

A SCHOOL YEAR FROM HOME

HOW CHILE HAS TAUGHT MATH DURING THE PANDEMIC

PART 3 OF THE WEBINAR SERIES

“Moving Forward in the Midst of a Pandemic: International Lessons for Math Teachers”

U.S. National Commission on Mathematics Instruction
National Academies of Sciences, Engineering, and Medicine

SALOMÉ MARTÍNEZ
UNIVERSIDAD DE CHILE

MARCH 4TH, 2020
FIRST DAY OF CLASS!





COLEGIO CORDILLERA

**Se suspenden las clases
por dos semanas a partir
de mañana 16 de marzo**



SUSPENSIÓN DE CLASES

PLAN DE ACCIÓN
CORONAVIRUS
COVID-19

- Se **extiende** la suspensión de clases hasta el 12 de abril.
- Se **adelantan** las vacaciones de **invierno**: desde el lunes 13 de abril al viernes 24 de abril.

#CuidémonosEntre**Todos**

#PlanCoronavirus

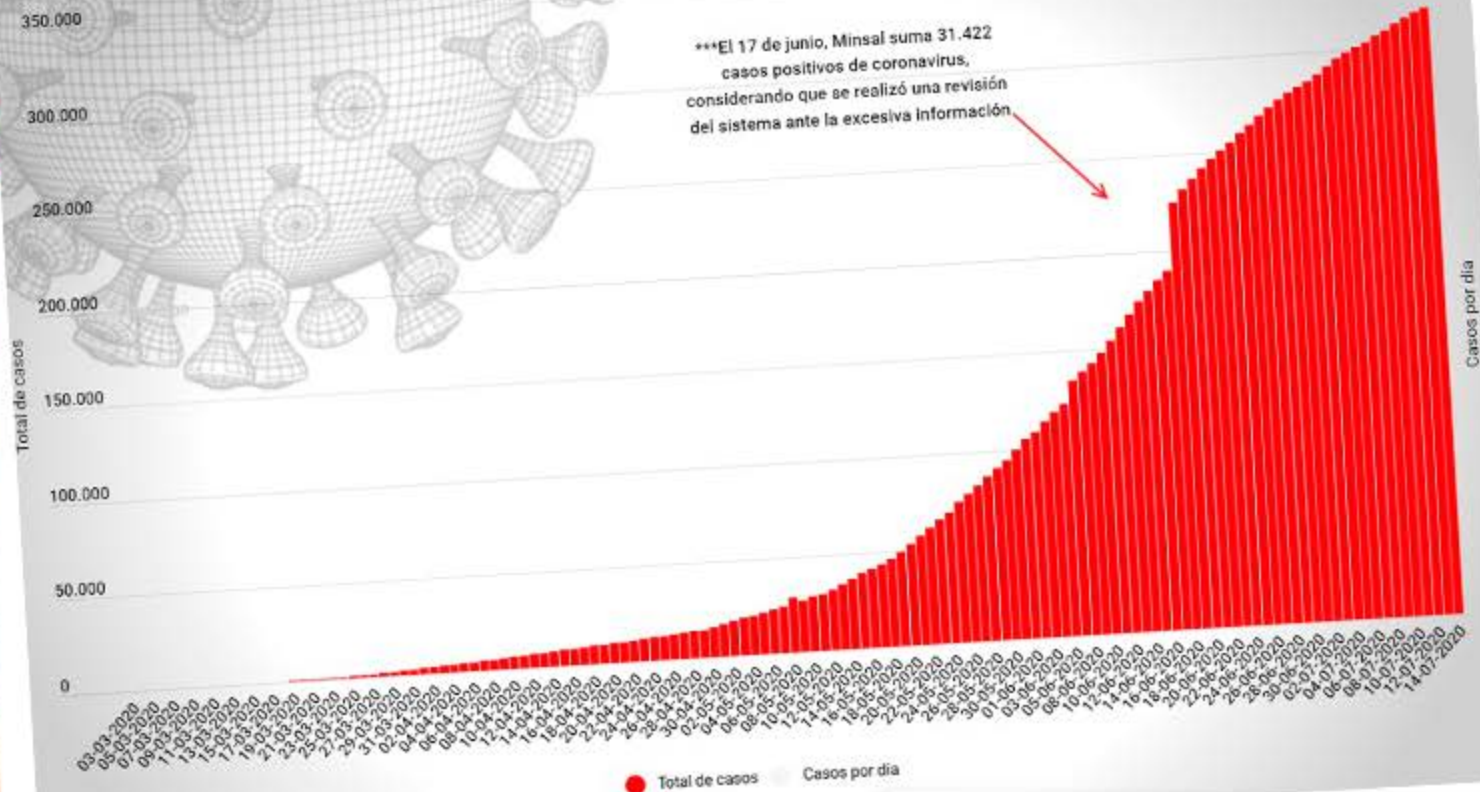




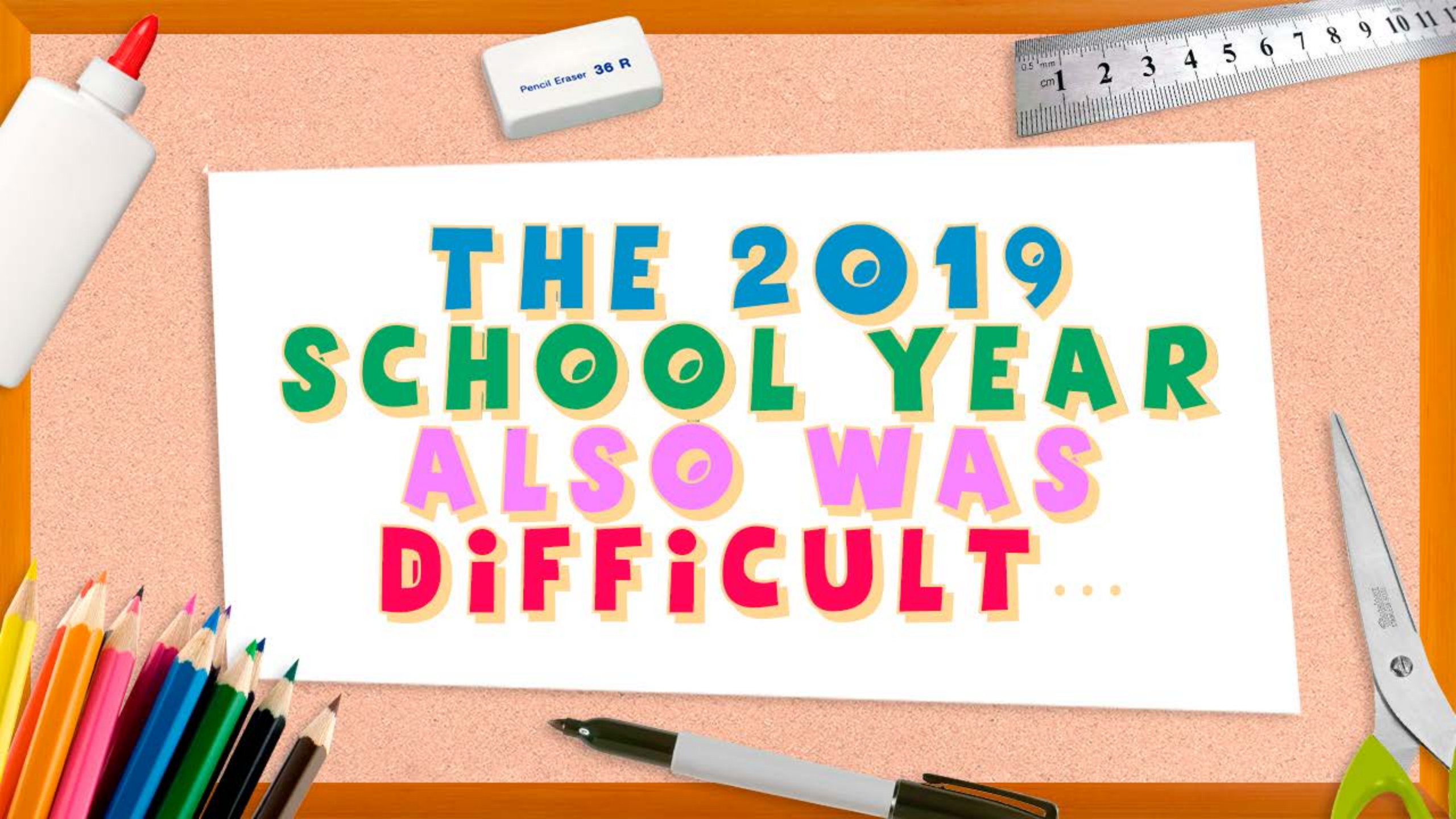
RETURNING
TO CLASS IN

May

EVOLUCIÓN DEL COVID-19 EN CHILE



MAYBE NOT...



THE 2019
SCHOOL YEAR
ALSO WAS
DIFFICULT...



**THE 2019 SCHOOL YEAR
WAS INTERRUPTED
IN OCTOBER 18TH**



UNIVERSITIES FINISHED THE TERM ONLINE
SCHOOLS HAD DIFFICULTIES FINISHING THE SCHOOL YEAR

ACTIONS TO SUPPORT TEACHING AND LEARNING DURING THE PANDEMIC

Ministry of Education

Develops and support:

- **Curriculum**
- Standards
- Technical and Pedagogical assistance

Superintendence

- Controls the use of resources
- Investigate complaints

National Board of Education

Approves and reports:

- **Curriculum**
- Standards
- Assessment plan

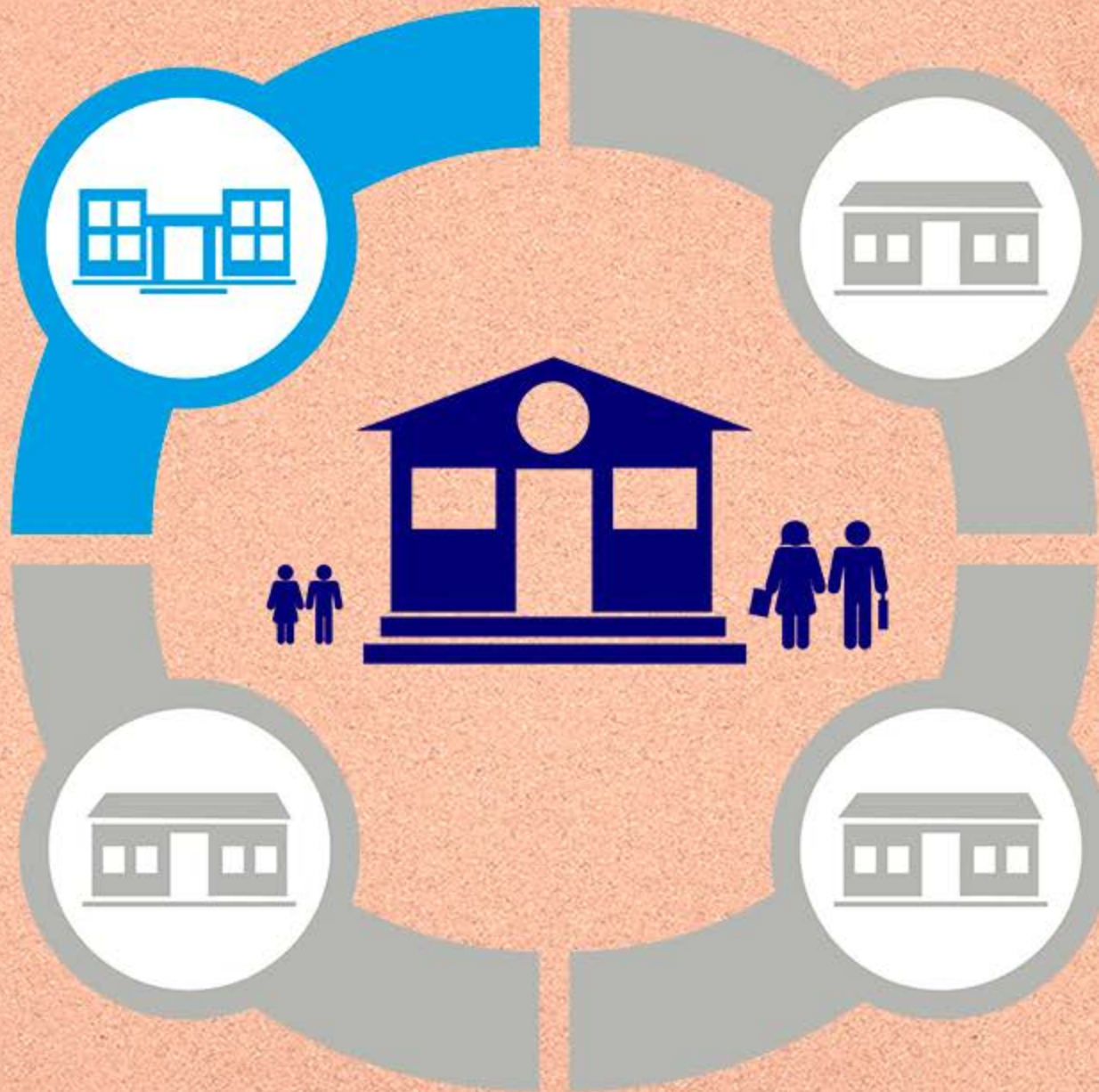
Quality Agency

- **Assesses learning achievements**
- Assessment of the performance of schools



Ministry of Education

- **Prioritized Curriculum** (2020-2021)
- Resources: web platform, TV content



Ministry of Education

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- Resources: web platform, TV content



National Board of Education

Approves prioritized curriculum

Ministry of Education

- **Prioritized Curriculum** (2020-2021)
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National Board of Education

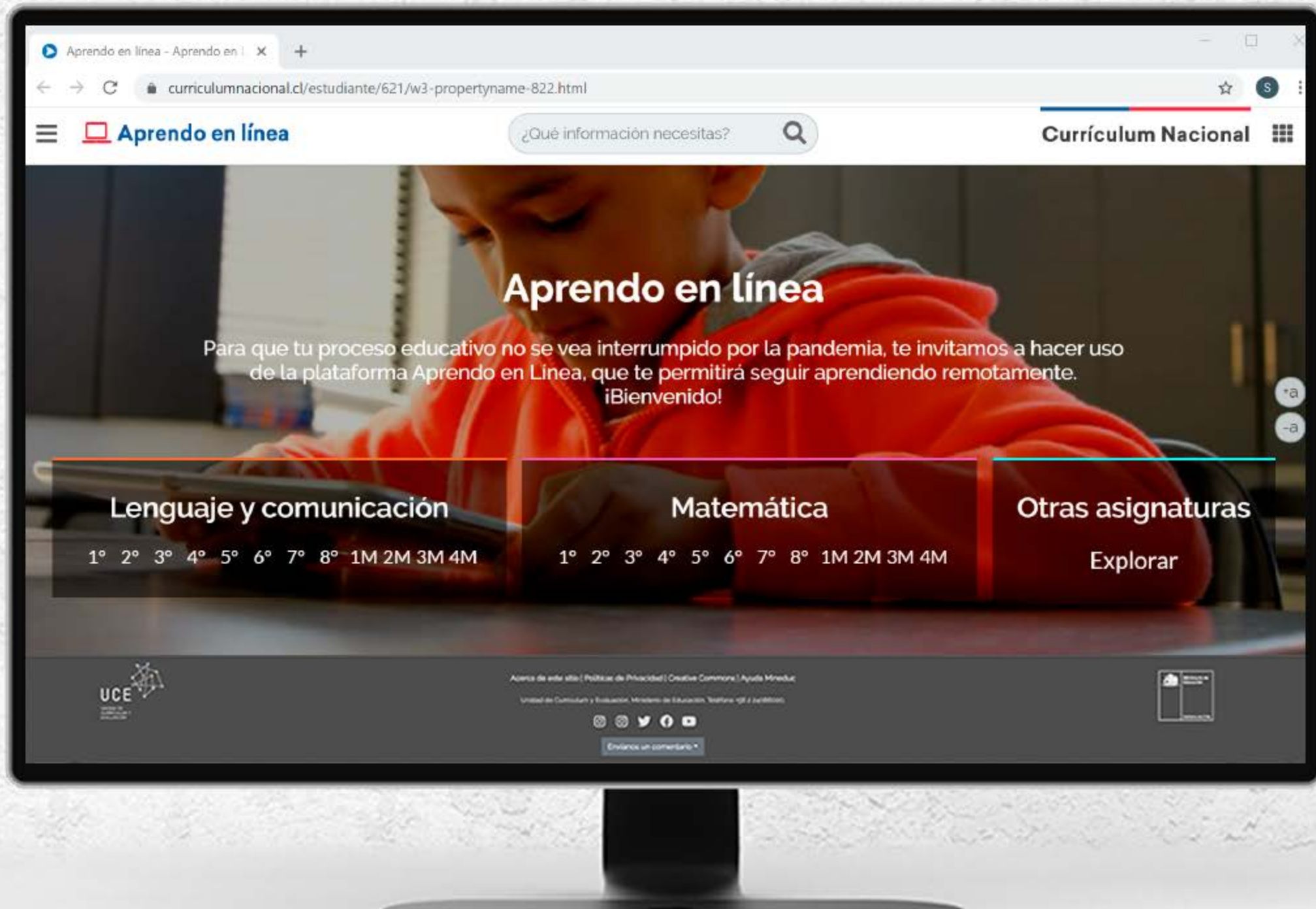
Approves prioritized curriculum.



Quality Agency

Once the classroom classes return:

- Diagnostic tests for reading and math
- Socio-emotional questionnaires



← → ↻ <https://www.curriculumnacional.cl/estudiantes/12148-articulo-79936.html> ¿Qué información necesitas?

Aprendo en línea Curriculum Nacional Unidad 1 Unidad 2 Unidad 3 Unidad 4 Asignatura

1M Matemática

Unidad 1: Ampliar conocimiento de las potencias

En esta unidad los estudiantes amplían su conocimiento de potencias al ámbito de los números racionales para las bases, y extienden el ámbito numérico de los exponentes a los enteros. Se trabaja también con los productos notables, tema que corresponde al eje de Álgebra y funciones.

Junio a Diciembre

Semana 1 Semana 2 Semana 3 Semana 4 Semana 5

Aprendo en línea
1° medio
Matemática 1° medio Unidad priorizada: Clase N° 1

Aprendo en línea
1° medio
Matemática 1° medio Unidad priorizada: Clase N° 2

Aprendo en línea
1° medio
Matemática 1° medio Unidad priorizada: Clase N° 3

Aprendo en línea
1° medio
Matemática 1° medio Unidad priorizada: Clase N° 4

Solucionario Matemática 1° medio Unidad priorizada: Semana 1

Evaluación Matemática 1° Medio

Marzo a Mayo

Semana 1 Semana 2 Semana 3 Semana 4 Semana 5 Semana 6 Semana 7 Semana 8 Semana 9 Semana 10 Semana 11

Plan de trabajo
1° Medio Matemática
Plan de trabajo Matemática 1° medio

Aprendo sin parar
1° medio
Matemática 1° medio Unidad 1: Clase N° 1

Aprendo sin parar
1° medio
Matemática 1° medio Unidad 1: Clase N° 2

Aprendo sin parar
1° medio
Matemática 1° medio Unidad 1: Clase N° 3

Aprendo sin parar
1° medio
Matemática 1° medio Unidad 1: Clase N° 4

Solucionario Matemática 1° medio Unidad 1: Semana 1

Curriculum Nacional

Matemática 1° medio

22 horas pedagógicas

Unidad 1: Ampliar conocimiento de las potencias

En esta unidad los estudiantes amplían su conocimiento de potencias al ámbito de los números racionales para las bases, y extienden el ámbito numérico de los exponentes a los enteros. Se trabaja también con los productos notables, tema que corresponde al eje de Álgebra y funciones.

Propósito

Objetivos

Recursos

Propósito

En esta unidad, las y los estudiantes operan con los números racionales, ejercitan con ellos y utilizan algoritmos para determinar relaciones y responder a problemas. Amplían su conocimiento de potencias al ámbito de los números racionales para las bases, y extienden el ámbito numérico de los exponentes a los enteros. Para esto, utilizan lo aprendido sobre potencias y extienden las propiedades al nuevo ámbito numérico. Con esta ampliación del conocimiento, se espera que resuelvan problemas de potencias, que ejerciten de manera precisa y variada, y que resuelvan problemas de crecimiento y decrecimiento.

Se trabaja también con los productos notables, tema que corresponde al eje de Álgebra y funciones y que se incluye en esta unidad para reforzar el trabajo de la operatoria con variables y como reforzamiento de lo aprendido. Los productos notables comienzan con sus representaciones pictóricas, relacionadas con área de figuras 2D y con el volumen de figuras 3D, para continuar con su representación simbólica y con su manejo para reducir expresiones algebraicas. Asimismo, se abordan las fórmulas del área de superficie y de volumen de un cono, comenzando con representaciones concretas para llegar a lo simbólico. En este camino, los estudiantes refuerzan lo aprendido en cursos anteriores y la operatoria con números racionales y con expresiones algebraicas.

Conocimientos previos

- Multiplicación de números enteros.
- División de números enteros.
- Números racionales.
- Multiplicación y división de potencias de base y exponente entero.
- Raíces cuadradas de números naturales.
- Factorización de expresiones algebraicas.

Palabras clave

Números racionales, potencias, crecimiento, decrecimiento, productos notables, reducción de expresiones algebraicas, área del cono, volumen del cono.

Compartir

Unidades

Priorización curricular: Matemática 1° medio

Presenta los objetivos prioritarios y los contenidos asociados.

Unidad 1: Ampliar conocimiento de las potencias

En esta unidad los estudiantes amplían su conocimiento de potencias al ámbito de los números racionales para las bases, y extienden el ámbito numérico de los exponentes a los enteros. Se trabaja también con los productos notables, tema que corresponde al eje de Álgebra y funciones.

Unidad 2: Incorporar la noción de linealidad en dos variables

Los estudiantes refuerzan lo aprendido sobre función lineal, incorporando la noción de linealidad en dos variables. Se recurre a fijar los parámetros a y b de la relación lineal, en dos variables y a determinar relaciones en el gráfico.

Unidad 3: Determinar el factor de una homotecia

Se espera que las y los estudiantes sean capaces de determinar, desde lo concreto, el factor de una homotecia.

Unidad 4: Desarrollar las reglas de probabilidad

El objetivo es comenzar con la repesca lineal que se estudia en cursos superiores. Asimismo, se busca que desarrollen las reglas de probabilidad, comenzando con experimentos sencillos, para obtener conjuntos y a partir de estos, obtener una fórmula.

Unidad 1: Representación vectorial de situaciones y fenómenos

Utilizar la representación vectorial para describir situaciones y fenómenos de la vida diaria, comunicando sus resultados de manera gráfica y también algebraica.

Actividades de Aprendizaje

Actividad 1: Representar situaciones con vectores

1. **Actividad 1: Aplicar homotecias en obras de arte**

Se presentará una serie de imágenes de obras de arte que han sido modificadas mediante homotecias. Se explicará el concepto de homotecia y se mostrará cómo se puede aplicar en la práctica. Se presentará una serie de imágenes de obras de arte que han sido modificadas mediante homotecias. Se explicará el concepto de homotecia y se mostrará cómo se puede aplicar en la práctica.

2. **Actividad 2: Aplicar homotecias en obras de arte**

Se presentará una serie de imágenes de obras de arte que han sido modificadas mediante homotecias. Se explicará el concepto de homotecia y se mostrará cómo se puede aplicar en la práctica. Se presentará una serie de imágenes de obras de arte que han sido modificadas mediante homotecias. Se explicará el concepto de homotecia y se mostrará cómo se puede aplicar en la práctica.

Actividad 3: Transferir de 2D a 3D por medio de ecuaciones y vectores

Actividad 4: Las ecuaciones vectoriales y los fenómenos de la naturaleza

Actividades de Evaluación

[illegible]

https://www.curriculumnacional.cl/webinars/12143-search.html

Aprende en línea

¿Qué información necesitas?

Curriculum Nacional

Filtrar resultados por:

Nuevas

Asignaturas EG

Tipo de contenido

79 resultados para su búsqueda "aprendo tv"



Aprendo TV: Lenguaje 4° básico - Capítulo 5

4° básico Lenguaje y Comunicación



Aprendo TV: Lenguaje 3° básico - Capítulo 6

3° básico Lenguaje y Comunicación



Aprendo TV: Lenguaje 1° básico - Capítulo 04

1° básico Lenguaje y Comunicación



Aprendo TV: Lenguaje 2° básico - Capítulo 5

2° básico Lenguaje y Comunicación



Aprendo TV: Lenguaje 4° básico - Capítulo 3

4° básico Lenguaje y Comunicación



Aprendo TV: Ciencias Sociales 4° básico Capítulo 3

4° básico Historia, Geografía y Ciencias Sociales

1 2 3 4 5 6 7 8 9 10 11 12 ... 34

UCE

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Unidad de Curriculum y Evaluación, Ministerio de Educación. Teléfono +56 2 24000000

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Desarrollado por  Karatberg  H3C  H3C  Law

COVID SOCIAL TABLE



- Established by the government and composed by health specialists, municipalities and academics who will work on proposals and coordinate actions against the pandemic.
- The presidents of Universidad de Chile and Pontificia Universidad Católica de Chile are part of the social table.
- Social tables on Education, Mental Health and Economics led by faculty members of these universities, were formed.
- The Education social table produced two reports:
 - ✓ The first one was focused on Recommendations for the School System (April).
 - ✓ The second one on **Didactical Orientations for Times of Crisis** (7 subjects) and also on School Leadership (23rd July).

MANY THANKS TO...

- María Isabel Baeza (MINEDUC)
- Pamela Reyes (MINEDUC)
- Alejandra Mizala (Education Social Table, Universidad de Chile)
- Carmen Sotomayor (Education Social Table, Universidad de Chile)
- Magdalena Claro (Education Social Table, P. Universidad Católica de Chile)
- Horacio Solar (Didactical Orientation Math, P. Universidad Católica de Chile)
- Francisco Rojas (Didactical Orientation Math, P. Universidad Católica de Chile)
- Helena Montenegro (CMM-Edu, Universidad de Chile)
- Sofía Bustos (CMM-Edu, Universidad de Chile)
- Cachorro Rodríguez (CMM-Edu, Universidad de Chile)
- Thomas Peet (CMM-Edu, Universidad de Chile)

| LEARNING CONTEXT DURING THE PANDEMIC

MINEDUC SURVEY

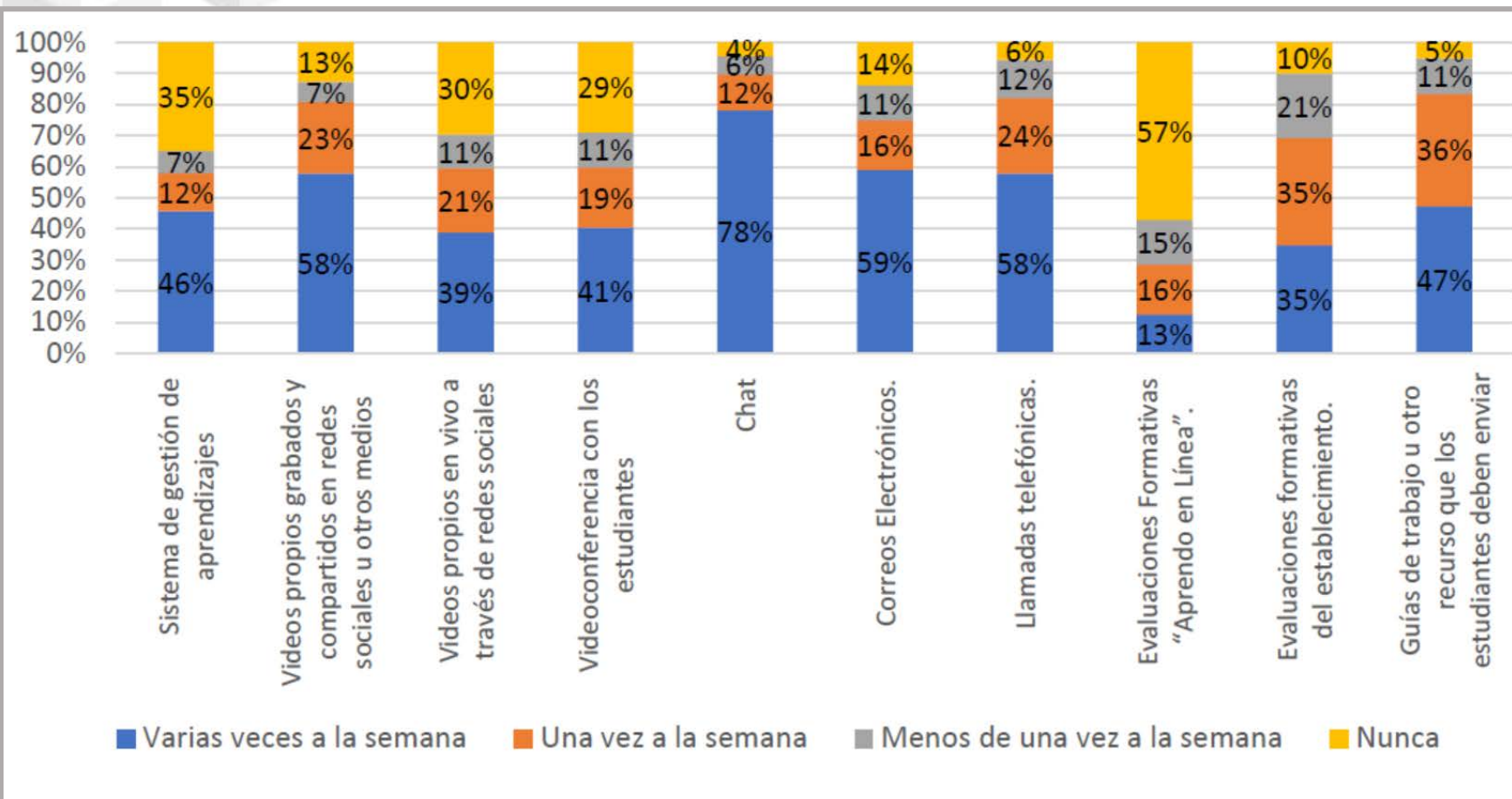
- On June 4 the Ministry of Education launched two online consultations:
 - ✓ one aimed at principals, management teams and teachers;
 - ✓ the other one to parents/tutors.
- They addressed the use and evaluation of the tools that educational communities are using to give continuity to students' teaching-learning processes.

Participants

- 8,698 different elementary-middle, high schools, representing **72%** of all schools
- 15,966 teachers,
- 167,630 parents/tutors.

How often do you use each of the following tools to teach online, coordinate activities with students and / or monitor students' progress?

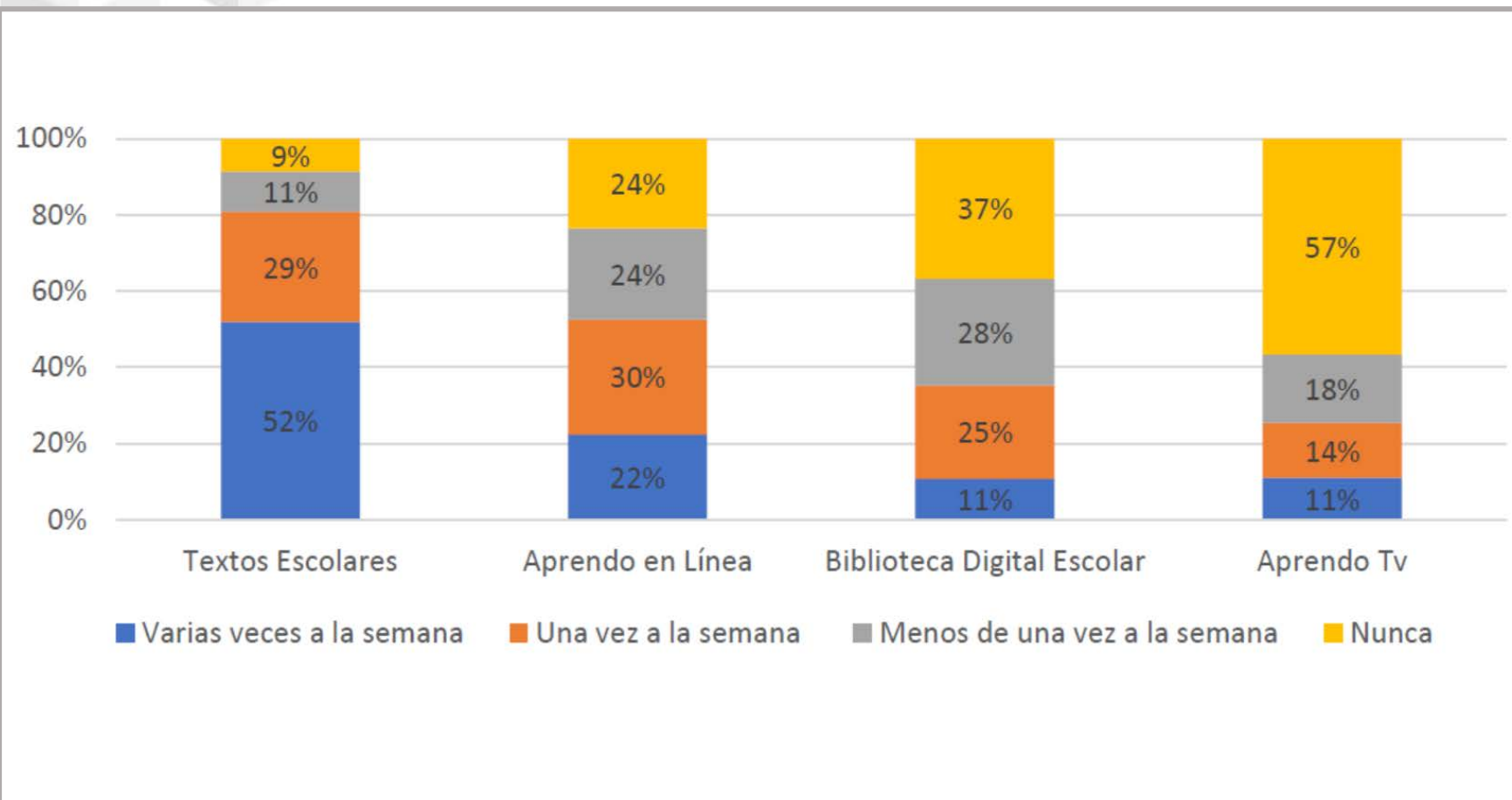
As reported by teachers



- **78%** use chat tools more than once a week
- **35%** has never used LMS systems
- **29%** has never used videoconferences

How often do you use the following resources provided by the Ministry of Education?

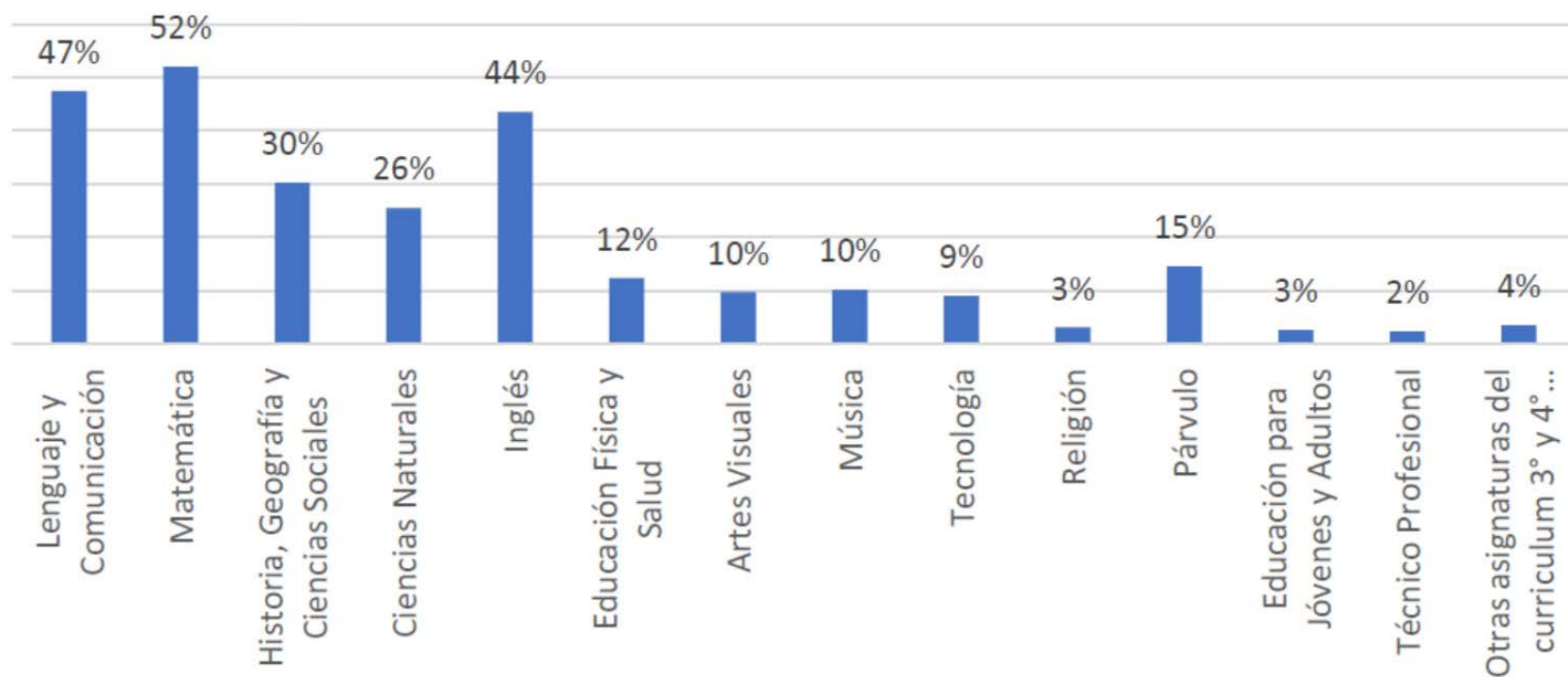
As reported by teachers



- The most used are school textbooks.
- The Ministry's platform is used by **52%** of teachers at least once a week.

Thinking about the tools that the Ministry of Education has made available: In which subject do you think your child/pupil needs more resources?

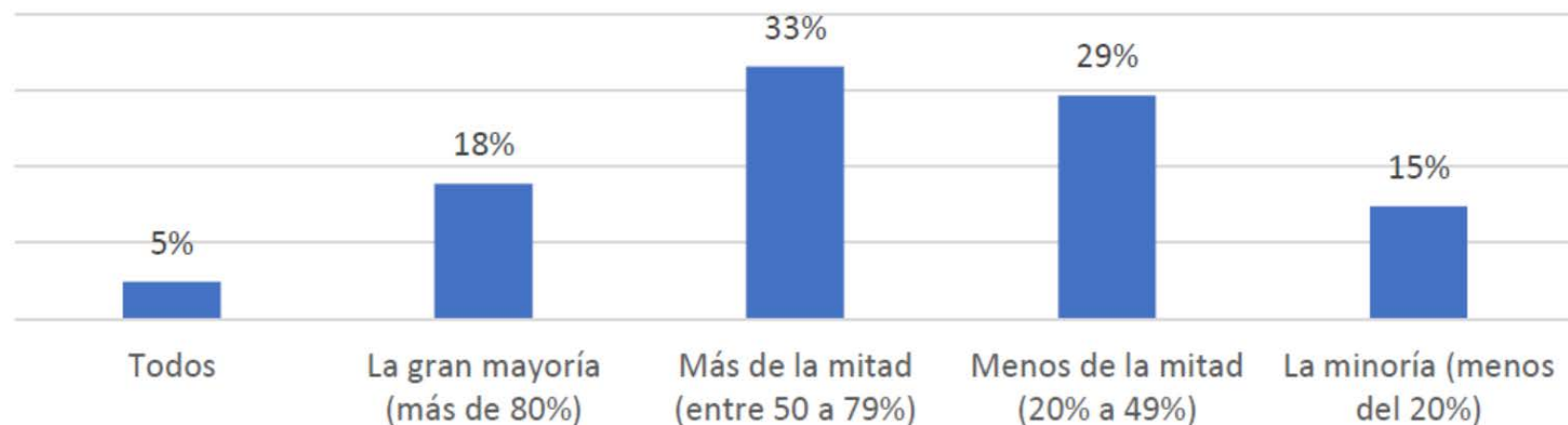
As reported by parents/tutors



- **52%** considers that more pedagogical resources are needed for **mathematics**.

What proportion of your students do you estimate have internet access to access the digital resources that you intend to use?

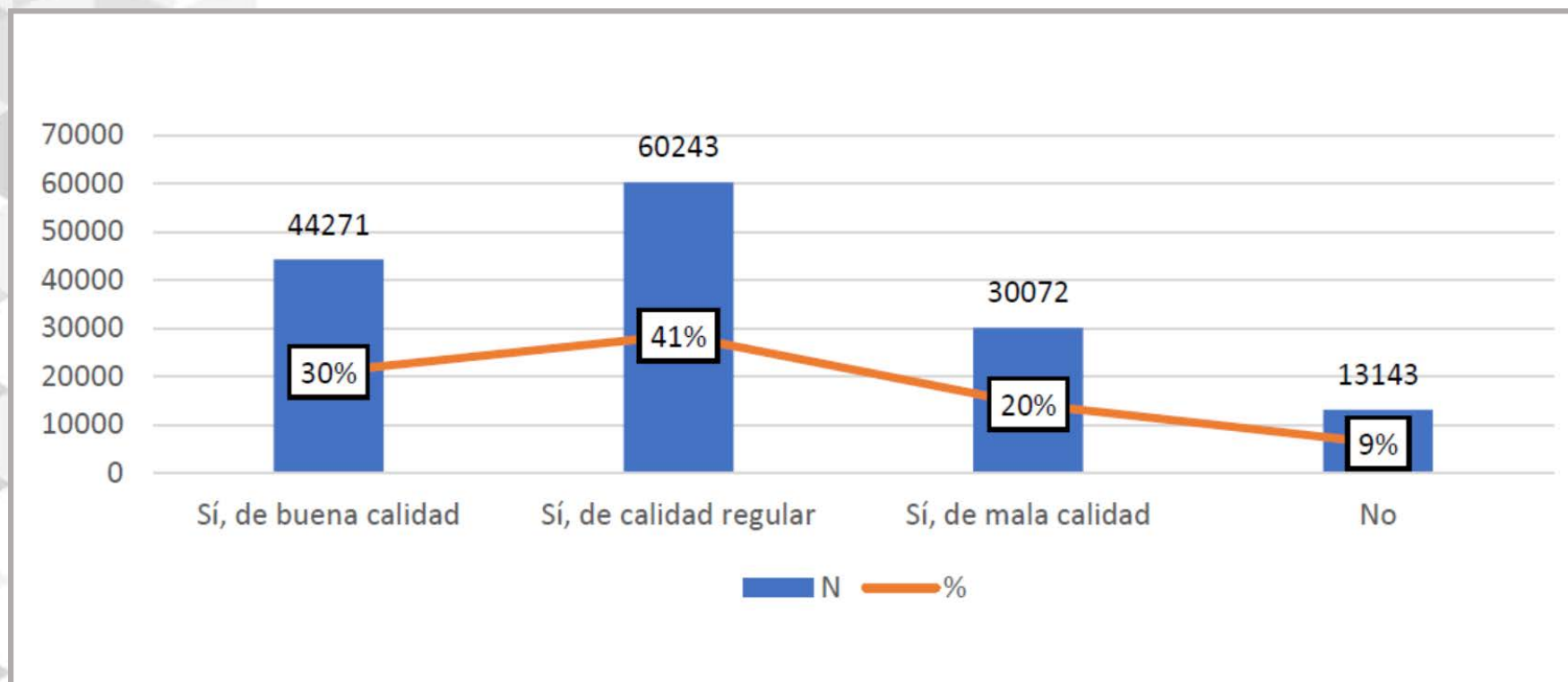
As reported by teachers



- **44%** of the teachers reports that half of the students do not have adequate internet access.

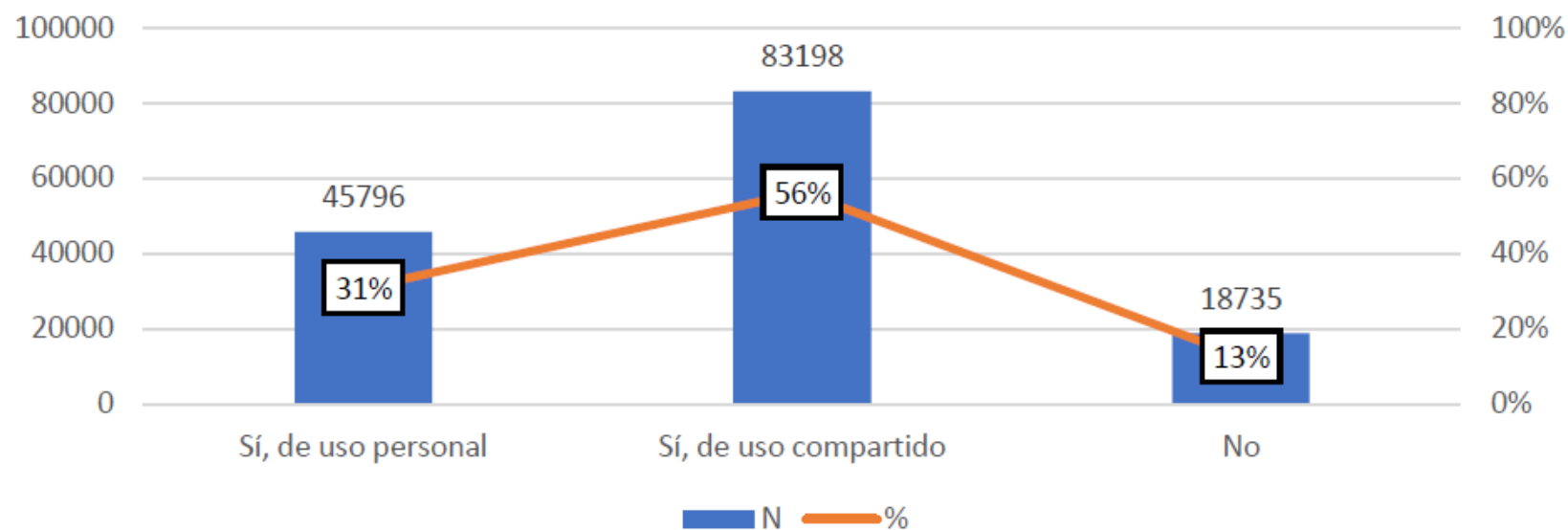
Does your child/pupil have internet access to access the digital educational resources?

As reported by parents/tutors



- **30%** of parents/tutors consider that his/her child/pupil has good quality internet access to access digital resources.

Your child/pupil has access to a device (PC, Tablet, cell phone) to access digital educational resources?
As reported by parents/tutors



- **31%** of parents/tutors consider that his/her child/pupil has access to a personal use device.

| TEACHERS' EXPERIENCES

I TEACHERS' SURVEY

- 298 teachers participating in a Math PD program share their experiences with teaching math in the pandemic context.
- We asked them:
 - ✓ **What strategies to teach mathematics that you have used do you feel that have worked?**
 - ✓ **If this pandemic context continues, what resources or new knowledge would you need to be able to teach mathematics?**



CHALLENGES IN THE TRANSITION TO DISTANCE TEACHING

Internet connectivity may be an issue

Due to connectivity problems in the rural sectors where our students live, **we distributed** a summary of specific topics, and then **activities in different formats:** items with alternatives, paired terms, completing sentences, decipher hidden messages, etc. **Then we give feedback, doubts are answered, concepts are clarified by an email.**

(Teacher, High School)

Collaborative work among teachers can be an opportunity to face this new educational setting

It has helped me **to prioritize the learning objectives and relate them to other subjects.** Do not overwhelm the students with worksheets but rather to do simple activities that they can solve in daily life.

(Teacher, Middle School)

DISTANCE TEACHING ENCOURAGES THE USE OF MULTIMODALITY APPROACHES

Some teachers combine different teaching strategies

Make classes by **video call**, combining the use of **online presentations** and the use of a **whiteboard to explain complex exercises.**

(Teacher, High School)

Other teachers use social media tools (WhatsApp)

I have used several strategies: recorded sessions, **video calls using WhatsApp**, voice-only recording while projecting the task to work.

(Teacher, Middle School)



DISTANCE TEACHING IS LEARNED AS ONE GOES

As a **mathematics department**, we have been addressing **different strategies**. **We started by giving assignments and pages of the textbook. Then, we explored the students' internet access**, and we also set periodicity in the delivery of material. **Today**, in primary and middle school, **we worked one weekly activity in mathematics and language while the other subjects every other week**.

For example, in **6th grade**, we sent a **PowerPoint presentation**. It begins **with the goal of the session, the utility or history of the concept to work, an introduction, and both a guided practice and independent practice** (hopefully using the textbooks so we can give universal access to the work material). **We closed the session with** three different exercises to evaluate the meeting. **These exercises must be sent to the teacher's email at the end of the week**. So the **teachers can share feedback through the same email associating the achievement with a formative grade**, and students are aware of their learning progress.

This formative assessment is discussed in the synchronous sessions that take place **every two weeks** with the teacher. Finally, if the PowerPoint presentation is sent on Monday, **the teacher shares a video of the presentation that same day**, highlighting the moments of the class, explaining the content, and showing exercises. The video is shared by different strategies: **WhatsApp, the school platform, and on the teacher's YouTube channel**. Besides, **students have a "catch up" week every three weeks, which gives flexibility in delivering different homework**.

(Teacher, Middle School)



FORTHCOMING SUPPORT NEEDED

To learn the use of technologies

Many of us have learned new technologies at the moment. **We need training in using those technologies:** online classrooms, programs to edit videos or the best use of communication platforms such as Meet or Zoom.

(Teacher, High School)



To learn how to teach remotely

I always trained for face-to-face teaching. **I need to learn about distance education.** Please!!!

(Teacher, Middle School)

To broaden pedagogical strategies to face different mathematics problems
(Teacher, High School)



FORTHCOMING SUPPORT NEEDED

How can we offer a quality remote teaching when not all students have access to the internet?

To have **free internet network for students**.
Since many of my students do not have the resources or the conditions to enter online classes

(Teacher, High School)

What are the best practices for assessing and monitoring distance learning?

Strategies **to monitor the learning** of my students **remotely**

(Teacher, High School)

How to assess in a way that is **fair, pertinent, and related** to the (pandemic) context?

(Teacher, High School)



We need to overcome social distance!

I believe that the most significant support may be **knowing strategies that have been carried out in other schools for distance education, how other teachers have addressed both content and motivation** to encourage students to take part in the class.

(Teacher, High School)

A library of good teaching practices would be quite useful since many times, the search for new pedagogical tools, more in a pandemic, is exhausted. But in **conversation with other colleagues, new options that are replicable appear**, and some of them can have very good results

(Teacher, Middle School)

| TEACHING MATH IN THE TIME OF CRISIS

I PRIORITIZED CURRICULUM

- Our school curriculum distinguishes **Content**, **Abilities** (transversal or specific) and **Attitudes**. The learning objectives address all of them.
- It includes a first level of learning objectives considered essential to advance to new learning. A second level of prioritized objectives corresponds to those that are meaningful for real life (significant) or susceptible to relate to other disciplines (integrating).
- Maintaining the ability focused learning objectives development is proposed as a transversal strategic tool.
- For the purposes of implementation, the years 2020 and 2021 will be considered as spaces for recovery and reinforcement of fundamental learning.
- In March of the year 2022, the current curriculum is resumed.

PRIORITIZED CURRICULUM

Mathematical Abilities

Problem solving	Reason and communicate	Modeling	Representing
-----------------	---------------------------	----------	--------------

Content strands

Numbers	Algebra and functions	Geometry	Statistics and Probabilities
---------	--------------------------	----------	---------------------------------

PRIORITIZED CURRICULUM

Mathematical Abilities



15 Learning Objectives

Problem solving

Reason and
communicate

Modeling

Representing

1M (9th grade)

Learning Objective b

To evaluate the process and check the results
and solutions of a mathematical problem.

Content strands

Numbers

Algebra and
functions

Geometry

Statistics and
Probabilities

PRIORITIZED CURRICULUM

Mathematical Abilities

Problem solving	Reason and communicate	Modeling	Representing
-----------------	------------------------	----------	--------------

Content strands



15 Learning Objectives

Numbers	Algebra and functions	Geometry	Statistics and Probabilities
---------	-----------------------	----------	------------------------------

1M (9th grade)

Learning Objective 6

Develop the formula for the area and perimeter of sectors, starting from central angles of 60° , 90° , 120° and 180° , by means of concrete representations.

PRIORITIZED CURRICULUM

Mathematical Abilities

Problem solving	Reason and communicate	Modeling	Representing
-----------------	------------------------	----------	--------------



(All **15** learning objectives related to ability development are maintained)

Content strands

Numbers	Algebra and functions	Geometry	Statistics and Probabilities
---------	-----------------------	----------	------------------------------



(**15** Learning objectives related to content strands are classified: **5** level 1, **5** level 2)

1M GEOMETRY

LO 6	LO 7	LO 8	LO 9	LO 10	LO 11
Develop the formula for the area and perimeter of sectors, starting from angles of 60° , 90° , 120° and 180° by means of concrete representations	Develop formulas to find surface area and volume of a cone: -Unfolding the cone net. -Finding the relationship between the cylinder and cone volume. -Applying the formulas to solve problems.	Show that they understand the concept of homothetic transformation: -Relating it to perspective, optical instruments and the eye. -Measuring segments to determine properties. -Applying properties for construction and problem solving	Develop Thales' theorem using the properties of homothetic transformation, to apply it in problem solving.	Apply similarity and proportionality properties to scale models and other situations of daily life and other subjects.	Represent the concept of homothetic transformation in vector form, relating it to the product of a vector by a scalar, manually and with educational software.

1M GEOMETRY

Level 1 Learning Objectives

LO 6	LO 7	LO 8 	LO 9	LO 10	LO 11
Develop the formula for the area and perimeter of sectors, starting from angles of 60° , 90° , 120° and 180° by means of concrete representations	Develop formulas to find surface area and volume of a cone: -Unfolding the cone net. -Finding the relationship between the cylinder and cone volume. -Applying the formulas to solve problems.	Show that they understand the concept of homothetic transformation: -Relating it to perspective, optical instruments and the eye. -Measuring segments to determine properties. -Applying properties for construction and problem solving	Develop Thales' theorem using the properties of homothetic transformation, to apply it in problem solving.	Apply similarity and proportionality properties to scale models and other situations of daily life and other subjects.	Represent the concept of homothetic transformation in vector form, relating it to the product of a vector by a scalar, manually and with educational software.

1M GEOMETRY

Level 1 and 2 Learning Objectives

LO 6	LO 7 	LO 8 	LO 9 	LO 10 	LO 11
Develop the formula for the area and perimeter of sectors, starting from angles of 60° , 90° , 120° and 180° by means of concrete representations	Develop formulas to find surface area and volume of a cone: -Unfolding the cone net. -Finding the relationship between the cylinder and cone volume. -Applying the formulas to solve problems.	Show that they understand the concept of homothetic transformation: -Relating it to perspective, optical instruments and the eye. -Measuring segments to determine properties. -Applying properties for construction and problem solving	Develop Thales' theorem using the properties of homothetic transformation, to apply it in problem solving.	Apply similarity and proportionality properties to scale models and other situations of daily life and other subjects.	Represent the concept of homothetic transformation in vector form, relating it to the product of a vector by a scalar, manually and with educational software.



SOME CONCERNS

- Difficult to attend ability development when working on Level 1 Learning Objectives.
 - Level 1 learning objectives are mostly terminal. It is not clear how to work on their achievement.
- Many teachers are not grading. This is needed to be promoted.
 - What to do if the Learning Objectives of Level 1 are not achieved by children this year.
- The issue of students' socio-emotional well-being is perceived as the most relevant at this time. Students and teachers are under a lot of stress.
 - Some say that “why worry about the curriculum if the children need emotional support”. This can lower our learning expectations.



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We will address this!

How to assess and qualify is a difficult issue. Promotion regulation needs flexibility.

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- What to do if the Learning Objectives of Level 1 are not achieved by children this year.

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- Some say that “why worry about the curriculum if the children need emotional support”. This can lower our learning expectations.

- More school breaks
Example: 4 weeks of classes per 1 week off (college), a week off to catch-up.
- Skip standardized tests this year.
- Stress that cognitive activity is also important for socio-emotional well-being. We need to live situations of achievement to build trust in our own abilities to learn in this context (self-efficacy).

3 KEY IDEAS

Suggestions Mesa Social COVID-19



Departamento Didáctica
Facultad de Educación UC

1

LEARNING ROUTES



Formulation of short, medium and long-term learning goals



2

SYNCHRONOUS AND ASYNCHRONOUS ACTIVITIES



Task design



Creation of
content
capsules



Small group
interaction

3

ASSESSMENT



Remote
assessment



Effective feedback

DIDACTICS FOR PROXIMITY LEARNING MATH IN TIMES OF CRISIS

- **Problem solving** as a central ability: Orientations and learning routes proposed validate the prioritized contents and focus mainly on the problem solving learning objectives.
- **Diversity of contexts for learning.** Considers three connectivity and access scenarios: More asynchronous activities and some synchronous moments.
- **Construction of authentic and meaningful contexts.** Use of different media.

Problem based learning routes

Understanding the problem:

- Topic introduction
- Initial exploration



Problem solving:

- Application
- Discussion
- Deepening understanding



Conclusions:

- Problem conclusions
- Assessment

EXAMPLE

Analyzing COVID-19 data in Chile and the world

Goals: -to become familiar with statistical information from COVID-19, obtained web pages that are updated daily.

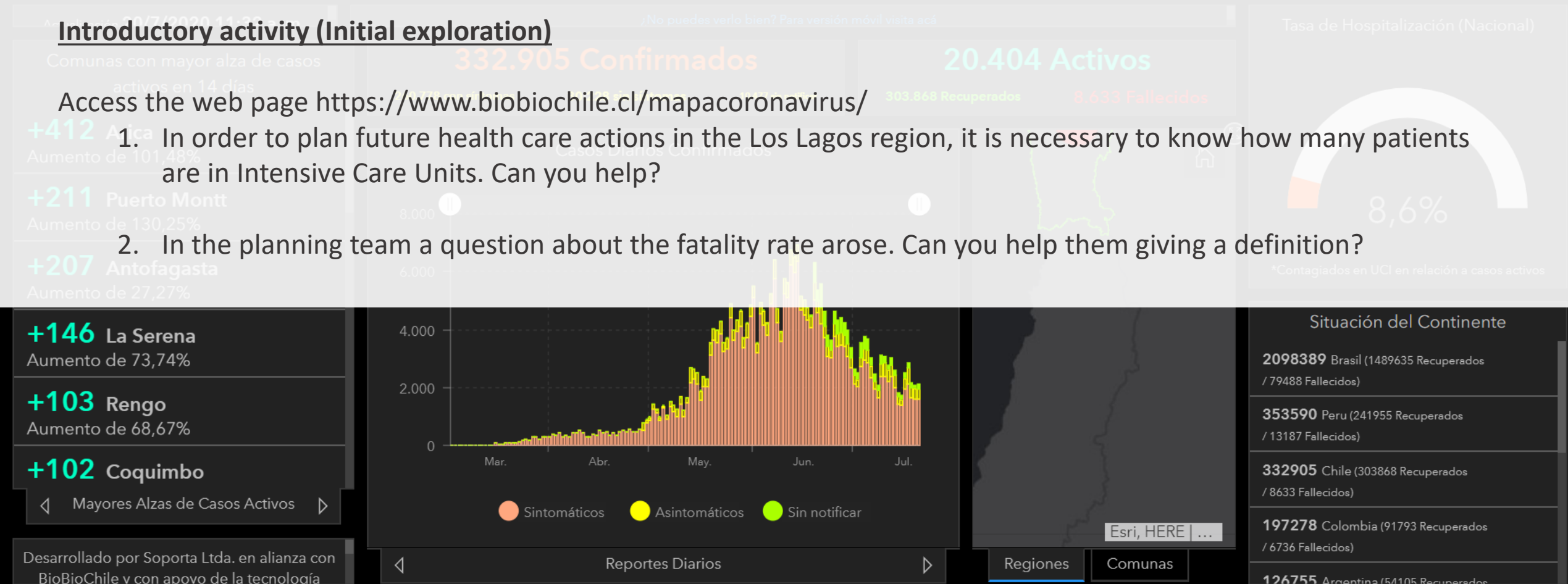
Learning Objectives for 7th and 8th grade (related to percentages and percentage variation)

Introductory activity (Initial exploration)

Access the web page <https://www.biobiochile.cl/mapacoronavirus/>

1. In order to plan future health care actions in the Los Lagos region, it is necessary to know how many patients are in Intensive Care Units. Can you help?

2. In the planning team a question about the fatality rate arose. Can you help them giving a definition?



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LO 4 of 7th grade and LO 5 of 8th grade.

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2. In the planning team a question about the fatality rate arose. Can you help them giving a definition?

Start activity with an explanatory video which stimulates the search for objective information regarding the COVID-19 pandemic, and poses the initial problem of obtaining data at the national and regional level in Chile.

Comment, if students require it, on the type of responses you expect to receive

Basic connectivity:

Teacher sends a WhatsApp to the class with a short text with the 3 questions. Students use a Smartphone to search for information on website and send their responses via WhatsApp.

Seguimiento de Coronavirus (COVID-19) en Chile

Actualización 20/7/2020 11:32 a.m.

Comunas con mayor alza de casos
activos en 14 días

+412 Arica
Aumento de 101,48%

+211 Puerto Montt
Aumento de 130,25%

+207 Antofagasta
Aumento de 27,27%

+146 La Serena
Aumento de 73,74%

+103 Rengo
Aumento de 68,67%

+102 Coquimbo

◀ Mayores Alzas de Casos Activos ▶

Desarrollado por Soporta Ltda. en alianza con
BioBioChile y con apoyo de la tecnología

EXAMPLE

332.905 Confirmados

20.404 Activos

Deepening understanding activity

Access the web page <https://www.biobiochile.cl/mapacoronavirus/>, review it and select one of the counties with the highest increase in active cases, which is presented in percentage.

- How many infected were there in the chosen county before the reported increase?
- Explain its contextualized meaning and the calculation made to obtain the base value.

Assessing activity

Divide students into groups of 3 or 4 (randomly, but taking care that there is connectivity in each group).

Asks them for a report that describes the work done in the previous activities, the mathematics that they have used, and the conclusions drawn regarding the growth of COVID-19 cases, as well as other conclusions that the students consider relevant.

Esri, HERE

Reportes Diarios

Regiones

Comunas

| DESIGN OF ASYNCHRONOUS TECHNOLOGY BASED ACTIVITIES

LEARNING THROUGH MATH STORIES



- We developed an instructional model for Suma y Sigue a technology based PD program for math teachers (elementary and high school).
- To enact contextualized problem-based learning, we design online activities around a *mathematical story*, which operates as a general frame to problematize various aspects of the content.
- For instance, a discussion among characters of the story can help to produce a conflict around mathematical idea, triggering a questioning process.
- To provide opportunities for active learning in an autonomous learning environment, it is key to design a dynamic scenario that allows the modification of specific tasks to address different aspects of math knowledge.

Engagement



Construction



Systematization



Three friends have to bring some ideas and data from an article, so they can use measures of central tendency to explain the data.



I found this advanced sudoku



Let me try

What does this mean?



Wait! We could use the time
each of us needs to solve it for
our math homework



That it is difficult to solve in
less than 15 minutes



Great! But we need to ask some
classmates to solve it, so we can
have more data.

1

What is the variable that Juan proposes to study?

The three friends convinced 7 classmates to solve the Sudoku puzzle

5	3			7				
6			1	9	5			
	9	8					6	
8				6				3
4			8		3			1
7				2				6
	6					2	8	
			4	1	9			5
				8			7	9

Since Juan already solve the Sudoku, he keeps track of time, registering the time and name when they solve it. After 25 minutes...

Compañero	Minutos	Segundos
Flor	10	22
Ricardo	11	35
Rosa	11	46
Paula	15	46
Aldo	20	51
Jaime	23	11
Marcela	24	24



Ok, I am bored... let's just leave it like this.

But we will have only 7 data.... Anyway, what is the average?



Let's just put that in our report.

2

What is the value of the average Juan wants to report?

3

Juan proposes to use only the average of the classmates who have already finished the sudoku. Is the resulting value representative of the time needed by his classmates to solve the sudoku? Why?

After a while all the classmates finished the Sudoku...

Compañero	Minutos	Segundos
Ror	10	22
Ricardo	11	35
Rosa	11	46
Paula	15	46
Aldo	20	51
Jaime	23	11
Marcela	24	24
Grecia	35	36
Stefan	38	45



Juan

Now that everybody has finished, the average is 21 min and 22 seconds...



Jaime

Let's ask him to fix it, we can keep the time going.



Rosa

Did you check the solutions? I think Stefan's solution is wrong



Rosa

But we are running out of time...

4

Can you give an advice to the three friends? What do you think they can report?



I found the mistake and fixed it! Only 4 min and 5 seconds of extra time.

5

If Juan, Jaime and Rosa decided to replace Stefan's original time (38 minutes and 45 seconds) with the total time, how does the mean and median change?

6

Do you agree with the statement that the sudoku is difficult to solve in less than 15 minutes? How do you think they came up with that number?



Analyzing assumptions



Sasfone phones lead failures complaints in the domestic market.
The probability of failure is around 30%.
The representatives decide to offer an unprecedented guarantee:
If your phone fails, we change it for a new one!

1

How is the probability stated in the news headline interpreted?

Juan, who always uses Sasfone phones, had the misfortune to buy a faulty phone, causing him problems in his job as a driver. Since he doesn't want to risk losing more trips, he is hesitant to use the warranty or change the brand.



Sorry about the delay. The GPS of my phone is failing.

But if it's Sasfone you can change it, right? Also, the probability that the second phone will fail you is less.



Are you sure?

Yes. And if the second one turns out bad, then surely the third one turns out good.



2

According to the above dialogue, the passenger suggests that after a streak of failed phones, the probability that the next one will also fail is much less than 30%. Is this correct?



I think I was just unlucky with the first phone. The replacement is new, so the probability of failure does not depend on the first phone.

Maybe you're right. But then, what percentage of replacement phones fail?



Mmm...so that both the new and replacement phones will fail.

3

Find probability that the phone and its replacement will fail and the probability that the first phone fails, and its replacement does not.

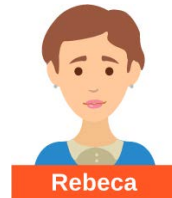


Armando and Rebeca, managers at Sasfone, are interested in estimating the costs associated with the guarantees. **They start by considering that the warranty can only be used once, swapping the failed phone for a new one.**



Ok, so we are selling each phone for \$450.

Yes, and the unit cost of each phone is de \$300. This is what it costs the company to make a phone. So \$450 seems reasonable.



But if we sell you a phone, and you need to replace it, then there would be only one sale ...

...and the company has to cover the cost of the two phones delivered. I understand what you mean.



At a price of \$450 the company earns \$150 in one case and loses \$150 in the other. So, on average, there is no loss or gain.

Let's see... I think that depends on what percentage of phones fails.





Why? If there are only two possible cases.

4

Do you agree with Armando's statement regarding the fact that the company has no profit or loss?

Well, we know that about 30% fail, let's think what happens with 10 phones



Rebeca

					
Costo	\$300	\$600	\$300	\$300	\$600
Precio	\$450	\$450	\$450	\$450	\$450
Ganancia	\$150	-\$150	\$150	\$150	-\$150
					
Costo	\$300	\$300	\$300	\$600	\$300
Precio	\$450	\$450	\$450	\$450	\$450
Ganancia	\$150	\$150	\$150	-\$150	\$150

4

According with the analysis that Rebecca and Armando did, when you sell 10 phones and 3 fail, does the company have a profit?



Armando

Obviously, if we lower the price, we would earn less. It would be interesting to know what is the minimum price that we can charge.

How can we compute that?



Rebeca

5

What is the minimum price such that, on average, there is no loss for the company?



THANK
YOU!



¿Cuánta sombra
cubre la figura?



Catalina is painting figures in the tiles at the front of a building. She draw a rectangle in the following way.

Tile

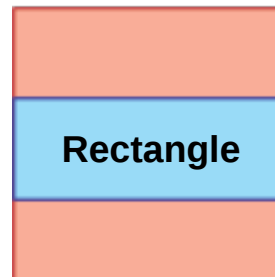


Image 1

At 2 o'clock in the afternoon the shadow is aligned with the left edge of the tile and as time passes, the shadow advances at a constant speed and covers the tile until it is completely under the shadow.

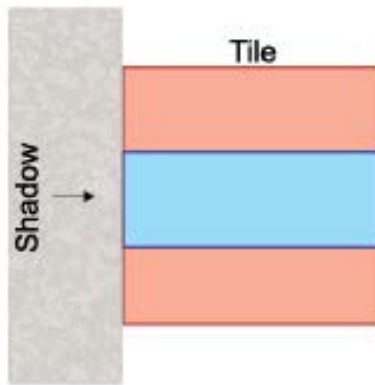


Image 1

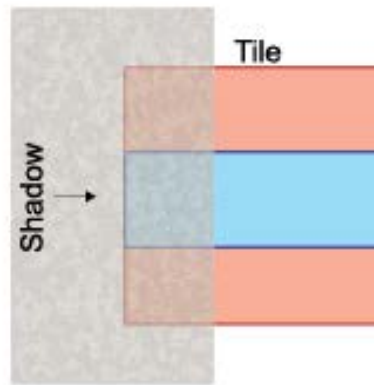


Image 2

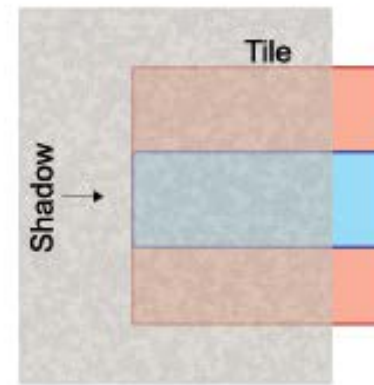


Image 3

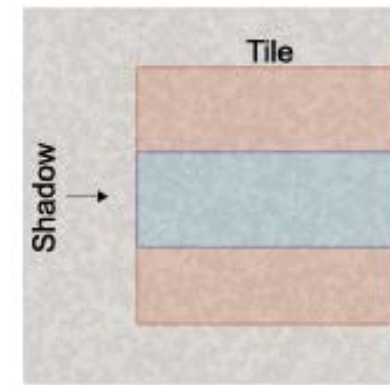
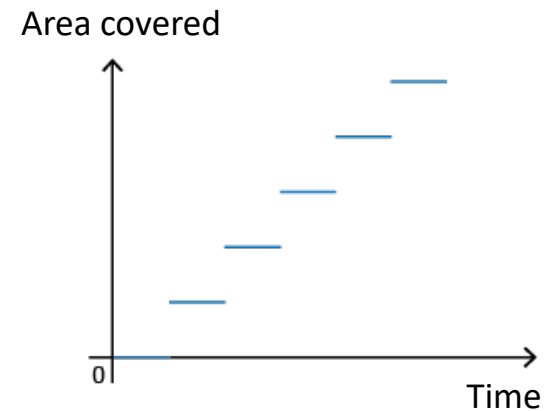
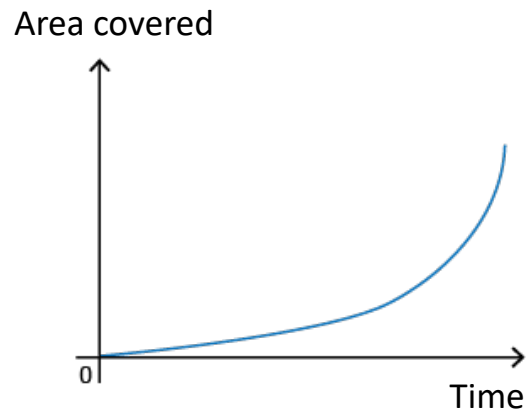
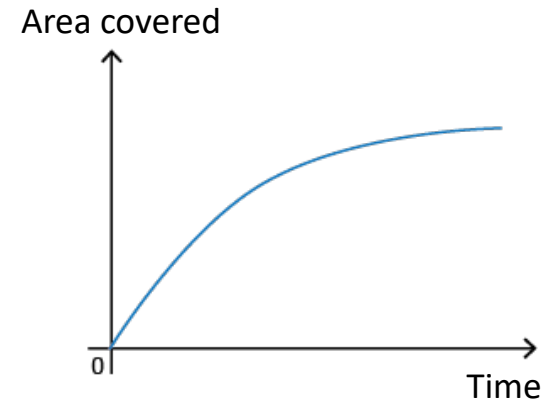
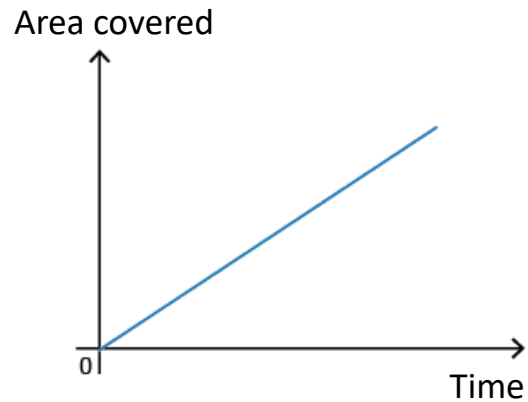


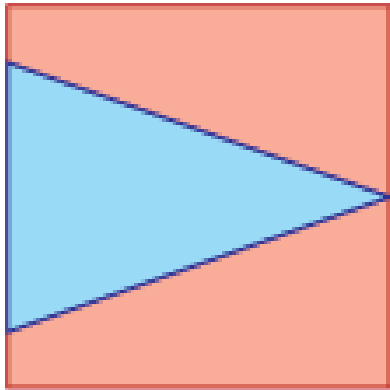
Image 4

1

If we consider the variables "area of the rectangle covered by the shadow" and "time", which of the following graphs can correspond to the relationship between these variables? Why?

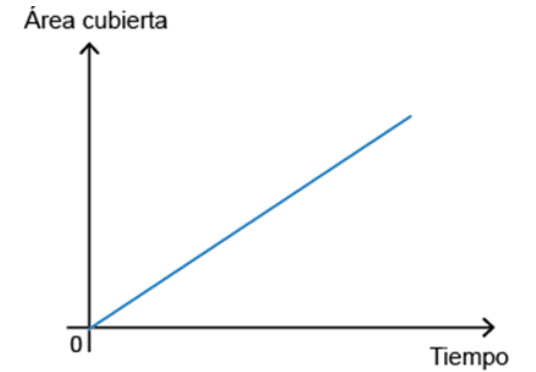
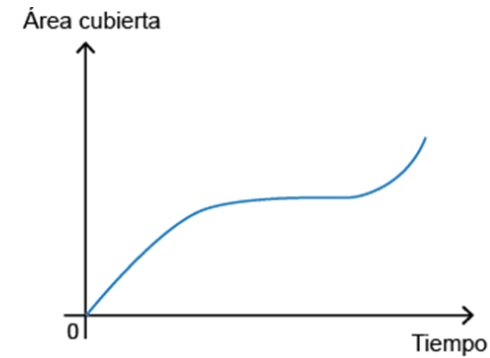
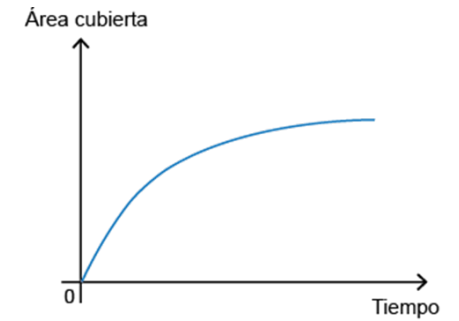
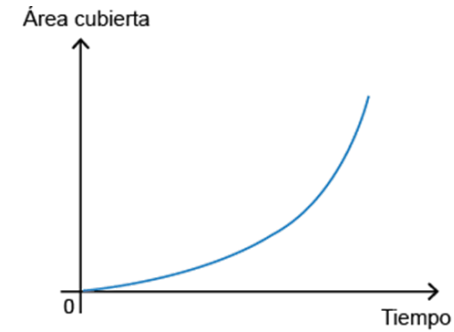


Catalina then draw a rectangle. As before the shadow advances at a constant rate, and the shadow hits the left edge of the tile at 3 o'clock.

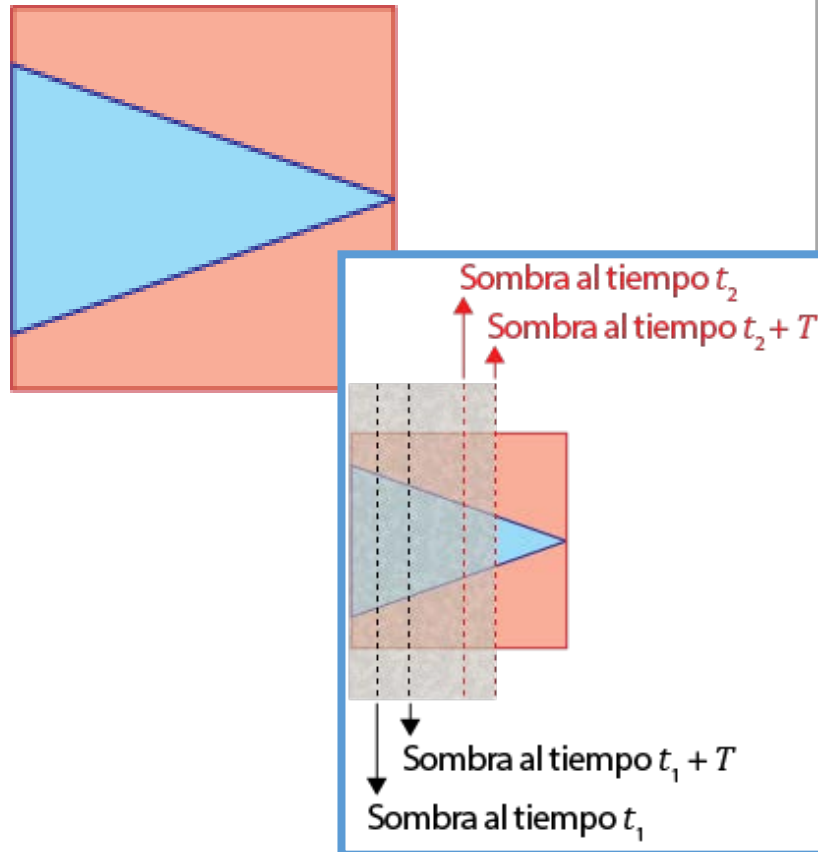


2

What is the graph now?

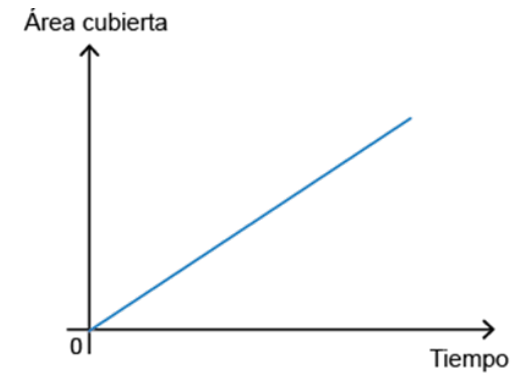
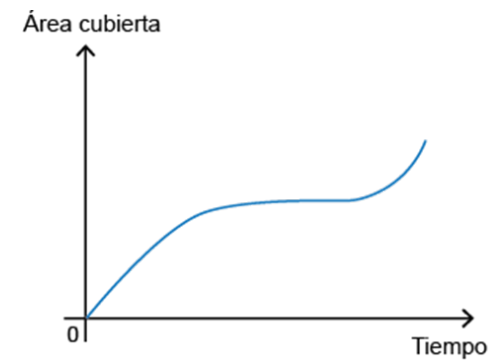
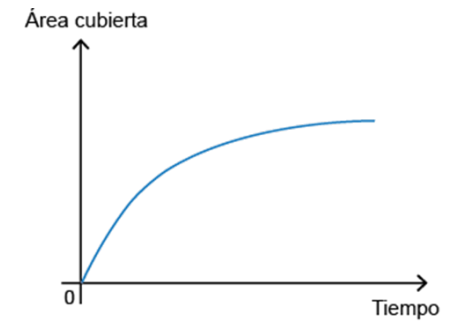
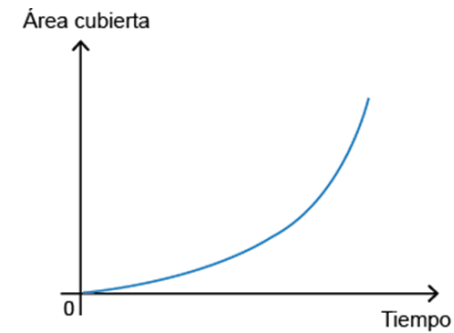


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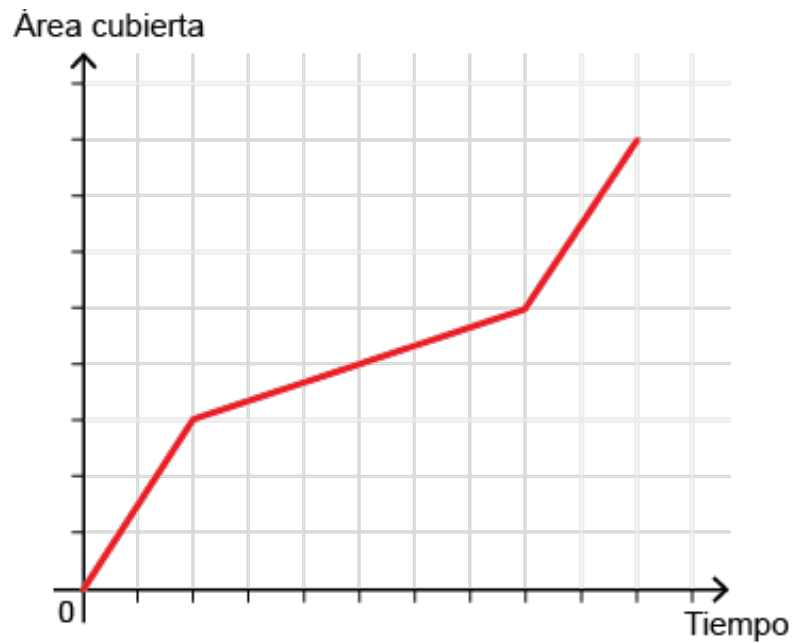


2

What is the graph now?



Catalina made another figure that it was covered by the shadow as before. The graph shows the area of the figure covered as a function of time.



3

Which figure do you think she draw?

