

Is Concrete Hotter than Asphalt?

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**Navarre Elementary, Toledo, Ohio
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Purpose

Our purpose is to compare surface temperatures of cement and asphalt

Essential Question

How does cement and asphalt react to heat?

Hypothesis

Asphalt will be hotter than cement because it is a darker color.

Investigation Plan

Take surface Temperature and cloud data at our school sites

Upload Data to GLOBE website

Determine our research question and locations to investigate

Compare data between two surfaces at Navarre

Research school ecosystems and climates

Compare data

Determine errors

Write conclusions and abstract

Research: Navarre Elementary, Toledo, Ohio

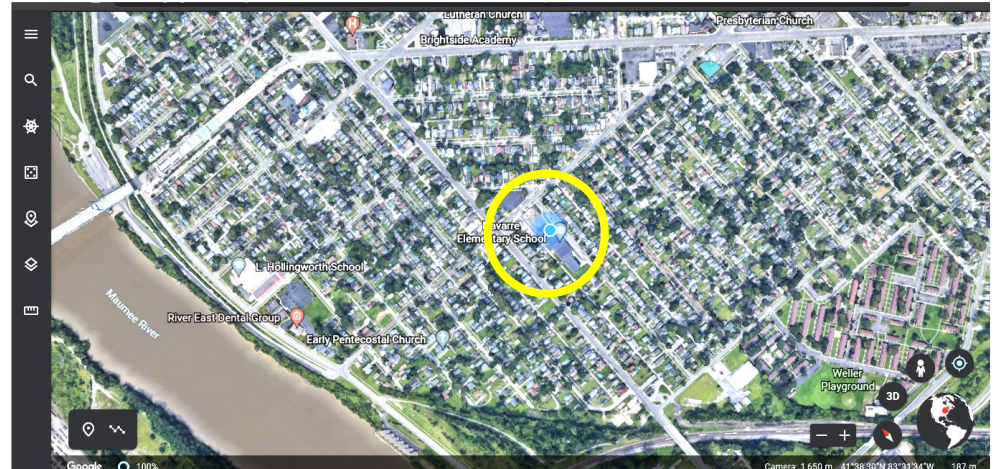
Latitude: 41.63493

Longitude: -83.52423

Elevation: 187 m

Population: urban

Climate: Temperate; we have 4 seasons



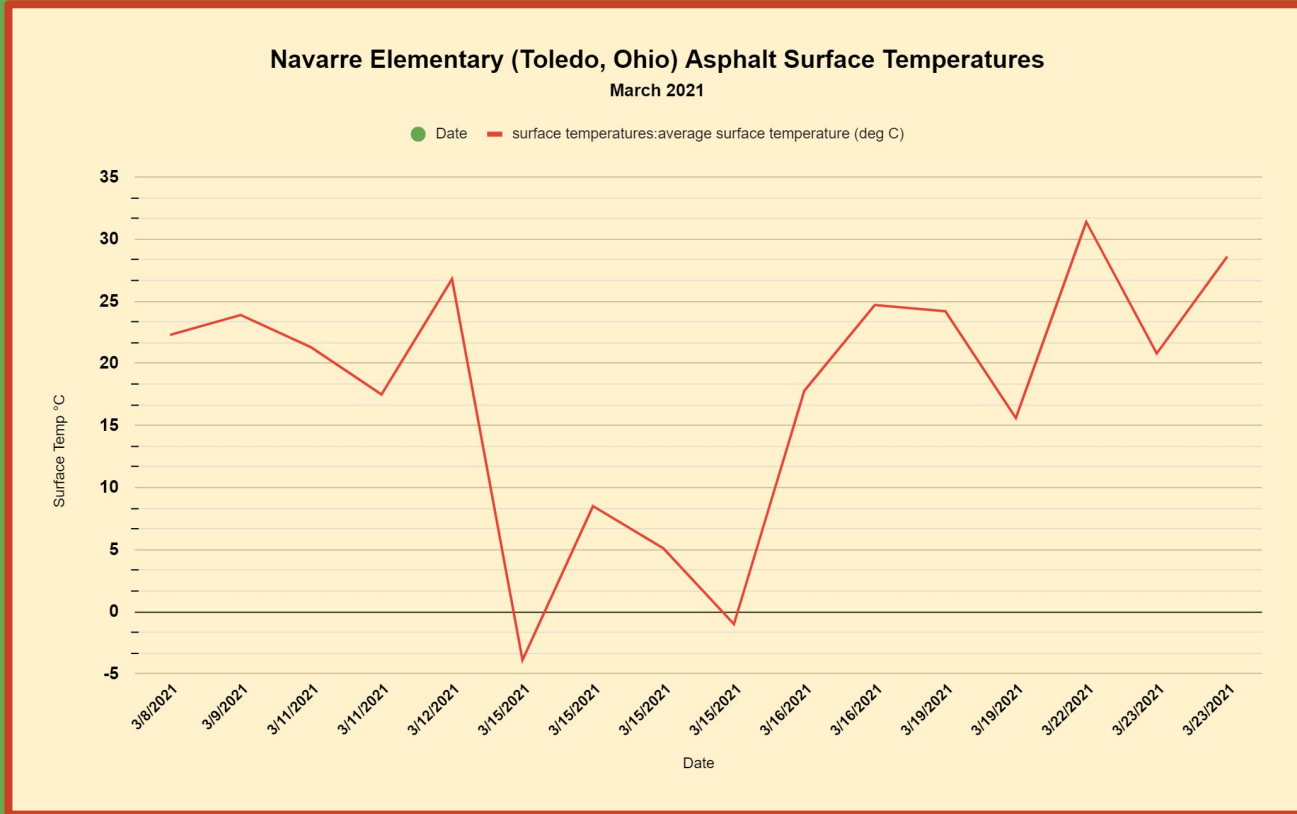
Data Table: Navarre, Toledo, Ohio: Asphalt

site_name	latitude	longitude	elevation	Date	Ssurface temperature: C
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/8/2021	22.3
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/9/2021	23.9
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/11/2021	21.3
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/11/2021	17.5
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/12/2021	26.8
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/15/2021	-3.9
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/15/2021	8.5
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/15/2021	5.1
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/15/2021	-1
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/16/2021	17.8
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/16/2021	24.7
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/19/2021	24.2
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/19/2021	15.6
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/22/2021	31.4
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/23/2021	20.8
Navarre Asphalt area in front of / East of School	41.63484	-83.5242	186	3/23/2021	28.6

Data Table: Navarre, Toledo, Ohio: Concrete

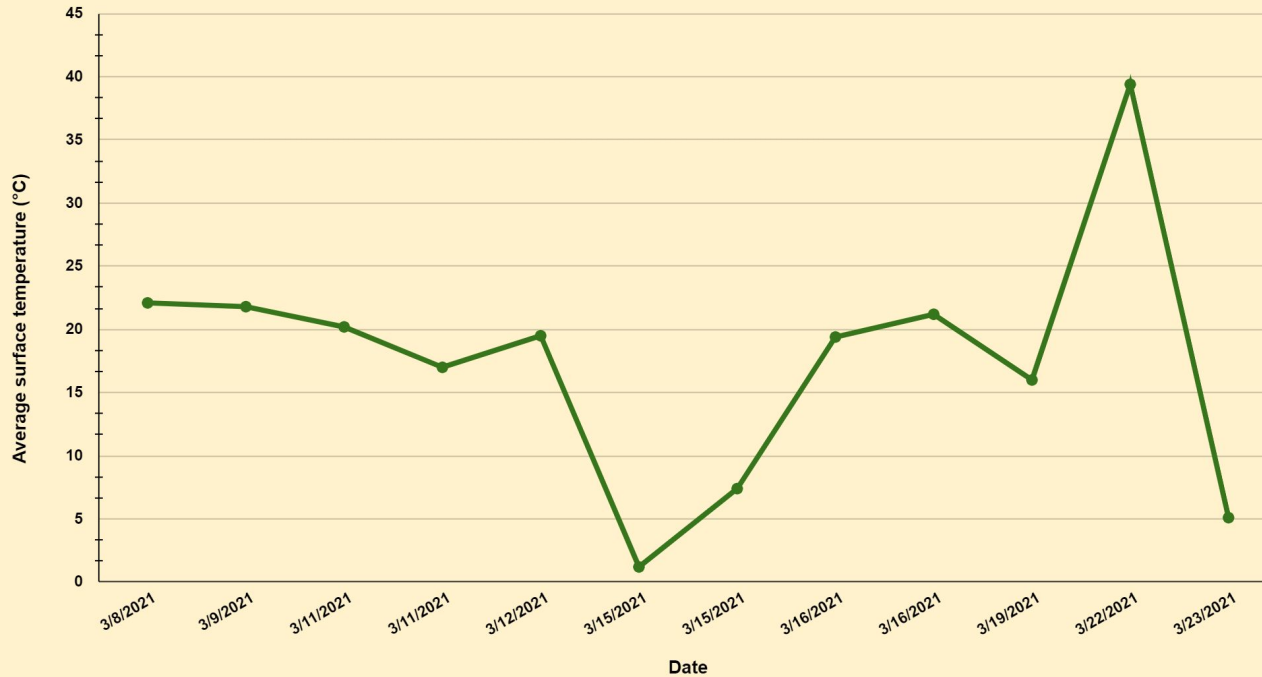
site_name	latitude	longitude	elevation	Date	Surface temperature °C
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/8/2021	22.1
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/9/2021	21.8
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/11/2021	20.2
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/11/2021	17
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/12/2021	19.5
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/15/2021	1.2
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/15/2021	7.4
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/16/2021	19.4
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/16/2021	21.2
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/19/2021	16
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/22/2021	39.4
Navarre Cement area in front of / East of School	41.63493	-83.5242	186	3/23/2021	5.1

Graph: Navarre Asphalt



Graph: Navarre Concrete

Navarre Elementary, Toledo, Ohio Concrete Avg Surface Temperature (°C)
March 2021



Data Analysis

Navarre concrete

- The range of temperatures for Navarre concrete is 1.2°C to 22.1°C
- The average temperatures for Navarre concrete is about 17.5°C

Navarre asphalt

- The range of temperatures for Navarre asphalt is -3.9°C to 31.4°C
- The average temperature for Navarre asphalt is 18°C

Limitations / Sources of Error

There may be an error in the data entry

The Globe data shows surface temperatures were taken at 6 different time periods between 12:00 noon and 19:45.

Although we took temperatures at two basic times of day (11:45 a.m. and 2:45 p.m.), the data reveals an error when entering time into the GLOBE website.

Conclusions

- **Our hypothesis was that asphalt would be hotter than cement**
- **Asphalt had a wider range of temperatures than concrete.**
- **Asphalt got colder AND got hotter than concrete.**
- **The average temperatures were pretty close together.**
- **Our hypothesis was somewhat supported.**

Abstract

Our purpose was to compare surface temperatures of cement and asphalt. Our hypothesis was that asphalt would be hotter than cement. We took surface temperatures of concrete and asphalt at our school using IRT's. The analysis of our data showed that the range temperature of concrete is 1.2°C to 22.1°C and the average temperatures was 17.5°C. And the range of Navarre asphalt is -3.9°C to 31.4°C and the average temperature was 18°C. Although there may have been errors when entering the time temperatures were taken on the Globe website, those errors do not affect our conclusion. Our conclusion was that our hypothesis is somewhat supported: the asphalt was hotter than the concrete at times. Heat is absorbed by darker things.

Works Cited

Globe.gov

Google Earth

