Ministerio de Educación

Gobierno de Chile

APEC Project InMside

Statistical Thinking & Computational Thinking in the Chilean Curriculum

May 2019, Viña del Mar

You are here

18. 5 million inhabitants

18. 5 million inhabitants

1. 2 million immigrants

*NOTA: La información de este año corresponde a la matrícula preliminar a abril de 2018.
Fuente: Ministerio de Educación, Centro de Estudios (2018). Mapa del estudiantado extranjero en el sistema escolar chileno (2015-2017). *Documento de trabajo N° 12*. Santiago, Chile.

- **Kindergarten**

  - Day nursery (0-2 years olds)
  - Middle Level (2-4 years old)
  - 1st and 2nd Transition Levels (4-6 years old)

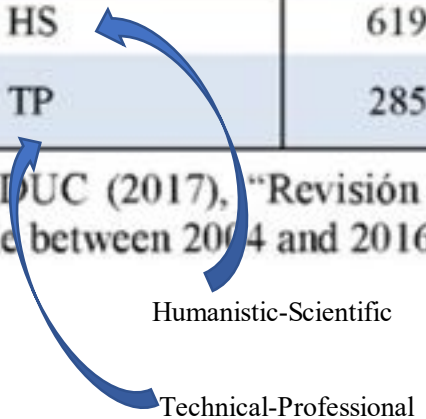
- **Basic** (Elementary) School
  Grades 1st to 8th

- **Middle** (Secondary) School
  Grades 1st to 4th
  (Grades 9th to 12th)

Table 1.4. Distribution of compulsory education enrolment by provider type (2015)

Level and education modality		Total enrolment	Distribution of enrolment by provider type (%)			
			Public municipal	Government-dependent private	Government-independent private	Delegated administration
Primary education	Regular	1 937 397	38.9	53.2	7.9	0.01
	Special needs	39 867	34	65.8	0.1	-
Secondary education (youth)	HS	619 940	31.1	54.1	12	2.8
	TP	285 304	46.3	43.8	0.002	9.9

Source: MINEDUC (2017), "Revisión de las políticas educativas en Chile desde 2004 a 2016" [Review of educational policies in Chile between 2004 and 2016: Chile National Report], Research Centre, Ministry of Education of Chile, Santiago.



Curriculum (2018)

1rst to 6th Elementary (Basic) School

- Language and Communication
- Mathematics
- History, Geography and Social Sciences
- Visual Arts
- Music
- Physical Education and Health
- Orientation
- Technology
- Religion
- Natural Sciences
- Foreign Language: English

1st to 4th, Bilingual intercultural Curriculum

Indigenous language:
Aymara, Mapuzungun, Quechua, Rapa Nui

7th to 8th Elementary School
1st and 2nd Middle School

- Language and Literature
- Mathematics
- History, Geography and Social Sciences
- Visual Arts and Music
- Music
- Physical Education and Health
- Orientation
- Technology
- Religion
- Natural Sciences
- Foreign Language: English

7th to 8th Elementary School
1st and 2nd Middle School

- Language and Literature
- Mathematics
- History, Geography and Social Sciences
- Visual Arts and Music
- Music
- Physical Education and Health
- Orientation
- Technology
- Religion
- Natural Sciences
- Foreign Language: English

Technology

- To provide with tools to manage the "digital world" and develop in it, using these technologies in a competent and responsible way

Objectives

28. Search, access and evaluate information from virtual sources.
29. Use ICT for information, communication, expression and creation
30. Use applications to present, represent, analyze and model; communicate ideas and arguments, understand and solve problems
31. Participate in virtual communication networks and citizen participation and information networks
32. Make a conscious and responsible use of ICT; (self-care and care of others; respecting the rights).

3rd to 4th Middle Education

General, and
Scientific-Humanist Differentiation

- Language and Communication
- Mathematics
- History, Geography and Social Sciences
- Visual Arts or Musical Arts
- Physical Education and Health
- Class council
- Religion
- Biology, Chemistry, Physics (choose two)
- Foreign Language: English
- At least 2 Elective courses

General, and
Technical-professional Differentiaton

- Language and Communication
- Mathematics
- History, Geography and Social Sciences
- Religion (optional)
- Biology, Chemistry, Physics (choose two)
- Foreign Language: English
  Differentiated courses (22 hours)

General, and
Artistic Differentiation

- General education courses (33/19 hours)
- Differentiated courses (0/21 hours)
- Free choice courseds (9/2 hours)

3rd to 4th Middle Education

General, and
Scientific-Humanist Differentiation

- Language and Communication
- Mathematics
- History, Geography and Social Sciences
- Visual Arts or Musical Arts
- Physical Education and Health
- Class council
- Religion
- Biology, Chemistry, Physics (choose two)
- Foreign Language: English
- At least 2 Elective courses

General, and
Technical-professional Differentiaton

- Language and Communication
- Mathematics
- History, Geography and Social Sciences
- Religion (optional)
- Biology, Chemistry, Physics (choose two)
- Foreign Language: English

Differentiated courses (22 hours)

15 sectors, (35 specialties)

- Administration
- Farming
- Feeding
- Tailoring
- Building
- Electricity
- Graphics
- Hotel management and tourism
- Timber
- Maritime
- Metalworking
- Mining industry
- Chemistry and industry
- Health and education
- Technology
- Communications

1rst to 6th Basic (Elementary) School Curriculum	1rst to 4th		1rstt to 4th intertcultural		5th to 6th	
Subject	**All-day**	**Not All-day**	**All-day**	**NotAll-day**	**All-day**	**Not All-day**
Language and Communication	8	8	8	7	6	6
Indigenous language			4	4		
Mathematics	6	6	6	6	6	6
History, Geography & and Social Sciences	3	3	2	2	4	4
Visual Arts	2	2	2	2	1.5	1
Music	2	2	2	2	1.5	1
Physical Education and Health	4	3	2	2	2	2
Orientation	.5	.5	.5	.5	1	1
Technology	1	.5	1	.5	1	1
Religion	2	2	2	2	2	2
Natural Sciences	3	3	2	2	4	3
Foreign Language: English					3	3
Free choice hours	6,5	0	6.5	0	6	0
Total minimum	38	30	38	30	38	30
Total annual	1444	1140	1444	1140	1444	1140

Decree Number 2960, 2012. (38 weeks)

Curriculum	7th & 8th Basic (Elementary)		1rs & 2nd° Middle School	
Subject	**All-day**	**Not All-day**	**All-day**	**Not All-day**
Language & Literature	6	6	6	6
Mathematics	6	6	7	6
History, Geography & Social Sciences	4	4	4	4
Visual & Musical Arts	3	2	2	2
Physical Education & Health	2	2	2	2
Orientation	1	1	1	1
Technology	1	1	2	1
Religion	2	2	2	2
FL: English	3	3	4	3
Natural Sciences	4	4	6	6
Free choice hours	6	6	6	0
Total minimum	32	31	42	33
Total (annual)	1444	1254	1596	1254

Decrees N. 628, N. 1264, N. 1265, 2016

3rd-4th Middle School Humanistic-Scientific		Annual hours				Weekly hours			
		All-day		Not all-day		All-day		Not all-day	
	Subject	3rd	4th	3rd	4th	3rd	4th	3rd	4th
General Education	Language and Communication	114	114	114	114	3	3	3	3
	Mathematics	114	114	114	114	3	3	3	3
	History, Geography & Social Sciences	152	152	152	152	4	4	4	4
	Visual or Musical Arts	76	76	76	76	2	2	2	2
	Physical Education	76	76	76	76	2	2	2	2
	Class Council	38	38	38	38	1	1	1	1
	Religion	76	76	76	76	2	2	2	2
	FL: English	114	114	114	114	3	3	3	3
	Biology	76	76	76	76	4	4	4	4
	Chemistry	76	0	76	0				
	Physics	0	76	0	76				
	Philosophy and Psychology	114	114	114	114	3	3	3	3
	Total minimum general education	1026	1026	1026	1026	27 1026	27 1026	27 1026	27 1026
Differentiated Education	Total minimum differentiated education	342	342	342	342	9 342	9 342	9 342	9 342
	Free choice	228	228	0	0	6	6	0	0
	Total minimum	1596	1596	1368	1368	42 1596	42 1506	36 1368	36 1368

3rd & 4th Technical-professional Education	Subject	Anual hours		Weekly hours	
		All-day	Not All-day	All-day	Not All-day
General Education	Language & Communication	114	114	3	3
	Mathematics	114	114	3	3
	History, Geography & Social Sciences	152	152	4	4
	Religion (Optional)	76	76	2	2
	Foreign Language: English	76	76	2	2
	Total minimum general education	532	0	14	14
Differentiated education	Total minimum	836	836	22	22
	Free choice	228	76	6	2
	Total hours	1596	912	42	38

Differentiated Artistic Middle School	Annual hours		Weekly hours	
	All-day school		All-day school	
	1rst & 2nd	3rd & 4th	1rst & 2nd	3rd & 4th
Total minimum general education	1254	722	33	19
Total minimum differentiated education	0	798	0	21
Free choice hours	342	76	9	2
Total minimum hours	1596	1596	42	42

Mathematics

Purpose
to enrich the understanding of reality,
facilitate the selection of strategies to solve problems and
contribute to the development of critical and autonomous thinking in all students.

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(Developing) **skills**:
- Problem solving
- Modeling
- To argue and communicate
- To represent

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- Problem solving
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Axes (Basic School):
- Numbers and operations
- Patterns and algebra
- Geometry
- Measurement
- Data and probabilities

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to enrich the understanding of reality,
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- Problem solving
- Modeling
- To argue and communicate
- To represent

Axes (Basic School):
- Numbers and operations
- Patterns and algebra
- Geometry
- Measurement
- Data and probabilities

To record, classify and read information arranged in tables and graphs,
and to begin in topics related to probabilities

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

5th Grade
Unit 4. **Statistics** (34 hours)

Purpose

Reading and interpretation of tables and graphs (of bars and circulars).
Chance: possibility of occurrence of an event.
Arithmetic average concept.

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

5th Grade
Unit 4. **Statistics** (34 hours)

Purpose

Reading and interpretation of tables and graphs (of bars and circulars).
Chance: possibility of occurrence of an event.
Arithmetic average concept.

Learning Objectives

- Calculate and interpret the average
- Describe possibility of occurrence of an event based on a randomized experiment
- Compare probabilities of different events without calculating them
- Read, interpret and complete tables, simple bar graphs and line graphs

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

6th Grade
Unit 4. **Statistics** (34 hours)

Purpose

Reading and interpretation of double bar and circular charts.
Chance: predictions, experiments with dice and coins.

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

6th Grade
Unit 4. **Statistics** (34 hours)

Purpose

Reading and interpretation of double bar and circular charts.
Chance: predictions, experiments with dice and coins.

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

6th Grade
Unit 4. **Statistics** (34 hours)

Purpose

Reading and interpretation of double bar and circular charts.
Chance: predictions, experiments with dice and coins.

Learning Objectives

- Compare distributions of two groups, from random samples,
  using dot and stem and leaf diagrams
- Conjecture about tendency of results obtained by repiting a experiment
  with dice, coins or others,.
- Read and interpret double and circular bar graphs
  and communicate their conclusions

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

7th Grade
Unit 4. **Statistics** (57 hours)

Purpose

Realization of surveys, representation of data through frequency tables and use of graphics.

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

7th Grade
Unit 4. **Statistics** (57 hours)

Purpose

Realization of surveys, representation of data through frequency tables and use of graphics.

Learning Objectives

- Estimate the percentage of some characteristics of an unknown population through sampling.
- Represent data obtained in a sample using tables of absolute and relative frequencies
- Show understanding of measures of central tendency and range, and use them to compare two populations.
- Explain the probabilities of events obtained by means of experiments
- Compare the relative frequencies of an event obtained by repeating an experiment with the probability obtained theoretically, using tree diagrams, tables or graphs.

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

8th Grade
Unit 4. **Statistics** (54 hours)

Purpose

Work with the concepts of position measurements, percentiles and quartiles and representation of the data, using several types of graphs

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

8th Grade
Unit 4. **Statistics** (54 hours)

Purpose

Work with the concepts of position measurements, percentiles and quartiles and representation of the data, using several types of graphs

Learning Objectives

- Show understanding of measures of position, percentiles and quartiles
- Evaluate the way in which the data are presented:
  information represented in different types of graphs, diagrams
- Explain the multiplicative combinatorial principle,
  representing it with tables and regular trees.
  Use it to calculate the probability of a composite event.

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

9th Grade (1st, Middle)
Unit 4. **Statistics** (77 hours)

Purpose

Start with the linear regression that will be studied in higher grades.
(Students to) develop probability rules, starting with simple experiments,
to obtain conjectures and, from these, to obtain a formula.

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

9th Grade (1st, Middle)
Unit 4. **Statistics** (77 hours)

Purpose

Start with the linear regression that will be studied in higher grades.
(Students to) develop probability rules, starting with simple experiments,
to obtain conjectures and, from these, to obtain a formula.

Learning Objectives

- Register distributions of two different characteristics, from the same population,
in a double entry table and in a points cloud.
- Compare populations by making *xy* graphics for two sample attributes.
Using point clouds
- Develop the rules additive, multiplicative and the combination of both
in the context of solving problems.
- Show understanding of the concept of chance: Galton table, simple random walks.
Statistical analysis, starting with relative frequencies.
Use probabilities to describe random behavior.
Solve problems of daily life and other subjects.

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

10th Grade (2° Middle)
Unit 4. **Statistics** (71 hours)

Purpose

Associate the concept of experimental probability
to understand the concept of finite random variable.

Current curriculum
Statistics (and Probabilities)
(1 out of 4 units in Mathematics)

10th Grade (2° Middle)
Unit 4. **Statistics** (71 hours)

Purpose

Associate the concept of experimental probability
to understand the concept of finite random variable.

Learning Objectives

- Show understanding of the finite random variables:
  - Defining the variable.
  - Determining the possible values of the unknown.
  - Calculating your probability.
  - Graphing their distributions
- Use simple combinatorics to calculate event probabilities and solve problems.
- Show understanding of the role of probability in society:
  - Revising information from the media.
  - Identifying assumptions based on probabilities.
  - Explaining how a probability can support opposing assumptions.
  - Explaining decisions based on subjective situations or probabilities.

11th Grade (3rd, Middle)
Unit 4. **Data and Chance** (30 hours)

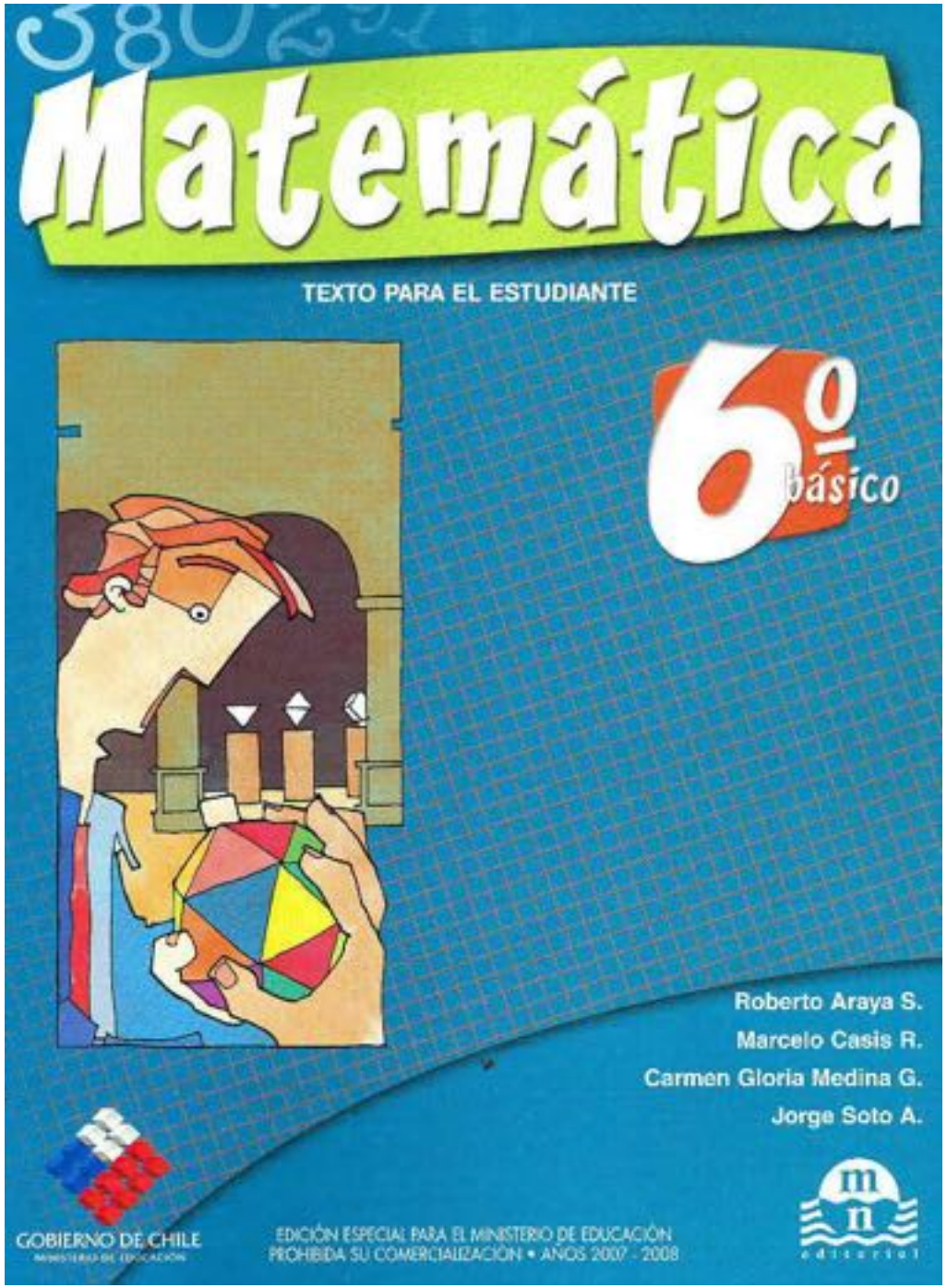
Learning Objectives

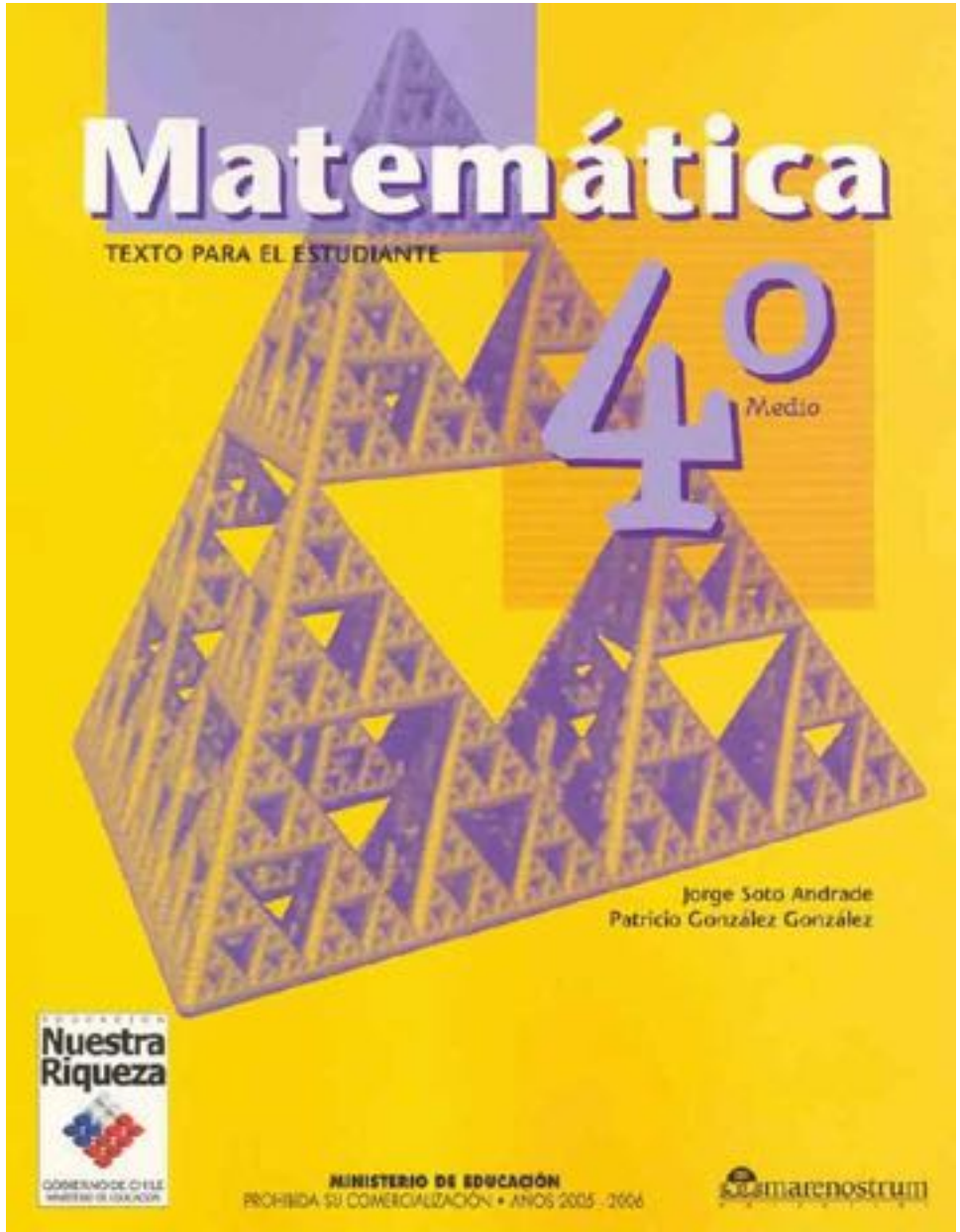
- Use of the probability function of a discrete random variable; relationship with the distribution function.
- Explore the relationship between the theoretical distribution of a random variable and the corresponding frequency graph, in discrete random experiments using digital simulations.
- Application and graphic interpretation of the concepts of expected value, variance and standard deviation or standard of a discrete random variable.
- Determination of the distribution of a discrete random variable in diverse contexts and of the mean, variance and standard deviation from those distributions.
- Use of the binomial model to analyze situations or experiments dichotomous: face or seal, success or failure or zero or one.

12th Grade (4th, Middle)
Unit 4. **Data and Chance** (30 hours).

Learning Objectives

- Critically evaluate statistical information extracted from the media,
  such as newspapers, magazine articles or from the Internet.
  Interest in knowing reality and using knowledge
  Search and access information from various virtual sources
- Relate and apply the concepts of density function and probability distribution,
  for the case of a continuous random variable.
- Argue about the reliability of the estimation of the mean of a population
  with normal distribution, based on sample data.




Matemática
TEXTO PARA EL ESTUDIANTE
4º Medio
Jorge Soto Andrade
Patricio González González
Nuestra Riqueza
MINISTERIO DE EDUCACIÓN
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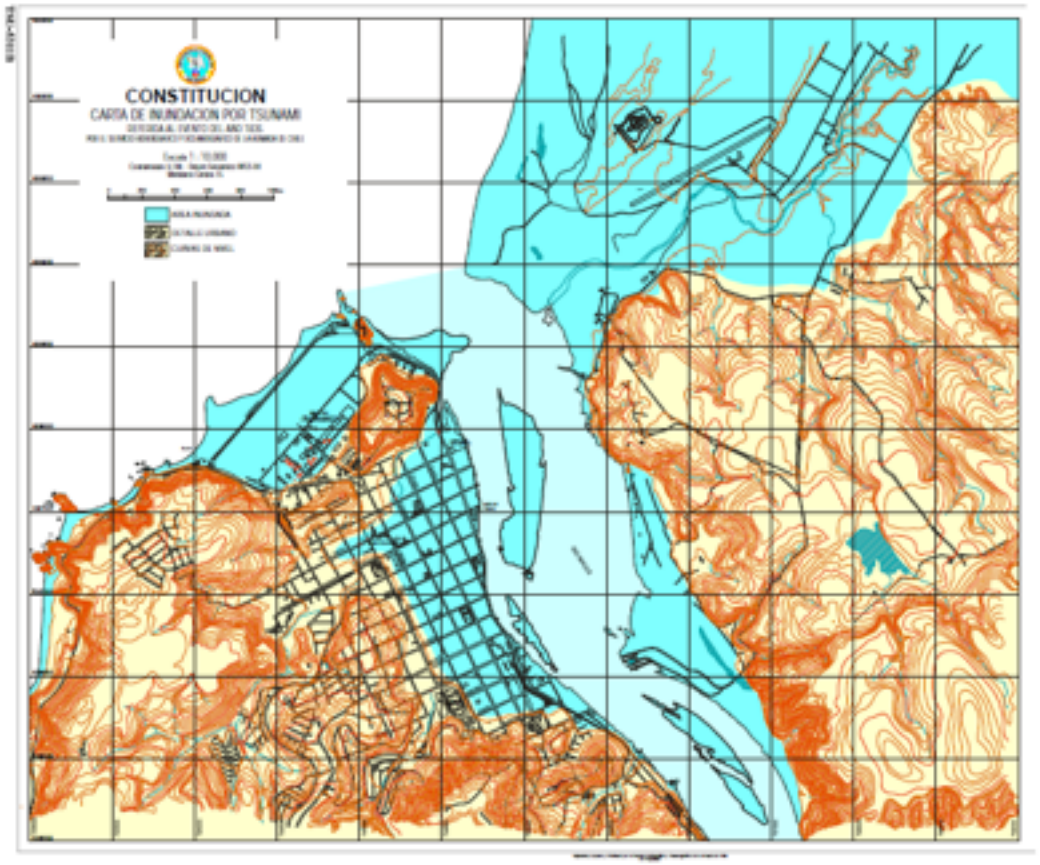

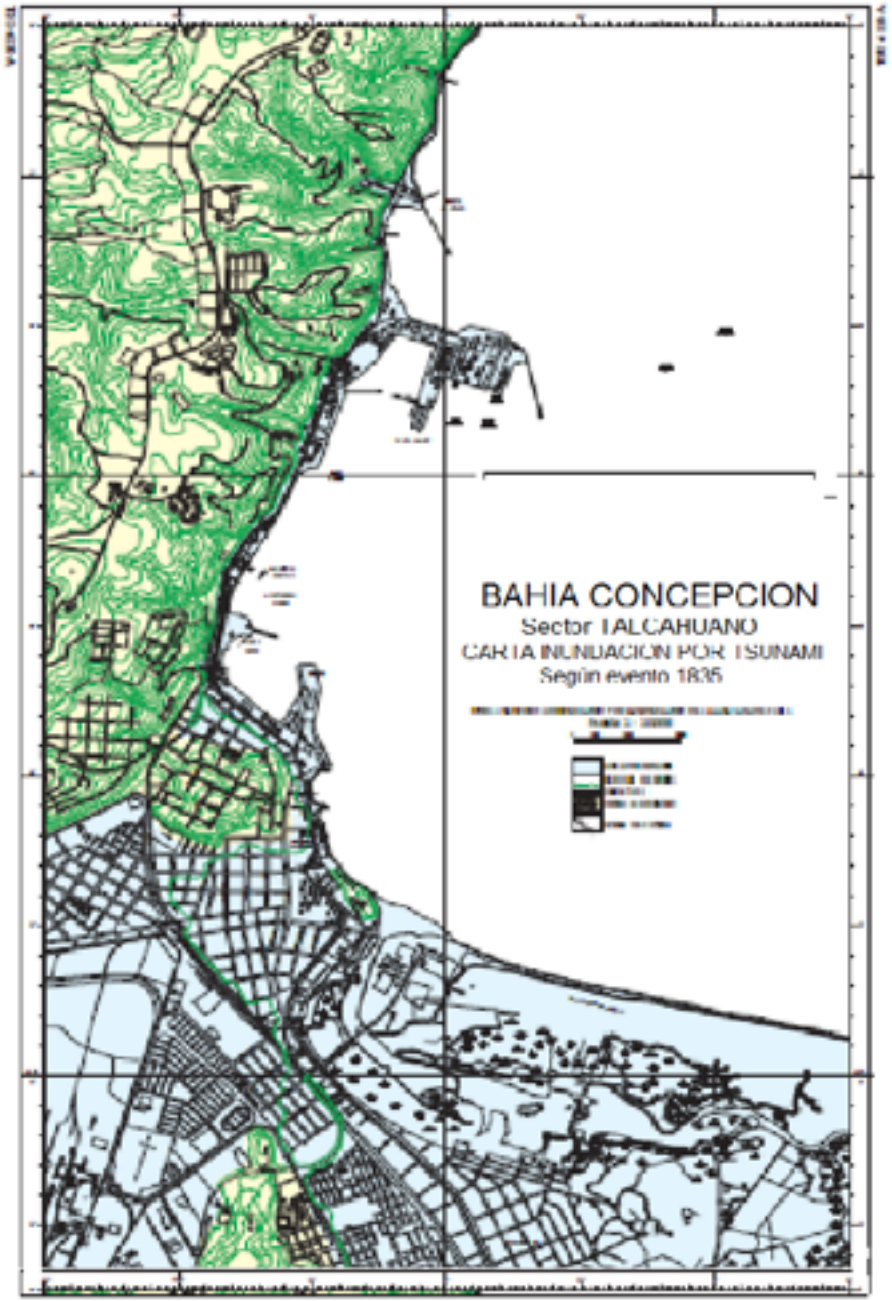

Big Earthquake and Tsunamis 2010
Soledad Estrella, Raimundo Olfos
(APEC-Tsukuba Project)

Ministerio de Educación
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TSUNAMI

On February 27, 2010, the coasts of southern Chile were hit by a tsunami that left many casualties. Currently, with the intention of saving lives, campaigns that intend to educate the people about such phenomena are developed.

In a newspaper I met a picture with recorded information about high and time of arrival of tsunami waves that struck the coast of Chile in 2010. Authorities of those localities need to know that information to educate people to react to natural disasters and then save lives.

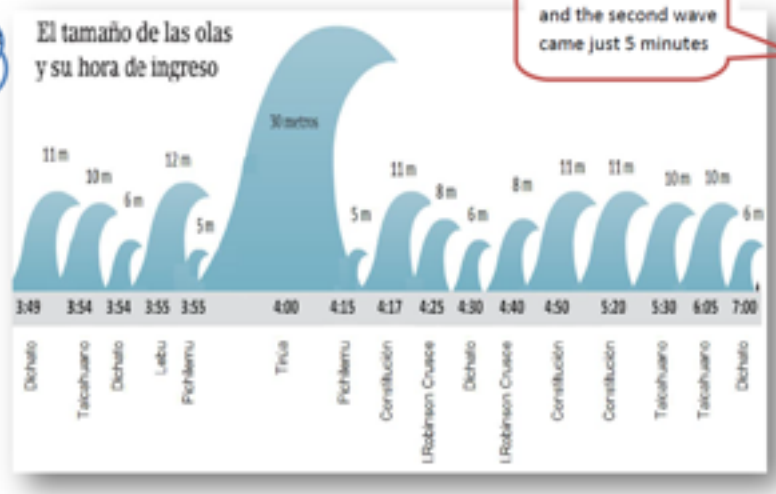
Exploring the extraction, classification and interpretation of information

What information can be extracted from the image below?

How I can organize the data for getting information?

1.- Let's look carefully at the image below. Let's talk about what you tell from this image. What information can you draw?

Sixteen waves hit for more than three hours



Among the first wave and the second wave came just 5 minutes

Big Earthquake and Tsunamis 2010
Soledad Estrella, Raimundo Olfos
(APEC-Tsukuba Project)

(Relative frecuencies)

Matemática 7° básico / Unidad 4 / OA 19 / Actividad 2

Representar

Elegir y utilizar representaciones concretas, pictóricas y simbólicas. (OA k)

2. Lanzan 10 chinches a la vez, registran el evento "base" o "punta" y calculan las frecuencias relativas.
   - Repiten los lanzamientos y calculan las frecuencias relativas acumuladas.
   - Elaboran un gráfico de líneas, en el cual anotan las frecuencias relativas acumuladas para cada 10, 20, 30, ... lanzamientos.

National Curriculum,
Digital Resources,
Suggested activities
http://www.curriculumnacional.cl/614/w3-propertyvalue-49735.html

(minimum, maximum, mean, median)

Matemática 7° básico / Unidad 4 / OA 17 / Actividad 2

Argumentar y comunicar

Fundamentar conjeturas dando ejemplos y contraejemplos. (OA f)

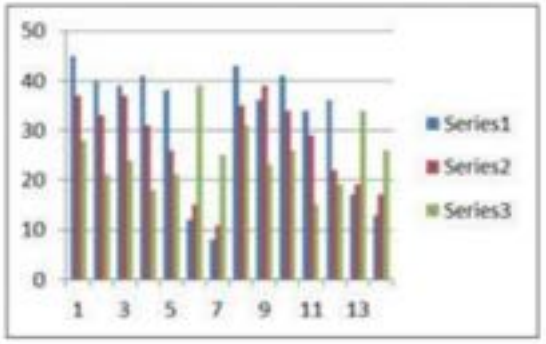
2. El pictograma representa el número de espectadores que asistieron a 7 partidos de fútbol de un club chileno de la primera división. En la escala del lado, cada cuadrícula representa 500 personas.

- Determinan el valor mínimo, el valor máximo, el recorrido y la mediana de los espectadores.
- Calculan la media (promedio) y la comparan con la mediana.

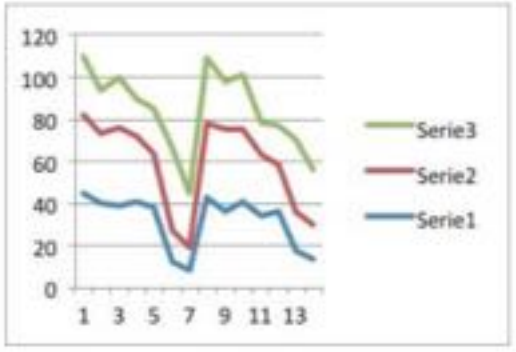
National Curriculum,
Digital Resources,
Suggested activities
http://www.curriculumnacional.cl/614/w3-propertyvalue-49735.html

(Comparison of graphs)

2. Una empresa de buses realiza diariamente viajes entre dos ciudades. Para mejorar el servicio, durante dos semanas se anotó el número de pasajeros que viajaron en la mañana de la ciudad A hacia la ciudad B. Se investigaron tres viajes que partían, respectivamente, a las 7.00, a las 8.00 y a las 9.00. Los números se registraron en la tabla.



HR.	LUN	MAR	MIE	JUE	VIE	SAB	DOM	LUN	MAR	MIE	JUE	VIE	SAB	DOM
7:00	45	40	39	41	38	12	8	43	36	41	34	36	17	13
8:00	37	33	37	31	26	15	11	35	39	34	29	22	19	17
9:00	28	21	24	18	21	39	25	31	23	26	15	19	34	26



› ¿Cuál de los gráficos representa mejor la cantidad diaria de usuarios de la empresa?

› Mencionan fortalezas y debilidades, comparando los 2 gráficos.

Representar

Ejemplificar representaciones con analogías, metáforas y situaciones familiares para resolver problemas. (OA m)

Argumentar y comunicar

Explicar y fundamentar procedimientos de soluciones y resultados. (OA e)

Resolver problemas

Presentar ideas propias y soluciones utilizando palabras gráficos y símbolos. (OA c)

National Curriculum,
Digital Resources,
Suggested activities
http://www.curriculumnacional.cl/614/w3-propertyvalue-49735.html

New Curriculum

3rd and 4th Grades (Middle School)

Common Core

Objectives, 3rd Grade:

2. To make decisions in situations of uncertainty that involve the analysis of statistical data with measures of dispersion and conditional probabilities.

New Curriculum

3rd and 4th Grades (Middle School)

Common Core

Objectives, 3rd Grade:

2. To make decisions in situations of uncertainty that involve the analysis of statistical data with measures of dispersion and conditional probabilities.

Objectives, 4th Grade:

1. To base decisions in the personal and community financial and economic areas, based on models that consider percentages, interest rates and economic indexes.

2. To base decisions in situations of uncertainty, supported on the critical analysis of statistical data and based on the binomial and normal models.

New Curriculum

3rd and 4th Grades (Middle School)

Common Core

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(Use of ICT)

New Curriculum

3rd and 4th Grades (Middle School)

Differentiated asignatures (optional)

- (Elements of) Differential and Integral Calculus
- Probabilities and Descriptive and Inferential Statistics
- Geometry 3-D
- Computational Thinking and Programming

New Curriculum

3rd and 4th Grades (Middle School)

Probabilities and Descriptive and Inferential Statistics

- To integrate probabilities and statistics as a tool for the study of diverse situations or social and scientific phenomena.
- (ICT tools)

New Curriculum

3rd and 4th Grades (Middle School)

Probabilities and Descriptive and Inferential Statistics

- To integrate probabilities and statistics as a tool for the study of diverse situations or social and scientific phenomena.
- (ICT tools)

Objectives

- To argue and communicate decisions based on the critical analysis of information
- To solve problems (by using standard deviation, variance, sample correlation)
- To model phenomena or everyday situations in the scientific field and in the social sphere, that require probabilities and binomial or normal distributions

New Curriculum

3rd and 4th Grades (Middle School)

Computational Thinking and Programming

- Computational thinking is applied
  in almost all activities of the human being.
  Thus:
  - to integrate interests in different fields of knowledge and work
  - to promote interdisciplinary work with different areas of creation
    (scientific, artistic, technological, humanistic).

- From program procedures, simulate processes or perform calculations:
  a new vision and a new understanding about
  concepts, procedures or relationships

New Curriculum

3rd and 4th Grades (Middle School)

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    (scientific, artistic, technological, humanistic).

- From program procedures, simulate processes or perform calculations:
  a new vision and a new understanding about
  scheduled concepts, procedures or relationships

- To understand, analyze critically and act
  in a space strongly influenced by ICT.
- To apply computer thinking and program development
- To develop analytical skills, problem solving and design ability:
  decompose phenomena or situations and abstraction,
  to reduce complexity

New Curriculum

3rd and 4th Grades (Middle School)

Computational Thinking and Programming

Objectives

- To apply concepts of computer science
  when creating the code for a computational solution.

- To represent different types of data in a variety of ways
  (texts, sounds, images, numbers...).

- To develop and program algorithms
  to execute mathematical procedures,
  and get terms defined by a rule or pattern.

- To create applications and perform analysis, through symbolic processors,
  of dynamic geometry and statistical analysis.

- To develop applications for mobile devices and for
  devices equipped with sensors and control mechanisms.

- To use digital technology, and the information it contains,
  in a creative, respectful and responsible way

On Statistical thinking

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why and how researches are carried out, taking into account essential statistics ideas,
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or
b) start with a problem within a context, followed by
the uprising of question from the behavior of the data,
the exploration and collection and cleaning of the data,
and the conclusion that responds to these questions,
with evidence provided by the data at a certain level of certainty.

On Computational thinking

Computational thinking involves
the use of computer science techniques and technologies
that apply to different disciplines;
skills such as modeling and decomposing a problem, so that reduce complexity;
data processing and modeling processes;
creating, generalizing and evaluating algorithms;
in due course using the current technological potential.

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Computational thinking involves
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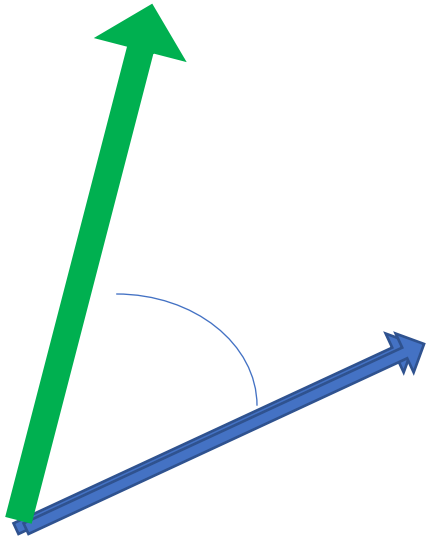
Computational thinking allows developing the knowledge and know-how
necessary to understand, critically analyze and act
in a realm strongly influenced by digital technologies,
having experience with the cycle that
starts in a problem or challenge,
continues with the analysis of alternatives of solution and formulation of a response
and leads to the design, development and testing of a program
that makes explicit one of those possible solutions.

The Ministry of Education of Chile seeks
to develop Statistical thinking and Computational thinking in students
and incorporate these issues into schools

to motivate students' interest in the areas of
science, technology, mathematics and engineering, and the arts;

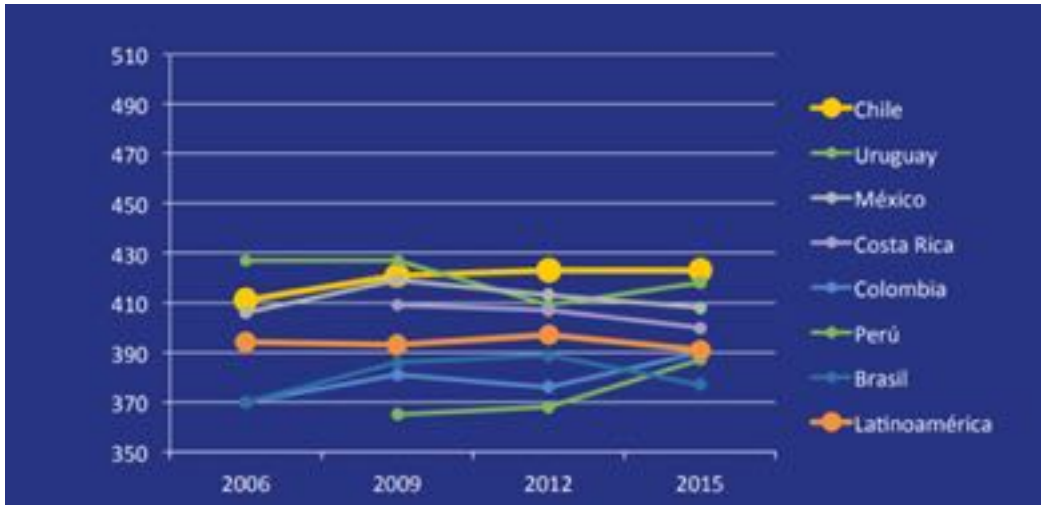
fostering the development of XXI-century skills

and favoring a greater understanding and appropriation of technologies,
so that allowing students to move
from consumer-users to potential creators in technological environments.



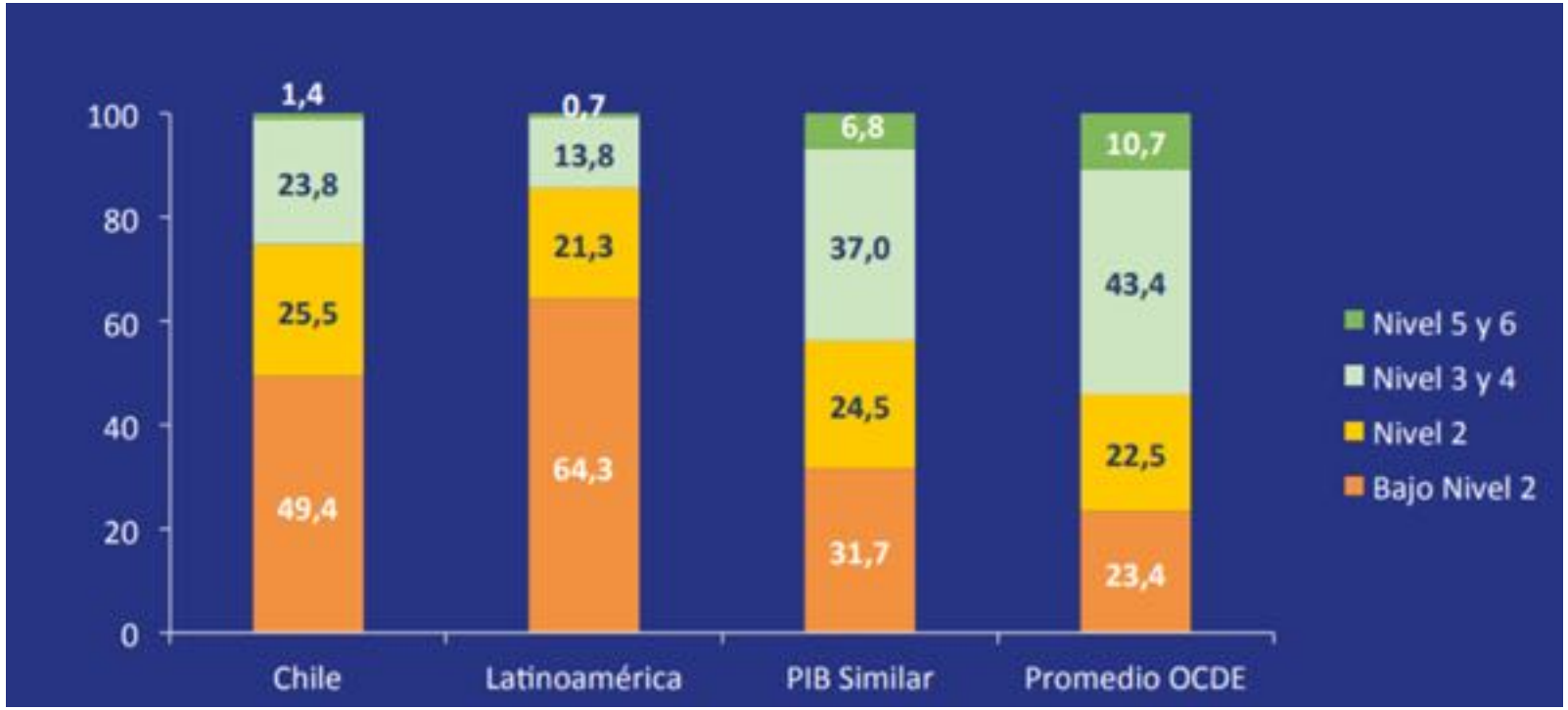
First Task

PISA, **Mathematics**



María Jesús Honorato
Chairperson,
Unit of Curriculum and Evaluation
Ministry of Education
Chile

PISA, **Mathematics** 2015



Under Level 2

– (Raise in expenditure on education)

driving force

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– (2008). *Programa INICIA*, for Teacher training institutions.

– Competitive resources for financing human resources
– Curricular guidelines and Standards for initial training
– Diagnostic evaluation for graduating students

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Chile, curriculum reform:

– Ministry of Education

– National Council on Education

– Teachers, students, parents, teacher training institutions, academic societies, public at large

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driving force

Equity and quality on education
for individuals and for development of the country

driving force

– The threat/opportunity of a Big change on employment

driving force

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– Epistemological aspect:
¿Questions first, or data dirst?