

# Abstract: Science and Engineering Fair of Houston

**1017**

## From the Hoof to the Heart

Hayden Lesak

Clear Creek ISD /Seabrook Intermediate School

Category:

Animal Science

Horses have always been an important part of life, and the dream of becoming a veterinarian in the future makes learning about their health very exciting. This project was chosen because knowing how a horse's heart recovers after exercise can show how healthy and fit the animal is. This experiment was designed to test the hypothesis that various horses of different ages and activity levels are worked for 2 minutes and then timed to see how fast they can decrease their heart rate back to their resting, then the horse with the greatest activity will do it the fastest. 5 horses with different activity levels were tested for 2 min and then timed to see how long it took them to return to resting, then their time was recorded. After analyzing the heart rate data from all five horses, several important patterns emerged. Ellyott, the most conditioned horse, had the fastest recovery time at only 75 seconds, supporting the idea that better conditioning leads to quicker recovery, while all horses showed similar peak heart rates (101–117 bpm), indicating they worked at about the same intensity. Mo, the youngest horse, had the highest resting heart rate at 62 bpm, almost double Ellyott's as well as a higher peak heart rate and a slower recovery time of 127 seconds, suggesting lower conditioning and age-related differences in response. Grey-C had the slowest recovery at 179 seconds and showed increases in heart rate and recovery time when traveling to the right, possibly indicating discomfort or pain.

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# Abstract: Science and Engineering Fair of Houston

**1018**

## Analyzing the Effects of Fertilizer on the Survival Rate of Red Wigglers

Adithya Akula

Conroe ISD /McCullough Junior High

Category:

Animal Science

Earthworms are important organisms that protect our healthy soil because they break down food scraps and dead plants, which reduce waste and add nutrients to the soil. This projects tests how different fertilizers affect the survival and activity of red wiggler earthworms. Three groups were tested: one with chemical fertilizer, one with organic fertilizer, and one with no fertilizer as a control. Each group had five earthworms in soil and was kept in the same temperature,moisture, and light conditions. The earthworms were observed twice a day for 10 days. I recorded the number of live worms, how active they were, and any changes in soil or worm behavior. Tables were used to keep track of the data, and bar graphs were used to compare survival and activity in each group. I thought that worms in the chemical fertilizer group would experience lower survival rates and be less active because certain chemicals present in fertilizers can negatively affect earthworm health and survival. This study evaluates how chemical and organic fertilizers impact earthworm survival and activity, identifying fertilizers that are safer for soil ecosystems. These results are important as earthworms are vital to plant and soil preservation and overall environmental health.

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# Abstract: Science and Engineering Fair of Houston

**1019**

## The Effect of Red Light on Teen Sleep

Sonya Gopalani

Conroe ISD /Knox Junior High

Category:

Animal Science

The purpose of this experiment is to determine if red light exposure before bed affects how adolescents sleep. Testing this can be helpful because it could provide a possible solution to teenagers struggling with sleep. The hypothesis states that if participants are exposed to 20 minutes of red light at least one hour before bedtime, then they will report longer sleep duration, reduced sleep latency, greater morning alertness and overall improved sleep quality compared to participants exposed to white light or no light, because red light stimulates melatonin production. In this experiment, the researcher gathered twenty-six participants to complete a two-week study. This study consisted of one control week with no red light and one experimental week where the students were exposed to red light for twenty minutes less than an hour before bed. Sleep data was collected using weekly sleep surveys that measured sleep duration, sleep latency, morning alertness, and overall sleep quality. In conclusion, the week in which participants were exposed to red light before bedtime showed improved sleep measures in every variable compared to the week without red light exposure. This experiment supported the hypothesis and had the same results as the educated guess. These findings could be a very beneficial alternative to adolescents lacking sleep because red light provides a possible solution to any of their sleep problems. By making the quick swap of white or no light to red light, teenagers may be able to improve their sleep quality without significantly disrupting melatonin production.

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# Abstract: Science and Engineering Fair of Houston

**1020**

## Guinea Pig Memory

Demi Callie Dalumpines, Ananya Cheruku  
Conroe ISD /Irons Junior High

**Category:**

Animal Science

The main objective of this science project is to test how well animals, specifically guinea pigs, use their memory and what they've already learned to overcome new and recurring obstacles. The importance of this project lies within the information gathered and learned not only about the intelligence of common pets like guinea pigs, but it sheds light on the capabilities of animals that most people overlook. The hypothesis stated that the guinea pigs are expected to remember the maze outlines and complete them at a faster rate than they did when they first completed the maze. In order to test the hypothesis, four mazes needed to be created; each maze had a different outline, color, and unique obstacle. However, the fourth maze will have all of the previous obstacles in one maze. Firstly, the guinea pigs will go through the first, second, and third maze four times; the last maze will only be tested thrice. Each trial will be timed and recorded to track signs of growth the guinea pigs may show. The quicker the guinea pigs finish the maze tells us how much they truly remember from their last trial. The data recorded showed growth in the guinea pigs' speed and ability to go through the mazes. This experiment shows that they did indeed learn the maze as well as how to overcome the obstacles inside; this tells us that guinea pigs are intelligent creatures that are capable of learning skills such as problem solving, planning, and strategizing.

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# Abstract: Science and Engineering Fair of Houston

**1021**

## **The Purr-fect Diet: What Cat Evolution Teaches Us About Sugar, Genetics, and Preventing Chronic Conditions**

Keerti Parimi

Katy ISD/Seven Lakes - JH

**Category:**

**Animal Science**

This study examines/investigates the loss of taste, specifically sweet perception in domestic cats (*Felis catus*), indicating the evolutionary elimination/inactivation of the TAS1R2 gene, leading to the popular phenomenon “Sugar Blind”. Humans and dogs retain a working version of the same gene, indicating genetic intactness. In order to elucidate differences at the molecular level, using public genetic databases, quaternary structures of proteins were depicted with the help of an artificial intelligence program. Structural analysis revealed that the TAS1R2 proteins in humans and dogs are full-length and structurally stable, supporting normal sugar recognition. In contrast, the targeted gene is truncated in the cat and structurally unstable, resulting in loss of function. These results are consistent with existing biological research explaining the absence of sweet taste perception in cats. Further research links the evolutionary biology of the gene in humans, suggesting that reduced sweet receptor activity is correlated with obesity, diabetes, and chronic conditions.

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# Abstract: Science and Engineering Fair of Houston

**1022**

## Shedding Light On Galveston's Missing Nests: How Light Pollution And Sand Characteristics Affect Kemp's Ridley Sea Turtle Nesting Locations

Caden Pohlkamp

Clear Creek ISD /Brookside Intermediate School

Category:

Animal Science

The Kemp's ridley is the most endangered sea turtle and endemic to the Gulf of Mexico and Texas Coast. Nesting was first recorded in Galveston in 2002, and has occurred annually since 2019 – except 2024. To determine how to modify Galveston beaches to attract more nests, light pollution and sand characteristics along 10 Galveston beaches (5 with, 5 without historic nests) were compared to 5 South Padre sites (where 86 nests occurred in 2024). Little information is known about the sand preferences of the species. A recorder was designed and built to measure light pollution for two weeks. Results show current Galveston light pollution does not deter nesting. Average levels at historical nests were 0.03 lux, same as South Padre, and 0 lux at Galveston beaches without a nest. This was not statistically different ( $p=0.584$ ,  $2\sigma=17\%$ ). Data from 7 sand characteristics suggests the best way to attract Kemp's ridley nests to Galveston would be to replace eroded beaches with sand of a higher percentage of coarser grain. South Padre had a highly statistically larger amount of coarser grain (17%,  $2\sigma=4\%$ ,  $p=1.04e-6$ ). One of the two 2025 Galveston nests was at a beach with the highest amount of coarse sand (10% vs. 4% for the rest of the island). A recent study showed similar results for Green sea turtles (Zhang, Jan. 2025, Ecology and Evolution). By request, results were shared with the Galveston Park Board and leading Kemp's ridley experts.

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# Abstract: Science and Engineering Fair of Houston

**1023**

## The Role of Ant Antennae and Their Substructures in Homing

Nathan Zhang

Clear Creek ISD /League City Intermediate School

Category:

Animal Science

Understanding how ants behave may help us find safer ways to keep them out of home without using pesticides. Last year, I tried to learn how ants find food by doing experiments with fire ants from my backyard. I placed the ants into petri dishes, but they did not eat. I thought this happened because they were stressed by being moved into an unfamiliar environment. This year, I used commercially available harvester ants and allowed them to adapt to an ant farm, but they still did not show interest in food. To continue working toward my research goal, I studied how ants find their way home instead. After training the ants to return to their nest, I prepared four groups: ants with both antennae, ants with one antenna removed, ants with both antennae removed, and ants with only the antenna tips removed. I recorded their homing activity, counted how many ants reached the nest, came close, or ended far from home, and used ImageJ software to track their paths. I found that ants with both antennae could return to the nest and traveled along longer paths. In contrast, ants without antennae wandered around and rarely reached the nest. Even ants missing one antenna or just the antenna tips had difficulty navigating. I concluded that antennae are very important for homing. Unexpectedly, I discovered that stressed ants made sounds that possibly cause nearby ants to return quickly to the nest. I hope to study this behavior further in the future.

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# Abstract: Science and Engineering Fair of Houston

**1024**

## **Earthworms: How They Benefit the Environment and the Threats They are Facing**

Riya Kejriwal

Private/The Kinkaid School - MS

**Category:**

Animal Science

This literature review examines how certain factors including microplastics, pesticides, and tillage affect soil-dwelling earthworms. Previous experiments and meta-analysis looked at how these individual factors affect earthworms. Mine aims to combine these aspects to make the conclusion more applicable in real-life, where they may be present all at once. Sources commonly highlight that in soil contaminated with microplastics (usually PE) and pesticides, significant gut bacteria changes and oxidative stress are present. Tillage on the other hand destroys earthworms' burrows and sometimes relocates them to a different, unfamiliar part of the soil. These factors all lead to stunted growth and inflammation in earthworms. Earthworms are a crucial part of our ecosystem, enhancing soil fertility and therefore crop yield. This study sheds light on the dangers that these creatures are facing and how this issue will chain-react back to us.

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# Abstract: Science and Engineering Fair of Houston

**1025**

## How humans affect sharks

mia pintacuda

Galveston ISD/Central Middle School

Category:

Animal Science

my project is about have humans effect sharks on how their getting killed over fishing and destroying their home. I'll talk about shark finning, over fishing, and habbitat destotion.

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# Abstract: Science and Engineering Fair of Houston

**1026**

## Food Glorious Food!

Layla Henry

Clear Creek ISD /Seabrook Intermediate School

Category:

Animal Science

This project was designed to test if different foods affected brine shrimp growth and survival. And if the brine shrimp are fed spirulina powder, then the growth and lifespan of the brine shrimp will increase. The variables were tested by feeding the brine shrimp the foods following: spirulina powder, bloodworm meal, vegetable meal, fish meal, insect meal, and seaweed meal. Data was collected and was analyzed by comparing the size, color, and number of approximate population. According to the data, the spirulina group had most growth and survival. For example, the data averages for measuring the number, size, and color, spirulina had the largest average of 2.8 for the population. The average for measuring the size was 1.4, resulting in second largest. And the average for measuring the color was 1.8 and was the largest average for measuring color. While the other food groups had lower averages, spirulina resulted in more growth and survival.

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# Abstract: Science and Engineering Fair of Houston

**1027**

## Engineering a Low-Cost Embryo Growth Chamber to Study Genetic Stress Response Mechanisms.

Sanhita Baggidi

Fort Bend ISD /Quail Valley Middle School

Category:

Animal Science

Building A low-cost Embryo Incubator for Brine Shrimp uses many different scientific concepts such as temperature, Humidity, and Solar Power. These different variables will help prove my hypothesis and be used to represent my graphs and to convey my data. The general idea of the experiment is to build a Incubator for Brine Shrimp and then demonstrate it ability to incubate simple organisms such as Brine Shrimp and show the difference of the stability of its growth when it has a stable environment and a unstable environment.

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# Abstract: Science and Engineering Fair of Houston

**1028**

## How Does A Hamsters Gender Affect How Fast They Can Go Through A Maze?

Avery Bernard

Houston ISD/BCM Academy at James D Ryan - MS

Category:

Animal Science

This project investigates whether the gender of a hamster affects how quickly it can navigate a maze. Understanding gender-based differences in learning and problem solving can help us better interpret animal behavior. I hypothesized that the female hamster would complete the mazes faster because some studies suggest that females recover from social defeat more quickly, which could help them stay calmer during challenges. To test this, one female and one male hamster were each timed while completing three types of mazes—easy, medium, and hard. Each hamster ran all three mazes once per trial, for a total of three trials each. A stopwatch was used to record completion times, and mistakes were counted for every maze. The female hamster completed the easy maze in 32, 30, and 29 seconds, the medium maze in 48, 45, and 44 seconds, and the hard maze in 67, 63, and 60 seconds across Trials 1–3. The male hamster completed the easy maze in 28, 27, and 26 seconds, the medium maze in 43, 41, and 40 seconds, and the hard maze in 64, 60, and 58 seconds. On average, the male completed each maze type faster: 27 seconds (easy), 41.3 seconds (medium), and 60.7 seconds (hard), compared to the female’s averages of 30.3, 45.7, and 63.3 seconds. The male also made fewer mistakes overall. In conclusion, the data did not support my original hypothesis. Instead, the male hamster consistently completed all maze levels faster and with fewer errors, suggesting that factors other than gender may have influenced performance.

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# Abstract: Science and Engineering Fair of Houston

**1029**

## Which ants can best survive the cold?

Emma Roberts

Conroe ISD /Knox Junior High

Category:

Animal Science

The purpose of this science project is to see how animals, specifically ants, react to the extremes that Houston's temperatures can reach. Additionally, to see which ant species have adapted best to handle Houston's strongest extreme cold -15°C or 4°F. The hypothesis was that if three Houston ant species were made to survive recorded extreme cold in Houston weather, then imported red ants would be the most likely to survive because red ants burrow whenever temperatures drop. In this experiment the scientist separated three species of ant into groups of three and put them in a fridge set to 33°F for about 6 hours. Additionally, checking on the ants every thirty minutes to record the ants reactions to the drop in temperature and allowing the ants to defrost. After that, the scientist places the ants into a freezer set to 4°F for 16 hours to act as the weather during the coldest day in Houston. In conclusion, the leaf cutter ants were the best prepared for Houston's cold as they had the most ants standing by the end of the experiment and seemed to be one of the most stable species as they were on average able to unfreeze and move around quickly after only around 10 minutes of rest. The hypothesis was not supported. The imported red ants actually performed the worst of all the ants; only one survived. This information could be useful for biology in the study of possible sustainable food sources if climate change gets worse.

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# Abstract: Science and Engineering Fair of Houston

**1030**

## **Paw-sitive Pulse**

Alexandra Pruneda

Clear Creek ISD /Seabrook Intermediate School

**Category:**

**Animal Science**

Dogs are very curious animals and have an extremely powerful sense of smell that is far beyond humans. Scientists are still doing tests to see if a dog's heart rate increases due to different odors. If a dog smells the orange scent, then their heart rate will be the highest. There were five different scents, and each scent had the same amount which was  $\frac{1}{4}$  of a tablespoon a crumbled piece of paper. Then a heart rate monitor was strapped on each dog to receive their heart rate before and after smelling every scent. The assumption was that the orange scent would increase each dog's heart rate, which was not correct. The scent that didn't increase each dog's heart rate completely but was higher than the other scents was the rose scent.

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# Abstract: Science and Engineering Fair of Houston

**1031**

## How do crickets act during a solar eclipse

Landon Maldonado

Houston ISD/BCM Biotech Academy at Rusk - MS

Category:

Animal Science

For this project i researched how crickets behave during a simulated solar eclipse. I observed three crickets and changed the amount of light they were exposed to. Data shows that the crickets had no change in behavior to the change in light. This could be important when we consider animal behavior during an eclipse or in areas of light.

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