

How We Learn
April 2, 2019
Operator Training Committee of
Ohio
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WATER PROGRAMS
SACRAMENTO STATE

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8.00 L \times 3.785 L/gal
= 30.28 gal

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Quiz time

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What was the magic number mentioned yesterday in the Jar test Presentation yesterday to convert gpm/ft² into cm/min?

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Outline

- Definitions
- How we Learn
- Practical Aspect/Implementation

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Learning Objectives

- Understand learning process
- Be able to implement effective leaning strategies
- Be able to recognize less effective strategies in learning

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Hard Water

Coagulant

Detention
Time

Flow Rate

Acre-foot

Langelier
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Learning

- Acquire new knowledge or skills and be able to apply them when needed

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Learning

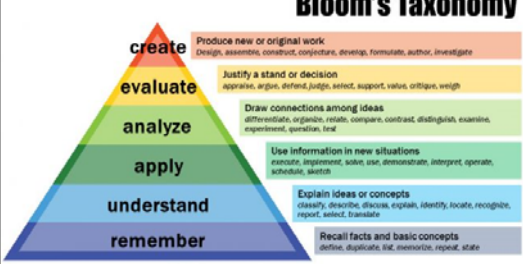
- Learning is Difficult
 - Dispel the notion that Learning is easy
 - Struggling is part of the process
 - Setbacks and failures
 - Effort contributes to change in brain




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Ultimate Objective of Teaching

Bloom's Taxonomy



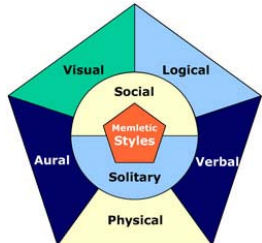
Vanderbilt University Center for Teaching
<https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/>




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Learning Style

- Visual
- Auditory
- Reading
- Kinesthetic
- Not supported by evidence

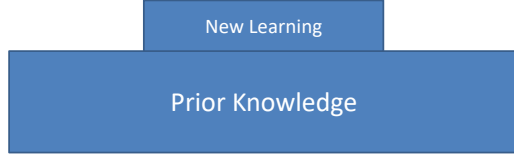



<http://www.learning-styles-online.com/overview/>



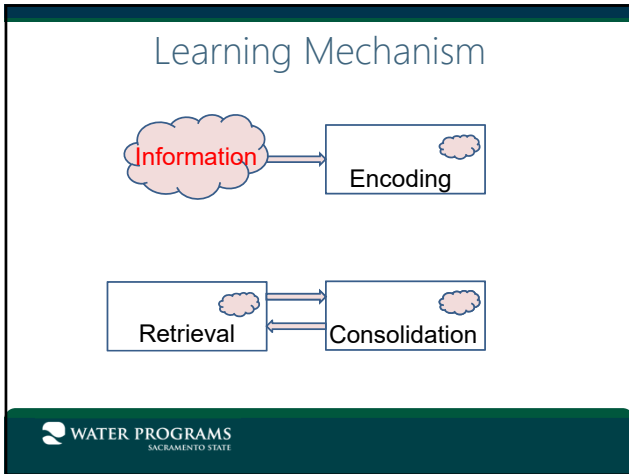
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Learning





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Memory

- Storage Strength
- Retrieval Strength

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Retention

- Consistency of effort
 - Study ritual, time, place, schedule, etc.
- Context and Memory
 - Jump School example

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Strategies for Effective Learning

The diagram features a central hexagon with the letters 'LS' and the word 'Scientists' written inside. Surrounding the hexagon are six learning strategies: 'ELABORATION' at the top, 'RETRIEVAL PRACTICE' at the top-right, 'SPACED PRACTICE' on the right, 'DUAL CODING' at the bottom-right, 'INTERLEAVING' at the bottom-left, and 'CONCRETE EXAMPLES' on the left.

Taken from www.learningscientists.org

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Strategies for Effective Learning

- Retrieval Practices
- Spaced Practices
- Dual Coding
- Interleaved practices
- Concrete Examples
- Elaboration

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Retrieval Practices

- Practice bringing information from long-term memory
 - Self-quizzing
 - Gauge what you know
 - Primary study strategy
 - Do this periodically
 - Rereading is not effective

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Spaced Practices

- Set a schedule overtime
- No cramming session
 - Short-term may work
- Space Out these Practices
 - Study more than once but with time in between
 - Plan self-quizzing session
 - Flash cards

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Dual Coding

- Combine words and graphics
- Infographics

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Interleaving Practices

- Switch between topics
 - Sedimentation, filtration, and disinfection
 - F/D/S; D/S/F
- Examples
 - Alternate smaller chunks
 - Spacing out retrieval practices (previous strategy)
 - Myth – Focusing on one topic in an extended session is more effective

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Concrete Example

- Practical examples for abstract ideas
 - Micron

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Elaboration

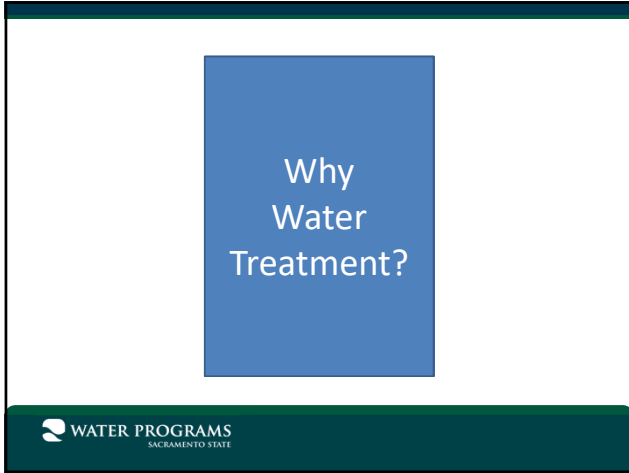
- Asking why and how things work
 - Why coagulation and how does it work?

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Other Strategies

- Generation
 - Answer questions before learning key points of a new topic
- Reflection
 - Ask questions about new learning
- Calibration
 - Inventory of what you know and do not know

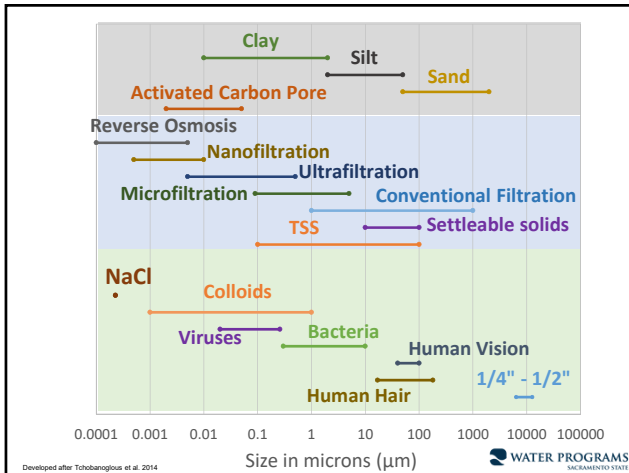
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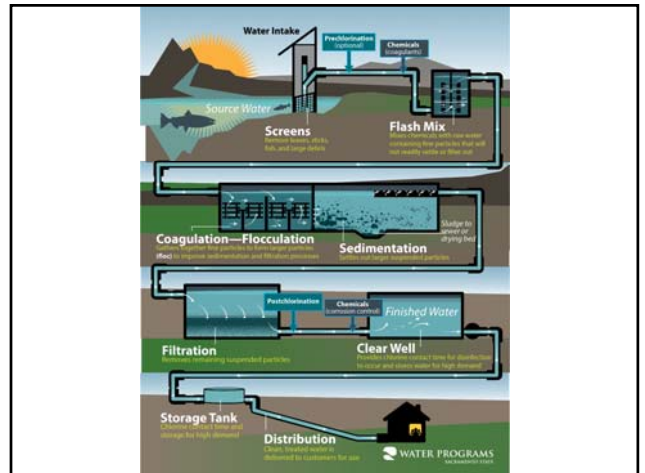
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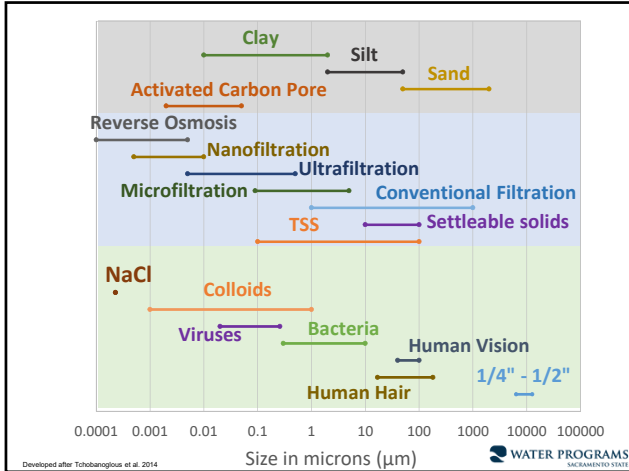
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Learning Again

- Mastery – A Journey not a tour
 - Gradual knowledge accumulation
 - Conceptual understanding
 - Judgment
 - Skills

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Effort

- Reconsolidate Memory
- Create Mental Models
- Mastery
- Conceptual Learning
- Improve Versatility
- Priming the Mind

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Learning Mechanism

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Multitasking Exercise

- [Exercise](#)

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Exercise – Multi-Tasking

- Task 1
- Task 2
- Task 3

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Questions?

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