

ChEn / MEEEn 522 Combustion

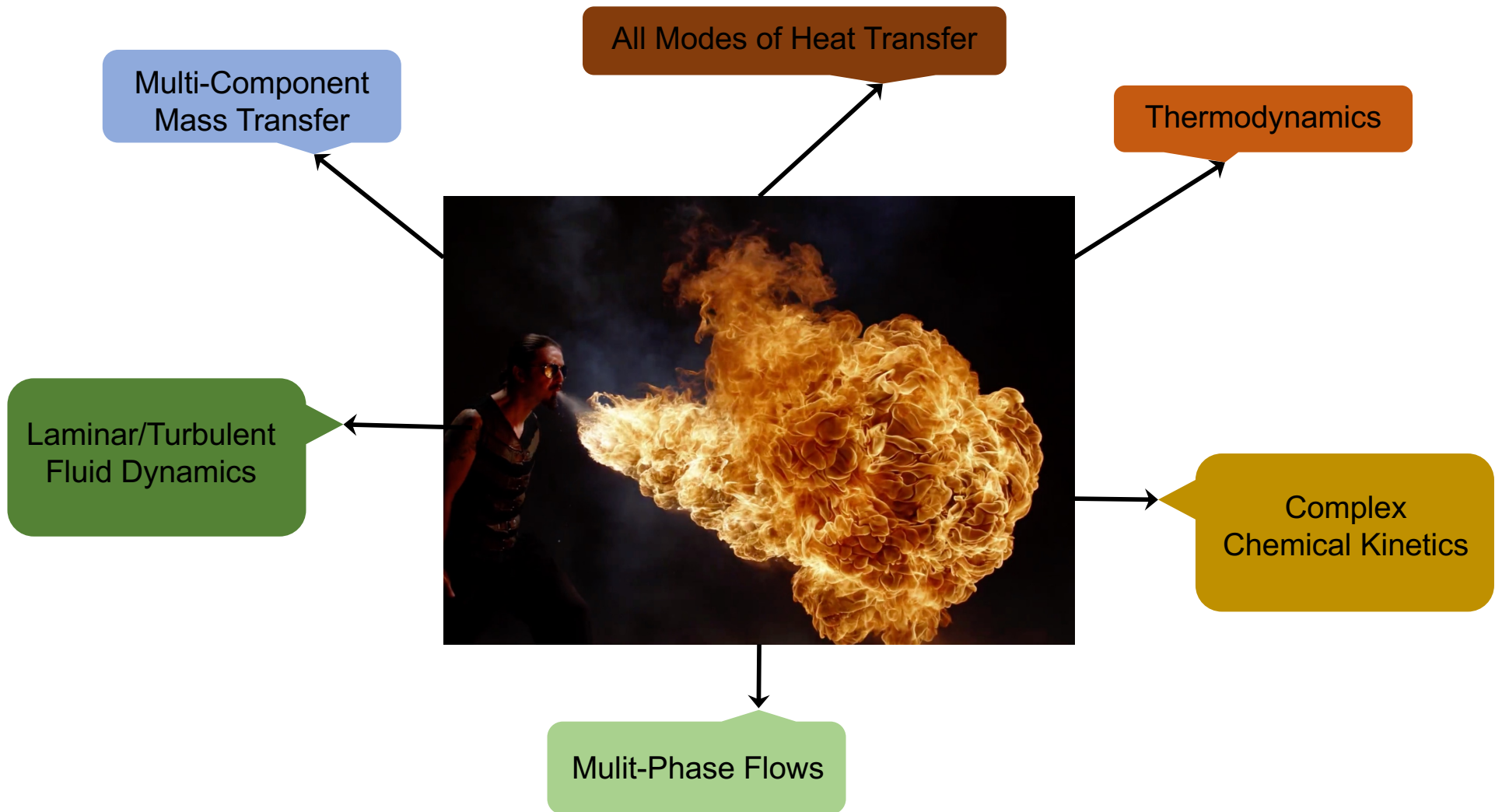


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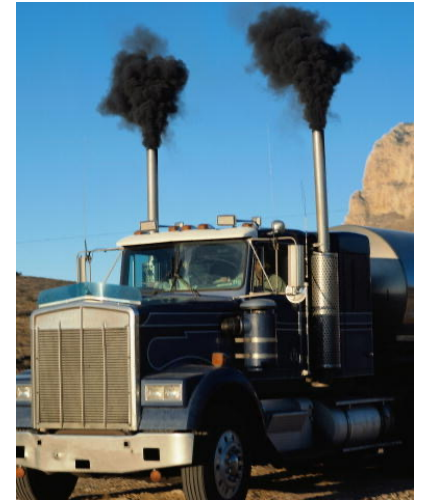
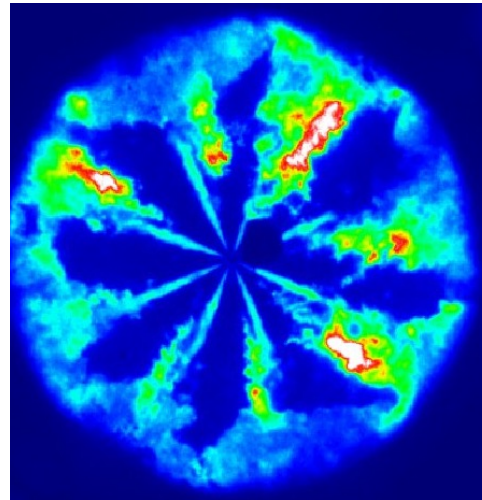
Combustion Physics



Fuels

Mostly Hydrocarbons, all three Phases

- Gas (natural gas, light hydrocarbons)
- Liquid (diesel, gasoline)
- Solid (Coal, Biomass)



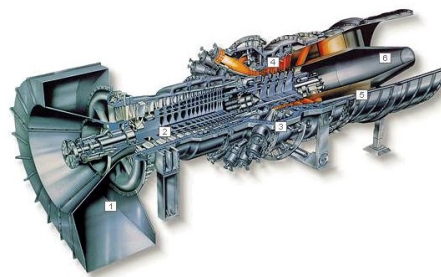
Pollutants

- NO_x
- SO_x
- P.M.
 - Soot
 - Ash
- Metals
- Unburnt HCs



Applications

- Heating
 - Furnaces
 - Boilers
 - Stoves
 - Process Heat
- Power/Electric
 - Coal PP
 - Gas Turbines
- Military/Space
 - Rockets, Missiles
- Hazards
 - Fires
 - Explosions
 - Detonations
- Transportation
 - Turbines
 - Engines
- Other
 - Catalytic combustion
 - Metal combustion
 - Particle synthesis



Study techniques...

Learning is deeper and more durable when it is effortful. Learning that's easy is like writing in the sand, here today and gone tomorrow.

Rereading text and massed practice of a skill or new knowledge are by far the preferred study strategies of learners of all stripes, but they're also among the least productive.

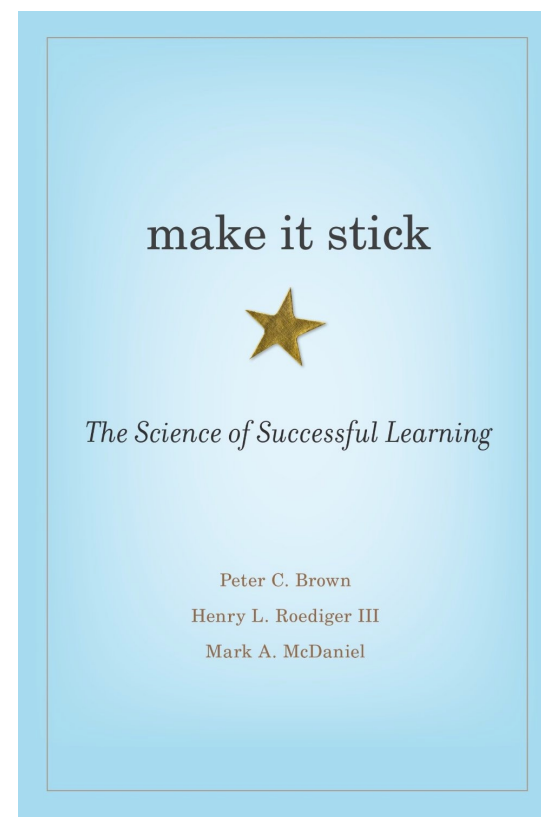
Retrieval practice—recalling facts or concepts or events from memory—is a more effective learning strategy than review by rereading.

Elaboration is the process of giving new material meaning by expressing it in your own words and connecting it with what you already know.

Students who don't quiz themselves (and most do not) tend to overestimate how well they have mastered class material).

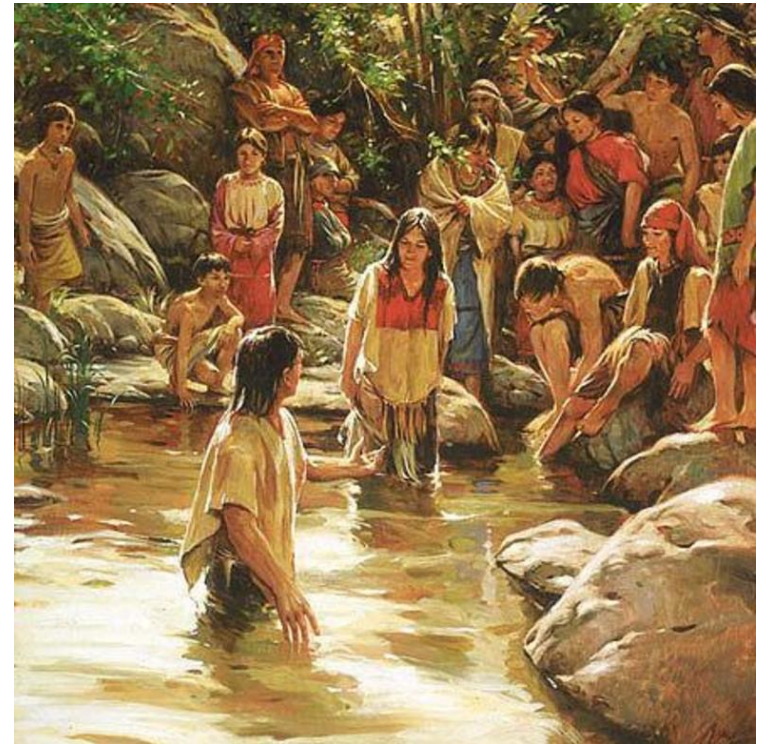
One of the best habits a learner can instill in herself is regular self-quizzing to recalibrate her understanding of what she does and does not know.

From “Make it Stick, The Science of Successful Learning” by Brown, Roediger, and McDaniel



Mosiah 18:30

30 And now it came to pass that all this was done in Mormon, yea, by the ^awaters of Mormon, in the forest that was near the waters of Mormon; yea, the place of Mormon, the waters of Mormon, the forest of Mormon, how beautiful are they to the eyes of them who there came to the knowledge of their Redeemer; yea, and how blessed are they, for they shall ^bsing to his praise forever.



<https://history.churchofjesuschrist.org/exhibit/scenes-from-the-land-of-promise-book-of-mormon-paintings-by-walter-rane>

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Perspectives

Teach Me to Love Botany

Barbara Sorensen Stoutner
Ensign vol 13 issue 7, 1983

Teach me that in mitosis there are two replications of chromosomes and in meiosis only one.

Teach me that there is secondary growth in dicotyledons but not in monocotyledons because monocotyledons do not have cambia.

Teach me that I can get a grade symbolizing a knowledge of botany if I study two hours out of class for every hour in.

Teach me that if I endure the semester, I can graduate and never have to know about botany.

Teach me to marvel at the intricate difference between meiosis and mitosis.

Teach me to wonder in awe how a majestic tree developed from a tiny seed containing two cotyledons.

Teach me to know in humility that all of the textbooks of men cannot reveal the secrets contained in a tiny blade of grass.

Teach me to love botany, and a lifetime's search for knowledge will not be able to quench the thirst you created.



<https://swanhose.com/blogs/general-watering/how-does-water-its-amount-its-quality-affect-plant-growth>