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Exploding Frogs in Germany

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The city of Hamburg, Germany faced an unusual problem in April, 2005 when toads in a local pond began **exploding** in the night. The unfortunate **amphibians** swelled to three times their normal size and burst with enough force to send toad parts flying up to three feet.

Local environmental workers in Hamburg have described it as a scene out of a horror or science fiction movie, with the bloated frogs agonizing and twitching for several minutes, inflating like balloons before they suddenly burst. "It's horrible," biologist Heidi Mayerhoefer was quoted as telling the daily newspaper. "The toads burst the entrails slide out. But the animal isn't immediately dead— they keep struggling for several minutes."

As the death toll rose to at least 1000 in just a few days, local residents began to refer to the pond as "Tumpel des Todes" or Pool of Death. Soon reports of a similar phenomenon were coming from across the border in Denmark. Local officials were puzzled by the explosions. Most cases of animal explosion occur after an animal has died. Exploding whales, for example, are a result of the buildup of gases during decomposition. But, the toads in Hamburg were exploding while they were still alive.

A variety of hypotheses were proposed, including a bacteria or virus in the water, the introduction of a fungus by South American racehorses running nearby, pesticides, or exposure to increased ultraviolet radiation as a result of ozone depletion. Some even suggested that the toads are committing suicide to save others from overpopulation. Scientists ran many environmental tests but did not reveal any evidence of viruses or bacteria in the water. And other wildlife in the area, even frogs, was doing just fine.

Berlin veterinarian Franz Mutschmann collected toad **corpses** and performed **autopsies**. Mutschmann noticed that the toads had identical **incisions** in their midsections. Further observations revealed that aggressive crows were pecking through the skin between the toad's chest and abdominal cavity and plucking out the tasty **liver**. The toads responded with their natural defense, puffing themselves up. The hole in their bodies plus the missing liver led to a rupture of **blood vessels** and lungs, resulting in the explosions. Such a large number of toads were affected because crows are intelligent animals and were able to quickly learn the liver-plucking maneuver by watching other crows.

Questions: *(Please answer in complete sentences.)*

1. What observations did the citizens of Hamburg, Germany make about what was happening in the environment?

2. What question did these citizens make based on these observations?

3. List a few of the hypotheses that were made about why this was happening.

4. What type of Experimentation did they do to test these hypotheses?

5. What materials do you think they used for these tests.

6. What kind of data did they get back from their tests

7. What observations led to a change in their hypothesis?

8. What was their final conclusion?

9. *What are the steps of the scientific method? (Use questions 1-8 for help.)*

10. *If you lived in Hamburg, Germany, what would you do about this situation, if anything, and why?*
