

# 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, Michael L. Smith, won an Ig Nobel\* Prize for determining the most painful body part to receive a honey bee sting.



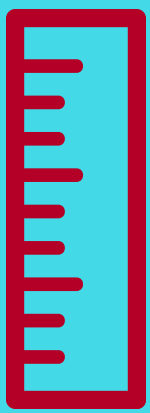
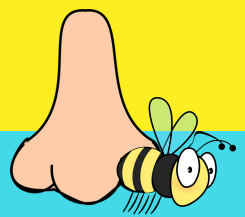
**Research question: which part of the body does a honey bee sting hurt the most?**



#### Claim

*a one sentence answer to the research question*

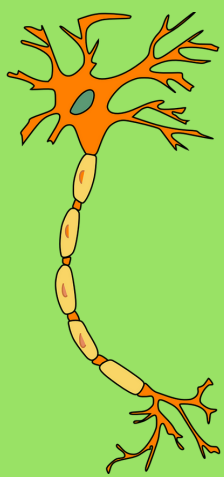
**The nostril is the most painful location for a honey bee sting. The upper lip is 2nd most painful.**



#### Evidence

*provide measurements or observations that support claim*

**Mr. Smith stung himself with honey bees. On a scale of 1-10, he noticed stings at the nostril and upper lip had an average pain rating of 9 and 8.7 respectively.**



#### Reasoning

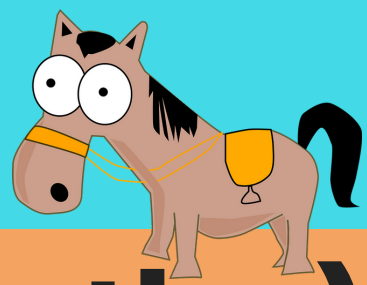
*use scientific principles to explain why the evidence supports the claim*



**Possible reasons: (1) Pain is more intense at locations with thinner skin. (2) Reaction to pain is greater at "important" body locations like "openings" (ex. lips, nostrils) for protection. (3) Measured neural activity show increased sensitivity at thumb, tongue, lips, and digits.**

**\*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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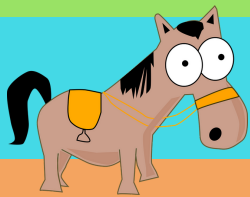


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### Example of CER

In 2015, a group of scientists won an Ig Nobel\* Prize in Physics for discovering that white horses are more "horsefly-proof".



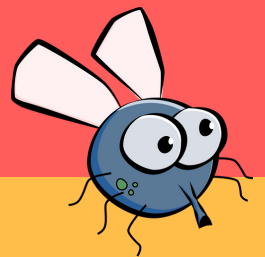
**Research question: What is the effect of horse color on horsefly attraction?**



#### Claim

*a one sentence answer to the research question*

**Horseflies are less attracted to white horses than dark horses.**



#### Evidence

*provide measurements or observations that support claim*

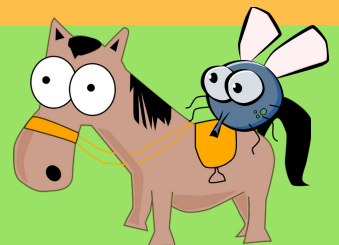
**Brown horses stay 2.2X longer in horsefly-free shady forest than white horses. Brown test surfaces trapped 21 horseflies while white test surfaces attracted 1 horsefly. Black horse models trapped 25.5X more horseflies than white horse models.**



#### Reasoning

*use scientific principles to explain why the evidence supports the claim*

**Horseflies are attracted to higher polarization of light reflected from dark surfaces. Since white animals reflect light with lower polarization, fewer horseflies are attracted to white horses.**



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In 2009, Dr. Unger won the Ig Nobel\* Prize in Medicine for finding no correlation between knuckle cracking and arthritis.



### Research question: Does knuckle cracking lead to arthritis of the fingers?



#### Claim

*a one sentence answer to the research question*

**Knuckle cracking does not lead to arthritis of the fingers.**



#### Evidence

*provide measurements or observations that support claim*

**For 50 years, the author deliberately cracked knuckles on his left hand twice a day but did not do the same to his right hand. At the end of 50 years, the hands were compared. There was no arthritis in either hand, and no apparent difference between hands.**



#### Reasoning

*use scientific principles to explain why the evidence supports the claim*

**It is possible that there is an osteoarthritis preventative therapeutic benefit from the exercise effect on joint lubrication resulting from habitual knuckle cracking.**



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