Case Studies in Teaching Science

The use of a story to deliver an educational message.
Why bother?

• Another form of active learning & class flipping.

• Case studies are well-established as effective.

• Integrates ‘real world’ problem-solving/critical thinking.

• Facilitates ‘soft skill’ building.
Types of case studies

Interrupted Case - progressive information & discussion
Content Case - center on important concept
Trigger Case - beginning of module/course section
Capstone Case - end of module/course section
Journal Case - take paper and turn into case study
Analysis Case - look at historical example
Decision Case - decide what to do to solve dilemma
Directed Case - closed-ended questions
Clicker Cases – student answer/voting using clickers in class
Content available online:

Enduring Legacies Native American Case Studies: [http://www.evergreen.edu/tribal/cases/](http://www.evergreen.edu/tribal/cases/)


Biotech Simulation Cases (chem, biol): [www.caseitproject.org](http://www.caseitproject.org)


Links to many different websites: [sciencecasenet.org/](http://sciencecasenet.org/)

Emory University (mostly K-12 and not peer reviewed): [http://www.cse.emory.edu/cases/](http://www.cse.emory.edu/cases/)

UCLA Statistics: [http://www.stat.ucla.edu/cases/](http://www.stat.ucla.edu/cases/)

SHiPs Science Teacher Resources [http://www.shipseducation.net/](http://www.shipseducation.net/)
Useful references


Journal Case Study –
Miller’s Amino Acids from Inorganic Molecules
Mary Koyuk is a UAS student who often trades food she harvests with her neighbors, family, and friends. .............. She grew a bit concerned that Jim might have mistakenly given her fillets that were not the king salmon she anticipated.

What steps should Mary take to determine whether she received king salmon filets from Jim?

➔ Describe the relationship of cells, chromosomes, and DNA
➔ Understand DNA replication and mutation.
➔ Design experiments to isolate and compare filet DNA to control(s).
➔ Predict and interpret results of DNA experiments.
Case of the Mystery Salmon – BIOL 105

What steps should Mary take to determine whether the filets she received are kings?

Where is DNA located?

How would you isolate and extract it?

--Students extract salmon DNA.

How would you determine whether Mary’s filets contain king salmon DNA?

--Students set up experiment w/ positive and negative controls.

--Students cut and visualize filet DNA and compare to known salmon DNA.

Did Mary get the filets she was promised?

--Students discuss DNA applications and biotechnology strengths/limitations.
Interrupted Case Study – The Shifty Salmon and Trout of Auke Creek

Alaska Department of Fish and Game (ADFG) Biologist Esther Aproblum is charged with ensuring that salmon in Southeast Alaska are harvested at a rate that maximizes harvest by commercial, sport, and subsistence users without compromising the long term health of these species and populations.
Is change in run timing genetic or plastic? Which evolutionary forces might be responsible?

Interpret figs. Design experiments. Identify and tease-apart evolutionary forces.
Case Studies in Teaching Science: using stories to deliver educational messages.

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**Some case study repositories**
- Enduring Legacies Native American Case Studies: [http://www.evergreen.edu/tribal/cases/](http://www.evergreen.edu/tribal/cases/)
- Science Case Studies U Buffalo. Has about 600 cases in math and sci: [sciencecases.lib.buffalo.edu/cs/](http://sciencecases.lib.buffalo.edu/cs/)
- Biotech Simulation Cases (chem, biol): [www.caseitproject.org](http://www.caseitproject.org)
- Links to many different websites: [sciencecasenet.org/](http://sciencecasenet.org/)
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**More references**