Science Critical Thinking Question #1

Rain Forests
Increasing? or Decreasing?

Tear down the Amazon rainforest idol
'Save the trees' more political myth than environmental truth

New York Times (29 Jan 2009) Here, and in other tropical countries around the world, small holdings like Ms. Ortega de Wing's — and much larger swaths of farmland — are reverting to nature, as people abandon their land and move to the cities in search of better livings.

These new “secondary” forests are emerging in Latin America, Asia and other tropical regions at such a fast pace that the trend has set off a serious debate about whether saving primeval rain forest — an iconic environmental cause — may be less urgent than once thought. By one estimate, for every acre of rain forest cut down each year, more than 50 acres of new forest are growing in the tropics on land that was once farmed, logged or ravaged by natural disaster.

Amazon rainforest vanishing at twice rate of previous estimates

UK Guardian (21 Oct 2005) The Amazonian rainforest is being destroyed at double the rate of all previous estimates, according to research published today in the journal Science. The destruction is leaving the forest more prone to fires and allowing more carbon dioxide to be released into the atmosphere, according to scientists.

A new analysis of satellite images of the Brazilian part of the Amazon basin, which forms part of the largest contiguous rainforest on Earth, shows that on average 15,500 sq km (6,000 square miles) of forest is being cut down by selective logging each year. This is besides a similar amount clear-cut annually for cattle grazing or farming.

Is it true?

Dirty test tube?

Are rainforests drastically decreasing?
From the two articles above...
1) Write 3 facts “for” and 3 facts “against”.
2) What do you think and why?
Science Critical Thinking Question #2
Animal Biodiversity
Decreasing Dangerously ...or Not?

Is it true?

Are Animal Species decreasing catastrophically?
From the news articles above ...
1) Write 3 facts “for” and 3 facts “against”.
2) What do you think and why?

Dirty test tube?

Biodiversity Crisis
Guardian (21 May 2010) In every corner of the globe the evidence of the global biodiversity crisis is now impossible to ignore... .Around the world the picture is as bad or worse: the International Union for the Conservation of Nature believes one in five mammals, one in three amphibians and one in seven birds are extinct or globally threatened, and other species groups still being assessed that are showing similar patterns. .Simon Stuart, a senior IUCN (Red List) scientist, has warned that for the first time since the dinosaurs humans are driving plants and animals to extinction faster than new species can evolve.

Mass Lizard Extinctions Looming
One in five lizard species predicted to vanish by 2080.
National Geographic (13 May 2010) ...The scientists created a computer model incorporating temperature data back to 1975 ...Global warming will hit lizards in the Amazon and Madagascar especially hard, the computer model predicted. "The number of local extinctions we're seeing [in the Amazon], based on the model, is through the roof," Sinervo said. "It's 60, 70, 80 percent even in some places."

Back from the dead:
One third of 'extinct' animals turn up again
Daily Mail (29 Sept 2010) Conservationists are overestimating the number of species that have been driven to extinction, scientists have said. A study has found that a third of all mammal species declared extinct in the past few centuries have turned up alive and well. Some of the more reclusive creatures managed to hide from sight for 80 years only to reappear within four years of being officially named extinct in the wild.
• Leave the extinctions to Mother Nature, not the Red List
We should abandon our crazy obsession with counting species
Telegraph (29 Sept 2010) What's going on? Are we, as many scientists claim, in the middle of a dramatic mass extinction of species on Earth? Or is this just a case of polarised scientists bending statistics to attract more grants? ...But are today's extinctions more numerous that the normal background rate? And what is that rate, exactly? Here we enter perilous territory, because no one really knows how many species there are, and universal standards for measurement and record-keeping are still in their infancy.
Science Critical Thinking Question #3

Arsenic
Alien DNA ... or Not?

"Life as we don't know it' discovery could prove existence of aliens

Telegraph UK (1 Dec 2010) The discovery could prove the theory of "shadow" creatures which exist in tandem with our own and in hostile environments previously thought uninhabitable. The "life as we don't know it" could even survive on hostile planets and develop into intelligent creatures such as humans if and when conditions improve.

NASA funded research discovers life built with toxic chemical

NASA (2 Dec 2010) Researchers conducting tests in the harsh environment of Mono Lake in California have discovered the first known microorganism on Earth able to thrive and reproduce using the toxic chemical arsenic. The microorganism substitutes arsenic for phosphorus in its cell components.

Incredible microbe found in California Lake

Daily Mail UK (3 Dec 2010) The excitement centres on the bug’s ability to thrive on arsenic, one of the most toxic elements on the planet. It can even incorporate arsenic into its DNA, making it part of its very being. As every other form of known life uses phosphorus rather than arsenic as a key building block of its DNA, the find suggests that a second form of life is with us. And if one alien life-form exists, enthusiasts argue, it is highly likely that there are others out there.

"This Paper Should Not Have Been Published"

Scientists see fatal flaws in the NASA study of arsenic-based life.

Slate (7 Dec 2010) "Low levels of phosphate in growth media, naive investigators and bad reviewers are the stories here," said Norman Pace of the University of Colorado, a pioneer of identifying exotic microbes by analyzing their DNA.

Fallout from Nasa's 'arsenic bacteria'

Guardian UK (7 Dec 2010) "When the Nasa scientists took the DNA out of the bacteria, for example, they ought to have taken extra steps to wash away any other kinds of molecules. Without these precautions, arsenic could have simply glommed to the DNA, like gum on a shoe. ‘It is pretty trivial to do a much better job,’ said Rohwer."

Arsenic and post-haste

WUWT Blog (7 Dec 2010) Harvard microbiologist Alex Bradley, the NASA scientists unknowingly demonstrated the flaws in their own experiment. They immersed the DNA in water as they analyzed it, he points out. Arsenic compounds fall apart quickly in water, so if it really was in the microbe’s genes, it should have broken into fragments. But the DNA remained in large chunks—presumably because it was made of durable phosphate. NASA scientists were feeding the bacteria salts which they freely admit were contaminated with a tiny amount of phosphate. It’s possible, the critics argue, that the bacteria eked out a living on that scarce supply.

Is it true?

Has Arsenic built DNA been found?

From the news articles above ... 1) Write 3 facts “for” and 3 facts “against”.

2) Write 2 paragraphs explaining each side of the argument.

3) What do you think and why?

Dirty test tube?

"Arsenic bacteria" both growing on a little bit of phosphorus
Science Critical Thinking Question #4

Oceans
Dangerously Acidic ... or Not?

Are the Oceans becoming dangerously acidic?
From the news articles above ...
1) Write 3 facts “for” and 3 facts “against”.
2) Write 2 paragraphs explaining each side of the argument.
3) What do you think and why?

'O everything dead by tomorrow!' warns Zoological Society of London
UK Telegraph (11 Jan 2011) If the ZSL wants to make a list of pretty corals, why can’t they just distribute it with facts about their habitats and their formation, maybe with lots of nice shiny pictures for us all to wonder at? Why must they lace their message with doom ... is this another of those overblown eco-panics...?

Ocean Acidification: Chicken Little of the Sea Strikes Again
US WUWT Blog (10 Jan 2011) ... when sudden increases of atmospheric CO2 have been tested under laboratory conditions, “otoliths (aragonite ear bones) of young fish grown under high CO2 (low pH) conditions are larger than normal, contrary to expectation (Checkley et. al. 2009). The low pH levels from 60 mya to 40 mya include the infamous Paleocene-Eocene Thermal Maximum (PETM). Even then, the oceans did not actually “acidify;” the lowest pH was 7.42 (still basic).

Oceans on Acid again
UK Times (4 Nov 2010) Environmentalists like to call this a 30% increase in acidity, because it sounds more scary than a 0.3 point (out of 14) decrease in alkalinity, but no matter. It is still well within the bounds of normal variation over space and time. Before I started looking into this, I assumed the evidence for damage from ocean acidification must be strong because that is what the media kept saying. I am amazed by what I have found.

BBC Radio4 (26 Jan 2010) Scientists are warning of the dangers of ocean acidification which is beginning to have an impact on the fundamental biology of marine ecosystems. In the 250 years since the start of the industrial revolution the acidity of the seas has increased by 30 percent. 

Jellyfish are taking over the oceans: Population surge as rising acidity of world's seas kills predators
UK Mail (3 Dec 2010) The new report, published by the UN Environment Programme during the Climate Change talks in Cancun, Mexico, warns that the acidification of oceans makes it harder for coral reefs and shellfish to form skeletons – threatening larger creatures that depend on them for food ...

... tropical coral reefs will be extinct within the next 50 years.

UK Telegraph (11 Jan 2011) A rise in temperature in the water causes coral bleaching as the algae that live inside the skeletons are no longer able to survive. Increased carbon dioxide in the atmosphere is also causing ocean acidification, which makes it difficult for corals to build their calcium carbonate skeletons. The last year is estimated to be one of the worst years for coral bleaching with more than 16 per cent of coral reefs suffering from the condition. Professor Jonathan Baillie, Director of Conservation Programmes at ZSL, warned that coral reefs will be “functionally extinct” within the lifetime of our grandchildren.

Is it true?

Dirty test tube?