question or solve a given problem, and design and implement strategies to obtain, organize and present those data. 	<ol style="list-style-type: none"> 3. Present data using the most appropriate representation and give a rationale for their choice; show how certain representations may skew the data or bias the presentation. 4. Identify what data are needed to answer a particular question or solve a given problem and design and implement strategies to obtain, organize and present those data.
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Seconda parte, elaborazione dei dati loro descrizione e interpretazione dei risultati		
Content Standard 2: Students examine data and describe characteristics of a distribution, relate data to the situation from which they arose, and use data to answer questions convincingly and persuasively. (Description and Interpretation)		
Elementary	Middle School	High School
1. Read and explain data they have collected and organized themselves and progress to reading data from other sources.	1. Critically read data from tables, charts or graphs and explain the source of the data and what the data represent.	1. Critically read data from tables, charts or graphs and explain the source of the data and what the data represent.
(in ambito statistico) (in ambito statistico)		
2. Describe the shape of the data using informal language.	2. Describe the shape of a data distribution and identify the center, the spread, correlations and any outliers.	2. Describe the shape of a data distribution and determine measures of central tendency, variability and correlation.
3. Draw, explain and justify conclusions, such as trends based on data.	3. Draw, explain and justify conclusions based on data.	3. Use the data and their characteristics to draw and support conclusions.
4. Raise and answer questions about the source, collection, organization and presentation of data, as well as the conclusions drawn from the data; explore biases in the data.	4. Critically question the sources of data; the techniques used to collect, organize and present data; the inferences drawn from the data; and the possible sources of bias in the data or their presentation.	4. Critically question the sources of data; the techniques used to collect, organize and present data; the inferences drawn from the data; and the sources of bias and measures taken to eliminate such bias.
5. Formulate questions and problems and gather and interpret data to answer those questions.	5. Formulate questions and problems and gather and interpret data to answer those questions.	5. Formulate questions and problems and gather and interpret data to answer those questions.

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Terza parte, inferenza statistica e predizione		
Content Standard 3: Students draw defensible inferences about unknown outcomes, make predictions, and identify the degree of confidence they have in their predictions. (Inference and Prediction)		
Elementary	Middle School	High School
1. Make and test hypotheses.	1. Make and test hypotheses.	1. Make and test hypotheses.
2. Conduct surveys, samplings and experiments to solve problems and answer questions of interest to them.	2. Design experiments to model and solve problems using sampling, simulations and controlled investigations.	2. Design investigations to model and solve problems; also employ confidence intervals and curve fitting in analyzing the data.
Section II • Michigan Content Standards and Draft Benchmarks 57		
3. Formulate and communicate arguments and conclusions based on data and evaluate their arguments and those of others.	3. Formulate and communicate arguments and conclusions based on data and evaluate their arguments and those of others.	3. Formulate and communicate arguments and conclusions based on data and evaluate their arguments and those of others.
4. Make and explain predictions based on data.	4. Make predictions and decisions based on data, including interpolations and extrapolations.	4. Make predictions and decisions based on data, including interpolations and extrapolations.
5. Make predictions to answer questions and solve problems.	5. Employ investigations, mathematical models and simulations to make inferences and predictions to answer questions and solve problems.	5. Employ investigations, mathematical models, and simulations to make inferences and predictions to answer questions and solve problems.



USA
Programmi
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Progetto Core-plus mathematics 1

integrazione dei principali concetti di matematica nei corsi USA

Programma
comune alla
maggior parte
degli Stati
americani .
Tre corsi che
includono
statistica

Course 1	
Unit 1	<p>Patterns of Change develops student ability to recognize and describe important patterns that relate quantitative variables, to data tables, graphs, words, and symbols to represent the relationships, and to use reasoning and calculating tools to answer questions and solve problems.</p> <p><i>Topics include variables and functions, algebraic expressions and recurrence relations, coordinate graphs, data tables and spreadsheets, and equations and inequalities.</i></p>
Unit 2	<p>Patterns in Data develops student ability to make sense of real-world data through use of graphical displays, statistical methods of analysis, and statistical models.</p> <p><i>Topics include description of data and their changes, as interpreted in dot plots, histograms, and box plots; measures of center including mean and median; and their properties; measures of variability including interquartile range and standard deviation, and their properties; and probability and outliers.</i></p>
Unit 3	<p>Linear Functions develops student ability to recognize and represent linear relationships between variables and to use tables, graphs, and algebraic expressions for linear functions to solve problems in situations that involve constant rate of change or slope.</p> <p><i>Topics include linear functions, slope of a line, rate of change, modeling linear data patterns, solving linear equations and inequalities, equivalent linear expressions.</i></p>
Unit 4	<p>Vertex-Edge Graphs develops student understanding of vertex-edge graphs and ability to use these graphs to represent and solve problems involving paths, networks, and relationships among a finite number of elements, including finding efficient routes and avoiding conflict.</p> <p><i>Topics include vertex-edge graphs, mathematical modeling, optimization, algorithmic problem solving, Euler circuits and paths, matrix representation of graphs, vertex coloring and chromatic number.</i></p>
Unit 5	<p>Exponential Functions develops student ability to recognize and represent exponential growth and decay patterns, to express those patterns in symbolic forms, to solve problems that involve exponential change, and to use properties of exponent to write expressions in equivalent forms.</p> <p><i>Topics include exponential growth and decay functions, data modeling, growth and decay rates, half-life and doubling time, compound interest, and properties of exponent.</i></p>
Unit 6	<p>Patterns in Shape develops student ability to visualize and describe two- and three-dimensional shapes, to represent them with drawings, to examine shape properties through both experimentation and careful reasoning, and to use those properties to solve problems.</p> <p><i>Topics include Triangle Inequality, congruence conditions for triangles, special quadrilaterals and quadrilateral linkages, Polyhedron Theorem, properties of polygons, tilings of the plane, properties of polyhedra, and the Fibonacci spiral.</i></p>
Unit 7	<p>Quadratic Functions develops student ability to recognize and represent quadratic relations between variables using data tables, graphs, and symbolic formulas, to solve problems involving quadratic functions, and to express quadratic polynomials in equivalent factored and expanded forms.</p> <p><i>Topics include quadratic functions and their graphs, applications to projectile motion and economic problems, expanding and factoring quadratic expressions, and solving quadratic equations by the quadratic formula and calculator approximation.</i></p>
Unit 8	<p>Patterns in Chance develops student ability to solve problems involving chance by constructing sample spaces of equally likely outcomes in geometric models and to approximate solutions to more complex probability problems by using simulation.</p> <p><i>Topics include sample spaces, equally likely outcomes, probability distributions, mutually exclusive (disjoint) events, Addition Rule, Multiplication Rule, Conditional Probability, Bayes' Law of Large Numbers and simulation.</i></p>



USA
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Progetto Core-plus mathematics 2

integrazione dei principali concetti di matematica nei corsi USA

Course 2	
Unit 1	<p>Functions, Equations, and Systems reviews and extends student ability to recognize, describe, and use functional relationships among quantitative variables, with special emphasis on relationships that involve two or more independent variables.</p> <p><i>Topics include direct and inverse variation and joint variation; power functions; linear equations in standard form; and systems of two linear equations with two variables, including solutions by graphing, substitution, and elimination.</i></p>
Unit 2	<p>Matrix Methods develops student understanding of matrices and ability to use matrices to represent and solve problems in a variety of real-world and mathematical settings.</p> <p><i>Topics include constructing and interpreting matrices, row and column sums, matrix addition, scalar multiplication, matrix multiplication, power of matrices, inverse matrices, properties of matrices, and using matrices to solve systems of linear equations.</i></p>
Unit 3	<p>Coordinate Methods develops student understanding of coordinate methods for representing and analyzing properties of geometric shapes, for describing geometric change, and for producing animation.</p> <p><i>Topics include representing two-dimensional figures and modeling situations with coordinates, including computer-generated graphics; distance in the coordinate plane, midpoint of a segment, and slope; coordinate and matrix models of rigid transformations (translation, rotation, and line reflection), of size transformations, and of similarity transformations; animation effects.</i></p>
Unit 4	<p>Regression and Correlation develops student understanding of the characteristics and interpretation of the least squares regression equation and of the use of correlation to describe the strength of the linear association between two variables.</p> <p><i>Topics include scatter plots, regression equations, least squares regression, residuals, and errors in prediction; use of regression curves; influential points; Pearson's correlation coefficient; matrix properties; forcing variables; and cause and effect.</i></p>
Unit 5	<p>Nonlinear Functions and Equations introduces function notation, reviews and extends student ability to construct and reason with functions that model parabolic shapes and other quadratic relationships in science and economics, with special emphasis on formal symbolic reasoning methods, and introduces common logarithms and algebraic methods for solving exponential equations.</p> <p><i>Topics include formalization of function concept, notation, domain and range; factoring and expanding quadratic expressions; solving quadratic equations by factoring and the quadratic formula; applications to supply and demand, break-even analysis, common logarithms; and solving exponential equations using base 10 logarithms.</i></p>
Unit 6	<p>Network Optimization develops student understanding of vertex-edge graphs and ability to use these graphs to solve network optimization problems.</p> <p><i>Topics include optimization, mathematical modeling, algorithmic problem solving, digraphs, trees, minimum spanning trees, distance matrices, Hamilton circuits and paths, the Traveling Salesperson Problem, critical paths, and the PERT technique.</i></p>
Unit 7	<p>Trigonometric Methods develops student understanding of trigonometric functions and the ability to use trigonometric methods to solve triangles and indirect measurement problems.</p> <p><i>Topics include sine, cosine, and tangent functions of measures of angle in standard position in a coordinate plane and in a right triangle; indirect measurement; analysis of variable-sided triangle mechanism; Law of Sines and Law of Cosines.</i></p>
Unit 8	<p>Probability Distributions further develops student ability to understand and visualize situations involving chance and to compute and interpret the underlying discrete probability distributions.</p> <p><i>Topics include: Binomial, Poisson, Geometric, and Hypergeometric distributions; conditional probability; probability distributions for discrete random variables; and binomial, Poisson, and normal distributions.</i></p>



Progetto Core-plus mathematics 3

integrazione dei principali concetti di matematica nei corsi USA

USA

Programmi base

Course 3

Unit 1	<p>Reasoning and Proof develops student understanding of formal reasoning in geometric, algebraic, and statistical contexts and of basic principles that underlie those reasoning strategies.</p> <p>Topics include inductive and deductive reasoning strategies; principles of logical reasoning—Affirming the Hypothesis and Chaining Implications; relation among angles formed by two intersecting lines or by two parallel lines and a transversal; rules for transforming algebraic expressions and equations; design of experiments including the role of randomization, control groups, and blinding; sampling distribution; randomization test; and statistical significance.</p>
Unit 2	<p>Inequalities and Linear Programming develops student ability to reason both algebraically and graphically to solve inequalities in one and two variables; introduces systems of inequalities in two variables; and develops a strategy for optimizing a linear function in two variables within a system of linear constraints on those variables.</p> <p>Topics include inequalities in one and two variables; number line graphs; interval notation; systems of linear inequalities; and linear programming.</p>
Unit 3	<p>Similarity and Congruence extends student understanding of similarity and congruence and their ability to use those relations to solve problems and to prove geometric assertions with and without the use of coordinates.</p> <p>Topics include connections between Law of Cosines, Law of Sines, and sufficient conditions for similarity and congruence of triangles; centers of triangles; applications of similarity and congruence in real-world context; necessary and sufficient conditions for parallelism; sufficient conditions for congruence of parallelograms; and midpoint connector theorems.</p>
Unit 4	<p>Sample and Variability extends student understanding of the measurement of variability; includes student ability to select the normal distribution as a model of variation; introduces student to the binomial distribution and to the normal distribution; and introduces student to the normal distribution with statistical inference limited to mean data used in industry, pharmaceutical, periodic business.</p> <p>Topics include normal distributions; right-skewed, normal distributions; change; repeated value standard deviation; normal approximation to a binomial distribution; odds; statistical process control; control limits; and Six Sigma; and Theorems.</p>
Unit 5	<p>Polynomial and Rational Functions extends student ability to represent and draw inferences about polynomial and rational functions using symbolic expressions and manipulations.</p> <p>Topics include definition and properties of polynomials; operations on polynomials; completing the square; proof of the quadratic formula; solving quadratic equations (including complex number solutions); vertex form of quadratic functions; definition and properties of rational functions; operations on rational expressions.</p>
Unit 6	<p>Circle and Circular Functions develops student understanding of relationships among special lines, segments, and angles in circles and the ability to use properties of circles to solve problems; extends student understanding of circular functions and the ability to use these functions to model periodic change; and extends student ability to reason deductively in geometric settings.</p> <p>Topics include properties of chords, tangent lines, and central and inscribed angles of circles; linear and angular velocity; radian measure of angles; and circular functions as models of periodic change.</p>
Unit 7	<p>Recursion and Iteration extends student ability to represent, analyze, and solve problems in situations involving sequential and recursive change.</p> <p>Topics include iteration and recursion as tools to model and analyze sequential change in real-world context; including compound interest and population growth; arithmetic, geometric, and other sequences; arithmetic and geometric series; finite differences; linear and nonlinear recurrence relations; and function iteration, including graphical iteration and fixed points.</p>
Unit 8	<p>Inverse Functions develops student understanding of inverses of functions with a focus on logarithmic functions and their use in modeling and analyzing problem situations and data patterns.</p> <p>Topics include inverses of functions; logarithmic functions and their relation to exponential functions; properties of logarithms; equation solving with logarithms; and inverse trigonometric functions and their applications to solving trigonometric equations.</p>



DOMANDE OCSE PISA 2009

Programmi di PLAN International – Risultati dell'anno finanziario 1996

	ETIOPIA	FRANCIA	GERMANIA	ITALIA	GIAPPONE	USA	UK	EURO
Crescere sani								
Unità sanitarie costruite (fino a 4 stanze)	1.003	0	0	0	0	0	0	0
Operatori sanitari formati (1 giorno di formazione)	10.084	0	0	0	0	0	0	0
Bambini che hanno ricevuto un'istruzione (per ogni 1 settimana)	0	0	0	0	0	0	0	0
Bambini che hanno ricevuto aiuti finanziari per cure mediche / dentistiche	0	0	0	0	0	0	0	0
Istruzione								
Impiegati formati (1 settimana di formazione)	0	0	0	0	0	0	0	0
Quaderni scolastici acquistati / donati	697	0	0	0	0	0	0	0
Fatti scolastici acquistati / donati	0	0	0	0	0	0	0	0
Uniformi scolastiche acquistate / fatte / donate	8.997	0	0	0	0	0	0	0
Costo di materiali di studio per le scuole scolastiche / borse di studio	12.321	0	0	0	0	0	0	0
Bambini beneficiari di aiuti per le tasse scolastiche / borse di studio	3.200	0	0	0	0	0	0	0
Banche scolastiche fabbricate / acquistate / donati	44	0	0	0	0	0	0	0
Aiuti scolastici	0	0	0	0	0	0	0	0
Adulti partecipanti a corsi di alfabetizzazione in questo anno finanziario	1.100	0	0	0	0	0	0	0
Insiediamenti								
Lettere scolastiche (senza giornali costanti)	80	0	0	0	0	0	0	0
Casse collegiate a norme igieniche	142	0	0	0	0	0	0	0
Fiori scolastici (involucri per giornali / riviste)	0	0	0	0	0	0	0	0
Nuove installazioni con auto-prodotto	0	0	0	0	0	0	0	0
Contribuzione di acquistati alimentari e sanitari	0	0	0	0	0	0	0	0
Acquisti riparati / migliorati	285	0	0	0	0	0	0	0
Casse riciclate con il progetto PLAN	222	0	0	0	0	0	0	0
Unità case costruite con il progetto PLAN	2	0	0	0	0	0	0	0
Edificio pubblico costruito o ristrutturato	2.244	0	0	0	0	0	0	0
Chilometri di strada riparati	1.2	0	0	0	0	0	0	0
Chilometri di strada costruiti	0	0	0	0	0	0	0	0
Fonti costruite	0	0	0	0	0	0	0	0
Esempi che hanno beneficiato direttamente del controllo dell'infezione	0	0	0	0	0	0	0	0
Casse di spente raggiunte da un progetto di identificazione	44	0	0	0	0	0	0	0

Domanda 26: PLAN INTERNATIONAL R099004A

Che cosa indica la tabella a proposito del livello di attività di PLAN International in Etiopia nel 1996 rispetto agli altri paesi nell'area?

A Il livello di attività è stato relativamente elevato in Etiopia.
 B Il livello di attività è stato relativamente basso in Etiopia.
 C Il livello di attività è stato pressoché uguale a quello degli altri paesi nell'area.
 D Il livello di attività è stato relativamente elevato nella categoria "Insiediamenti" e basso nelle altre categorie.

Domanda 27: PLAN INTERNATIONAL R099004B: 0 1 2 3

Nel 1996 l'Etiopia era uno dei paesi più poveri del mondo.

Considerando questo fatto e le informazioni fornite dalla tabella, secondo te come si può spiegare il livello di attività di PLAN International in Etiopia rispetto ai suoi interventi negli altri paesi?

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Domanda 28: PLAN INTERNATIONAL R099004C

Di seguito vengono elencati altri interventi umanitari. Se questi interventi venissero aggiunti alla tabella, a quale categoria di attività appartenerebbero? Indica la risposta ponendo una crocetta nella casella appropriata.

	Crescere sani	Istruzione	Insiediamenti
Telefoni pubblici installati	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Bambini vaccinati	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Madri informate sull'alimentazione dei bambini	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Centrali elettriche ad energia solare costruite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



La matematica nella riforma in Italia 2010

Gli obiettivi ruotano attorno a tre nuclei

IT

- 1) gli elementi della geometria euclidea del piano e dello spazio entro cui si definiscono i procedimenti caratteristici del pensiero matematico (definizioni, dimostrazioni, generalizzazioni, assiomatizzazioni);
- 2) gli elementi del calcolo algebrico, gli elementi della geometria analitica cartesiana, le funzioni elementari dell'analisi e le nozioni elementari del calcolo differenziale e integrale, con particolare riguardo per le loro relazioni con la fisica;
- 3) la conoscenza elementare di alcuni sviluppi caratteristici della matematica moderna, in particolare degli elementi del calcolo delle probabilità e dell'analisi statistica.

RAGIONI PER INSERIRE LA STATISTICA

- Informazione quantitativa è aumentata con avvento di Computer e Internet;
- Leggere, scrivere e far di conto sono diventati saperi insufficienti all'inclusione;
- Per inserirsi nella Società è fondamentale un nuovo sapere leggere e interpretare l'informazione quantitativa mediante gli strumenti statistici



Il parte La SIS e la valutazione nella scuola

- Da tempo ci occupiamo di valutazione
- Convegno intermedio SIS 2001 "Processi e Metodi Statistici di Valutazione"
- Gruppo Permanente "Statistica per la Valutazione e Qualità nei Servizi"



- Come si fa a dissipare la diffidenza nelle scuole sulla valutazione?
- Caratteristiche generali : **valutazione oggettiva e trasparente**
- **Valutazione oggettiva**
basata sull'osservazione di ciò che deve essere valutato (impostazione post Galileiana),
la definizione di uno standard qualitativo di riferimento (il modello),
la misurazione delle performance
la verifica dei risultati (ovvero lo scostamento dal modello).
- **Valutazione trasparente**
si realizza attraverso la ripetibilità del processo di misurazione che è indipendente da chi la effettua. In altri termini l'intero processo di valutazione è completamente noto ed è sempre possibile riprodurlo



Le dimensioni della valutazione

- Sistema Integrato per la Valutazione nella Scuola
- Che cosa valutare?
 - Valutazione dei programmi
 - Valutazione degli apprendimenti (diagnostica, formativa, sommativa)
 - acquisizione e applicazione di conoscenze, abilità e sviluppo di competenze personali
 - Valutazione della didattica
- Le dimensioni teoriche della valutazione
 - EFFICACIA (valutazione qualitativa: capacità di ottenere il migliore effetto migliorativo da un intervento)
 - EFFICIENZA (valutazione quantitativa: capacità di ottenere il maggior numero di effetti migliorativi)
 - SODDISFAZIONE (qualità percepita)
 - RISCHI (di erogazione degli interventi)
- La gestione della qualità totale del sistema di valutazione (Total Quality Management)
 - Processo di feed-back per il miglioramento degli interventi (valutazione diagnostica – formativa)



La valutazione dei programmi di matematica

Misura di efficacia di un nuovo programma
 si valuta il miglioramento nell'uso del nuovo programma senza tener conto delle risorse per realizzarlo e della frequenza dei miglioramenti (rapporto tra risultati ottenuti e obiettivi programmati: quantità di output/output atteso)

Misura di efficienza di un nuovo programma
 si valuta la frequenza dei miglioramenti nell'uso del nuovo programma fissando le risorse per realizzarlo (rapporto tra risultati ottenuti e risorse utilizzate: quantità di output/unità di input impiegate)

METODOLOGIA
 Campione a grappolo di studenti con uguali risultati in un *pre-test*
 - L'uso di uno esperimento randomizzato (o e del multilevel)
 - somministrazione di un test di valutazione degli apprendimenti
 - test statistico del χ^2 di Pearson o t-student (frequenze dei successi o medie)

Procedura adottata in : Effective Programs in Middle and High School Mathematics: A Best-Evidence Synthesis (2008), Best Evidence Encyclopedia. Exploring Educators on proven programs, Johns Hopkins University

Misura di soddisfazione di un programma
 Si somministra un questionario per valutare la soddisfazione sul nuovo programma



La valutazione degli apprendimenti

- VALUTAZIONE DI EFFICACIA Mediante:
 - Test Standardizzati (prove intermedie in condizioni standard)
 - Test con domande a scelta binaria o Multipla (strutturata)
 - Test con domande a risposta libera (destrutturata)
 - Valutazione di progetto
 - Valutazione iniziale, intermedia, finale
 - quantità di risultati / benchmark (obiettivi prestabiliti, risultati attesi sia individuali che collettivi)
 - es: esiti apprendimento raggiunti/obiettivi attesi,
 - Precondizioni
 - Strumenti che incoraggiano gli studenti ad autovalutarsi



La valutazione degli apprendimenti

- VALUTAZIONE DI EFFICIENZA Mediante:
 - Test Standardizzati (prove intermedie in condizioni standard)
 - Test con domande a scelta binaria o Multipla (strutturata)
 - Test con domande a risposta libera (destrutturata)
 - Valutazione di progetto
 - Valutazione iniziale, intermedia, finale
 - quantità di risultati / impegno in termini di personale partecipazione e regolarità nello studio;
 - es: esiti apprendimento raggiunti/partecipazione e regolarità nello studio;



La valutazione della didattica

- Valutazione come mezzo per migliorare le opportunità di apprendimento (non tanto come strumento di carriera)
- Autovalutazione (valutazione condivisa, protocollo di valutazione concordato con i docenti)
- Strumenti: Indicatori
 - Efficacia: N° obiettivi conseguiti / N° obiettivi attesi; Livelli di apprendimento medi/livelli attesi; N° dei materiali didattici prodotti / N° materiali attesi; valore aggiunto di apprendimento fornito dal docente
 - Efficienza: N° obiettivi conseguiti / numero partecipanti; percentuale di promossi
- Soddisfazione: Valutazione percepita dagli studenti che hanno fruito della didattica
- Aspetti valutati nei questionari sulla didattica dei docenti universitari
 - Chiarezza di esposizione
 - Partecipazione degli studenti
 - Metodi didattici
 - Puntualità
 - Ricevimento
 - Qualità del materiale didattico
 - Attenzione a problemi segnalati
 - Interesse nella disciplina
 - Soddisfazione complessiva dell'attività didattica



La soddisfazione studenti, docenti, famiglie

- SODDISFAZIONE degli **STUDENTI**:
 - sull'ORGANIZZAZIONE della scuola;
 - sul CLIMA INTERNO (rapporti con insegnanti, compagni di scuola e con il personale scolastico);
 - sulla DIDATTICA (il metodo di studio e di valutazione che vengono proposti);
 - sulla LOGISTICA (ambiente fisico, sugli spazi e sulla ristorazione della scuola);
 - sulle OPINIONI e ASPETTATIVE complessive sulla scuola.
- SODDISFAZIONE dei **DOCENTI**:
 - sull'ORGANIZZAZIONE;
 - sul CLIMA INTERNO;
 - sulla DIDATTICA;
 - sulla LOGISTICA
 - sulle OPINIONI e ASPETTATIVE complessive sulla scuola.
- SODDISFAZIONE delle **FAMIGLIE**:
 - sull'ORGANIZZAZIONE;
 - sul CLIMA INTERNO;
 - sulla DIDATTICA;
 - sulla LOGISTICA
 - sulle OPINIONI e ASPETTATIVE complessive sulla scuola.



III parte La valutazione statistica per la *governance* della scuola

SISTEMA INTEGRATO DI VALUTAZIONE con INDICATORI DI
EFFICACIA
EFFICIENZA
SODDISFAZIONE
RISCHIO

che coinvolgono (studenti, personale docente e non, famiglie), su aspetti quali

- LOGISTICA (la scuola come ambiente fisico);
- CLIMA INTERNO della scuola (studenti, insegnanti, dirigente scolastico);
- FORMAZIONE dei docenti;
- POF;
- PROGRAMMAZIONE DIDATTICA ;
- APPRENDIMENTI
- SODDISFAZIONE INTERNA (studenti, insegnanti) ESTERNA (Famiglie);
- INTEGRAZIONE SCUOLA-TERRITORIO: rapporti con gli enti;
- RISCHI (indicatori di disagio, indicatori di dispersione/abbandono, indicatori di comportamenti a rischio)
- Gestione dei RECLAMI

LIVELLI DI VALUTAZIONE
SCUOLA (valutazione esterna: evoluzione della scuola e suo posizionamento relativo tra le scuole)
CLASSE (valutazione interna: evoluzione della classe e suo posizionamento tra le classi della scuola)
STUDENTE (Valutazione dello studente, evoluzione degli apprendimenti dello studente e suo posizionamento nella classe)