The real joy of acquiring culture is using it for your own ends; doing with it what you please, knowing that it belongs to you as simply and as utterly as the air you breathe. When you accumulate enough of it, you can transform it into something new, individual and universal—a shiny coin that is yours one moment and currency the next.

With this currency you can pay your individual debt to everyone who domesticated a wild animal, bred new varieties of edible plants, helped build a pyramid, wrote a poem, cured a sick child, or discovered a law of physics; by adding to this treasure you pay homage to all those who have stubbornly worked for a better world when the odds were against them, and to those who—unsung and unnoticed—added their drop of blood to great tides of political change when social contradictions reached the breaking point.

This is the Rubicon you must cross to become a subject of history.

TOOLS AND RESOURCES

TO MEET THE NEEDS OF

ENGLISH LANGUAGE LEARNERS

IN THE

SCIENCE CLASSROOM

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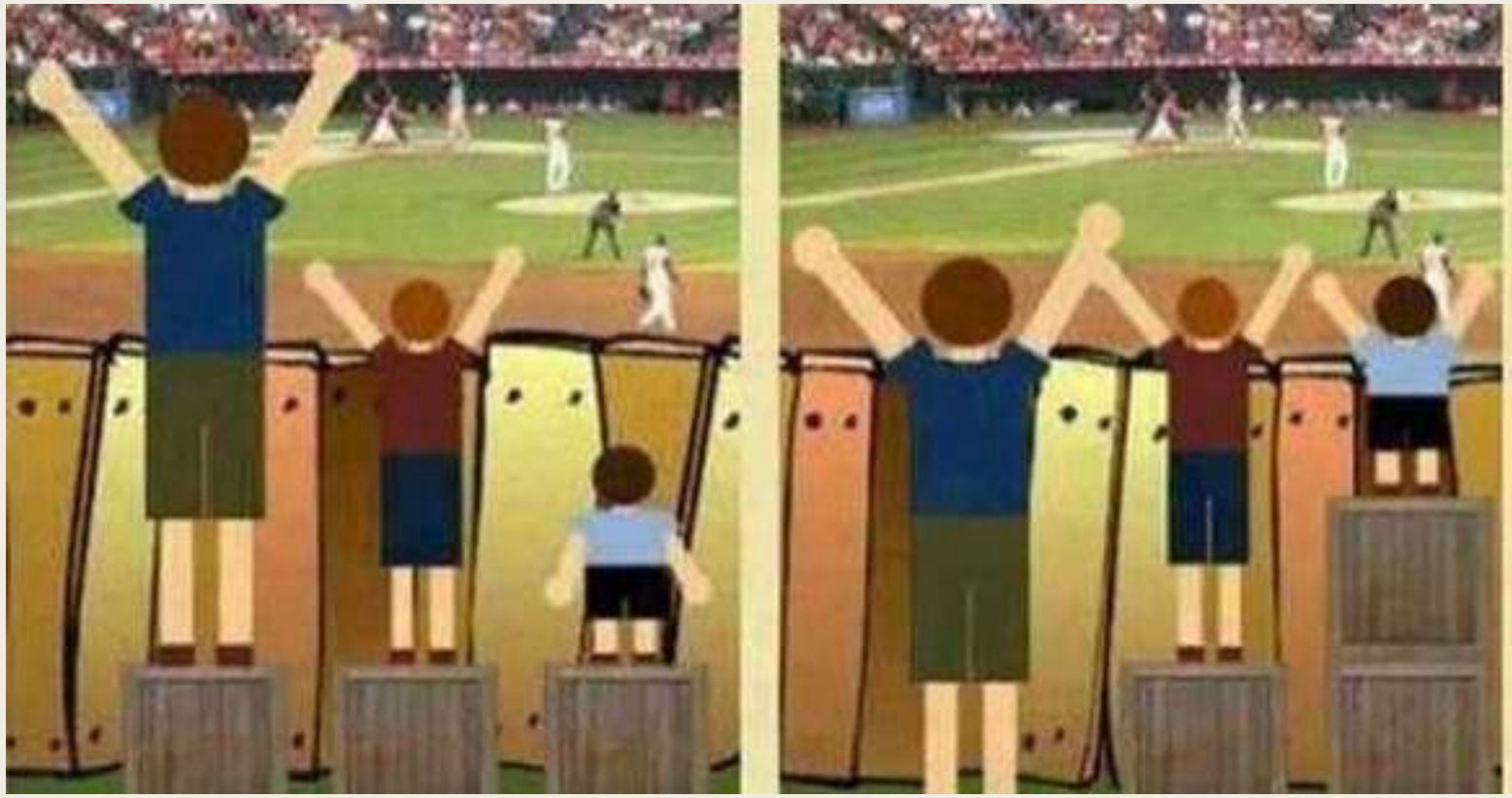
Promoting Authentic Language Acquisition in Multilingual Contexts

PÄDAGOGISHE HOCHSCHULE NÖ -- May 2018

Equality vs. Equity



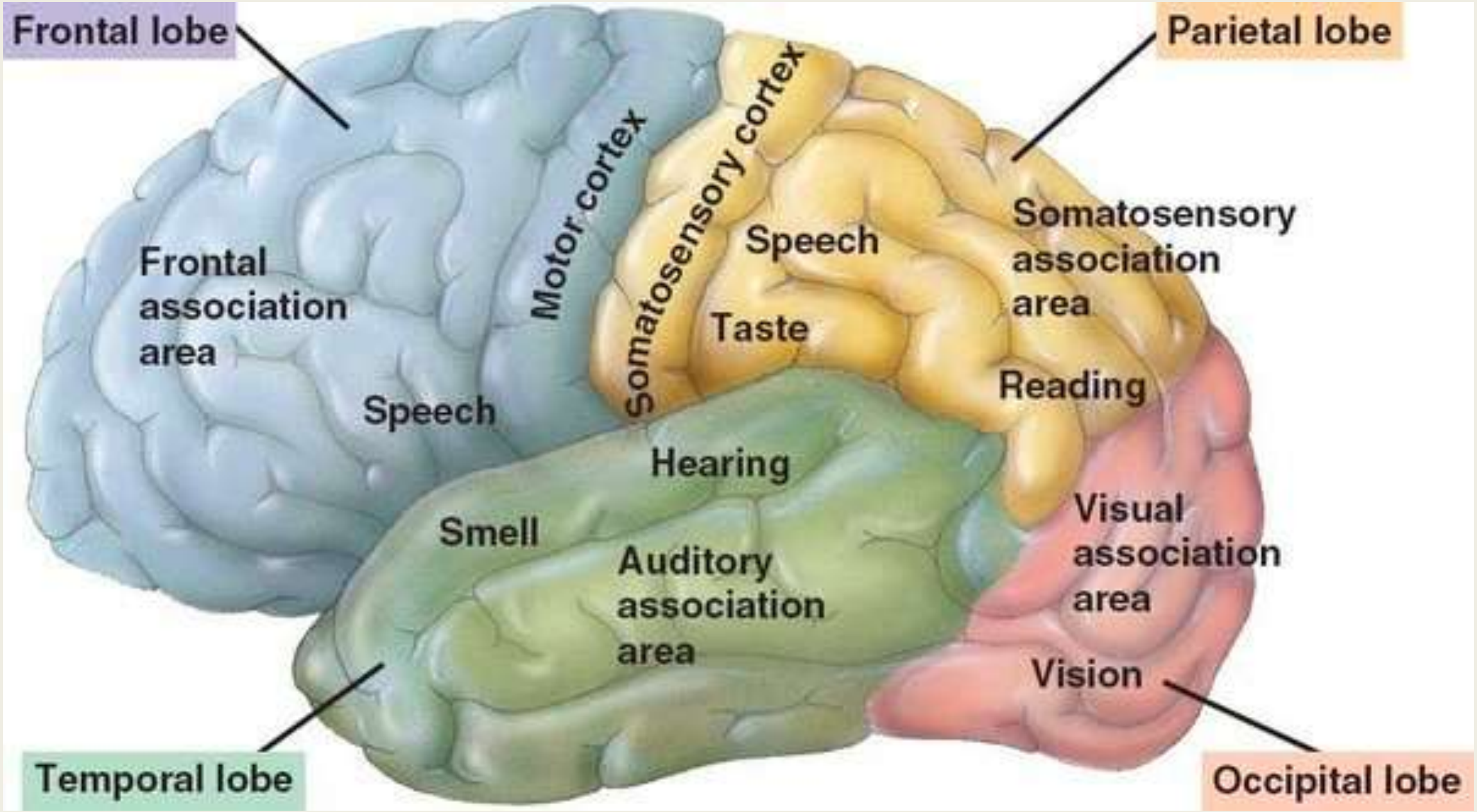
The pieces of this complex puzzle

- The key elements of effective second language acquisition
- Agency, Knowledge, Purpose, Mindset, and Essential skills
- Tools and resources you can find, and *how* to find them
- How your students can leverage what they find
- Embed conscious, language acquisition components into your lessons

Parallel lives / Vermont

Parallel lives / The Bronx

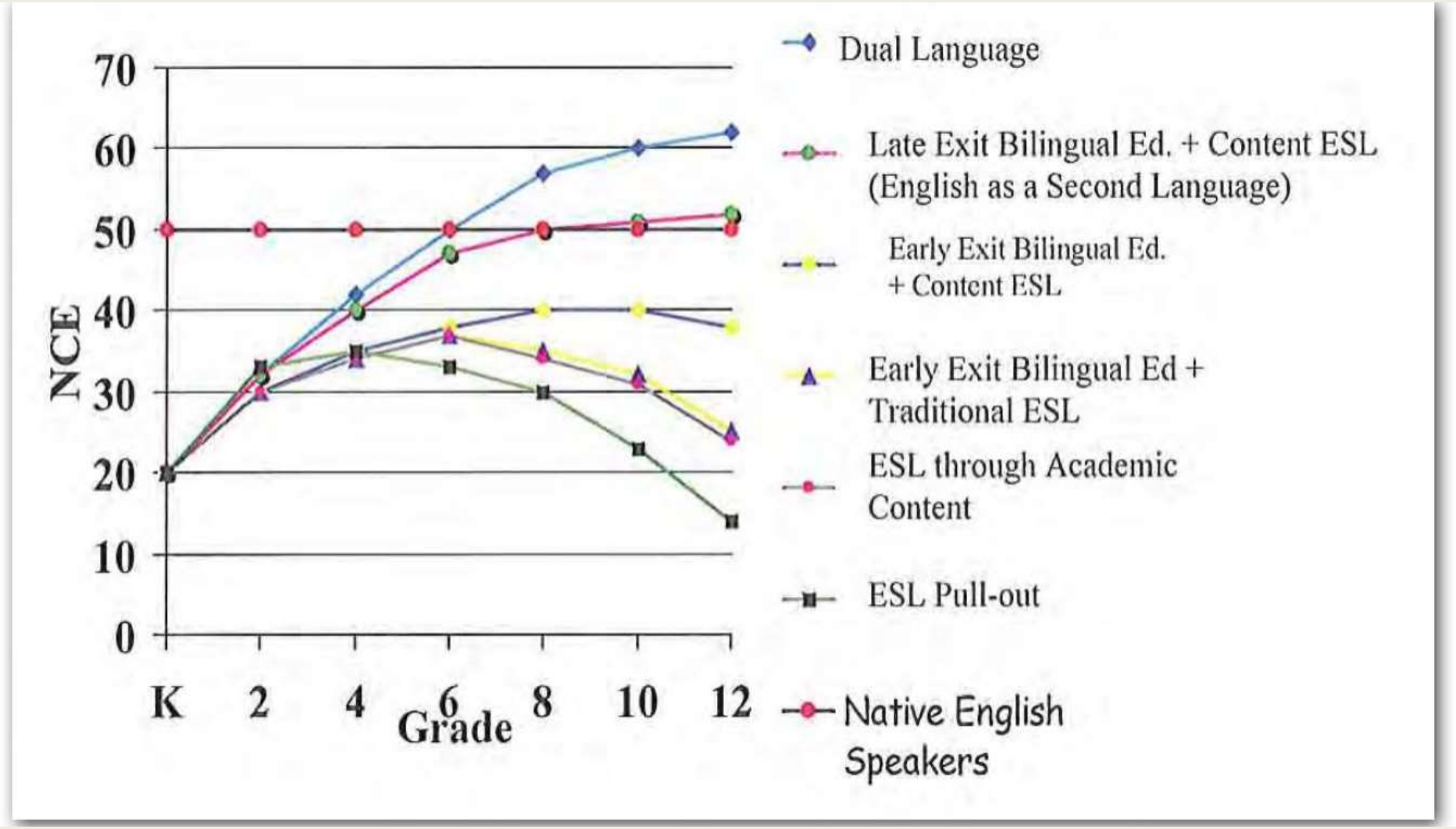
Perplexing development in India


Frontal lobe
Parietal lobe
Motor cortex
Somatosensory cortex
Frontal association area
Speech
Speech
Taste
Somatosensory association area
Reading
Hearing
Smell
Auditory association area
Visual association area
Vision
Temporal lobe
Occipital lobe

The key elements of a successful second language acquisition program

- **Intensive instruction in English (or other target language or languages)** —obvious, but *not all programs are the same*
- ***Challenging* first-language instruction** for full mastery and biliteracy
  - *Cervantes instead of Shakespeare—**promotes language transfer***
  - *How the "easy way out" cheats our students!*
- **At least *some* content-area instruction in the first language**
  - *Bilingual programs vs. ENL programs*
  - *Second language acquisition in the (science) classroom*
    - Lowering barriers: Tier 2 words; cognates; word-walls; student-created learning materials

What the research shows

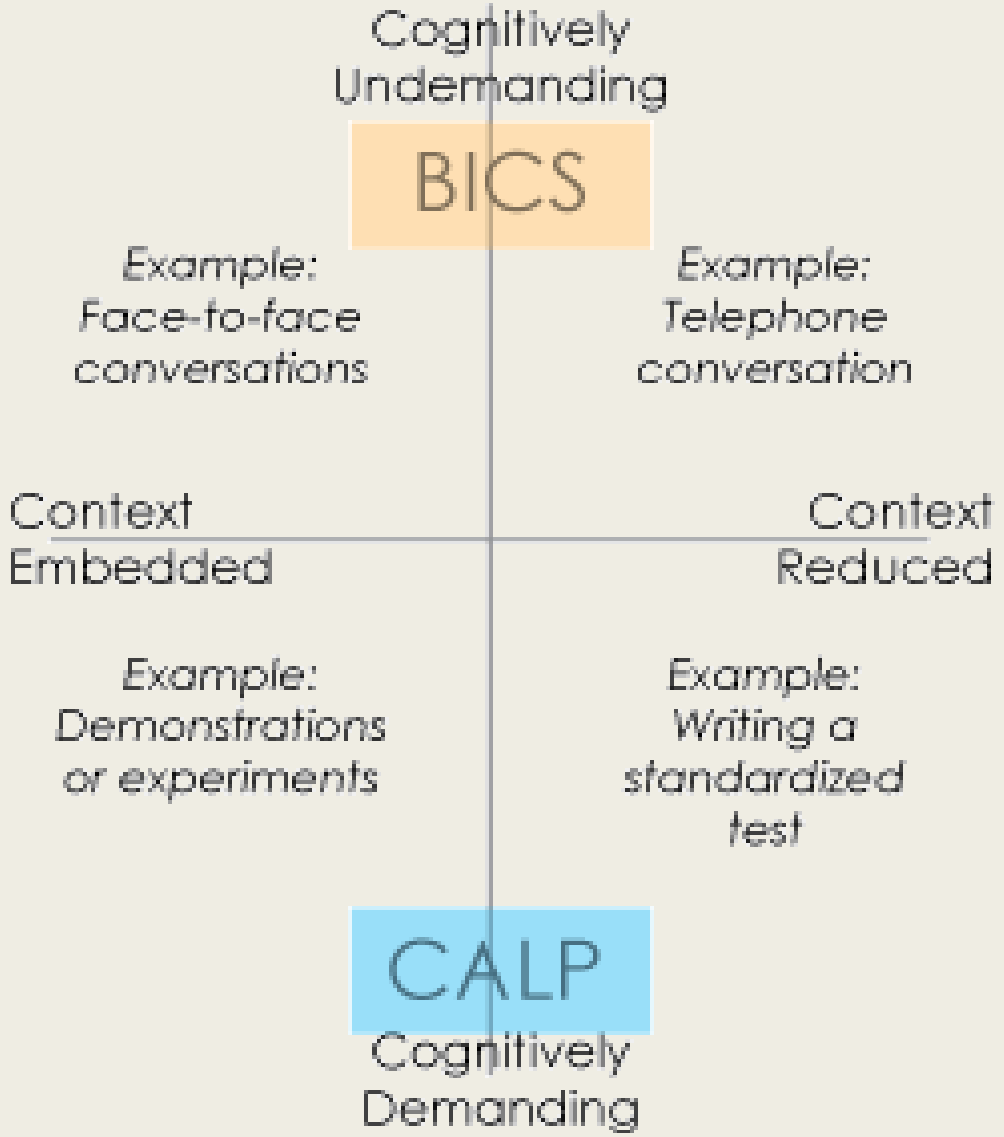


Emergent bilinguals in our schools

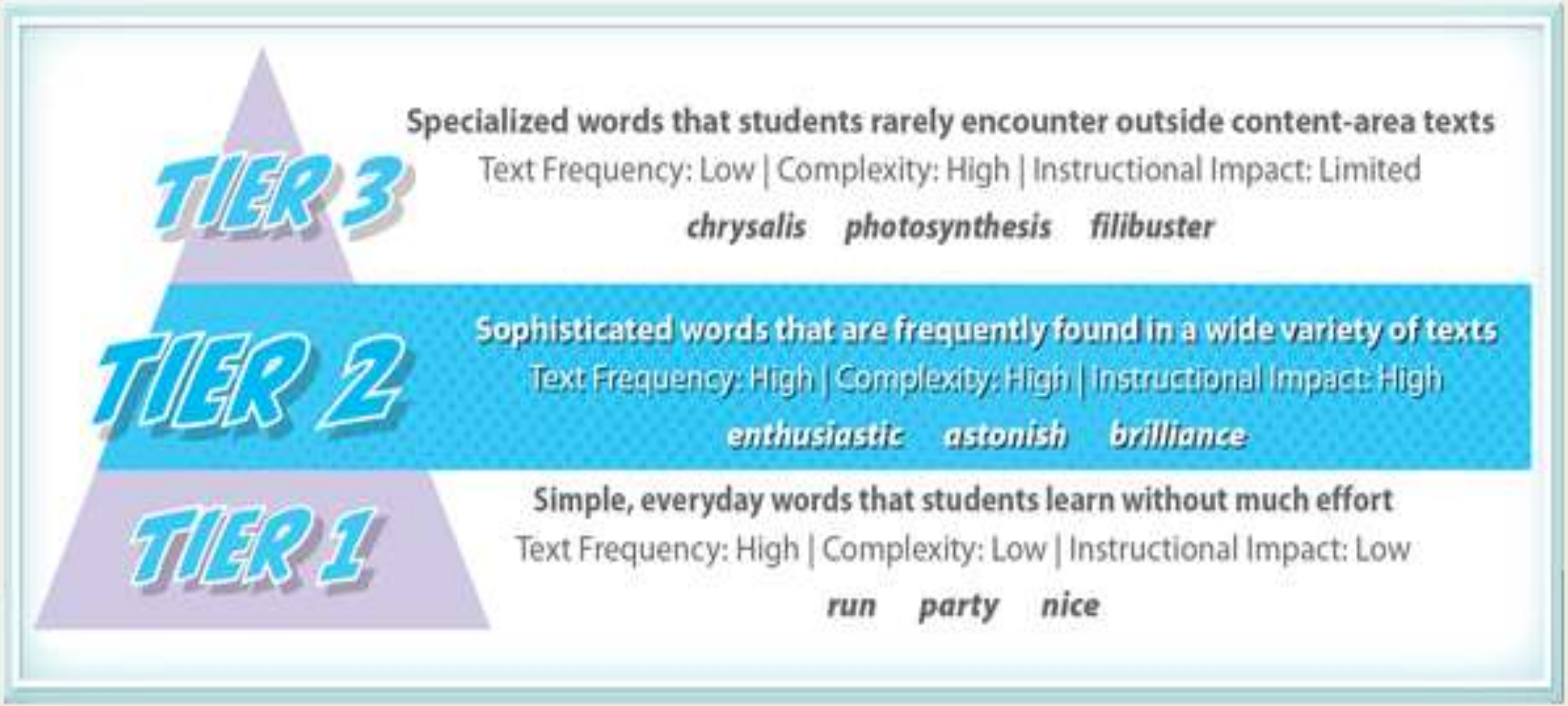
- Language **learning** vs. Language **acquisition**
- The acquisition of academic language takes about **5-6 years** under normal conditions
- Native language instruction **ACCELERATES** the acquisition of a second, target language
- Second language acquisition is achieved mainly through **listening and reading** (*Krashen*)
- Oral proficiency in social situations does NOT equal academic language mastery (BICS vs CALP)

Cognitive Academic Language Proficiency

- **BICS,** or **Basic Interpersonal Communicative Skills** describes the development of conversational fluency in the target language
- **CALP,** or **Cognitive Academic Language Proficiency** describes the use of language in decontextualized academic situations.



The importance of Tier 2 words

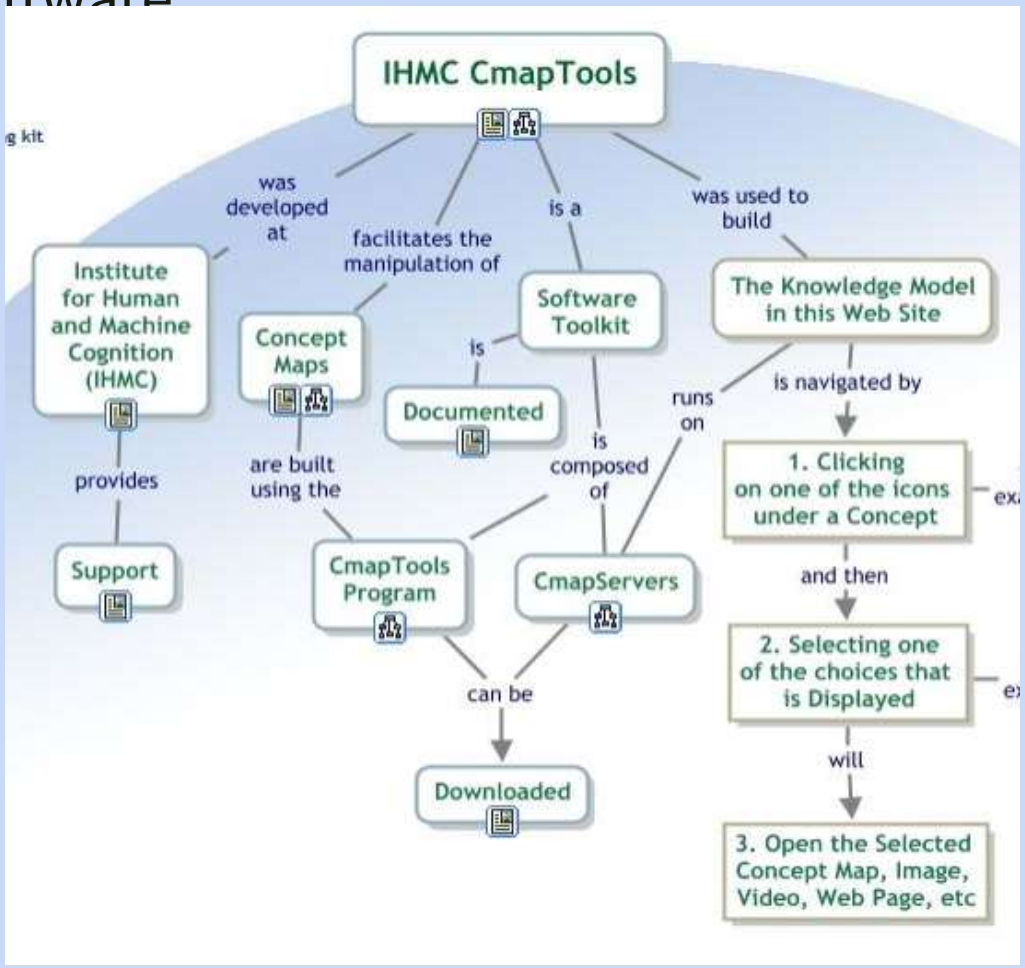


Tools, resources and strategies for ENL students in our classrooms

- The importance of **Tier 2 words**
- **IHMC** and the use of ***concept maps***
- Use ***glossaries*** to help with searches
- Find ***searchable*** (biology) dictionaries and glossaries
- **Leverage** the use of ***Google Translate*** and ***Google Images***
- International Resources from home/**same language countries**
- Khan Academy/Wikipedia

Creating concept maps

C-Map, the Institute of Human and Machine Cognition (IHMC) concept mapping software



ALSO:

GoogleDrawings· An app on Google Chrome, allows easy save/share on Google platforms.

WorldWideMaps Project:

http://www.2wmaps.com/

The WWMAPS project organizes relations of cultural exchange and construction of knowledge structures between students from geographically distant countries and in the language.

Pinterest

Pencil and paper works, too!

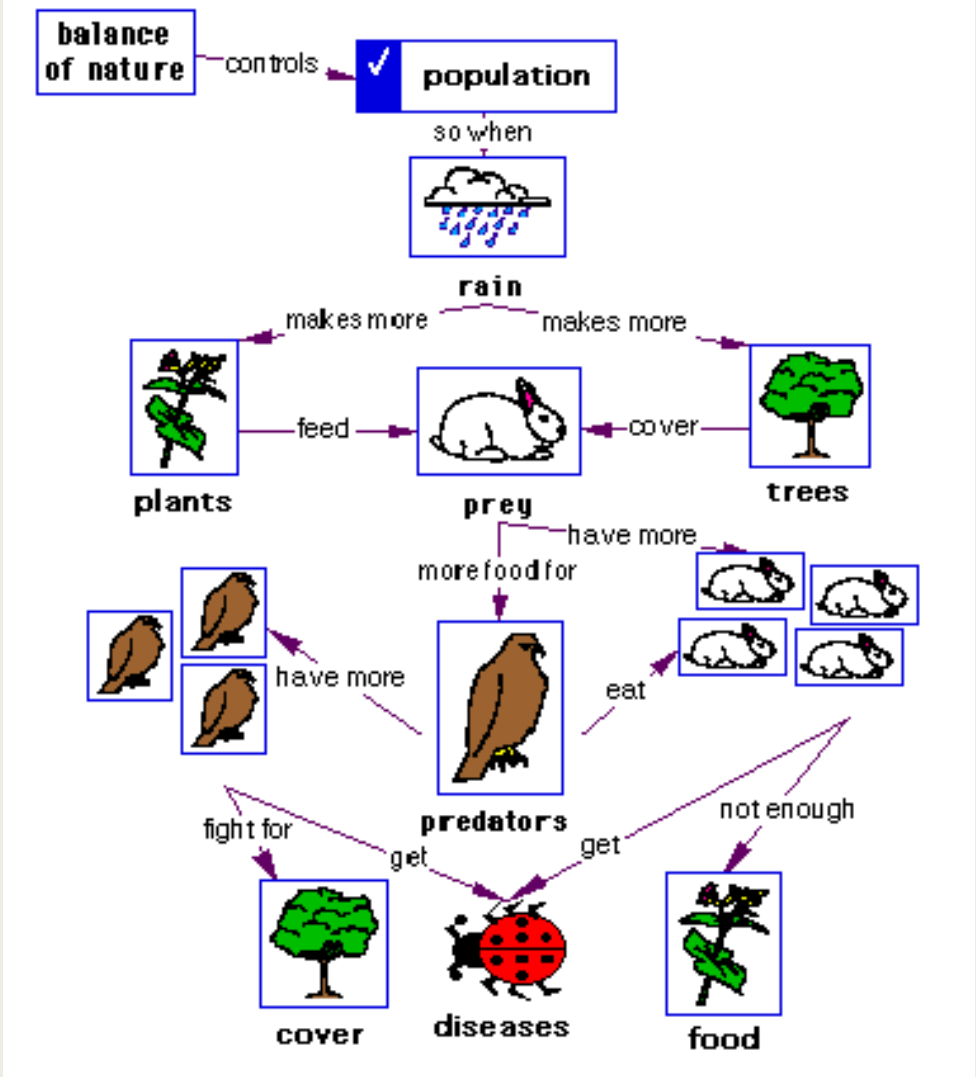
Concept Maps as a teaching/learning tool

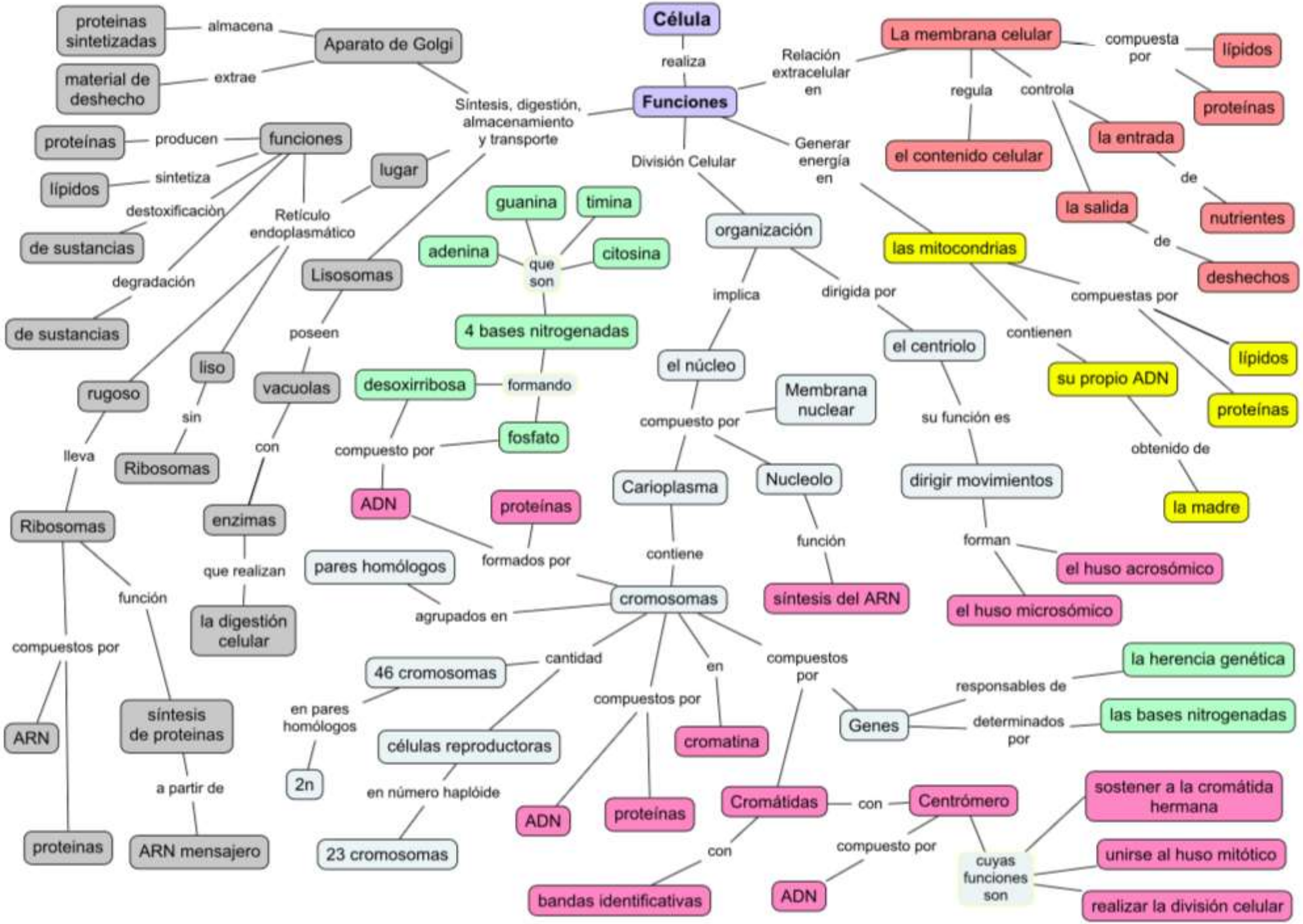
Students can benefit from concept maps:

To ***preview vocabulary and concepts before reading textbooks***; to use for study and test preparation; as a cheat-sheet for a take-home quiz.

As a ***collaborative/guided learning activity***: students create concept maps in pairs or small groups: students with better language command can assist less advanced students.

Concept maps give ***context*** to unfamiliar words students are trying to learn. Also, the graphic nature of concept maps can mitigate some language challenges.




Célula
realiza
Funciones
Síntesis, digestión, almacenamiento y transporte
Aparato de Golgi
almacena
proteinas sintetizadas
extrae
material de deshecho
Relación extracelular en
La membrana celular
compuesta por
lípidos
proteínas
regula
el contenido celular
controla
la entrada
de
nutrientes
la salida
de
deshechos
Generar energía en
las mitocondrias
compuestas por
lípidos
proteínas
contienen
su propio ADN
obtenido de
la madre
División Celular
organización
implica
el núcleo
compuesto por
Membrana nuclear
Carioplasma
Nucleolo
contiene
cromosomas
función
síntesis del ARN
dirigida por
el centriolo
su función es
dirigir movimientos
forman
el huso acrosómico
el huso microsómico
guanina
timina
adenina
citosina
que son
4 bases nitrogenadas
formando
desoxirribosa
fosfato
compuesto por
ADN
proteínas
formados por
pares homólogos
agrupados en
cantidad
46 cromosomas
en pares homólogos
2n
en número haplóide
23 cromosomas
células reproductoras
en
cromatina
compuestos por
ADN
proteínas
compuestos por
Genes
responsables de
la herencia genética
determinados por
las bases nitrogenadas
Cromátidas
con
Centrómero
compuesto por
ADN
con
bandas identificativas
cuyas funciones son
sostener a la cromátida hermana
unirse al huso mitótico
realizar la división celular
Lisosomas
poseen
vacuolas
con
enzimas
que realizan
la digestión celular
Retículo endoplasmático
lugar
liso
sin
Ribosomas
rugoso
lleva
Ribosomas
compuestos por
ARN
proteinas
función
síntesis de proteinas
a partir de
ARN mensajero
funciones
producen
proteínas
sintetiza
lípidos
destoxificación
de sustancias
degradación
de sustancias

The strategic use of Concept Maps

- Look up concept maps using the phrase:
  Mapa conceptual de…
- Use the Institute of Human and Machine Cognition (IHMC) concept mapping software to find or make concept maps
- Have your students use the concept maps:
  - To study and review the material
  - To answer, for example, questions about the cell and its organelles (or their function) that you have prepared as a handout, even if the questions are in English
  - To work in pairs to quiz each other, taking turns using the concept map for reference
  - As a cheat-sheet for a take-home quiz

Leverage Google Translate and Wikipedia

- Translate key words first, **then** search (try: cigoto, micela, catalasa…)
- Have students **search in their own language**!!
- Set search language
- NYS glossary for Living Environment (try: anaerobio, alternancia de generaciones, división celular, etc.)
  - www.rcsdk12.org/cms/lib/NY01001156/Centricity/Domain/4194/hs_livingenviron_spanish.pdf
- **Strings of words** sometimes work better

The symbiosis between learning science and language literacy

- “Code switching” develops executive skills in the prefrontal cortex of the brain. Executive skills go hand in hand with self-directed, intrinsically motivated learning: this is what we call ***agency***.
- Students who are learning science while they are also learning a new language will do **far better at both** if they continue to develop literacy skills in their own language. Therefore, encourage your ELL students use their own language as much as possible.

Have your students create learning materials for themselves and their peers

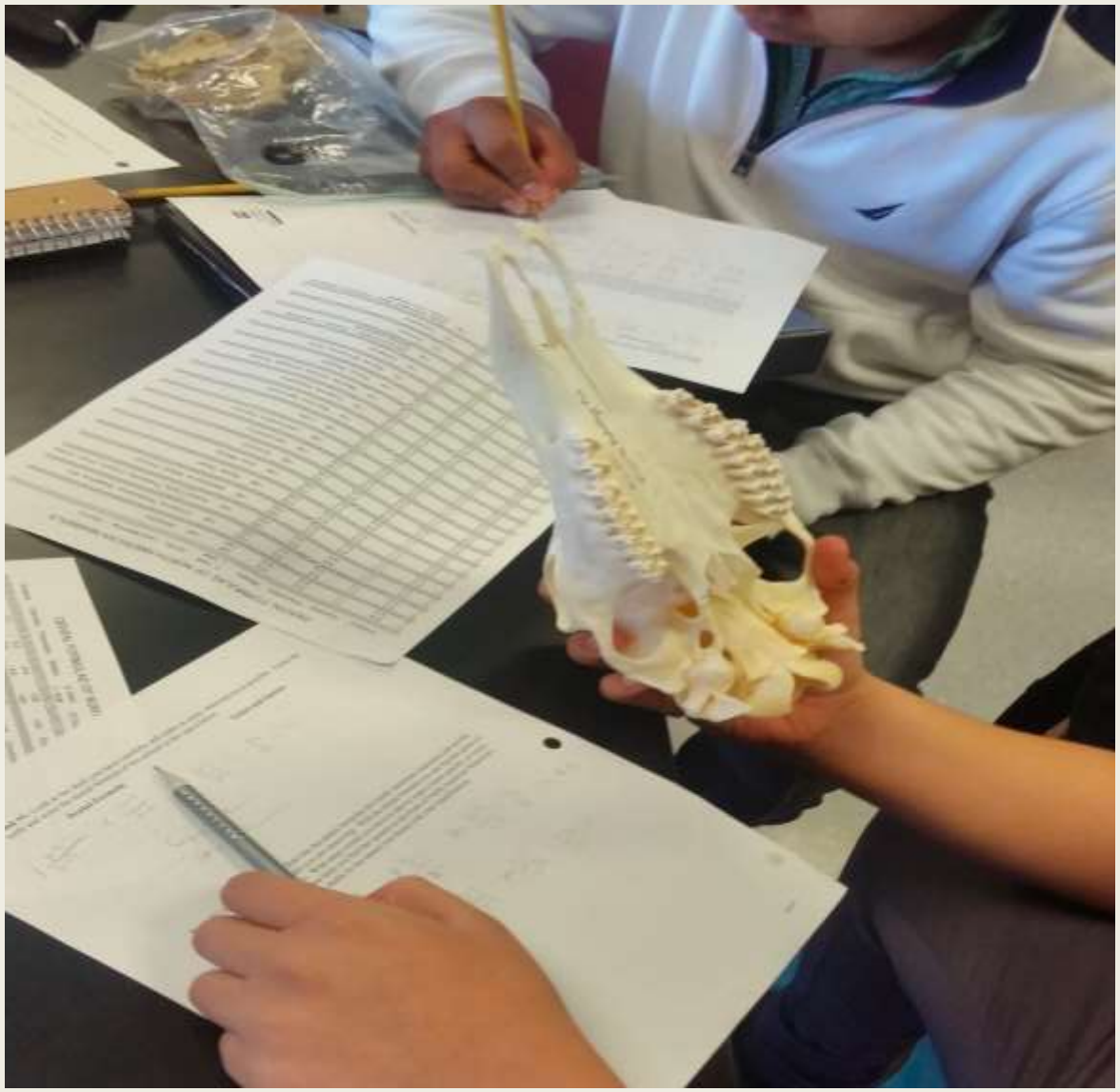
- Your students **can** create great learning materials.
- **Creating something useful** for others is a powerful motivator and helps students acquire the skills and mindsets needed in an increasingly innovative world.
- ***Learning to learn*** as a lifelong endeavor. As students *learn how to learn*, they free themselves of the need for formal instruction.

The keys to second language acquisition

- **Context is very important:** Giving students at least **some** materials in their own language provides more context, increases confidence, and promotes language use.
- **Listening and reading** are the keys to language acquisition (*S. Krashen*)
- **Comprehensible input is key**… both in L1 and L2!! [**Translanguaging, context, constructing meaning**]
- Learning is… a *meaningful* social exchange *mediated by language*… so **maximize** the use of language by your emerging bilingual students in **any** language
- Having students participate **actively** in ***constructing meaning*** is **KEY**

THE TAKEAWAY

- Learning is a **social** endeavor **mediated** by language
- Increasing the opportunity of emergent bilinguals to **USE** language (***any language***) every day will improve outcomes
- Ultimately, **using language** for **meaningful** communication is much more important than **which** language is used
- Tier 3 words are overwhelmingly cognates(*), so **the focus should be on Tier 2 words**



Fecha 12-1-17

Genética Humana

¿Cómo se distribuyen las características genéticas en el ser humano?

Antecedentes

En los humanos, los mecanismos de transmisión de los caracteres hereditarios se producen del mismo modo que en el resto de seres vivos.

- Los genes se transmiten de los progenitores a los descendientes.
- Las diferencias entre los individuos son consecuencia de sus **genes** y de la influencia del **ambiente**.

los genes se transmiten de los progenitores

El medio ambiente puede influir sobre el "banco" genético de una población a través del tiempo, y el medio ambiente puede hacer que ciertos genes en un individuo operen normalmente o no, pero los efectos producidos sobre el fenotipo debidos únicamente al ambiente **no se transmiten a los descendientes**.

Aunque no se pueden hacer los mismos experimentos en personas que en animales, pues no se puede planificar cruces para comprobar cómo es la descendencia, se pueden analizar los antecedentes familiares de algunas características o alteraciones que aparecen en personas de la misma familia.

ciertos genes en un individuo

los experimentos no se pueden hacer en animales como en personas

solo se puede analizar con los antecedentes de los familiares con características alteraciones que aparecen en personas de la misma familia

La herencia en la especie humana

Los humanos tenemos **46** cromosomas, o 23 parejas (o pares), en todas las células somáticas, dado que somos **diploides (2n)**. Las únicas células **haploides (n)** son los gametos (óvulos y espermatozoides), que sólo tienen 23 cromosomas, ya que cuando se unan en la fecundación, darán lugar a un individuo con los 46 cromosomas (2n). En los gametos están los genes con la información necesaria para las características hereditarias del nuevo individuo.

los humanos tenemos 46 cromosomas y 23 parejas o pares. Solo las haploides (n) que solo tienen 23 cromosomas cuando se unan son 46 cromosomas [illegible]

Los cromosomas no sexuales, comunes en los dos sexos, se llaman **autosomas**. Los **cromosomas sexuales** son homólogos (iguales) en las mujeres (**XX**) y diferentes en los hombres (**XY**). El cromosoma Y es mucho más pequeño que el cromosoma X y contiene un número más pequeño de genes que el cromosoma X.

los cromosomas no sexuales se llaman autosomas. los cromosomas iguales en las mujeres (XX) y los hombres (XY) la Y es mucho más pequeño que la X

El cariotipo es el conjunto de todos los cromosomas de [illegible] se puede ver su número y el aspecto (en metafase) de los cromosomas que caracterizan a la especie.

el cariotipo es el conjunto de todos los cromosomas en el que se puede ver su número y aspecto (en metafase) de los cromosomas que caracterizan a la especie

Cuando se representan gráficamente, en dibujo o fotografía, el **cariotipo**, con los cromosomas numerados y ordenados por parejas de homólogos, tamaños y forma, se obtiene el **cariograma** o **idiograma**. Analizando el cariotipo se pueden analizar anomalías numéricas y estructurales.

el cariotipo cuando se dibujan en foto con los cromosomas numerados y ordenados por parejas de homólogos tamaños y formas se obtiene el cariograma o idiograma analizando el cariotipo se analizan anomalías numéricas y estructurales.

Vocabulario

Gene

Partícula de material genético [illegible] a lo largo de un cromosoma [illegible] la aparición de los caracteres [illegible] seres vivos

Cromosoma

serie de genes alineados en forma [illegible] que se hallan en el núcleo de una célula [illegible] material genético; El número [illegible] de una especie en constancia.

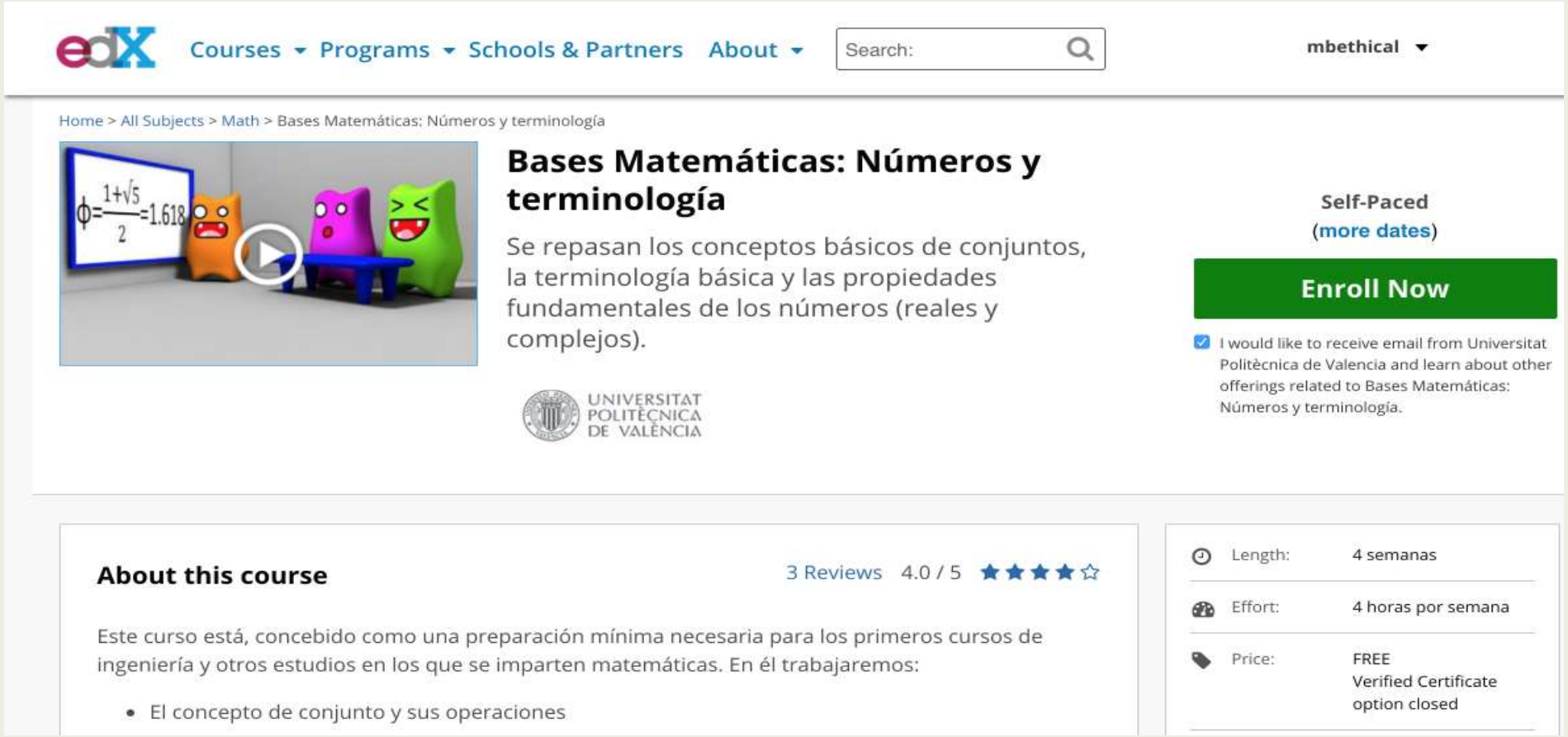
Stop trying to do things better…
Start doing ***better things***!

Focusing on purpose, mindsets, agency, skill sets and knowledge can transform learning in our schools

Help them learn to leverage their own language skills

- Glossaries, dictionaries, Greek and Latin roots (cognates)
- Searchable science glossaries
- “La etimología de…”
- Wikipedia en español
- Kahn Academy en español

Free college courses (with material you can adapt) through EdX, Coursera, etc.



Thank you!