THE ALBEDO EFFECT AND ITS APPLICATION TO CAR COLOR PAINT

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ABSTRACT

The purpose of this project is to see how the albedo and the color of many different cars affect the surface temperature of that car. This project was done because there was a great amount of like and curiosity towards cars, and to see what car would be the coolest to drive on hot summer days. What happened to gather these results was nine temperatures were taken of seven different car colors there was three cars for each car color. What I learned from this project is that that the green car would have the coolest surface temperature and the black car had the hottest surface temperature. The thing that stuck out most in this project most is that the green cars surface temperature was cooler than the white cars.

HYPOTHESIS

I believe a black car surface temperature will be warmer than a white car's surface temperature.

MATERIALS

The GLOBE Program protocol for surface temperature is to use an IR reader with an oven mitt wrapped around it. Point the IR reader at the substance that you taking the temperature of then take the temperature.

- I.R. Reader
- 3 white cars
- 3 black cars
- 3 red cars
- 3 blue cars
- 3 sliver cars
- 3 tan cars
- 3 green cars
- Note book
- Oven mitt
- Pencil
- Watch
- Excel
- Microsoft word
- I pad
- Computer
- Science fair bored
- Glue
- paper

PROCEDURES

For 7 days I tested three white cars, three black cars, three sliver cars, three red cars, three blue cars, three tan cars, and three green cars. For each car I took three temperatures. I took all temperatures between 15:30 and 16:00 Universal time.

 The GLOBE protocol for surface temperature is to take surface temperature you use an IR reader with an oven mitt wrapped around it. Point the IR reader at the substance you are taking the temperature of then take the temperature.

The GLOBE protocol for clouds is students study clouds, and contrails. Students study the types of clouds and the types of contrails and the percent of clouds in the sky.

The GLOBE protocol for air temperature is to hold the thermometer straight out in front of you for one minuet, then holding the thermometer even with your eye you read the temperature.

RESULTS

DAY 1

White Car #1:

The surface temperatures were: 13.2, 13.8 and 13.4.

Average: 13.4

White Car #2:

The surface temperatures were: 15.2, 15.8, and 13.8. **Tan Car #3:**

The surface temperatures were: This car was not there this day. **Red Car #1:**

The surface temperatures were: 18.8, 21.8, and 17.2

Average: 19.2

Red Car #2:

The Surface temperatures were: 19.0, 17.2, and 18.0

Average: 18.0

Red Car #3:

The surface temperatures were: 13.8, 19.4, and 20.2

Average: 17.8

Blue Car #1:

The surface temperatures were: 37.2, 36.4, and 31.2

Average: 34.9

Blue Car #2:

The surface temperatures were: 39.2, 30.4, and 41.2.

Average: 36.93

Blue Car #3:

The surface temperatures were: 30.6, 30.6, and 30.2.

Average: 30.46

Tan Car #1:

The surface temperatures were: 35.6, 33.6, and 32.2.

Average: 33.8

Tan Car #2:

The surface temperatures were: 32.4, 31.6, and 28.2

Average: 30.73

Green Car #1:

The surface temperatures were: 24.8, 32.6, and 31.2

Average: 29.53

Green Car #2:

The surface temperatures were: 35.6, 34.4, and 33.0.

Average: 34.33

Green Car #3:

The surface temperatures were: 36.6, 35.2, and 29.8

Average: 33.86

Day 2

White Car #1:

The surface temperatures were: 1.2, 1.2, and 2.2

Average: 2.3

White Car # 2:

The surface temperatures were: 4.4, 5.6, and 5.4

Average: 5.1

White Car #3:

The surface temperatures were: 5.4, 6.0, and 6.2

Average: 5.8

Black Car #1:

The surface temperatures were: 4.8, 4.2, and 3.6

Average: 4.2

Black Car # 2:

The surface temperatures were: 10.0, 9

Average: 13.4

White Car #3:

The surface temperatures were: 22.4, 21.2, and 21.6.

Average: 17.7

Black Car #1:

The surface temperatures were: 22.4, 21.2, and 21.6.

Average: 21.7

Black Car #2:

The surface temperatures were: 23.6, 22.6, and 22.4.

Average: 22.86

Black Car #3:

The surface temperatures were: 25.4, 27.8, and 28.4

 Average: 27.2

Sliver Car #1:

The surface temperatures were: 22.2, 22.2, and 22.2.

Average: 22.2

Sliver Car #2:

The surface temperatures were: 17.4, 16.0, and 15.8

Average: 16.4

Sliver Car #3:

The surface temperatures were: 19.8, 17.6, and 18.2

Average: 18.5

Red Car #1:

The surface temperatures were: 18.8, 21.8, and 17.2

Average: 19.2

Red Car #2:

The Surface temperatures were: 19.0, 17.2, and 18.0

Average: 18.0

Red Car #3:

The surface temperatures were: 13.8, 19.4, and 20.2

Average: 17.8

Blue Car #1:

The surface temperatures were: 37.2, 36.4, and 31.2

Average: 34.9

Blue Car #2:

The surface temperatures were: 39.2, 30.4, and 41.2.

Average: 36.93

Blue Car #3:

The surface temperatures were: 30.6, 30.6, and 30.2.

Average: 30.46

Tan Car #1:

The surface temperatures were: 35.6, 33.6, and 32.2.

Average: 33.8

Tan Car #2:

The surface temperatures were: 32.4, 31.6, and 28.2

Average: 30.73

.8 and 7.4

Average: 9.0

Black Car # 3

The surface temperatures were: 10.4, 9.4, and 8.2

Average: 9.3

Sliver Car # 1:

The surface temperatures were: the car was not there

Sliver Car # 2:

The surface temperatures were: 4.0, 4.4, and 3.6

Average: 4.0

Sliver Car # 3

The surface temperatures were: 6.2, 8.2, and 5.6

Average: 5.1

Red Car # 1:

The surface temperatures were: 4.6, 5.6, and 7.0

Average: 5.7

Red Car # 2:

The surface temperatures were: 5.6, 3.4, and 5.8

Average: 4.9

Red Car # 3:

The surface temperatures were: 7.0, 8.8, and 7.8

Average: 7.8

Blue Car # 1:

The surface temperatures were: 11.6, 10.0, and 12.6

Average: 11.4

Blue Car # 2:

The surface temperatures were: 10.0, 10.8, and 16.6

Average: 12.4

Blue Car # 3:

The surface temperatures were: 9.4, 7.8, and 7.6

Average: 8.2

Tan Car # 1

The surface temperatures were: 6.4, 6.2, and 6.2

Average: 6.2

Tan Car # 2:

The surface temperatures were: the car was not there

Tan Car # 3:

The surface temperatures were: 6.8, 7.6, and 9.4

Average: 7.9

Green Car # 1:

The surface temperatures were: -0.2, 0.8, and -0.2

Average: -0.4

Green Car # 2:

The surface temperatures were: 2.4, -0.2, and 1.6

Average: 1.2

Green Car # 3:

The surface temperatures were: 1.8, -0.4, and -0.2

Average: 0.4

Day 3

White Car #1:

The surface temperatures were: 5.4, 4.8, and 6.4

Average: 5.5

White Car # 2:

The surface temperatures were: 6.8, 8.4,and 8.4

Average: 7.8

White Car #3:

The surface temperatures were: 9.2, 10.2, and 8.8

Average: 9.4

Black Car #1:

The surface temperatures were: the car was not there

Average:

Black Car # 2:

The surface temperatures were: 6.2, 2.0, and 5.4

Average: 6.6

Black Car # 3

The surface temperatures were: 7.4, 5.4, and 8.0

Average: 6,9

Sliver Car # 1:

The surface temperatures were: the car was not there

Sliver Car # 2:

The surface temperatures were: 3.4, 3.0, and 2.6

Average: 3.0

Sliver Car # 3

The surface temperatures were: 6.2, 7.6, and 5.2

Average: 6.3

Red Car # 1:

The surface temperatures were: 3.0, 3.4, and 3.6

Average: 3.3

Red Car # 2:

The surface temperatures were: 5.6, 6.6, and 6.6

Average: 6.0

Red Car # 3:

The surface temperatures were: 4.4, 5.2, and 5.6

Average: 5.0

Blue Car # 1:

The surface temperatures were: the car was not there

Average:

Blue Car # 2:

The surface temperatures were: 5.2, 6.4, and 6.8

Average: 6.0

Blue Car # 3:

The surface temperatures were: 4.2, 4.2, and 4.8

Average: 5.8

Tan Car # 1

The surface temperatures were: 6.6, 7.4, and 4.8

Average: 6.2

Tan Car # 2:

The surface temperatures were: the car was not there

Average:

Tan Car # 3:

The surface temperatures were: the car was not there

Average:

Green Car # 1:

The surface temperatures were: 4.4, 5.0, and 4.2

Average: 4.5

Green Car # 2:

The surface temperatures were: the car was not there

Average:

Green Car # 3:

The surface temperatures were: the car was not there

Average N/A:

<h1 style="text-align:center">Day 4</h1>

White Car #1:

The surface temperatures were: 8.0, 4.4, and 7.6

Average: 6.6

White Car # 2:

The surface temperatures were: 8.2, 8.6, and 8.6

Average: 8.2

White Car #3:

The surface temperatures were: 9.2, 0.0, and 7.0

Average: 5.4

Black Car #1:

The surface temperatures were: the car was not there

Average:

Black Car # 2:

The surface temperatures were: the car was not there

Average:

Black Car # 3

The surface temperature were: 11.8, 5.0, and 10.0

Average: 9.8

Sliver Car # 1:

The surface temperatures were: the car was not there

Average:

Sliver Car # 2:

The surface temperatures were: 7.4, 2.0, and 3.2

Average: 4.2

Sliver Car # 3

The surface temperatures were: 9.6, 4.8, and 3.6

Average: 6.0

Red Car # 1:

The surface temperatures were: 7.2, 7.8, and 7.4

Average: 7.6

Red Car # 2:

The surface temperatures were: 9.2, 9.6, and 5.4

Average: 8.0

Red Car # 3:

The surface temperatures were: 9.6, 8.0, and 3.2

Average: 6.9

Blue Car # 1:

The surface temperatures were: the car was not there

Average:

Blue Car # 2:

The surface temperatures were: 11.4, 5.8, and 11.4

Average: 9.5

Blue Car # 3:

The surface temperatures were: 6.8, 7.8, and 3.4

Average: 6.

0

Tan Car # 1

The surface temperatures were: 7.6, 7.8, and 3.4

Average: 6.2

Tan Car # 2:

The surface temperatures were: the car was not there

Average:

Tan Car # 3:

The surface temperatures were: the car was not there

Average:

Green Car # 1:

The surface temperatures were: 6.4, 6.6, and 3.8

Average: 5.6

Green Car # 2:

The surface temperatures were: 7.4, 6.2, and 4.2

Average: 8.4

Green Car # 3:

The surface temperatures were: the car was not there

Average:

Day 5

White Car #1:

The surface temperatures were: 4.2, 3.4, and 5.4

Average: 5.6

White Car # 2:

The surface temperatures were: 5.2, 5.2, and 5.2

Average: 5.2

White Car #3:

The surface temperatures were: 1.4, 5.4, and 4.4.

Average: 3.7

Black Car #1:

The surface temperatures were: the car was not there

Average:

Black Car # 2:

The surface temperatures were: 4.2, 5.8, and 6.2

Average:5.4

Black Car # 3

The surface temperatures were: 7.8, 5.4, and 5.6

Average: 6.2

Sliver Car # 1:

The surface temperatures were: the car was not there

Average:

Sliver Car # 2:

The surface temperatures were: 4.8, 3.8, and 4.8

Average: 4.4

Sliver Car # 3

The surface temperatures were: 4.6, 4.2, and 4.2

Average: 4.3

Red Car # 1:

The surface temperatures were: 4.6, 3.8, and 3.8

Average: 4.0

Red Car # 2:

The surface temperatures were: 4.8, 6.2, and 3.4

Average: 4.8

Red Car # 3:

The surface temperatures were: 7.0, 5.6, and 5.4

Average: 6.0

Blue Car # 1:

The surface temperatures were: 4.8, 3,8, and 3.2

Average: 3.9

Blue Car # 2:

The surface temperatures were: the car was not there

Average:

Blue Car # 3:

The surface temperatures were: 8.8, 7.0, and 3.2

Average: 6.3

Tan Car # 1

The surface temperatures were: 5.8, 5.4, and 5.2

Average: 5.4

Tan Car # 2:

The surface temperatures were: the car was not there

Average:

Tan Car # 3:

The surface temperatures were: the car was not there

Average:

Green Car # 1:

The surface temperatures were: 3.6, 3.4, and 3.6

Average: 3.5

Green Car # 2:

The surface temperatures were: 4.2, 6.6, and 4.8

Average: 6.6

Green Car # 3:

The surface temperatures were: the car was not there

Average:

Day 6

White Car #1:

The surface temperatures were: -1.8, 1.2, and -5.2

Average: -1.9

White Car # 2:

The surface temperatures were: the car was not there

Average: N/A

White Car #3:

The surface temperatures were: the car was not there

Average: N/A

Black Car #1:

The surface temperatures were: the car was not there

Average: N/A

Black Car # 2:

The surface temperatures were: -3.8, -5.0, and -3.8

Average: -4.2

Black Car # 3

The surface temperatures were: the car was not there

Average:

Sliver Car # 1:

The surface temperatures were: the car was not there

Average:

Sliver Car # 2:

The surface temperatures were: the car was not there

Average:

Sliver Car # 3

The surface temperatures were: 5.4, 0.8, and -6.2

Average: 0.0

Red Car # 1:

The surface temperatures were: the car was not there

Average:

Red Car # 2:

The surface temperatures were: -0.8, -3.6, and -5.8

Average: -3.4

Red Car # 3:

The surface temperatures were: -3.4, -0.6, and -4.6

Average: -2.8

Blue Car # 1:

The surface temperatures were: the car was not there

Average:

Blue Car # 2:

The surface temperatures were: -1.4, -3.8, and -2.8

Average: -2.6

Blue Car # 3:

The surface temperatures were: -1.2, -1.0, and -2.6

Average: -2.0

Tan Car # 1

The surface temperatures were: the car was not there

Average:

Tan Car # 2:

The surface temperatures were: the car was not there

Average:

Tan Car # 3:

The surface temperatures were: the car was not there

Average:

Green Car # 1:

The surface temperatures were: 1.4, 2.6, and -0.4

Average: 1.2

Green Car # 2:

The surface temperatures were: the car was not there

Average: N/A

Green Car # 3:

The surface temperatures were: the car was not there

Average: N/A

Day 7

White Car #1:

The surface temperatures were: -5.4, -4.4, and -5.6

Average: -5.1

White Car # 2:

The surface temperatures were: the car was not there

Average: N/A

White Car #3:

The surface temperatures were: -2.8, -2.0, and -5.0

Average: -3.2

Black Car #1:

The surface temperatures were: -1.4, -3.0, and -5.6

Average: -3.3

Black Car # 2:

The surface temperatures were: the car was not there

Average: N/A

Black Car # 3

The surface temperature was: the car was not there

Average: N/A

Sliver Car # 1:

The surface temperatures were: the car was not there

Sliver Car # 2:

The surface temperatures were: -3.4, -3.6, and -1.8

Average: -2.9

Sliver Car # 3

The surface temperatures were: -0.8, -3.8, and -4.8

Average: -3.1

Red Car # 1:

The surface temperatures were: the car was not there

Average: N/A

Red Car # 2:

The surface temperatures were: -4.4,-1.4, and -2.6

Average: -2.8

Red Car # 3:

The surface temperatures were: -6.6, -4.0, and -4.8

Average: -5.4

Blue Car # 1:

The surface temperatures were: the car was not there

Average: N/A

Blue Car # 2:

The surface temperatures were: 6.2, 2.8, and 1.4

Average: 3.4

Blue Car # 3:

The surface temperatures were: -0.2, -2.6, and -2.8

Average: -1.8

Tan Car # 1

The surface temperatures were: the car was not there

Average: N/A

Tan Car # 2:

The surface temperatures were: the car was not there

Average:

Tan Car # 3:

The surface temperatures were: the car was not there

Average:

Green Car # 1:

The surface temperatures were: -4.8, -2.6, and -4.4

Average: -3.9

Green Car # 2:
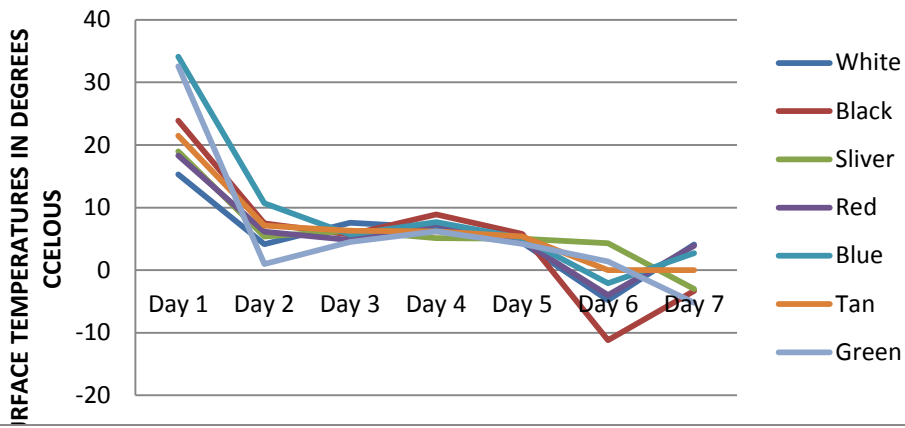
The surface temperatures were: -7.7, -5.4, and -7.0

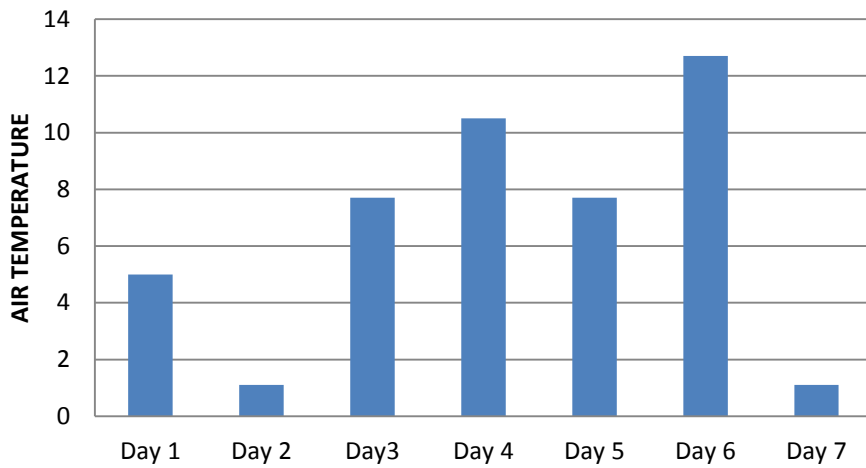Average:-6.6

Green Car # 3:

The surface temperatures were: the car was not there

Average: N/A

CAR PAINT SURFACE tEMPERATURES OVER 7 DAYS

TEMPERATURES OVER 7 DAYS

CONCLUSION

My conclusion is that my hypothesis was correct three out of the seven days I took data. The color that had the coolest surface temperature over all was green. The color that had the hottest surface temperature over all was black. I added the other colors because I needed a wider range of data to compare my studied of albedo effect on colors white and black. I also wanted to see a closer range of temperature data. What I am going to do when I continue this project is to take temperatures on different surface areas such as grass, concrete, and soil. The second coolest car was red. The third coolest car was sliver. The forth coolest car was white. The fifth coolest car was tan. The second hottest car was blue.

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