Educational Computing in an Age of Diaspora: A Conceptual Backpack for Digital Nomads

Ruben R. Puentedura, Ph.D.

Redefinition

Tech allows for the creation of new tasks, previously inconceivable

Modification

Tech allows for significant task redesign

Transformation

Augmentation

Tech acts as a direct tool substitute, with functional improvement

Substitution

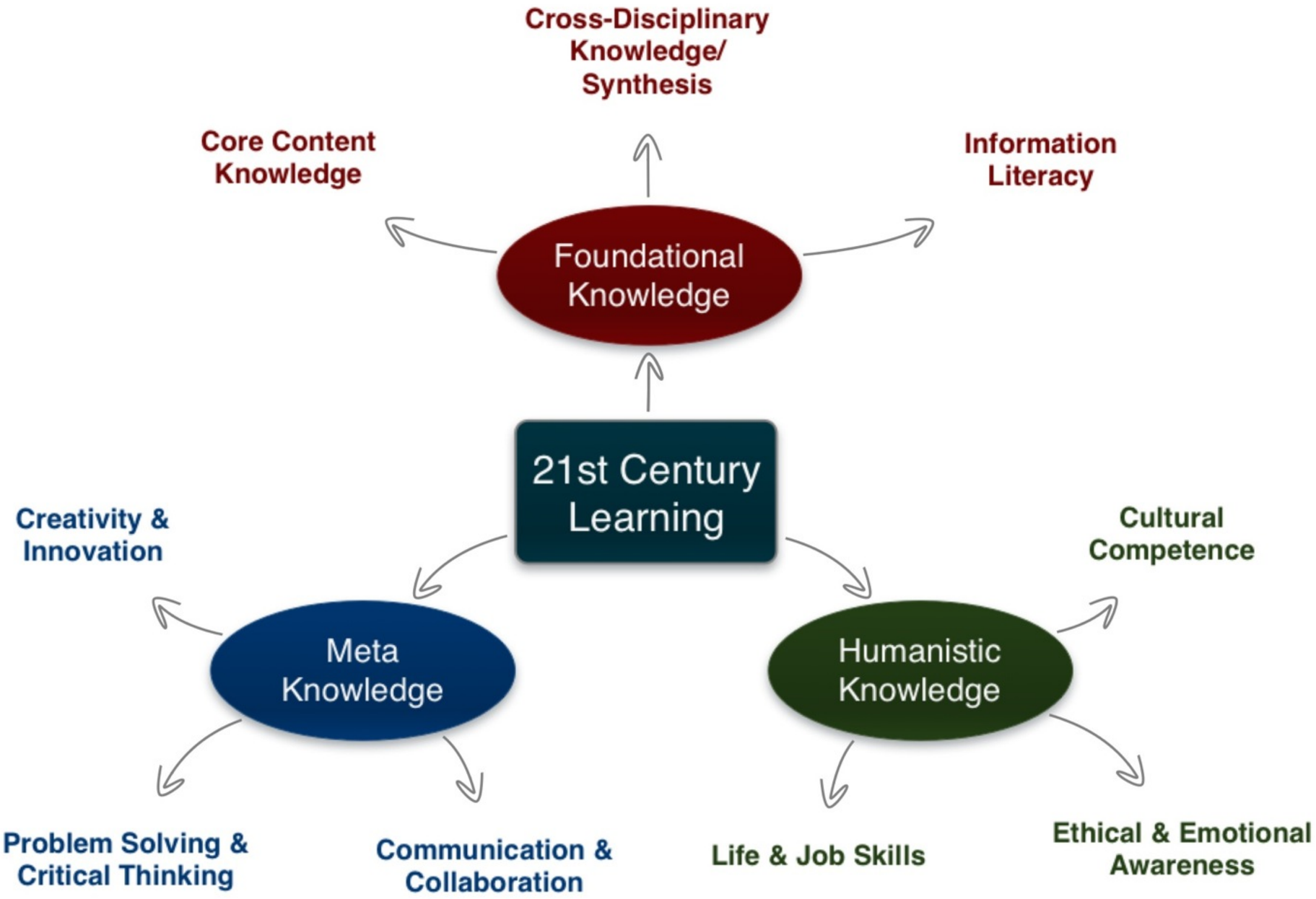
Tech acts as a direct tool substitute, with no functional change

Enhancement

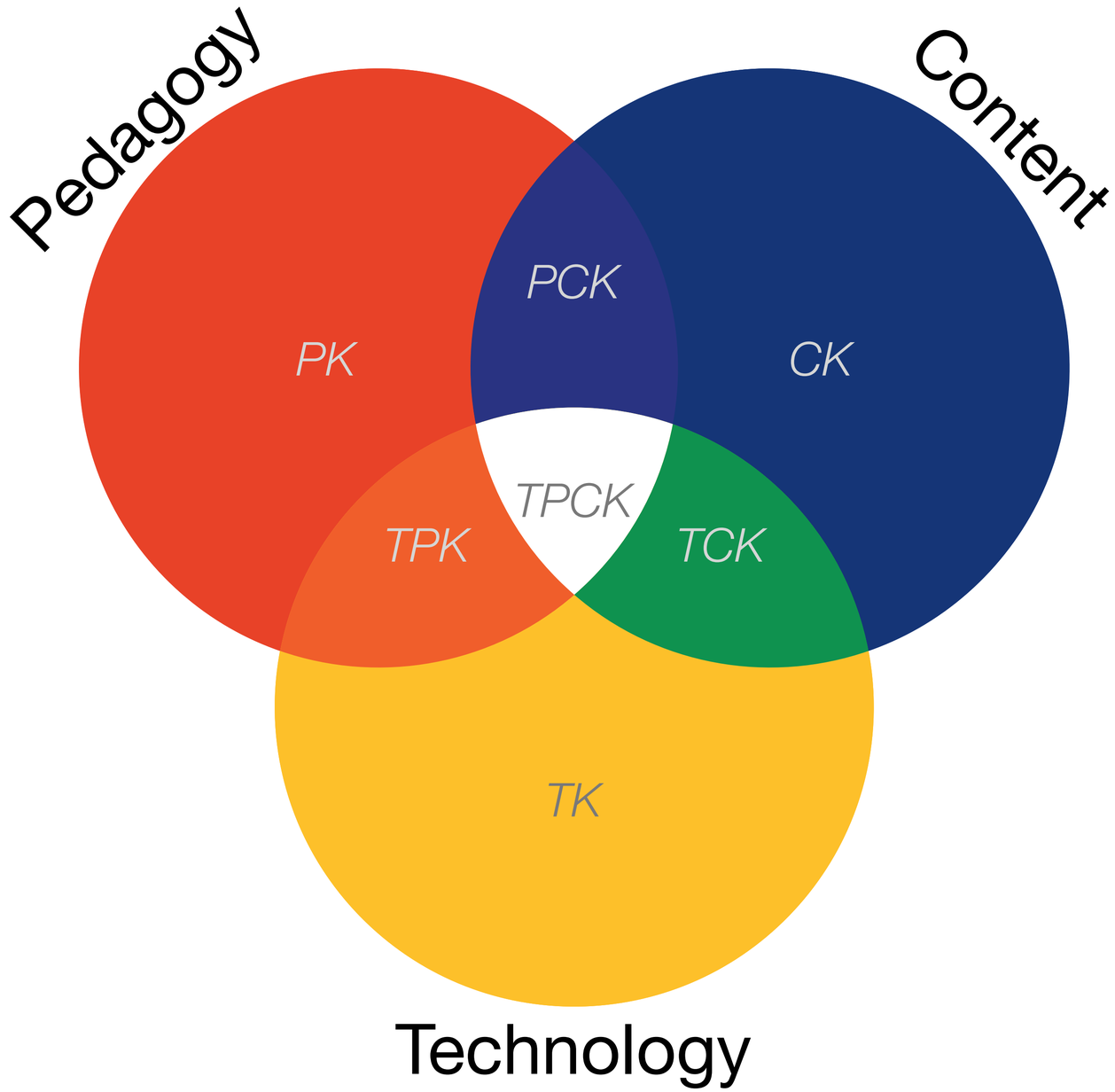
Ruben R. Puentedura, *As We May Teach: Educational Technology, From Theory Into Practice*. (2009)

Social	Mobility	Visualization	Storytelling	Gaming
200,000 years	70,000 years	40,000 years	17,000 years	8,000 years

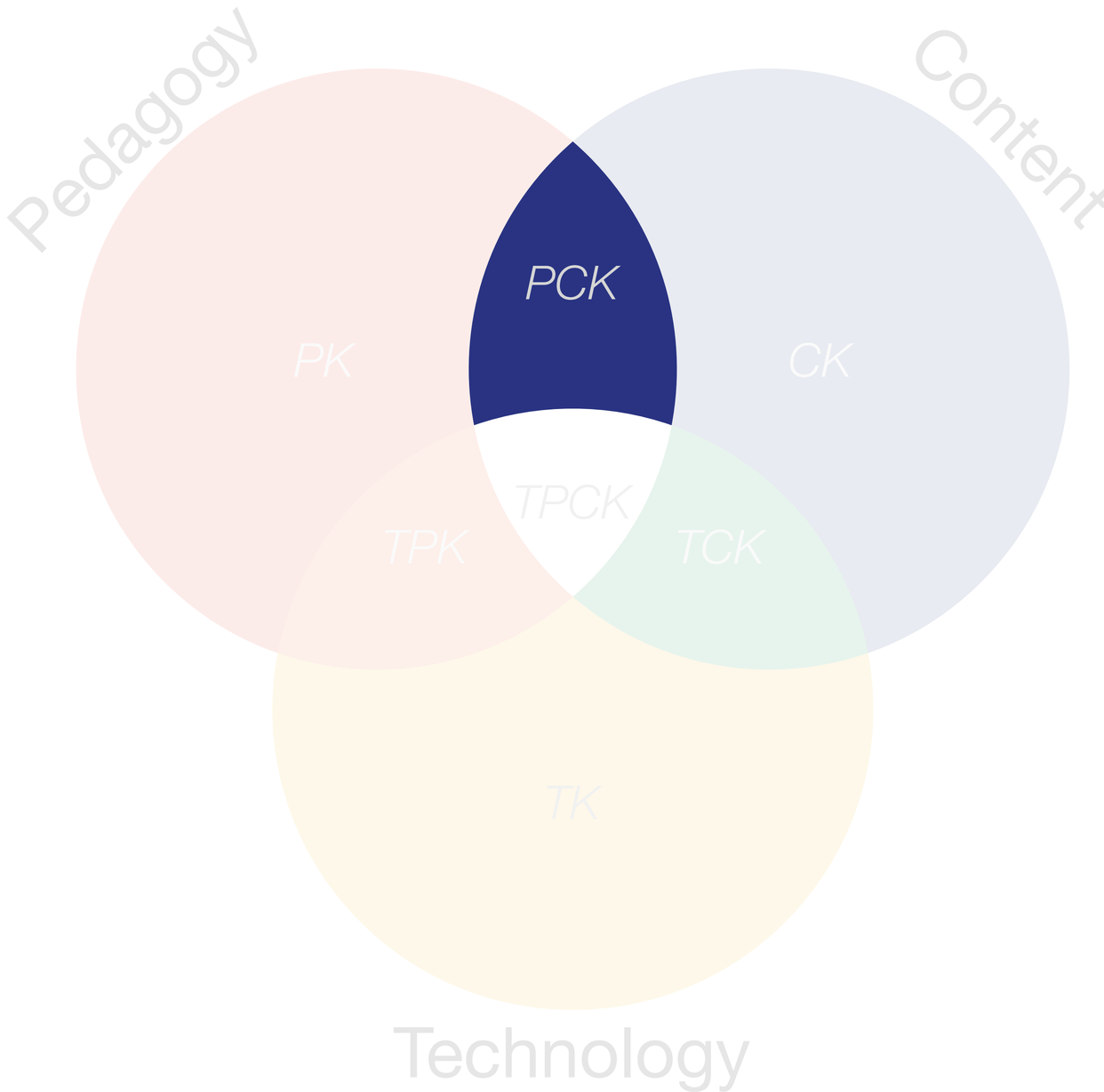
Ruben R. Puentedura, “Technology In Education: The First 200,000 Years” *The NMC Perspective Series: Ideas that Matter*. NMC Summer Conference, 2012.



Kristen Kereluik, Punya Mishra, Chris Fahnoe, and Laura Terry, "What Knowledge Is of Most Worth: Teacher Knowledge for 21st Century Learning". *Journal of Digital Learning in Teacher Education (29)* 4 (2013)

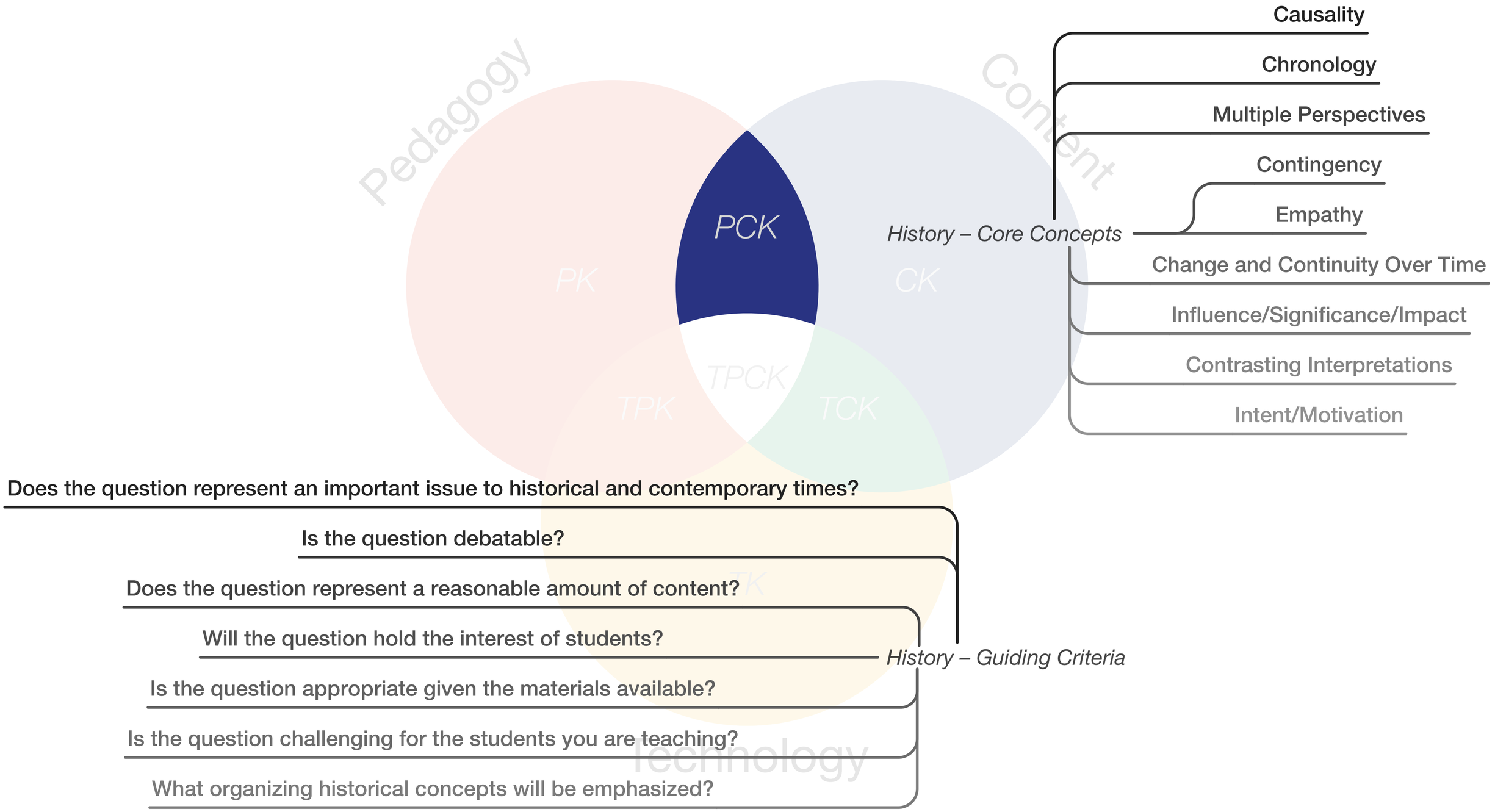


Punya Mishra & Matthew J. Koehler, “Technological pedagogical content knowledge: A framework for teacher knowledge”. *Teachers College Record, 108*(6). (2006)



Lee S. Shulman, "Those Who Understand: Knowledge Growth in Teaching." *Educational Researcher*, Vol. 15, No. 2 (Feb., 1986)

Session 1: History & Geography



Bruce Lesh. ''*Why Won't You Just Tell Us the Answer?*'' *Teaching Historical Thinking in Grades 7-12*. Stenhouse Publishers. (2011)

Location

Position in space

Condition

Mix of natural & artificial features that give meaning to a location

Links

Connections between places

Formal Region

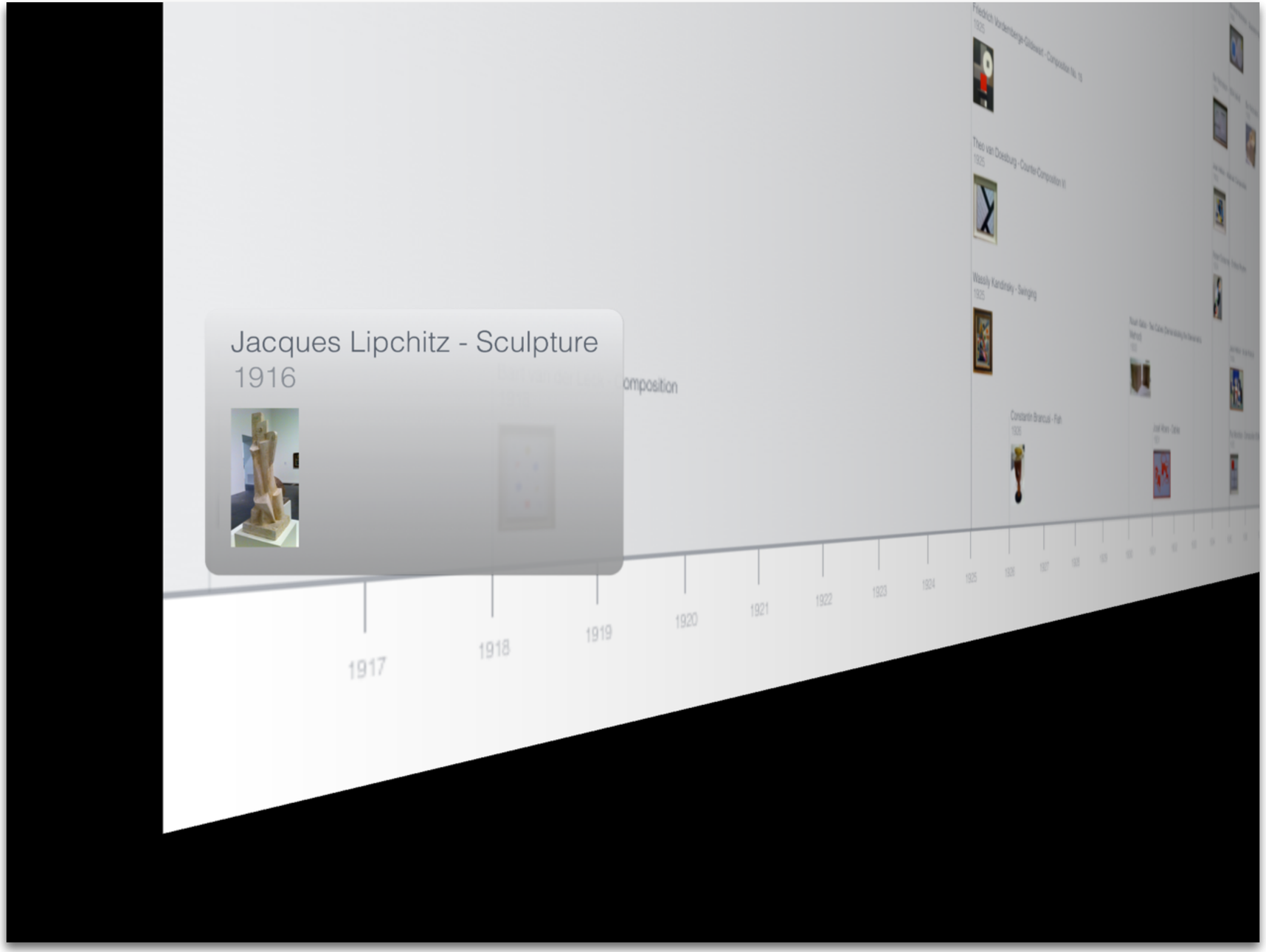
Group of places with similar conditions

Functional Region

Group of places linked together by a flow

Phil Gersmehl. *Teaching Geography*. The Guilford Press. (2005)

Spatial Thinking Skills	
Comparison	How are places similar or different?
Aura	What is this place’s influence on nearby places?
Region	What nearby places are similar to this one?
Transition	How do things change between two places?
Hierarchy	What larger area is this area inside? What smaller areas are inside it?
Analogy	What places have similar conditions?
Pattern	What distinctive arrangements can you see on a map?
Association	Are these patterns similar?


Jacques Lipchitz - Sculpture
1916
1917
1918
1919
1920
1921
1922
1923
1924
1925

1229 CE (785 years ago)

Byzantine Empire

Duration - Mongol Empire

Feb 18, 1229 CE

Sixth Crusade

Holy Roman Emperor Frederick II negotiated a truce with the Muslims, giving the Kingdom of Jerusalem temporary control of Jerusalem.

Sep 13, 1229 CE

Coronation of Ogedei Khan

Son of Genghis Khan

1230 CE

Mali Empire

The Mali Empire covered most of present-day northern Guinea and southern Mali, ruling millions of people from nearly every ethnic group in West Africa.

Discovery Series
World in 1600
Beijing
KOREA
Yellow Sea
Huang He
MING CHINA
East China Sea
Lhasa
TOUNGOO
South China Sea
Bay of Bengal
AYUTTHAYA
VIETNAM
ACEH
Malacca (Spain)
Borneo
MATARAM
HERFF JONES NYSTROM
Discovery Series
World
MONGOLIA
Ulaanbaatar
Shenyang
Beijing
NORTH KOREA
Pyongyang
SOUTH KOREA
Yellow Sea
Xian
Shanghai
Wuhan
Chongqing
Plateau of Tibet
East China Sea
BHUTAN
Thimphu
Brahmaputra River
BANGLADESH
Dhaka
Taipei
TAIWAN
Guangzhou
Hong Kong
Hanoi
MYANMAR (BURMA)
Nay Pyi Taw
LAOS
Vientiane (Viangchan)
Yangon (Rangoon)
THAILAND
Bangkok
VIETNAM
CAMBODIA
Phnom Penh
Ho Chi Minh City
South China Sea
Manila
Bay of Bengal
Bandar Seri Begawan
BRUNEI
MALAYSIA
Kuala Lumpur
SINGAPORE
HERFF JONES NYSTROM

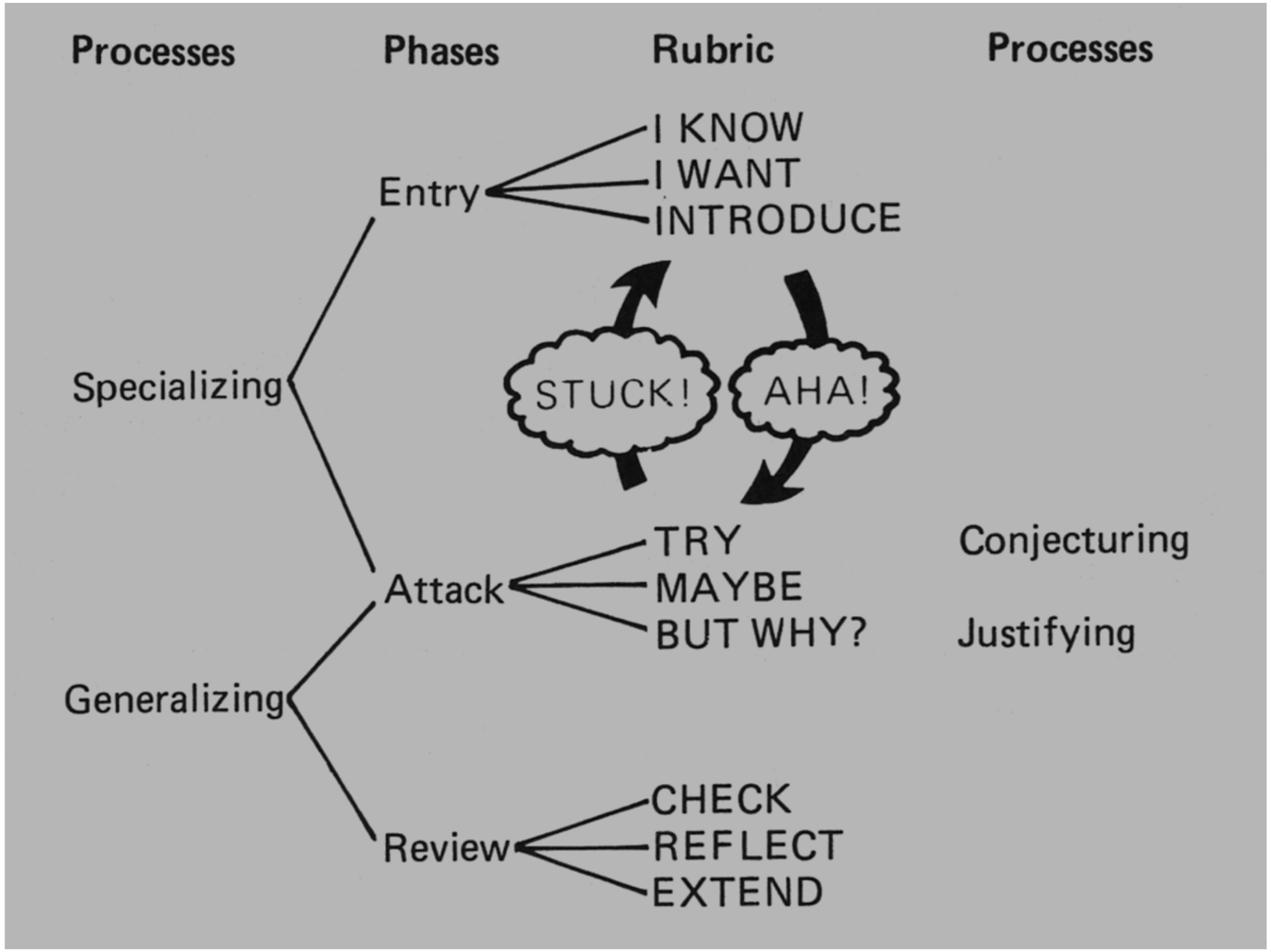
Session 2: Math, Science, & Physical Education

The Art of Problem Posing: the What–If–Not Strategy

- **Level 0: Choosing a Starting Point**
  - This could be an object, a concrete scenario, or a theorem.
- **Level I: Listing Attributes**
  - What are all the key components involved in this starting point?
- **Level II: What-If-Not-ing**
  - What if each attribute were not so - what could it be then?
- **Level III: Question Asking or Problem Posing**
  - What new questions can we ask using these new alternatives?
- **Level IV: Analyzing the Problem**
  - We select some of these questions and try to analyze or answer them.

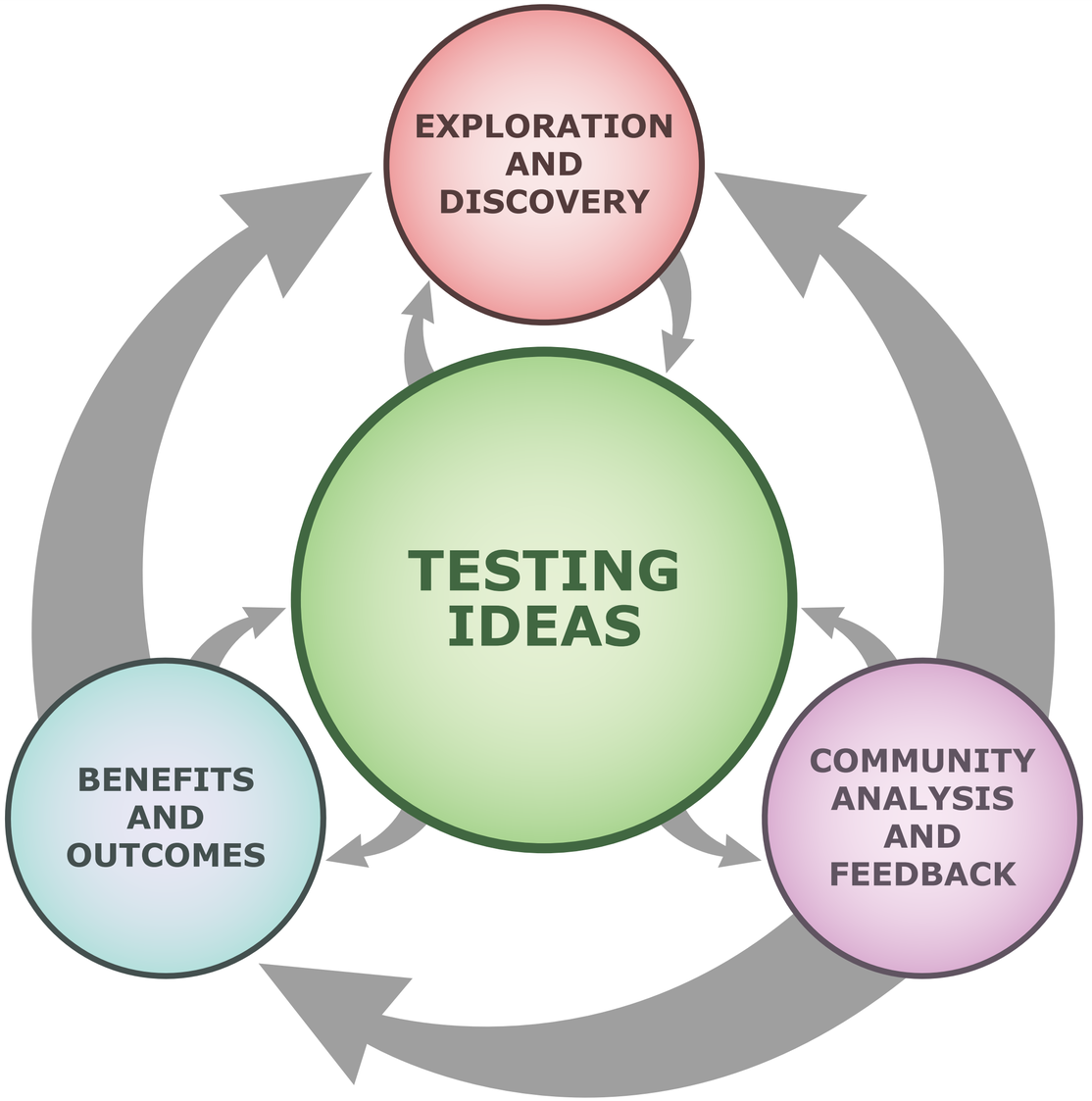
Stephen I. Brown and Marion I. Walter. *The Art of Problem Posing, Third Edition*. Psychology Press. (2005)

Thinking Mathematically



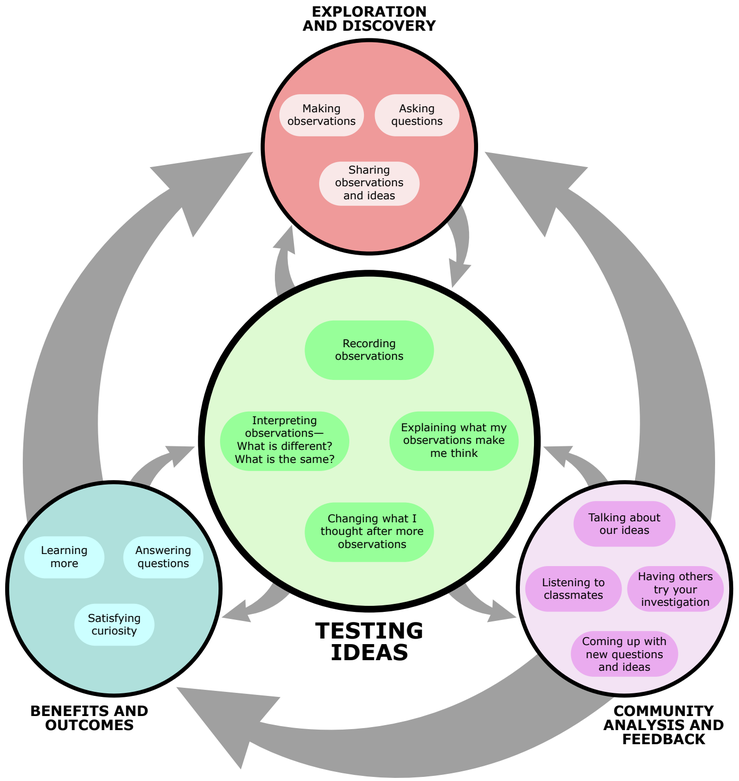
J. Mason, L. Burton, and K. Stacey. *Thinking Mathematically, Second Edition*. Prentice Hall. (2011)

Understanding Science: How Science Works

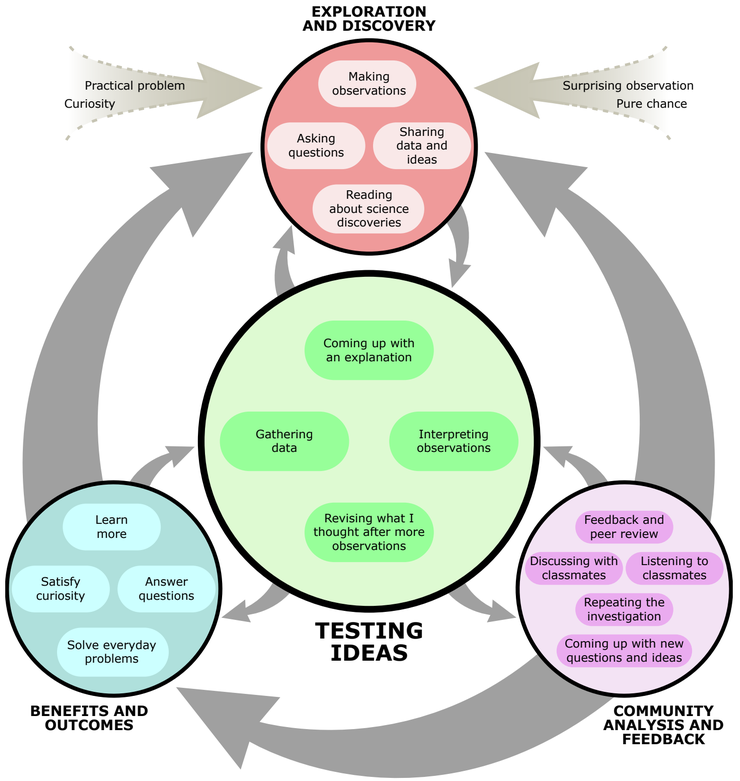


"Understanding Science." Understanding Science. N.p., n.d. Web. 5 Jan. 2014. <http://undsci.berkeley.edu>

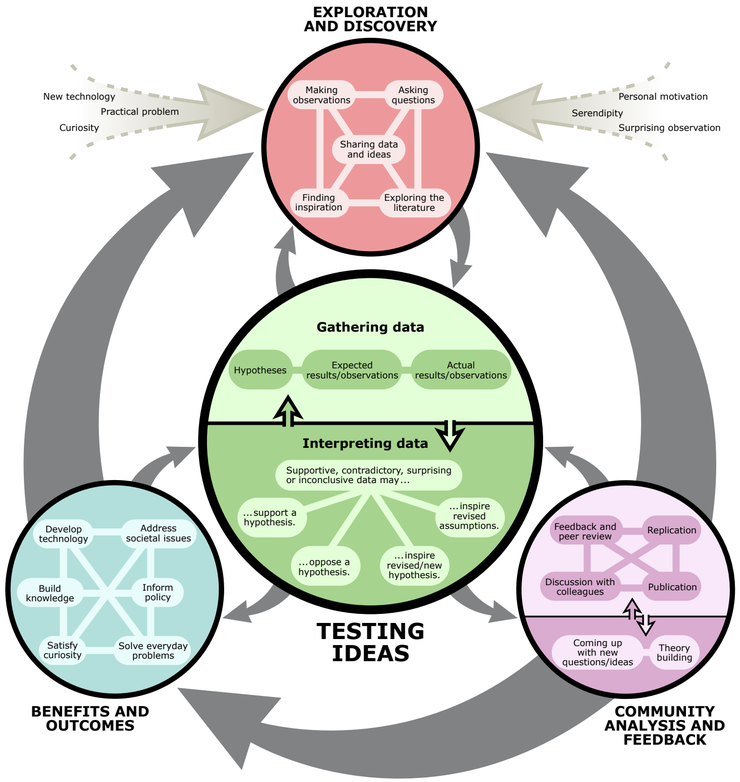
Understanding Science: How Science Works



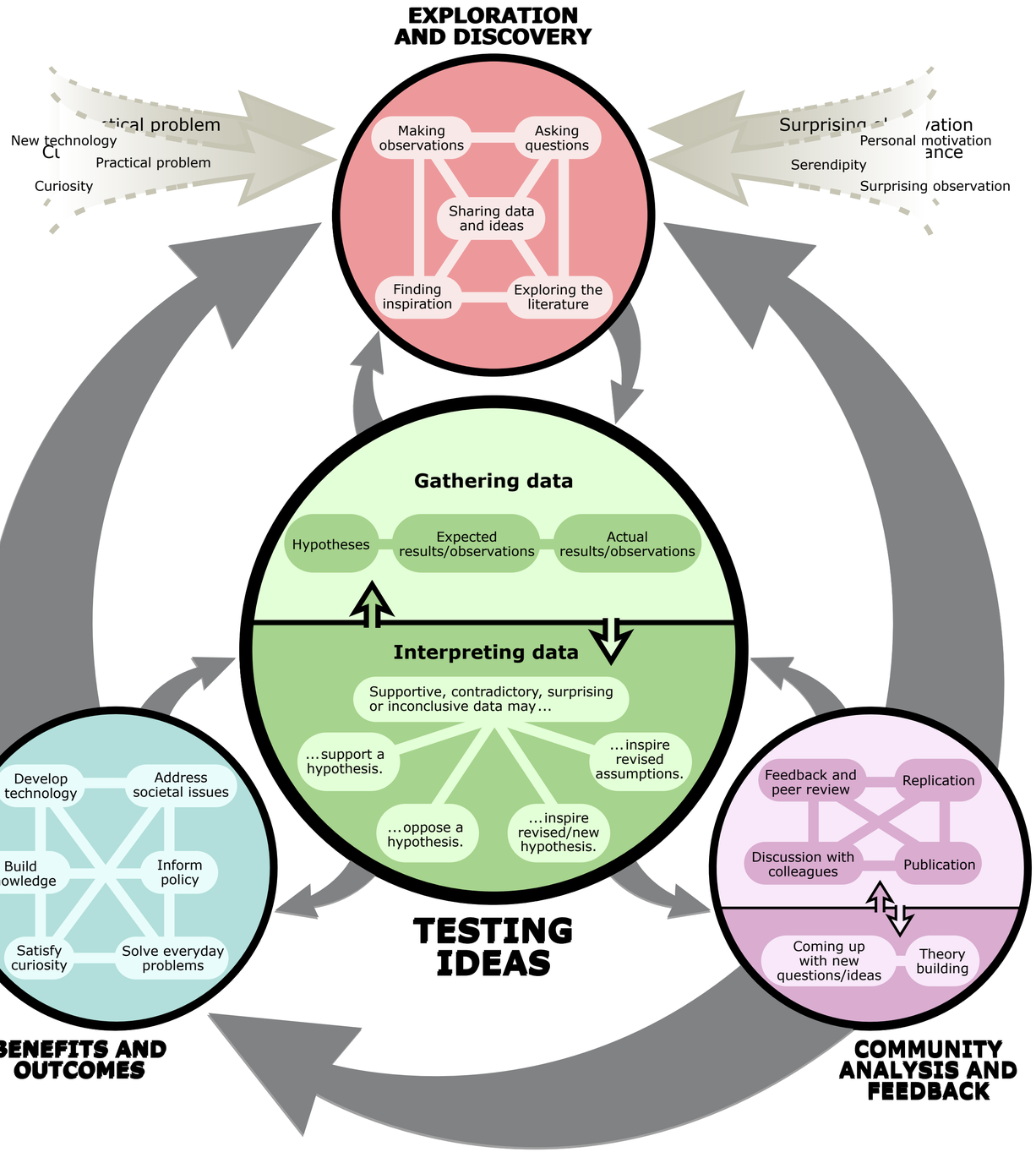
K–2



3–5



6–16


EXPLORATION AND DISCOVERY
Making observations
Asking questions
Sharing data and ideas
Finding inspiration
Exploring the literature
New technology
Practical problem
Curiosity
Personal motivation
Serendipity
Surprising observation
Gathering data
Hypotheses
Expected results/observations
Actual results/observations
Interpreting data
Supportive, contradictory, surprising or inconclusive data may…
…support a hypothesis.
…inspire revised assumptions.
…oppose a hypothesis.
…inspire revised/new hypothesis.
TESTING IDEAS
Develop technology
Address societal issues
Build knowledge
Inform policy
Satisfy curiosity
Solve everyday problems
BENEFITS AND OUTCOMES
Feedback and peer review
Replication
Discussion with colleagues
Publication
Coming up with new questions/ideas
Theory building
COMMUNITY ANALYSIS AND FEEDBACK

Psychomotor Processes

Dave (1967)	Characteristic Processes
Imitation	Repeating an act that has been demonstrated
Manipulation	Practicing an act until it becomes consciously habitual
Precision	Attaining proficiency and efficiency in performing an act
Articulation	Developing harmony and flexibility in performing an act
Naturalization	Creating new ways of performing an act Modifying responses “on the fly” automatically

Dave, R.H. *Taxonomy of Educational Objectives and Achievement Testing*. In: Ingenkamp, Karlheinz (ed.). *Developments in Educational Testing: The Proceedings of an International Conference Held Under the Aegis of the Pädagogisches Zentrum, Berlin*. University of London Press, 1969.

The T.A.C.T.I.C. Matrix

Game and Focus (from taxa)	**Principles of Play (depth)**	**Tactical Awareness Components (breadth)**				
		Initial			**Advanced**	
		Space	Force	Time	In relation to…	
		Where	*How*	*When*	*Self*	*Other*
Systems, rules, objectives of game	Basic elements of play that structure effective game playing	Where an object should be placed/ where a player should go in the area of play	How much and where to apply force on an object/ self for height, directional control, distance	When to execute a skill, or create time to execute a skill, or reduce opponent's time to execute a skill	In relation to what you are able to do, what should you do to gain a tactical advantage over your opponent?	In relation to what your opponent is able to do, what should you do to gain a tactical advantage over your opponent?

Hopper, T. and R. Bell. “Games classification system: Teaching strategic understanding and tactical awareness.” *CAHPERD*, Vol 66 (4), pp 14-19. (2001)

Rainfall in Gallons

I wonder how much water falls on land throughout the year? We can use a [rainfall database][rdb] to find out how much it rains in Seattle and then use Calca's unit conversion support to help us determine that.

```
land area = 0.25 acre

avg annual precip = 36.15 inch / year

daily rain accumulation
 = avg annual precip * land area
   in gallon/day
 => 671.9012 gallon/day
```

Wow, that's a lot of water, but what if we just have a bucket?

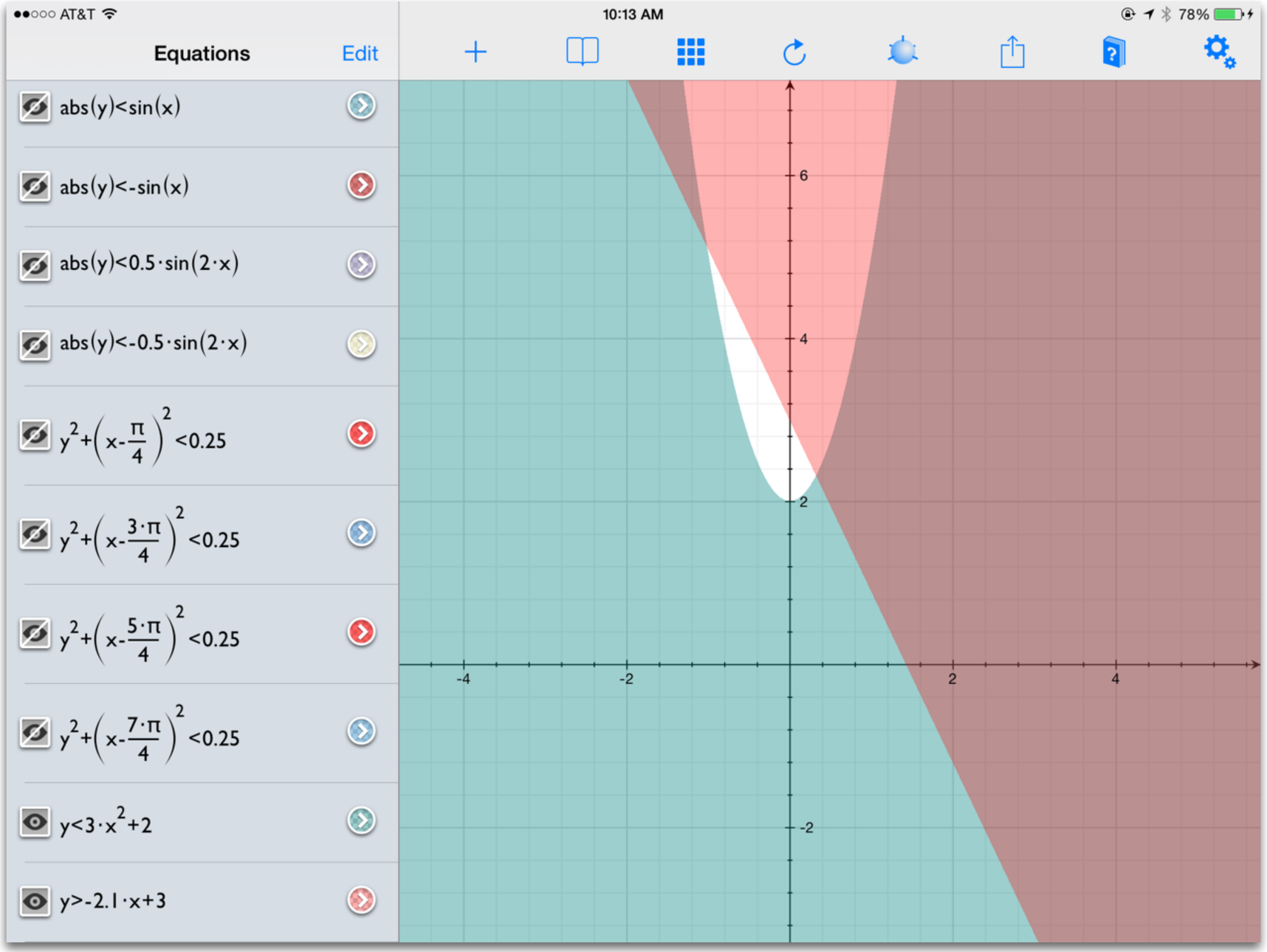
```
land area = 1ft * 1ft

daily rain accumulation => 0.0617 gallon/day
```

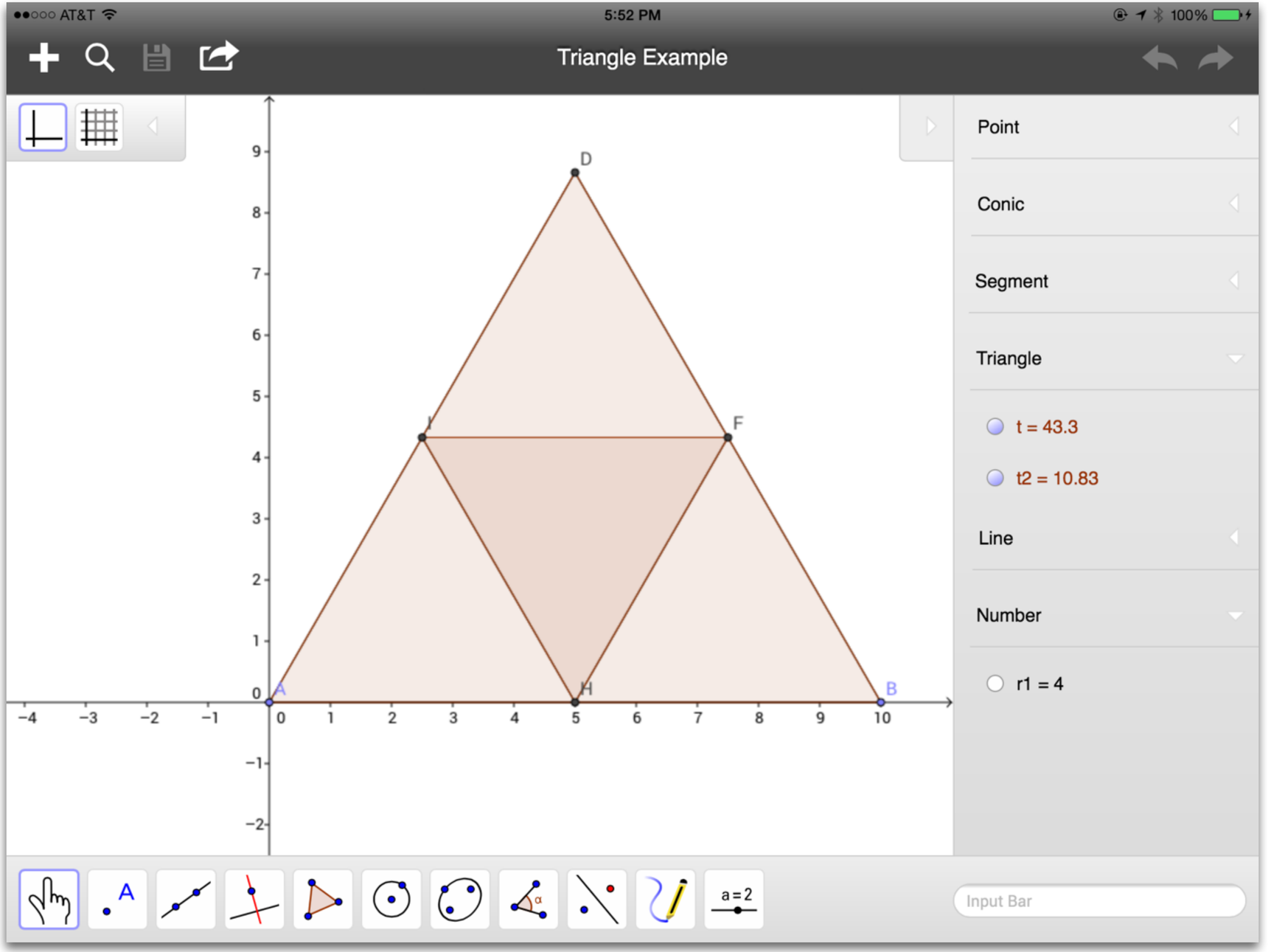
That's not very much... How many cups is that?

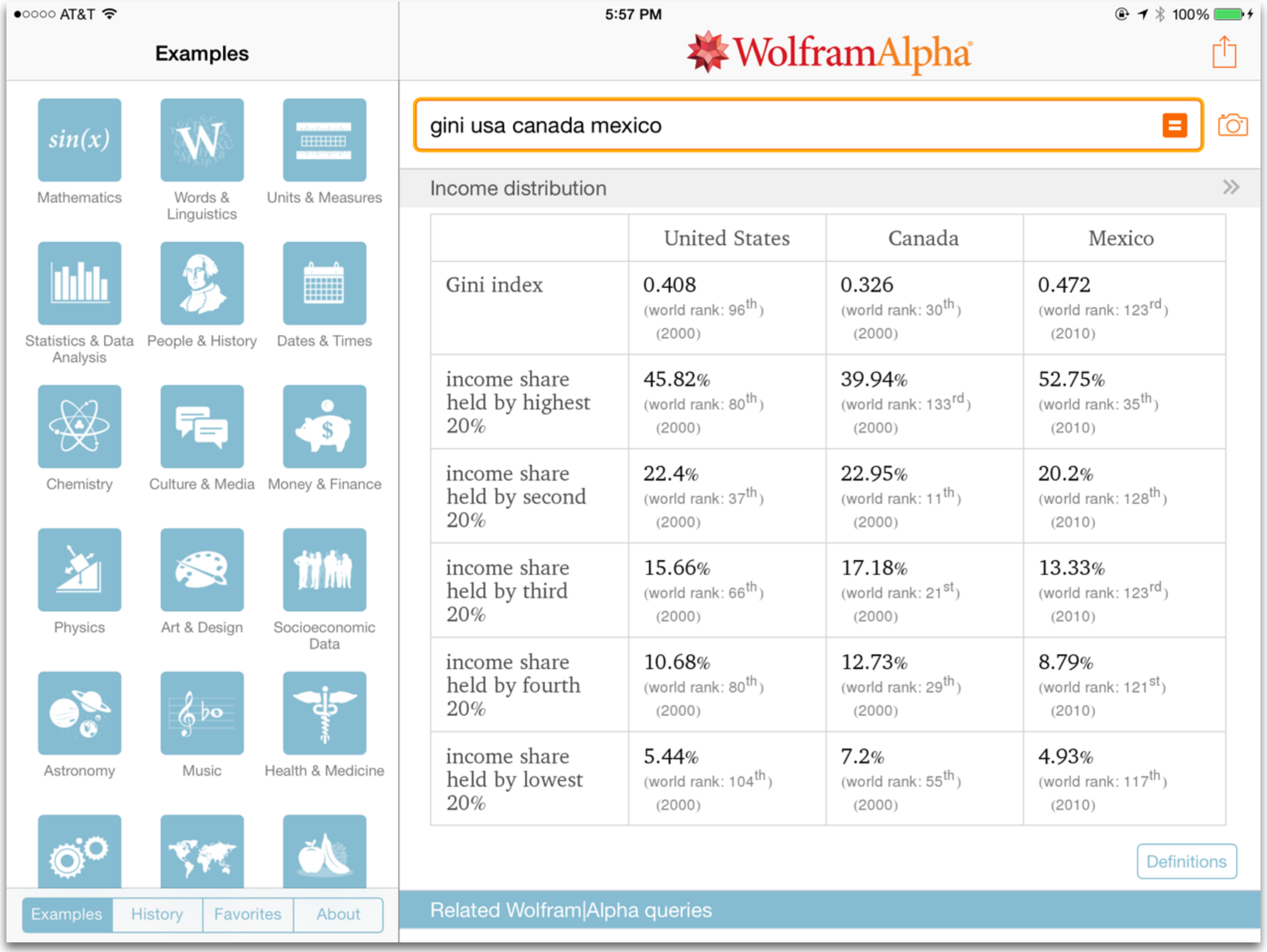
```
daily rain accumulation in cups/day => 0.9872 cups/day
```

So if I left a 1 ft by 1 ft bucket around I could collect about a cup of water every day. And they say it rains a lot.

[rdb]: http://average-rainfall.weatherdb.com


AT&T
10:13 AM
78%
Equations
Edit
abs(y)<sin(x)
abs(y)<-sin(x)
abs(y)<0.5·sin(2·x)
abs(y)<-0.5·sin(2·x)
$y^2+\left(x-\frac{\pi}{4}\right)^2<0.25$
$y^2+\left(x-\frac{3\cdot\pi}{4}\right)^2<0.25$
$y^2+\left(x-\frac{5\cdot\pi}{4}\right)^2<0.25$
$y^2+\left(x-\frac{7\cdot\pi}{4}\right)^2<0.25$
$y<3\cdot x^2+2$
y>-2.1·x+3
6
4
2
-2
-4
-2
2
4


AT&T
5:52 PM
100%
Triangle Example
Point
Conic
Segment
Triangle
t = 43.3
t2 = 10.83
Line
Number
r1 = 4
D
J
F
A
H
B
a = 2
Input Bar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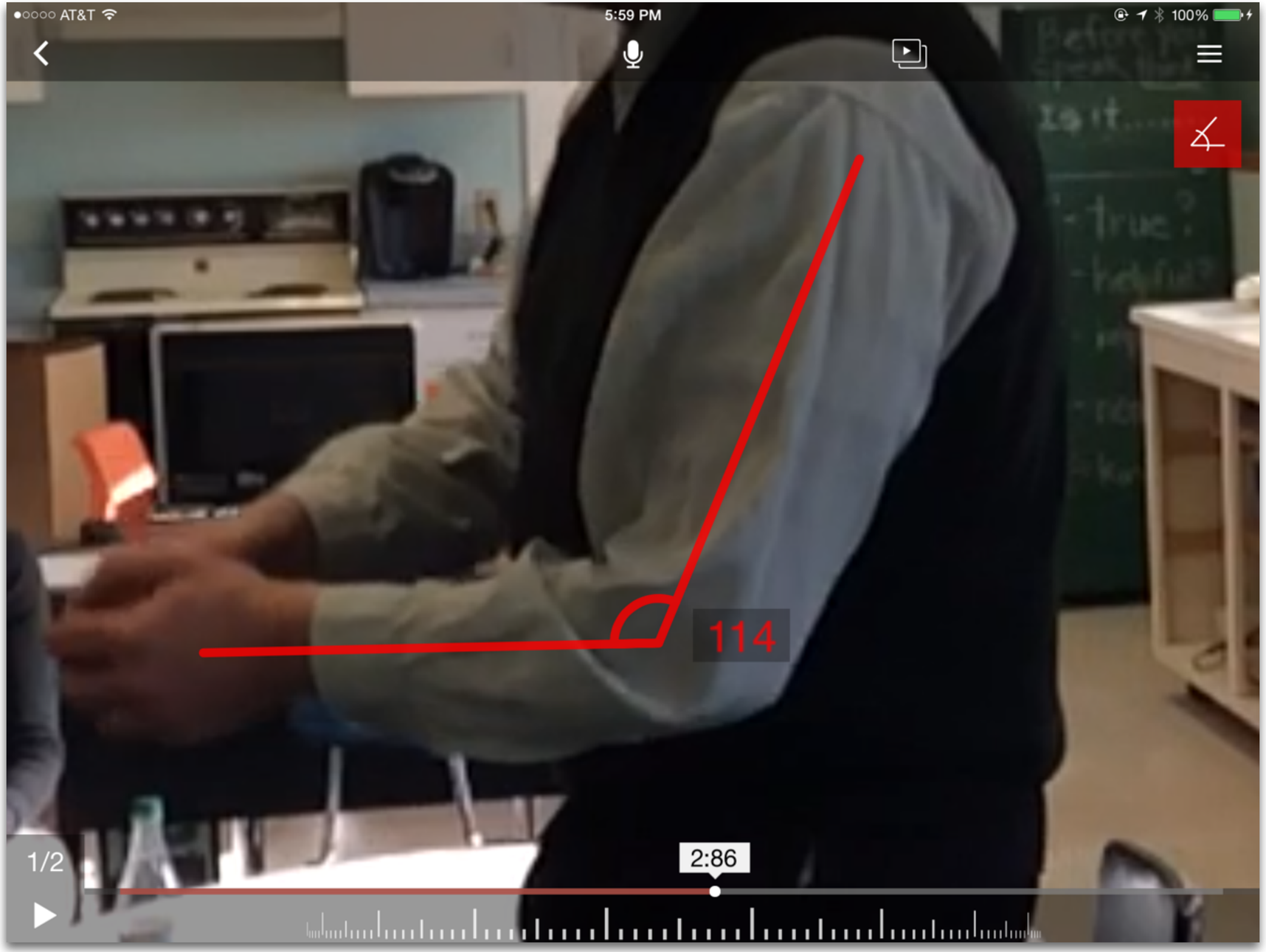
Examples
WolframAlpha
gini usa canada mexico
Mathematics
Words & Linguistics
Units & Measures
Statistics & Data Analysis
People & History
Dates & Times
Chemistry
Culture & Media
Money & Finance
Physics
Art & Design
Socioeconomic Data
Astronomy
Music
Health & Medicine
Examples
History
Favorites
About
Income distribution
United States
Canada
Mexico
Gini index
0.408 (world rank: 96th) (2000)
0.326 (world rank: 30th) (2000)
0.472 (world rank: 123rd) (2010)
income share held by highest 20%
45.82% (world rank: 80th) (2000)
39.94% (world rank: 133rd) (2000)
52.75% (world rank: 35th) (2010)
income share held by second 20%
22.4% (world rank: 37th) (2000)
22.95% (world rank: 11th) (2000)
20.2% (world rank: 128th) (2010)
income share held by third 20%
15.66% (world rank: 66th) (2000)
17.18% (world rank: 21st) (2000)
13.33% (world rank: 123rd) (2010)
income share held by fourth 20%
10.68% (world rank: 80th) (2000)
12.73% (world rank: 29th) (2000)
8.79% (world rank: 121st) (2010)
income share held by lowest 20%
5.44% (world rank: 104th) (2000)
7.2% (world rank: 55th) (2000)
4.93% (world rank: 117th) (2010)
Definitions
Related Wolfram|Alpha queries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114
1/2
2:86

Session 3: ELA, Foreign & Classical Languages

Facione: Critical Thinking – Cognitive Skills and Subskills

Skill	Subskills
Interpretation	Categorization Decoding Significance Clarifying Meaning
Analysis	Examining Ideas Identifying Arguments Analyzing Arguments
Evaluation	Assessing Claims Assessing Arguments
Inference	Querying Evidence Conjecturing Alternatives Drawing Conclusions
Explanation	Stating Results Justifying Procedures Presenting Arguments
Self-Regulation	Self-examination Self-correction

Peter Facione, *Critical Thinking: A Statement of Expert Consensus for Purposes of Educational Assessment and Instruction - Executive Summary*. "The Delphi Report". American Philosophical Association, Committee on Pre-College Philosophy. California Academic Press, 1990

Ten Strategies for Designing Critical Thinking Tasks

- Tasks linking course concepts to students' personal experience or previously existing knowledge
- Explanation of course concepts to new learners
- Thesis support assignments
- Problem-posing assignments
- Data-provided assignments
- Template assignments
- Assignments requiring role-playing of unfamiliar perspectives or imagining "what if" situations
- Summaries or abstracts of articles or course lectures
- Dialogues or argumentative scripts
- Cases and simulations

John C. Bean. *Engaging Ideas: The Professor's Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom, Second Edition*. Jossey-Bass. (2011)

ACTFL Proficiency Guidelines (2012)

	Speaking	Writing	Listening	Reading
Novice	short messages, everyday topics, isolated words/phrases	lists and notes, formulaic information, words and phrases	key words, expressions, simple statements, recognize known phrases	key words, expressions, predictable texts, recognize known text
Intermediate	recombine material, simple questions, sentence-level language	simple messages, simple facts, ideas, connected sentences	sentence-length speech, everyday topics, controlled environment	loosely connected texts, basic information, straightforward texts
Advanced	participatory dialogue, broader topics, paragraph-level	routine texts, factual narratives, paragraph structures	connected discourse, general interest topics, straightforward discourse	main idea of narratives, real-world topics, concrete texts
Superior	accuracy and fluency, abstract elaboration, extended discourse	research texts, complex topics, extended narrative	extended discourse, less familiar topics, specialized narrative	broad range of texts, wide range of subjects, stylistic awareness
Distinguished	articulate users, wide range of concepts, sophisticated discourse	full formal writing, wide range of topics, sophisticated discourse	rich cultural discourse, wide range of topics, sophisticated discourse	wide range of genres, complex topics, sophisticated discourse

ACTFL Proficiency Guidelines. (2012)

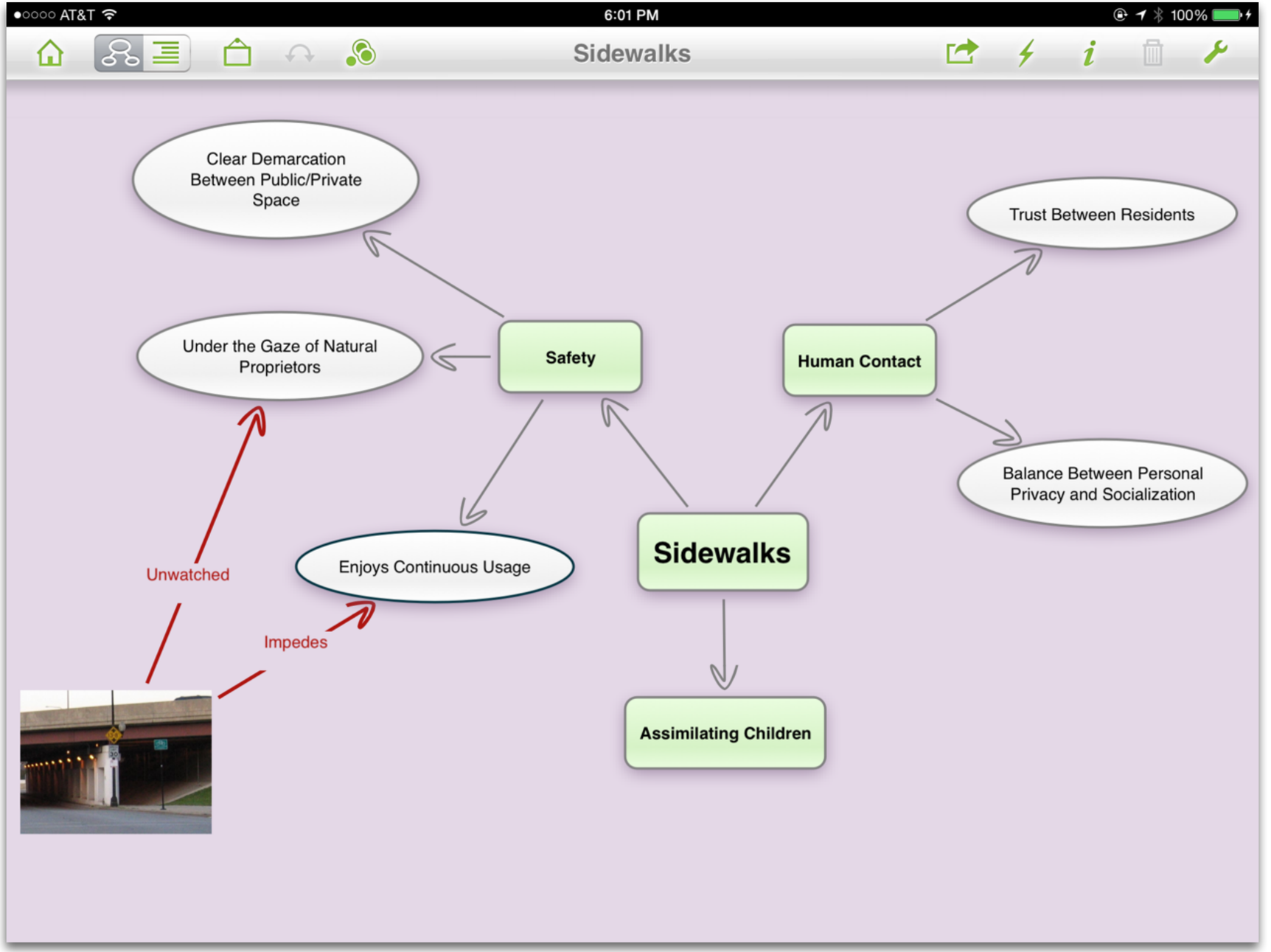
Designing Successful Fluency & Accuracy Activities

- **Characteristics of Successful Fluency Activities:**
  1. Comprehensible input (reading and/or listening texts)
  2. Culturally authentic and personalized information gap:
     a. Genuine (students share authentic information, e.g. their own life experiences)
     b. Contrived (students share information assigned to them, e.g. roleplaying someone else's experiences)
  3. Strategy Instruction
  4. Targeted language functions (e.g. narration, persuasion), text types, modes of language use (e.g. interpretive, interpersonal, presentational)
  5. Accountability phase (demonstration of mastery of skills, concepts, or information via multiple formats, e.g. oral presentation, written report, charts, graphs, digital storytelling)
- **Key Accuracy Components:**
  - Grammatical/Syntactical
  - Pronunciation/Intonation/Spelling
  - Lexicon
  - Sociolinguistic

Benjamin Rifkin. "Guidelines for Foreign Language Lesson Planning." *Foreign Language Annals*, Vol. 36 (2), pp 167-179. (2003)

A Five-Phase Lesson Plan

- **Overview**
  - Statement of goals, learning objectives
- **Preparation**
  - Presentation of listening, reading texts
  - Language processing tasks
  - Cultural context and background
  - Discussion of learning, language processing strategies
- **Drill and Practice**
  - Opportunities for discourse, spoken or written, interpersonal or presentational
  - Drill: teacher-centered
  - Practice: learner-centered
- **Check**
  - Demonstration of mastery of skills, concepts
- **Follow-up**
  - Discussion of outcomes, current and future strategies
  - Larger cultural comparisons, analysis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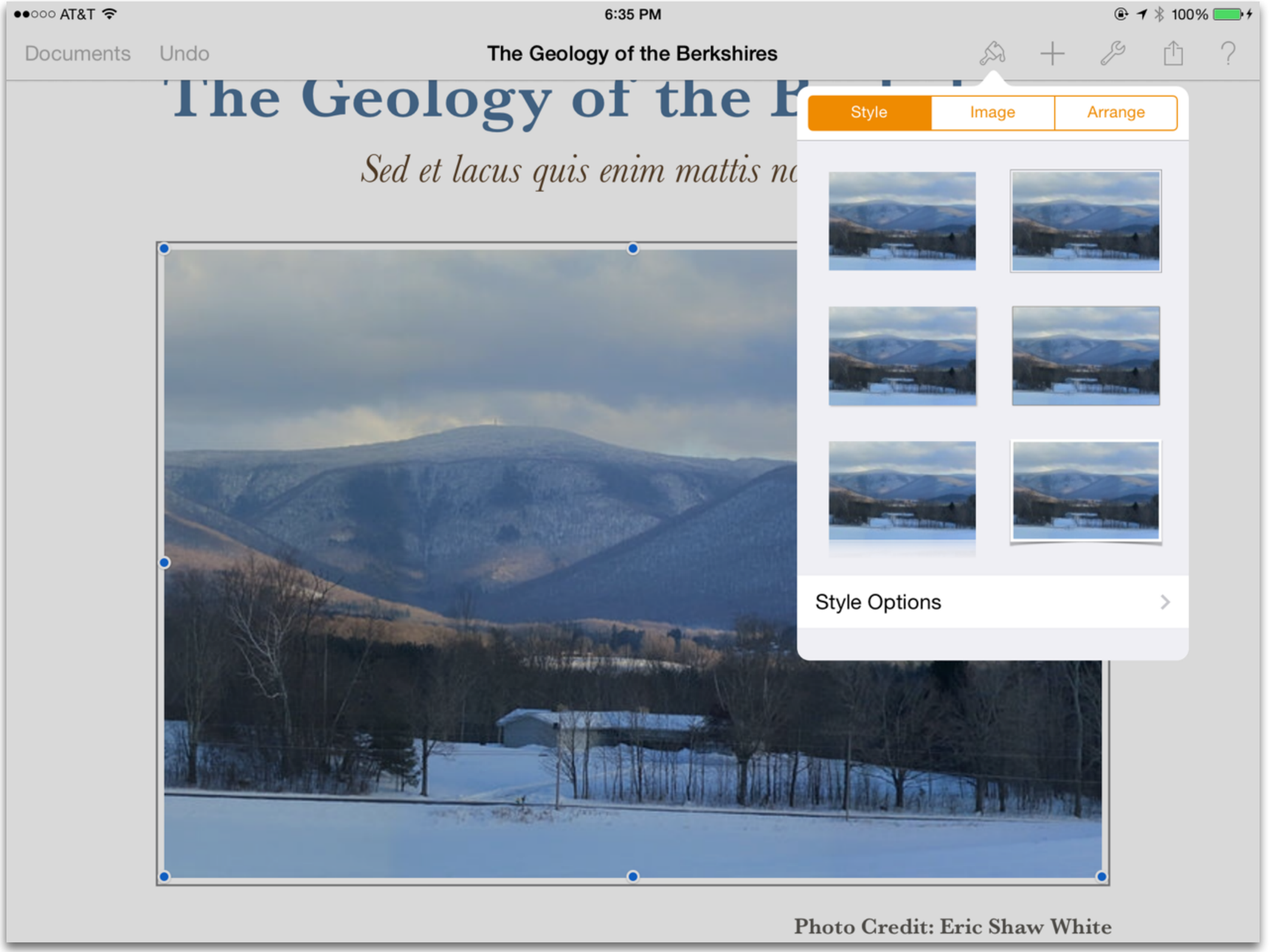
6:01 PM
100%
Sidewalks
Clear Demarcation Between Public/Private Space
Trust Between Residents
Under the Gaze of Natural Proprietors
Safety
Human Contact
Balance Between Personal Privacy and Socialization
Unwatched
Enjoys Continuous Usage
Sidewalks
Impedes
Assimilating Children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Documents
Undo
The Geology of the Berkshires
Style
Image
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Style Options
Photo Credit: Eric Shaw White

Session 4: Visual & Performing Arts, Music

Teaching Visual Culture

Organizer	Primary Level
Society	Art is made by and for people.
Imagination	People use their imaginations to create art.
Point of View/Stance	Art suggests a point of view.
Interpretation	Different people interpret art differently.
Identity	Each person makes art about himself/herself and his/her world.
Culture	The people of each culture make art in their own way.
Mediation	People tell stories through art.
Past/Present	People have always made art.
Form	People design art.
Medium	People make art using a variety of materials.
Inquiry	People make art based on what they see and what they know.
Criticism	People value art for many reasons.
Contexts	Art is a part of everyday life.
Reflective Practice	Art can make people think.
Didactics	Art educates.

Kerry Freedman. *Teaching Visual Culture: Curriculum, Aesthetics, and the Social Life of Art*. Teachers College Press. (2003)

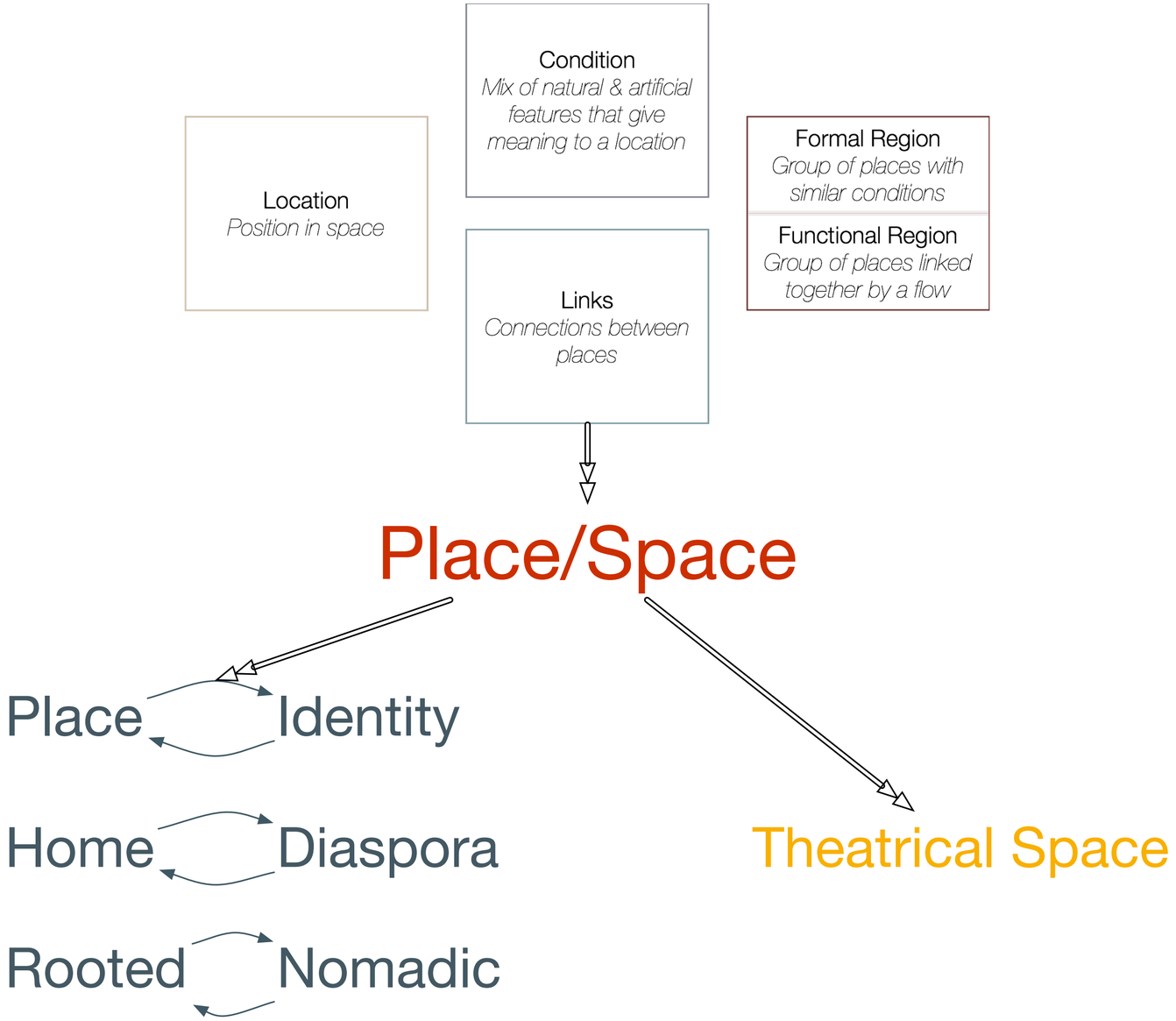
Following a Strand: Culture

- **Primary Level:** The people of each culture make art in their own way.
- **Middle Level:** Art is central to the development of cultures and subcultures, including student subcultures.
- **High School Level:** Art is a cultural carrier; it is shaped by cultural conditions and reveals them.
- **Higher Ed. Foundations:** Art, and its professional communities, promote cultural reification and critique.

influence. The successful journal *Theatre in Education: A Bulletin of the Drama, in University, College, School or Youth Group* ran from 1947 to 1953 and contributed to the dissemination of educational principles and dramatic practices in four issues each year. (It is widely believed that the term 'theatre in education' was coined in the 1960s, but it is interesting to note that the expression was already well known and debated in the 1940s.) The remit of this journal included all kinds of theatre that took place in educational settings, including plays that toured to schools, children's theatre, youth theatre and drama in schools and universities. The first issue in 1947 set the tone for the journal's eclecticism by promising that it would address the following objectives:

1. The importance of the study of drama as a subject in the school curriculum
2. The value of practical dramatic activity as an educational medium. (p. 1)

Helen Nicholson. *Theatre & Education*. Palgrave Macmillan. (2009)



Phil Gersmehl. *Teaching Geography*. The Guilford Press. (2005)
Helen Nicholson. *Theatre & Education*. Palgrave Macmillan. (2009)

Component Skills of Intelligent Musicianship

I. Performance Skills

- A. Social Behavior in Music Settings
- B. Psychomotor Skills/Performance Technique
  1. Tempo/Rhythm
  2. Intonation/Tone Quality/Articulation
  3. Dynamics/Balance
  4. Wind Instruments
  5. String Instruments
  6. Percussion Instruments
  7. Vocal Technique/Tone Quality/Intonation
  8. Conducting
- C. Music Literacy/Aural Analysis
- D. Musical Creativity
  1. Improvisation
  2. Composition

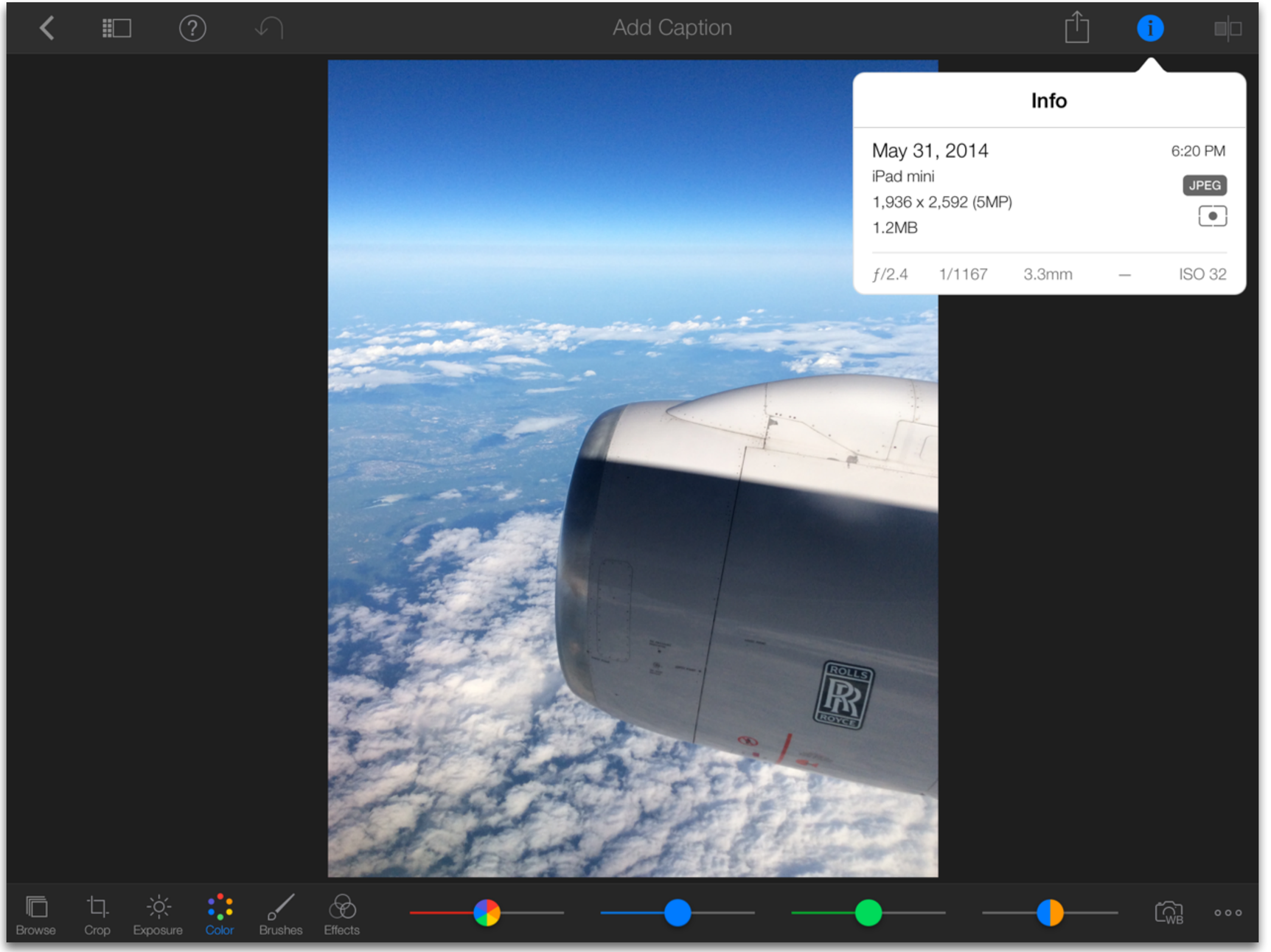
II. Knowledge of Subject Matter

- A. Personal Music Repertoire
- B. Verbalizing about Music/Music Performance Vocabulary
- C. Musical Styles/Genre, Music History
- D. Music Theory
- E. The Music Professions

III. Music Appreciation

- A. Music Listening
- B. Music Criticism

Robert A. Duke. *Intelligent Music Teaching: Essays on the Core Principles of Effective Instruction*. Learning and Behavior Resources. (2009)


Add Caption
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May 31, 2014
6:20 PM
iPad mini
JPEG
1,936 x 2,592 (5MP)
1.2MB
ƒ/2.4
1/1167
3.3mm
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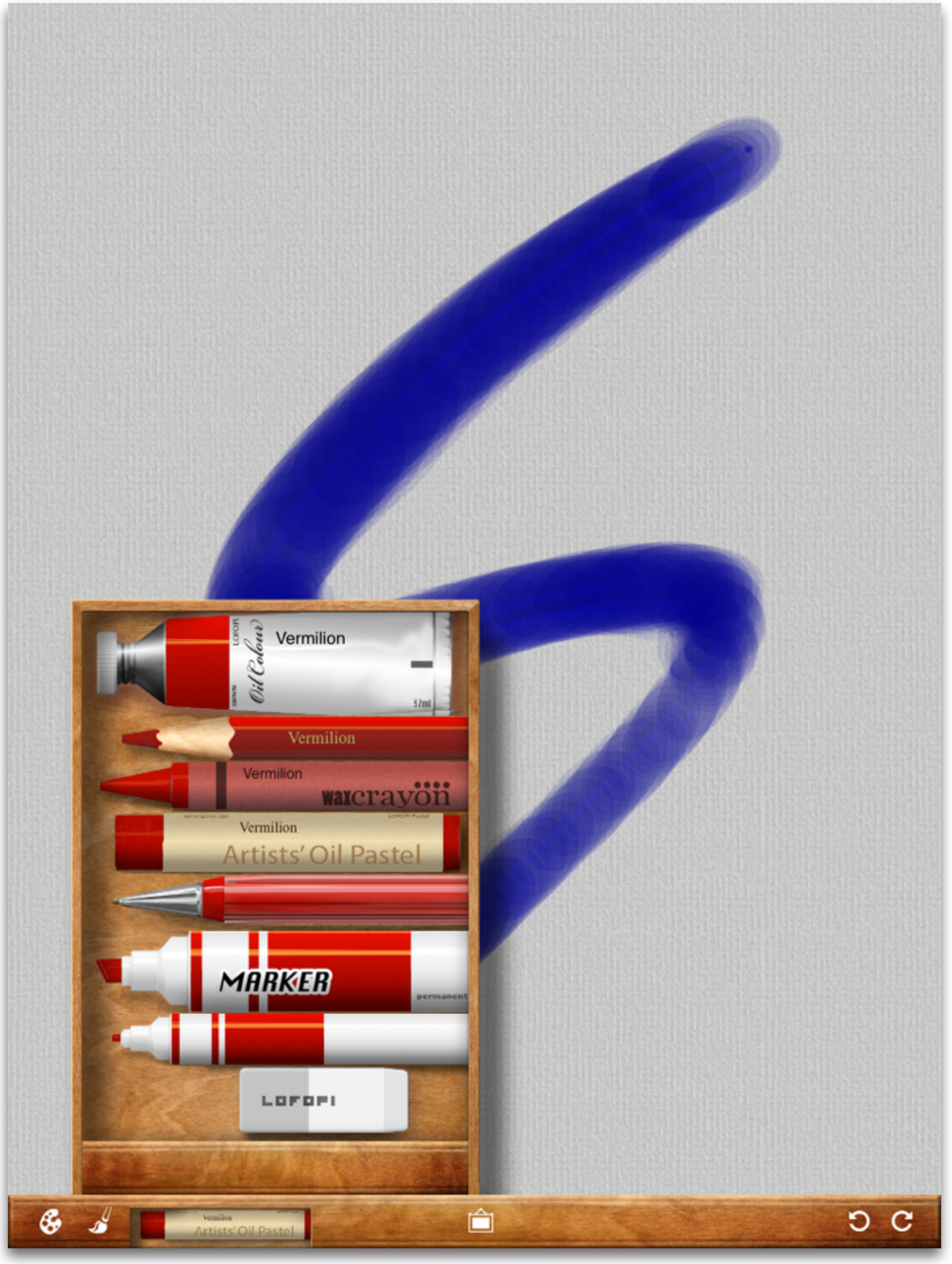
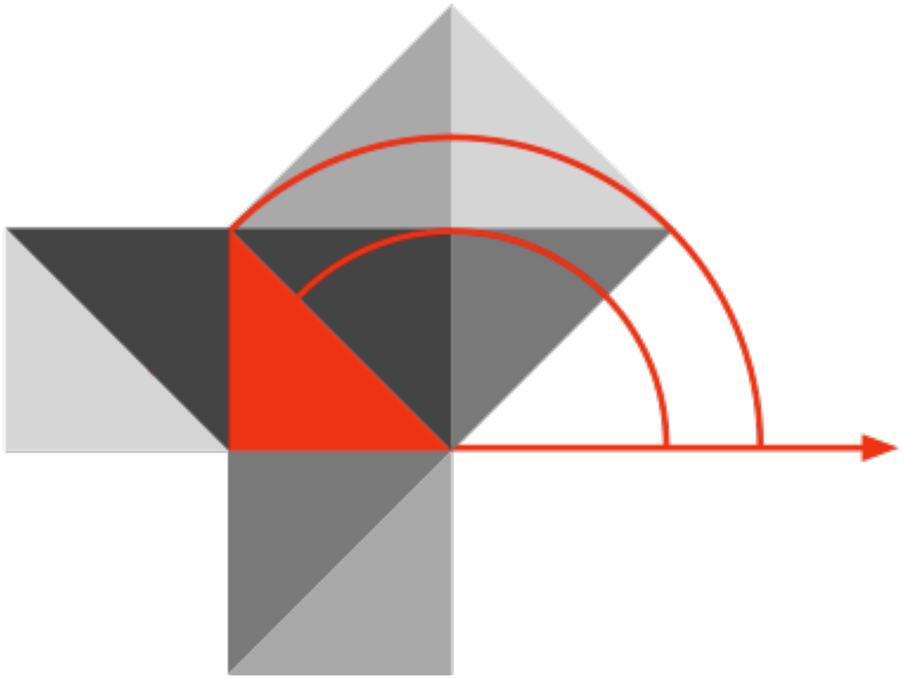
ISO 32
Browse
Crop
Exposure
Color
Brushes
Effects
WB


Vermilion
Oil Colour
Vermilion
Vermilion
wax crayon
Vermilion
Artists' Oil Pastel
MARKER
permanent
LOFOFI

Oil Colour

AT&T
10:38 AM
100%
My Songs
Instruments
1
2
3
4
5
6
7
8
Acoustic
2
1
3
OFF
4
AUTOPLAY
CHORDS
NOTES
Em
Am
Dm
G
C
F
B♭
Bdim

Hippasus



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