Geoscience in Two-year Colleges

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Earth Science

Geology

Meteorology

Oceanography

Supporting Student Success

heolohiya

syans Latè yo

khí tượng học

Океанография

nahasdzáán naalkaah

Kev kawm txog ntiaj teb

地球科学

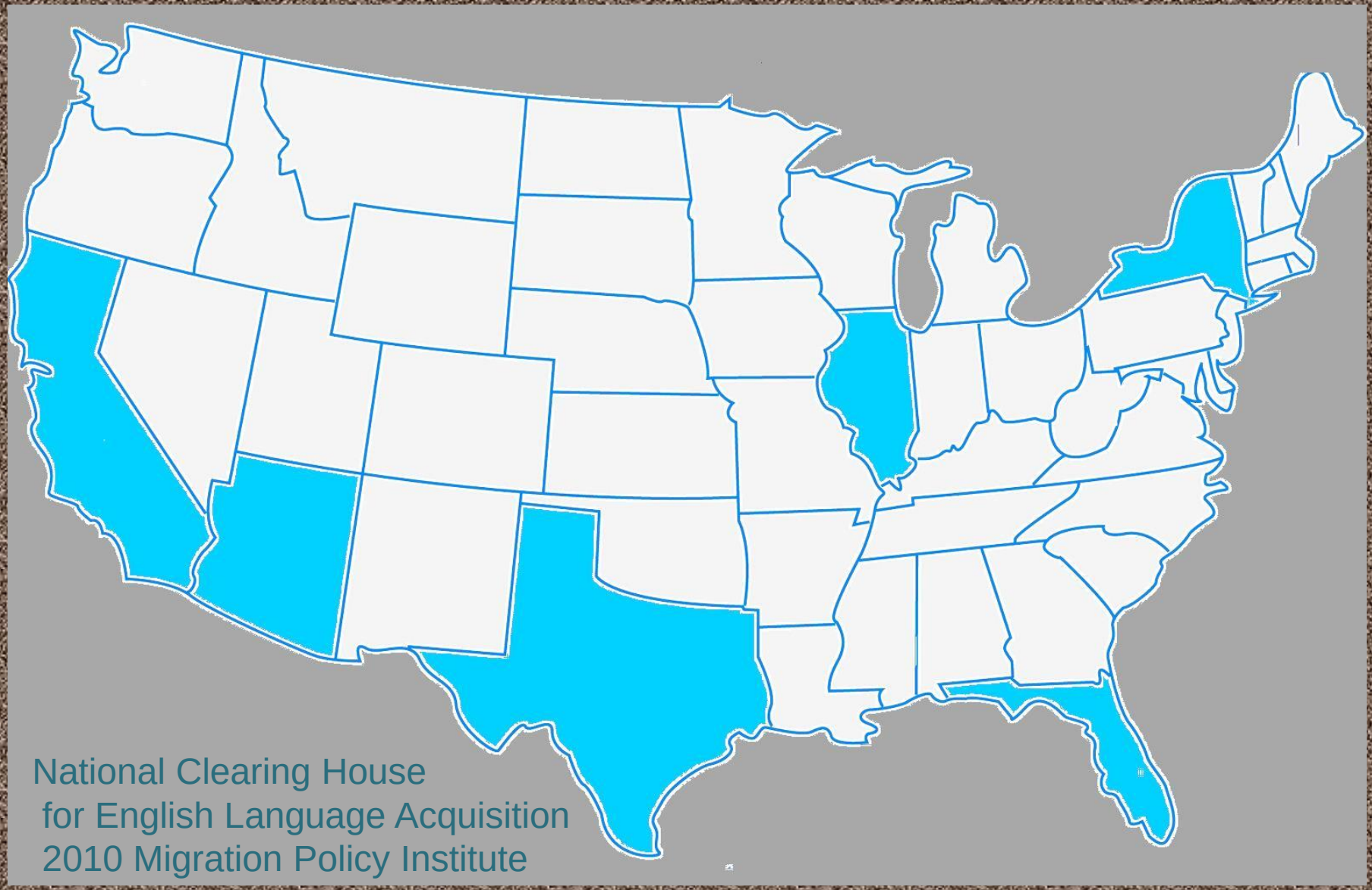
지질학

meteorología

علم المحيطات

Teaching English Language Learners in Geoscience courses

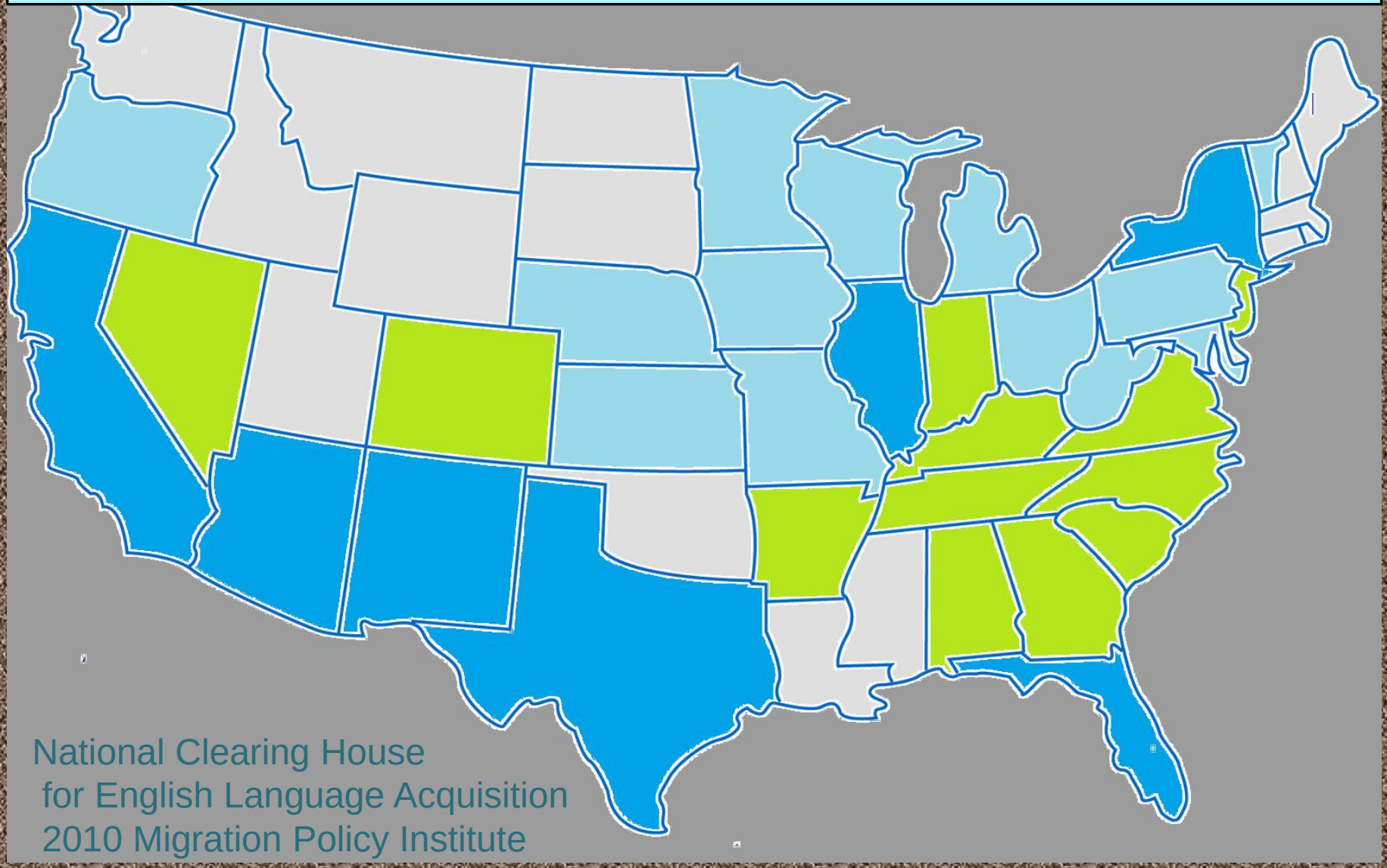
States with the largest English Language Learning populations



National Clearing House
for English Language Acquisition
2010 Migration Policy Institute

States with the fastest growing ELL populations (> 200% growth)

States reporting 100-200% growth in ELL population



National Clearing House
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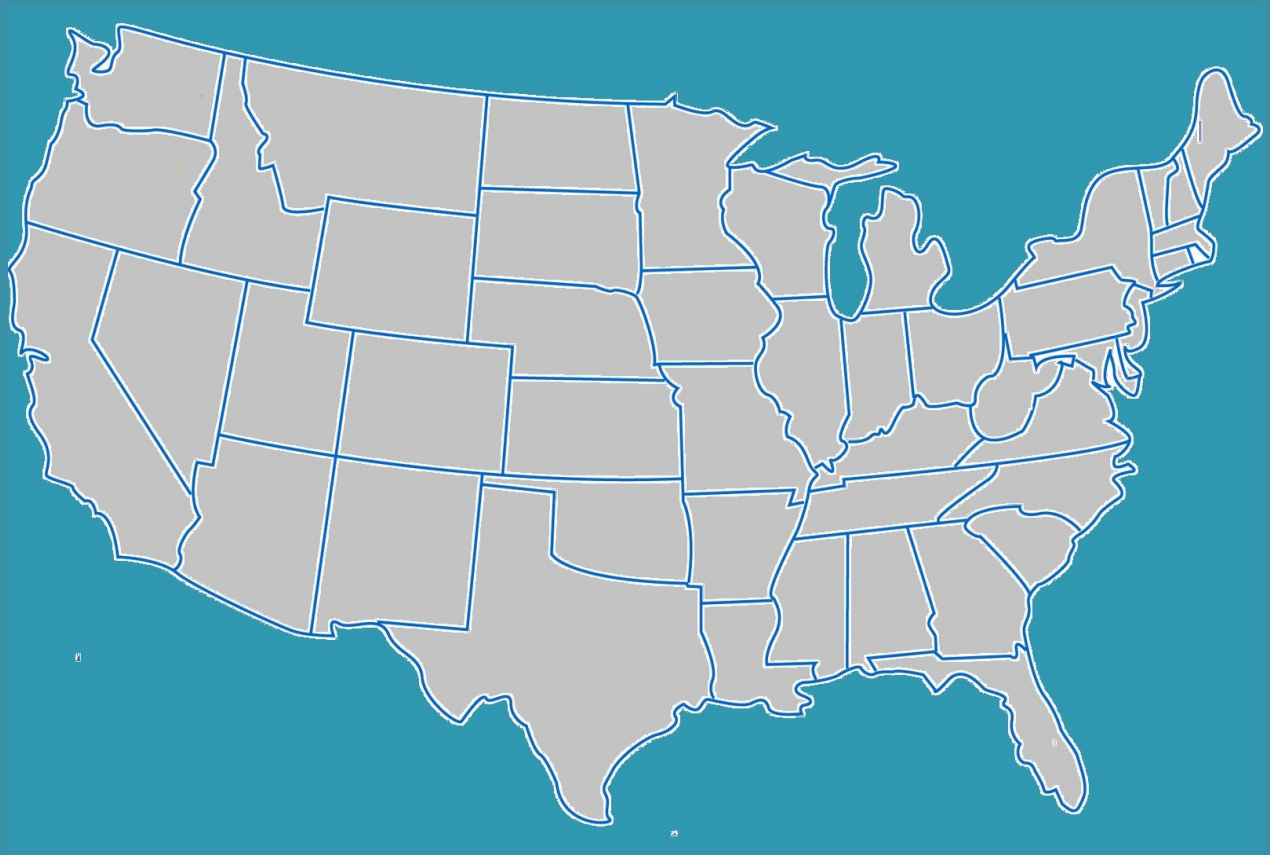


español

Spanish is the most frequently reported first language for ELLs in the U.S. (43 states)

Chinese	中國語言
Vietnamese	ngôn ngữ tiếng việt
Arabic	العربية
Hmong	hmoob
Korean	한국어
Haitian creole	kreyòl ayisyen
Russian	русский
Tagalog/Filipino	pilipino
Navajo	**Diné Bizaad**

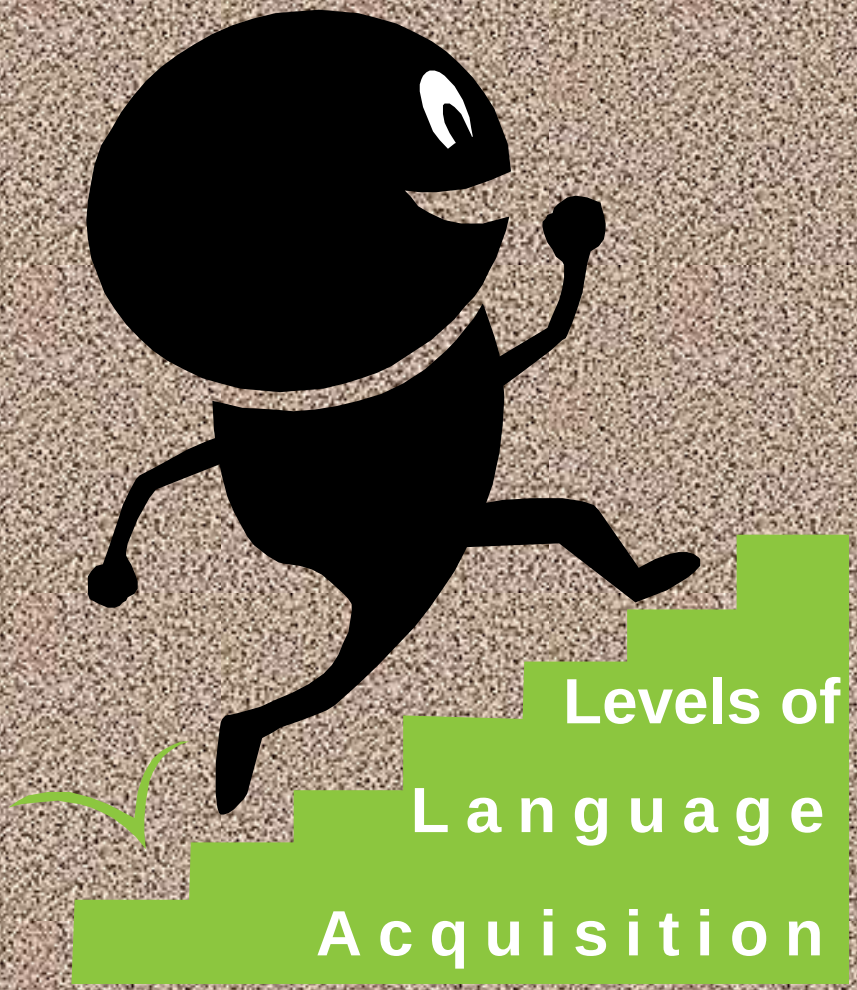
Spanish

español

How long does it typically take English language learners to acquire English?

CALP

BICS



Immigrant students

International students

Generation 1.5 students

Migrant students

English Language Learners are a very diverse group.

Immigrant students

May have significant educational experience, sporadic educational experience, or none at all

International students

Usually literate & educated in L1

Need help with conversation and listening comprehension

Generation 1.5 students

Non-native speakers of English, graduated from US high school

Spoken English is very strong, need help with writing English

Migrant students

Previous educational experience often 'choppy' & may have gaps

May or may not be literate in L1

English Language Learners are a very diverse group.

Teaching English

Language Learners

in content disciplines

Expectations & assumptions

Culturally relevant pedagogy

1

Non-verbal behaviors are culturally-acquired.

- ✓ Eye contact
- ✓ Head nodding
- ✓ Smiling
- ✓ Personal space
- ✓ Silence

Non-verbal behaviors are culturally-acquired.

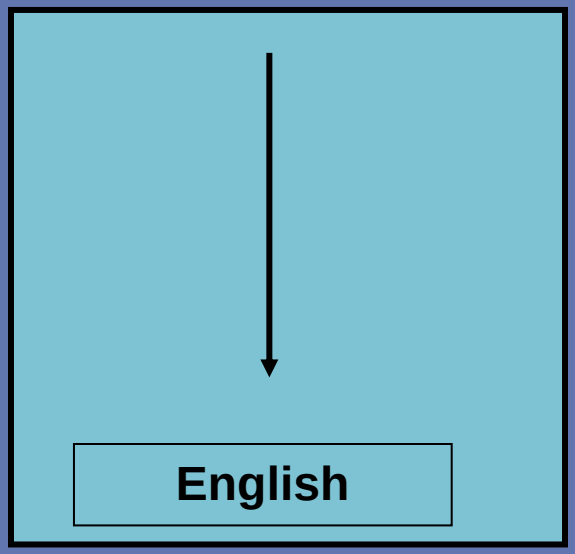
2

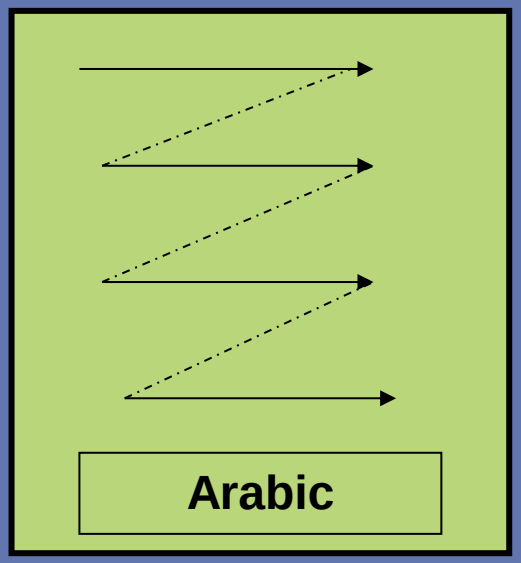
Roles & expectations in the classroom reflect cultural perspectives

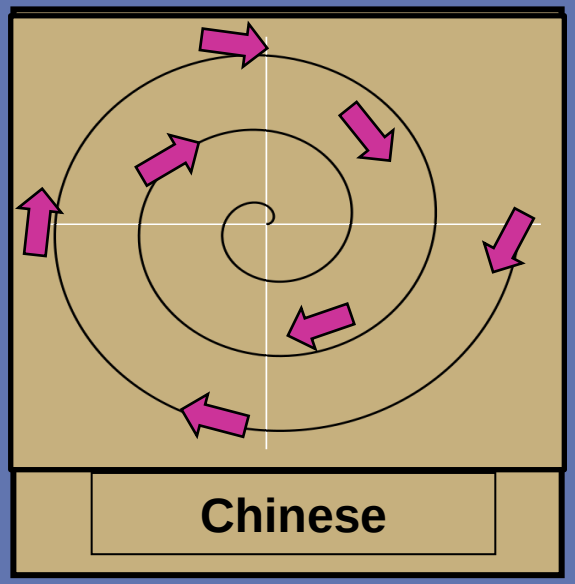
- ✓ Class participation
- ✓ Collaborative tasks
- ✓ Concepts of time
  monochronic / polychronic time orientation
- ✓ Narrative styles

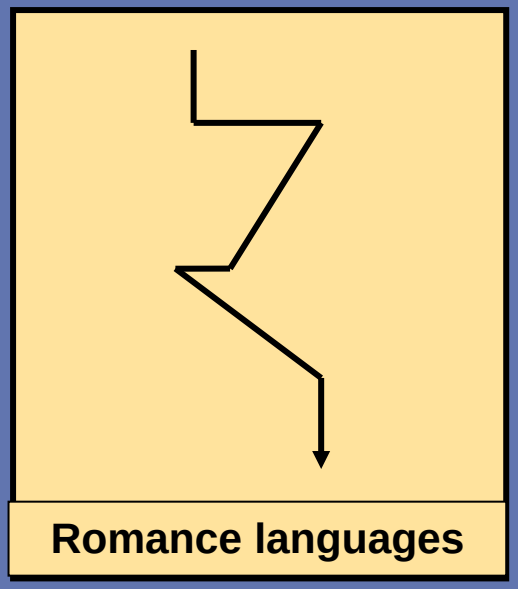
Roles and expectations reflect cultural perspectives

Narrative Styles









Ostler (1987), Ramirez (1995), Sousa (2011)

3

Approaches to the study & teaching of science vary among cultures

‘The rules of science inquiry (…) may be incongruent with the values and norms of cultures favoring social consensus, shared responsibility and respect for authority. ’

[Fradd & Lee, 1999]

Approaches to teaching science vary among cultures

4

Students face challenges with scientific notation, vocabulary & syntax

Notations for commmon functions vary

```
 127|4
−124|31,75
   3
 − 0
   30
 −28
    20
  −20
     0
```

Brazil, Venezuela, Colombia

```
6359 | 17
-51  | 374
 125
-119
   69
 - 68
    1
```

France [Wikipedia, 2013]

Vocabulary challenges

- Words may be used interchangably to refer the same function

  Addition – *add, plus, and, in all, sum, total, combined together, increase by, more than*

- Everyday vocabulary takes on new meaning

  E.g. *table, mass, crust, funnel, product, scale, pressure*

Vocabulary challenges

- Homophones create confusion

  e.g. dual/duel, rows/rose, sum/some, sine/sign, cosine/cosign, plane/plain, etc.

- Transition words and words describing logical relationships can be difficult; ELLs often miss (or misinterpret) important signal words

English syntax contributes to the puzzle

- The number ‘a’ is six less than the number ‘b’

  [ELL] $a = 6 – b$ [correct] $a = b - 6$

- There are six times as many students in the geology dept as teachers.

  [ELL] $6s = t$ [correct] $6t = s$

Word problems are a problem

In 3 more years, Miguel's grandfather will be six times as old as Miguel was last year. When Miguel's present age is added to his grandfather's present age, the total is 68. How old is each one now?

Word problems are a problem

*In 3 more years, Miguel's grandfather **will be** six times as old as Miguel **was** last year. When Miguel's present age **is added** to his grandfather's present age, the total is 68. How old **is** each one now?*

5

Activate student background knowledge

Connect to
the real world

Connect
to personal
experience

Connect to previous study

Brainstorming

Class discussion

Semantic mapping

Vocabulary preview

Pre-questions

Photos & Illustrations

Overviews

Structural organizers

Activate

student

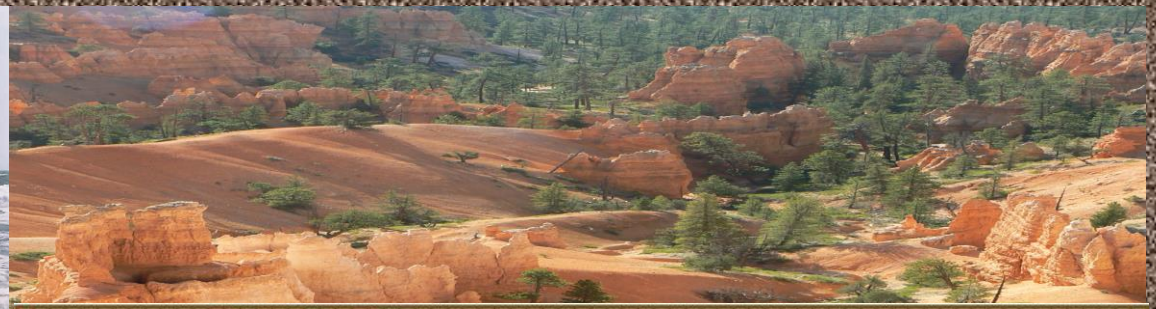
background

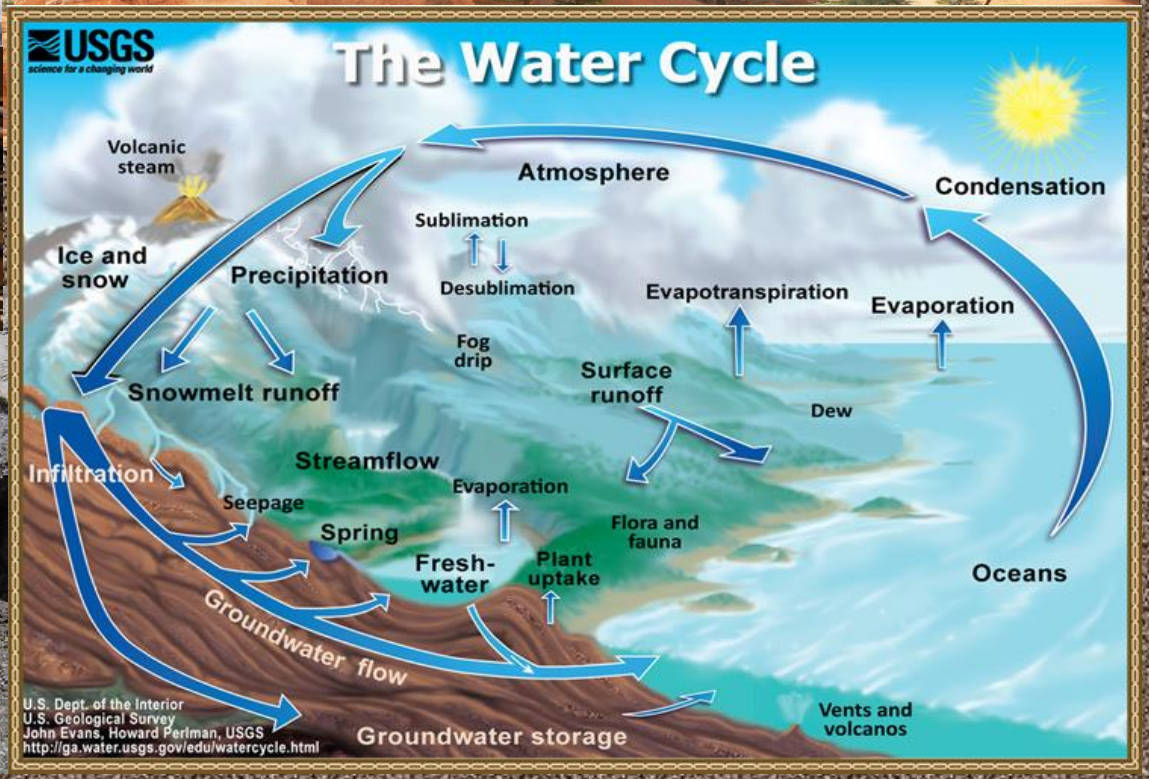
knowledge

6

Provide Scaffolding Support

The geosciences already incorporate many important forms of scaffolding support: photographs, diagrams, models, hands-on laboratory and field experiences





- Bridging
- Point out contextual clues
- Developing metacognition
- Schema building
- Modeling

Essential to provide scaffolding support

TITLE:

The effect of _____ on _____

independent variable dependent variable

HYPOTHESIS:

If _____, then _____.

independent variable dependent variable

There are _____ levels of the independent variable.

The constants are _____ and _____.

Number of trials: This experiment will be performed __ times.

The results will be measured by _____.

Kleiber & Walsh, 2010

CONCLUSION:

Our results demonstrate that the effect of ____ on ___ is ___.

I will record _____ on the x-axis and _____on the y-axis.

The graph/table/chart shows _____.

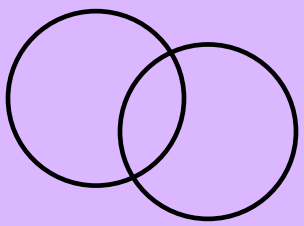
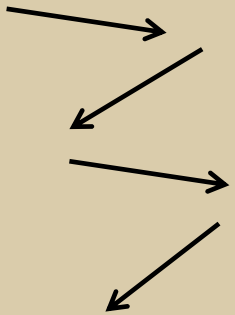
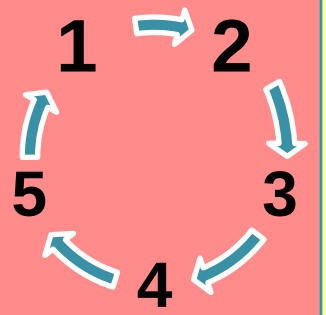
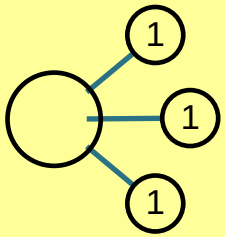
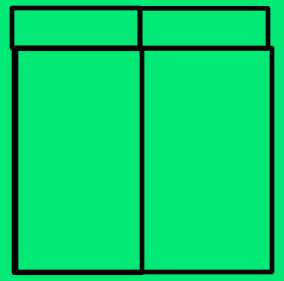
If we had _____, then _____might have been_____.

There may be _____ errors in our data.

In our data, the hypothesis was (not) confirmed by _____.

Kleiber & Walsh, 2010

Use graphic organizers systematically, to teach *both* relationships among concepts *and* the language needed to express those relationships. [Tang, 1992]

				
Venn diagram	**Cause & effect**	**Cycles**	**Semantic web**	**T-Charts**
Comparing & contrasting two entities	Illustrating a Relationship	producing a series of connected events or a process	Connecting categories to themes or topics	Sorting or Categorizing objects or concepts

WIDA Resource Manual, 2007

We each view the world through our own cultural lens

From your perspective, what are the challenges that ELL students encounter in geoscience courses?

What are the challenges that you face in teaching this group of students?

Immigrant students

International students

Generation 1.5 students

Migrant students

Supporting Student Success:

English Language Learning Students