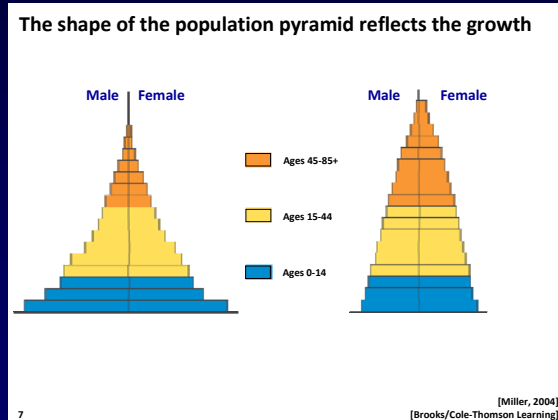


Rethinking the Design of Teaching Slides

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College of Engineering
Pennsylvania State University
University Park



In 1987, an entrepreneur and a computer scientist created PowerPoint for sales presentations

Click to edit Master title style

Title Area for AutoLayouts

- Click to edit Master text styles
 - Second level
 - Third level
 - Fourth level
 - Fifth level

Object Area for AutoLayouts

(date/time) Date Area (footer) Footer Area (#) Number Area

[Gomes, 2007]
[RobertGaskins.com, 2007]

Surprisingly, PowerPoint's defaults are not based on any research

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Click to edit Master text styles


- Click to edit Master text styles
 - Second level
 - Third level
 - Fourth level
 - » Fifth level

Phrase headlines

Large blocks of bulleted text

[Mayer, 2001]
[Sweller, 2005]
[Shaw et al., 1998]

Most slides are heavily influenced by the defaults of PowerPoint

 Our Decision

- Do not reprocess in the United States
- Do not send spent fuel to France for reprocessing.
- Wait for GNEP and new reprocessing methods to be developed.
 - Less chance for the proliferation of nuclear weapons.
 - New technology uses recycled fuel more efficiently.

Topic-Subtopic:
50%

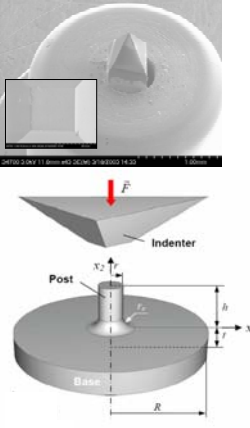
45 words

[Gaudelli et al., 2008]

Most slides are heavily influenced by the defaults of PowerPoint

Micro-compression

- MTS Nano Indenter XP
 - Modified Berkovich Indenter
 - Load applied with coil/magnet assembly
 - Load Resolution 50nN
 - Displacement measured with capacitance gauge
 - Sub nm displacement resolution
- Specimen
 - 300 nm to 20 μm diameter
 - fixed base



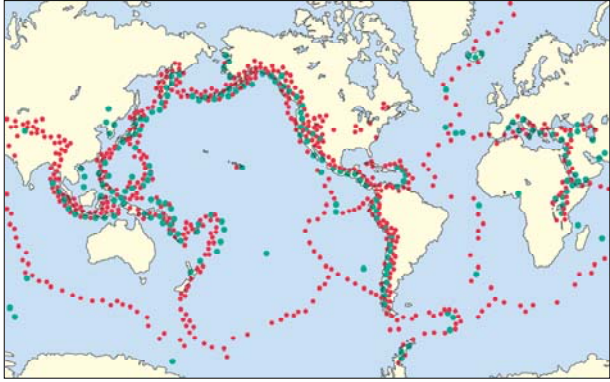
Topic–Subtopic and Image: 18%

33 words

[Gaudelli et al., 2008]

This workshop presents an assertion–evidence (A–E) structure that challenges PowerPoint’s defaults

Volcanoes and earthquakes occur along the boundaries of plates

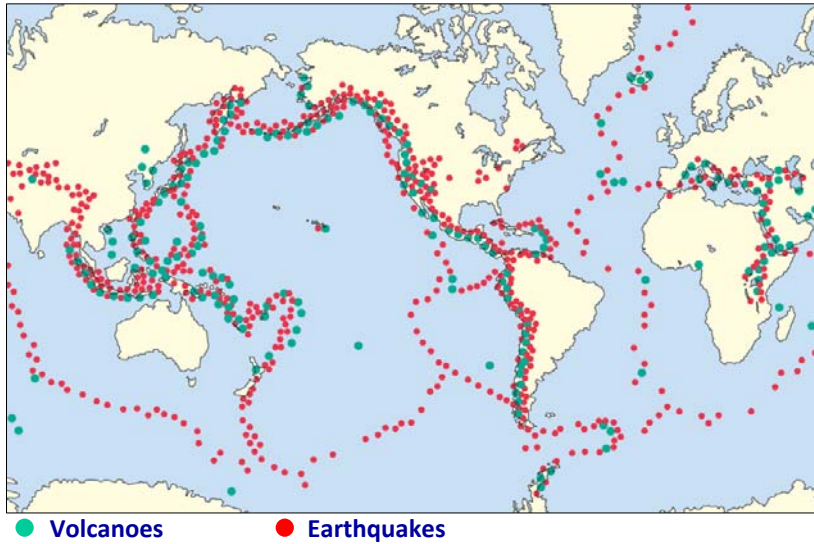


● Volcanoes ● Earthquakes

[Brooks/Cole-Thomson Learning]

[Alley, 2003]
[Atkinson, 2005]
[Dumont, 2007]

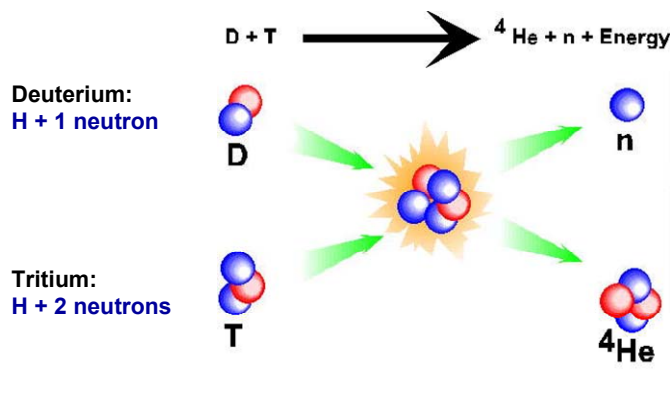
Volcanoes and earthquakes occur along the boundaries of plates



[Brooks/Cole-Thomson Learning]

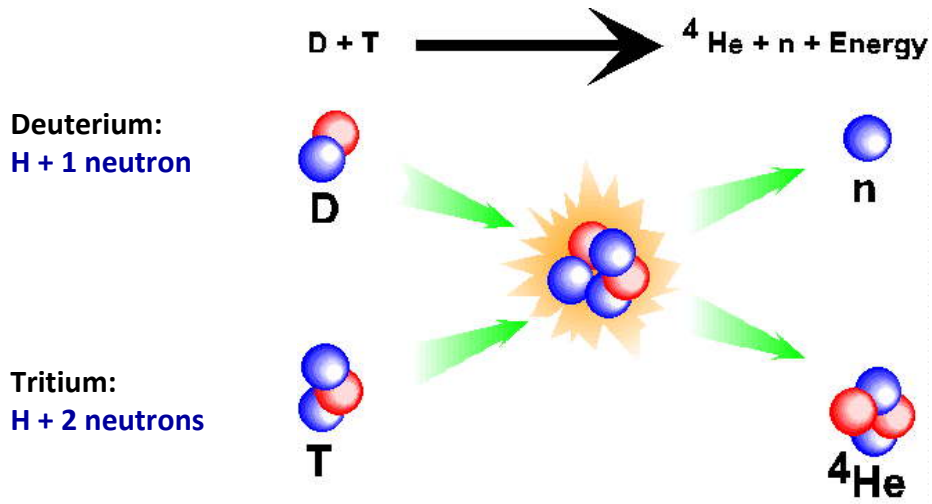
The A–E structure calls for a sentence headline that succinctly states the slide’s main assertion

Nuclear fusion combines deuterium and tritium to form helium and energy



[Toulmin, 2001]
[Cook, 2005]

Nuclear fusion combines deuterium and tritium to form helium and energy



In a pilot study, we tested the A-E structure for the teaching slides of a large geology course

Message delivered with typical slide design

Students: Fall 2004

Comparison: Test scores on same questions

Same message delivered with new slide design

Students: Fall 2005

[Alley et al., 2006]

The figure is a flowchart on a dark blue background. It compares two teaching methods. The top path shows a lecture slide with a 'typical slide design' (bullet points and a map) leading to a classroom of students in 'Fall 2004'. The bottom path shows the same lecture slide with a 'new slide design' (more structured layout) leading to a classroom of students in 'Fall 2005'. A large white arrow on the right points from the 2004 group to the 2005 group, labeled 'Comparison: Test scores on same questions'. A citation '[Alley et al., 2006]' is at the bottom right.

When the tested assertion was in the sentence headline, students performed significantly better



Message delivered with typical slide design



Students: Fall 2004



Comparison:
Test scores on
same questions



Same message delivered with new slide design



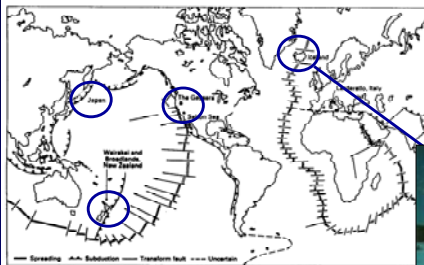
Students: Fall 2005



[Alley et al., 2006]

The A-E structure also calls for supporting that sentence-assertion headline with visual evidence

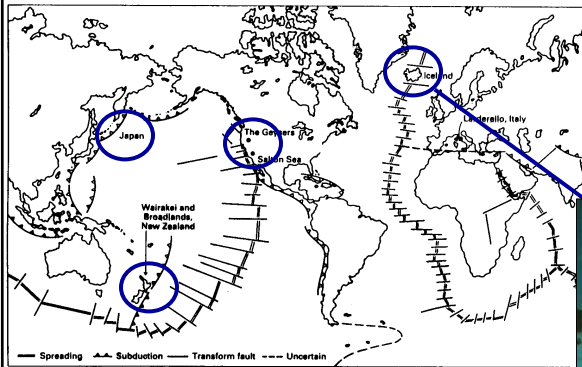
The best places to harness geothermal energy are at the plate boundaries



Iceland is almost entirely run on geothermal energy

[Mayer, 2001]
[Sweller, 2005]
[Shaw et al., 1998]

The best places to harness geothermal energy are at the plate boundaries



Iceland is almost entirely run on geothermal energy

According to Paivio, having images doubles the retention of the corresponding terms

Torus satellite

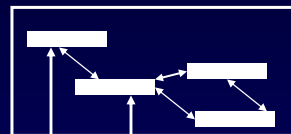


"Torus Satellite"

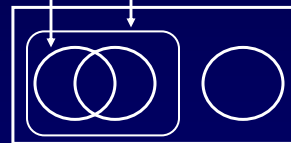


[sghealth, 2004]

Verbal System

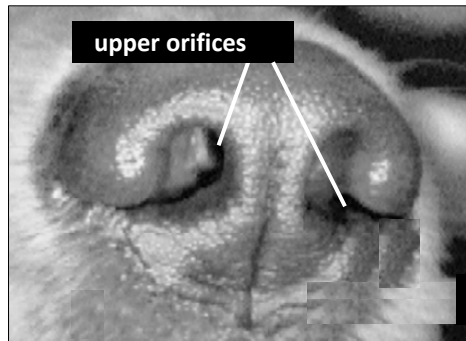


Nonverbal System



[Paivio, 1986]

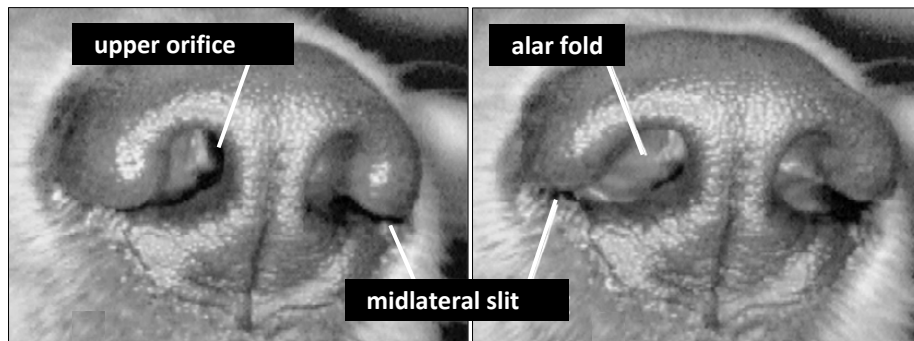
When a dog inhales, the dog simply breathes in through the upper orifices of its nose



[Settles et al., 2002]



When a dog exhales, folds cover the upper orifices, forcing the air out through the midlateral slits



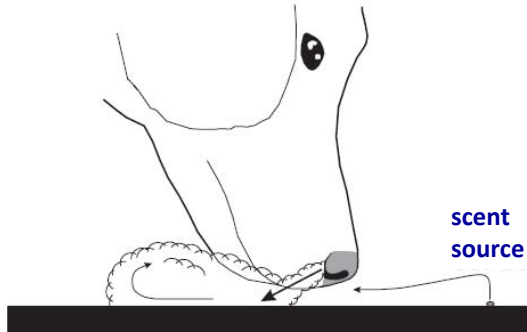
Inhalation

Exhalation

[Settles et al., 2002]



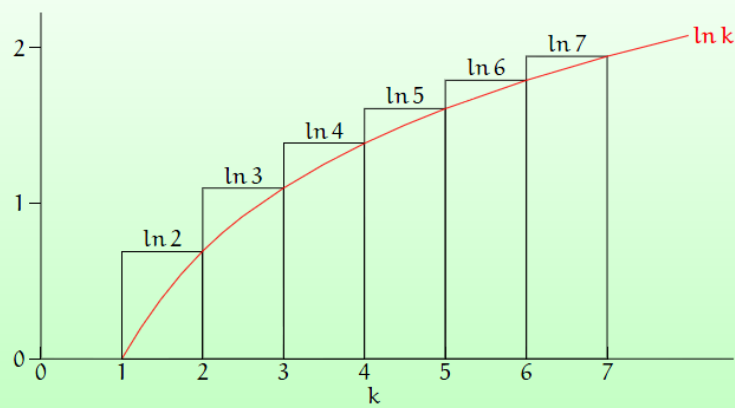
Exhaling through the midlateral slits does not disturb the vapor stream from the scent source



[Settles et al., 2002]



$\ln n!$ is the area of the rectangles



$$\ln n! = \sum_1^n \ln k$$

Finally, the assertion–evidence structure calls for challenging the defaults of PowerPoint

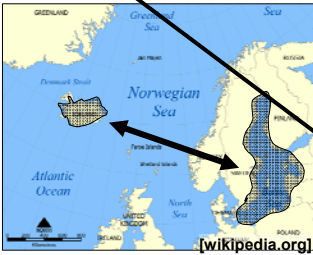

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 - » Fifth level

[Alley, 2002]
[Atkinson, 2005]
[Dumont, 2007]
[Carney & Levin, 2008]

Research Question

- Do the dunlins of Iceland and the Baltic Sea are different subspecies?
- If so, because the population of the Baltic dunlins is declining, it may be a threatened subspecies



©Lars Erik Johannessen

[wikipedia.org]

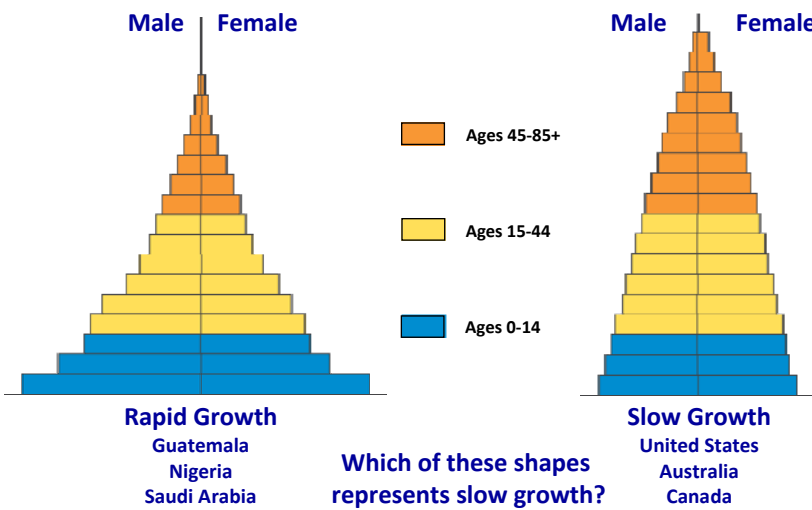
The research question is whether the dunlins of Iceland and the Baltic Sea are different subspecies



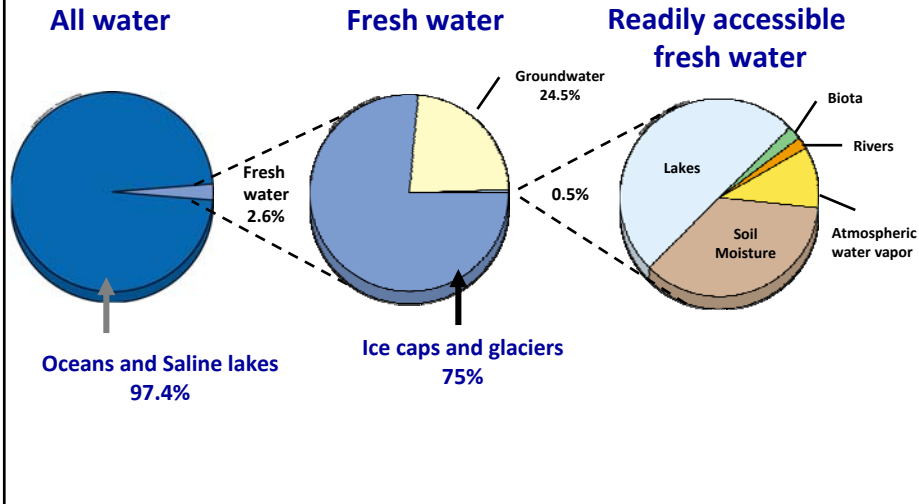
Because the Baltic dunlins population is declining, it may be a threatened subspecies



The shape of the population pyramid reflects the growth

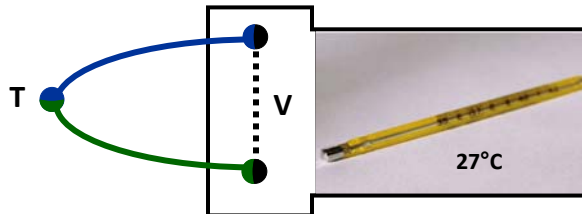


Only about 0.5% of all the water on earth is fresh water that is readily available for human use



Knowing the voltmeter temperature can let us determine the unknown temperature

For the circuit shown,
 $V = 8.22 \text{ mV}$
 For a Type J, find T



Law of Intermediate Temperatures says that—

$$V_{T-0} = V_{T-27} + V_{27-0}$$

$$?? = 8.22 + 1.38 = 9.6 \text{ mV}$$

$$\therefore T = 179^\circ\text{C}$$

