

# Nuclear Content in Alberta Grade 12 Science Education

Leon Lau

[LHLAU@CBE.AB.CA](mailto:LHLAU@CBE.AB.CA)

Nuclear Education  
Outreach 2010

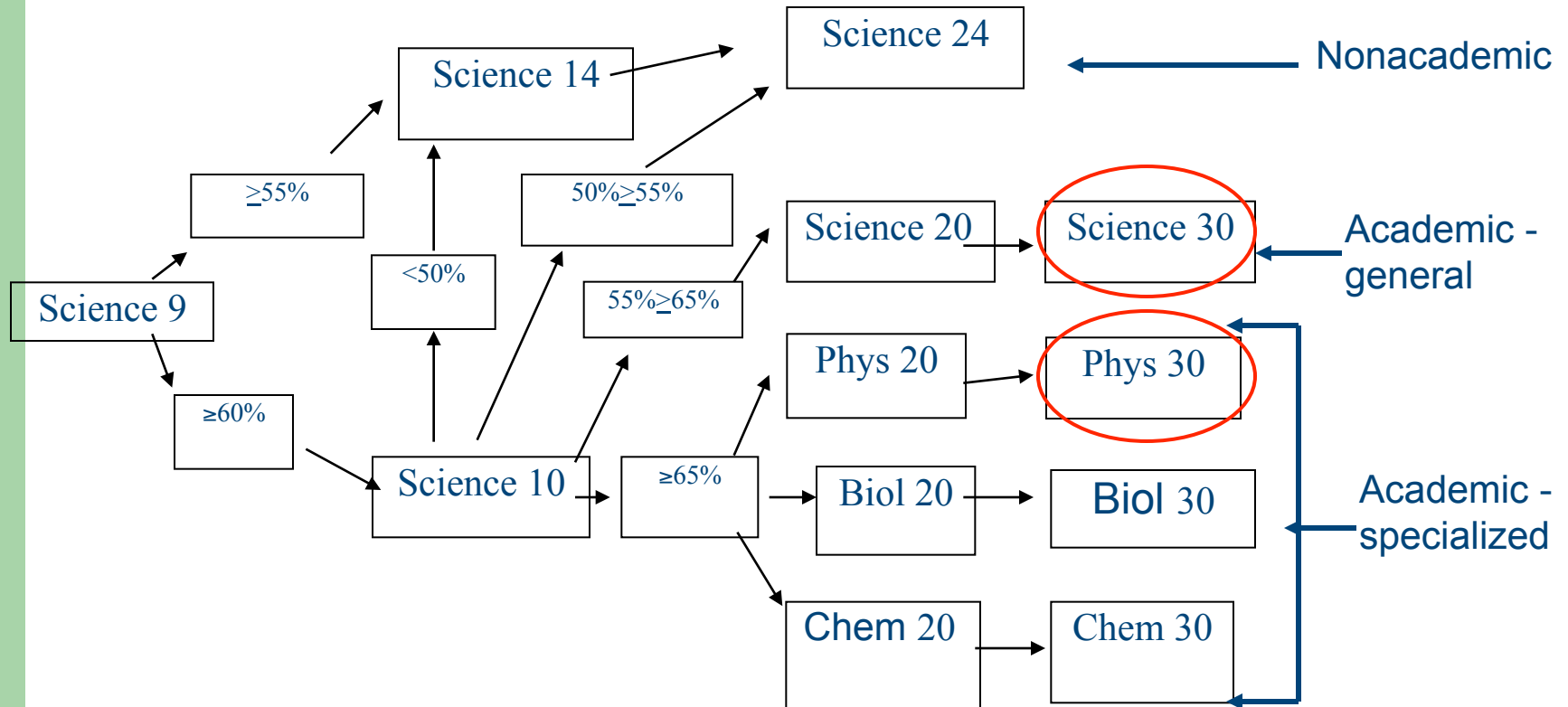
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# Agenda

- Science Education streams in Alberta high schools
- Abilities and background of students
- Nuclear content in Science 30 and Physics 30
- Environmental Sustainability (Science 30)
- Community Involvement

# Science Streams

- Grade 10: two streams
- Grade 11 and 12: three streams



# Students' background

- Science 30
  - Headed for non-science post-secondary studies
  - If enrolled in other science courses, usually Biology 30
  - Weak to moderate math & abstract skills
  - Very low enrolment (45 of 500 students)
- Physics 30
  - Headed for math/science post-secondary studies
  - Usually take other (or all) academic specialized courses
  - Moderate to strong math & abstract skills
  - Low enrolment (150 of 500 students)

# Course description

- Science 30
  - Chemistry, Biology, physics (Fields, Circuits, EMR) and Energy (Renewable and non-renewable)
  - General, brief coverage
  - Many links to everyday applications
- Physics 30
  - Momentum, Fields, EMR, Atomic Physics
  - History of theories, key experiments, development of formulas
  - Little links to everyday application

# Science 30 Nuclear Content

- Emission and absorption spectra (in analyzing gases in stars)
- Alpha, beta, and gamma decay
  - Balanced nuclear equations
  - Fission and fusion
  - Chain rxn, CANDU, moderator
  - $E = mc^2$  (no formula rearrangement)

# Science 30 Nuclear Content

- Nuclear energy as sustainable energy
  - Ecological, Economical, and societal impact of all energy sources
  - Nuclear waste management
  - “Dreams” of cold fusion

# Physics 30 nuclear content

- History of the atomic theory, models and corresponding experiments
- Emission and absorption spectrum
- Binding energy, mass defect,  $E = mc^2$ ,
- Alpha, beta, and gamma decay
  - Includes formula rearrangement!
  - Discussion on neutrino, strong and weak nuclear forces,

# Physics 30 nuclear content

- Radioactive hazards and measurements
- Decay series, rates, and application
  - E.g. irradiation, industrial measurements
- Fission and Fusion
- Nuclear research
  - Synchrotrons, Standard Model

# Community Involvement

- A “Homer Simpson”
  - Nuclear safety
  - Planning
- Nuclear scientist, radio-physician
- Urban planner
- Electrical engineer (efficiency in Science 30)