

What is CER?



(An Ig Nobel* Explanation)

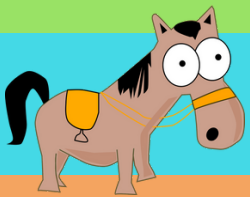


CER is a format for writing explanations.

C - Claim

E - Evidence

R - Reasoning



Example of CER

In 2015, a group of scientists won an Ig Nobel* Prize in Physics for discovering that all animals above 3kg finish peeing at roughly the same time.



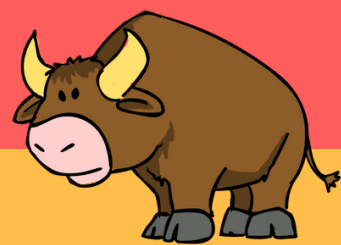
Research question: What is the effect of body size on urination flow/time?



Claim

a one sentence answer to the research question

Duration of urination does not change with body size.



Evidence

provide measurements or observations that support claim

Scientists observed 32 animals across six orders of magnitude of body mass (from 0.03 to 8,000 kg). Despite this wide range in mass, urination time remained constant, $T = 21 \pm 13$ s, for all animals heavier than 3 kg.



Reasoning

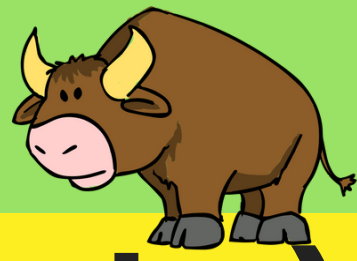
use scientific principles to explain why the evidence supports the claim

Urination time is highly sensitive to urethral cross-section. Larger animals have larger bladders; but, they also have larger urethral cross-sections resulting in a greater flow rate. Thus, larger bladders are offset by greater flow rates.



***Harvard awards the Ig Nobel prize to science that makes people laugh. It is a spoof of the Nobel Prize, an annual award given to great scientific advancements.**

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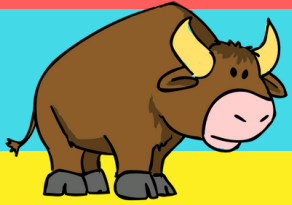


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Example of CER

In 2007, a group of scientists won an Ig Nobel* Prize in Chemistry for developing a way to extract vanilla from cow dung (aka. poop).



Research question: How can livestock excrement be disposed of efficiently and safety?



Claim

a one sentence answer to the research question

Cow feces can be used to produce vanilla extract.



Evidence

provide measurements or observations that support claim

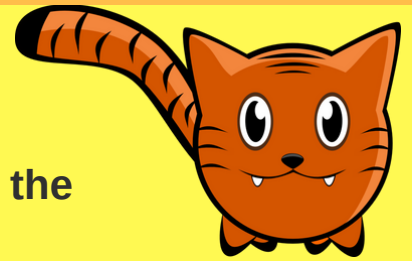
By heating up cow dung under different pressures and using liquid chromatography for analysis, scientists were able to extract vanillic acid and vanillin from cow dung. Vanillic acid and vanillin could not be extracted from tiger dung using the same process.



Reasoning

use scientific principles to explain why the evidence supports the claim

Vanilla can be produced from a biopolymer known as lignin, which is found in wood pulp. Cows, which are herbivores, have lignin in their excrement. Carnivores, like tigers, do not.



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Example of CER

In 2014, Eigil Reimers and Sindre Eftestol, won an Ig Nobel* Prize for determining how reindeers respond to humans dressed as polar bears.



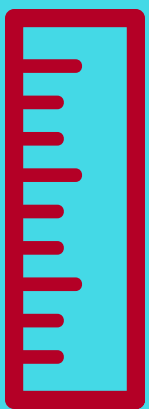
Research question: How do reindeers respond to humans and humans dressed as polar bears?



Claim

a one sentence answer to the research question

Reindeer are quicker to respond to humans dressed as polar bears than humans dressed in dark clothes.



Evidence

provide measurements or observations that support claim

Alert, flight initiation and escape distances were 1.6, 2.5 and 2.3 times longer, respectively, when reindeer encountered a person disguised as a polar bear compared to a person in dark hiking gear.



Reasoning

use scientific principles to explain why the evidence supports the claim

Possible reasons: (1) A predator-prey relationship between polar bears and reindeer but not between humans and reindeer; and, reindeer have developed responses for predators. (2) Dark colours tend to blend in with the reindeers' environment while white stands out.



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