

# **An Implementation Plan for a Voyage Scale Model Solar System**

**Date of Submission: April 1, 2021**

## **LEAD ORGANIZATION**

**Keep Broken Arrow Beautiful**



Sharon Atcheson, President

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<http://www.KeepBrokenArrowBeautiful.org>

non profit 501c3

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**Partner Organizations:**



Attn: President/CEO Jennifer Conway

210 N. Main Street

Broken Arrow, OK 74012

918-893-2100

<https://www.brokenarrowchamber.com>



Michael Sturgeon, City Manager/CEO

220 S. First Street

Broken Arrow, 74012

918-259-8419

<http://www.brokenarrowok.gov>



Broken Arrow Public Schools

Dr. Janet Vinson, Superintendent

701 S. Main Street

Broken Arrow, OK 74012

918-259-7400 [www.baschools.org](http://www.baschools.org)

## **SECTION 2 – The Community**

Identified as Oklahoma's "Fourth Largest City," Broken Arrow has a population of 115,000 in the city's geographic area of 64 square miles. Broken Arrow is located in the northeastern part of the state of Oklahoma, primarily in Tulsa County, with a portion in adjacent western Wagoner County. The community can claim an additional 10,000 plus residents who reside in new housing developments in unincorporated areas immediately adjacent to the city boundary.

Broken Arrow is the second largest city in Tulsa County and the 267th largest city in the United States. The city has the third-largest concentration of manufacturers in Oklahoma. Its current economy is very diverse, with a significant number of technical and aerospace companies.

The city has a Council-Manager form of city government. The city's geographic boundaries include portions of five major school districts—Broken Arrow, Bixby, Union, Tulsa, and Coweta Public Schools. Based on available demographic data, the community's racial makeup is 79.3% Caucasian, 4.3% African American, 5.2% Native American, 6.5% Hispanic-Latino population, 3.6% Asian, 0.05% Pacific Islander, and 5.4% from two or more races.

The City of Broken Arrow, established "overnight" in October 1902 when a wooden stake was driven in the prairie grass plains along the route of a proposed new railroad line, is now moving toward its 119th birthday.

Broken Arrow Independent School District's public school system, formed in 1904, is a major attraction for the community. The system provides educational services for more than 19,000 students on 30 separate campuses, offering Pre-Kindergarten through 12th grades, plus an Early College High School program.

The school district covers 115-square miles in Tulsa and Wagoner Counties, overlays much of the City of Broken Arrow boundaries, and includes large portions of residential and commercial developments of the adjacent City of Tulsa.

Higher education in Broken Arrow is provided by Northeastern State University—Broken Arrow that has a population of 3,000 students. Tulsa Community College's Southeast Campus serves Broken Arrow area students on one of four campuses that serve approximately 30,000 students per semester. Tulsa Technology Center's Broken Arrow campus has an enrollment of about 3,500 full- and part-time secondary and adult students. Rhema Bible Institute located on a 110-acre campus brings students to Broken Arrow from throughout the world.

The community's three major organizations, the City of Broken Arrow, the Broken Arrow Chamber of Commerce, and Broken Arrow Public Schools, have endorsed the project. The Chief Executive Officers of the three entities have provided individual statements of support. The Keep Broken Arrow Beautiful (KBAB) 501(c) 3 community umbrella group is the partner organization for receiving and distributing funds for the project.

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### **SECTION 3 – Your Strategic Objectives In STEM**

Voyage relates STEM education to real life and illustrates the value of STEM in local classrooms and other venues in the Broken Arrow community. Students visiting an exhibit at a museum have just minutes to experience each exhibition; however, the Voyage Solar System Model allows students to experience travel from the Sun to Pluto with discussions and questions along the route. Their time spent is only limited by the length of the school day! They are given a real sense of Earth's size, place in the universe and the magnitude of space science.

National Science Standard: ESS1.3 *Analyze and interpret data to determine scale properties of objects in the solar system.*

The Voyage program offers a comprehensive technique including visual, auditory, and kinesthetic activities that will engage children and adults in the historical significance and modern relevance of STEM today. This diverse program's components were developed by world class subject matter experts and are designed to engage even students at low-income schools and also their communities.

National Science Standard: ES.ESS1.4 Use mathematical or computational representations to determine patterns that can be used to predict the motion of orbiting objects in the solar system.

In order to make the current Mission to Mars, engineers used data about Mars and Earth orbits to successfully arrive on the Mars surface and math for the logistics of time, distance and velocity.

For a Mission to Mars Unit Visit: [www.jpl.gov](http://www.jpl.gov) [www.mars.gov](http://www.mars.gov)

STEM activities on these websites can be used with K-12 students incorporating NASA and JPL educational materials that include excellent hands-on activities for enhancing science, engineering, and mathematics.

#### *Mission to Mars Unit*

In this standards-aligned unit, students learn about Mars, design a mission to explore the planet, build and test model spacecraft and components, and engage in scientific exploration.

Students use satellite and rover images to learn about the various features and materials that cause color variation on the surface of Mars, then create their own "Marscape."

Students will use the engineering design process to design, build, test and improve a model satellite intended to investigate the surface of a planet.

#### *Water Filtration Challenge*

Students work in teams employing an iterative design process to design and build a water filtration device using commonly available materials.

## **SECTION 4 – Proposed Community Engagement**

The Voyage Scale Model Solar System will change the entire community of Broken Arrow! Our students and adult populations will greatly benefit from this program that makes the wonder of space and space travel accessible for all. Two of the National Science Standards Voyage address are: *ESS1.3* analyze and interpret data to determine scale properties of objects in the solar system and *ES.ESS1.4* use mathematical or computational representations to determine patterns that can be used to predict the motion of orbiting objects in the solar system.

Voyage will spark the imaginations of all “Broken Arrowans” and lead to visions of conquering places and ideas unimagined.. Our students will look in their mirrors and see reflections of scientists, mathematicians, inventors and explorers!

### **Voyage Community Involvement**

#### **Websites:**

**Broken Arrow Public Schools Website:** [www.baschools.org](http://www.baschools.org)

Voyage will build a link to add to the Broken Arrow Public School’s website. This site will give information about the model, events, access to the Voyage Curriculum and the location of the model. Photos and videos will show students and educators utilizing the model and student reactions at the stanchions. The website can be easily accessed and utilized by all Broken Arrow classroom teachers, students and parents.

**Broken Arrow Website:** [www.brokenarrow.gov](http://www.brokenarrow.gov)

The Broken Arrow community website will showcase the location of Voyage, information about upcoming events and suggestions about visiting the model with families and friends. Photos and video will entice local visitors to come enjoy the trip to Pluto. Broken Arrow parents who are looking for something amazing to do on a beautiful day will come walk through the Universe.

**Oklahoma Websites:** [www.travelok.com](http://www.travelok.com) and/or [www.discoveroklahoma.com](http://www.discoveroklahoma.com)

Oklahoma tourism websites will recommend the Voyage site as a tourist destination for travelers coming to Oklahoma. Voyage has the potential to receive national recognition as one of the ‘don’t miss’ travel destination in Oklahoma and the Midwest along with Tulsa’s award winning Gathering Place. It could literally put Broken Arrow on the map, bringing both respect for education and economic growth to Broken Arrow.

### **Broken Arrow Businesses:**

#### **Grand Opening VIP Event for Partners, Funders and Family**

All partners, donors, Voyage committee members, Broken Arrow Public School Administrators, City Officials and their families will be invited to take a “voyage” through the solar system with Dr. Jeff Goldstein, Director of National Center of Earth and Science Education, NCESSSE and designer of Voyage. This is a once in a lifetime opportunity to experience Voyage with the amazing Dr. Jeff. Following the tour, a casual reception with thank you messages to donors and a question & answer time with Dr. Jeff will be held at one of the three schools along the Voyage route.

## **All Broken Arrow Community Event:**

### **Run to the Sun**

The fun run is open to all ages with division for different age groups. Run to the Sun will give parents, siblings, students, grandparents and community members an opportunity to tour the universe!

Potential Solar System Activities may include:

- Build a rocket

- Build a Mars Rover

- Star colors activity

- \*Art contest with space theme

- \*Rocket design contest

Winners of the contests could be recognized at a certain time in the afternoon.

This annual run would bring attention to Broken Arrow, space science and space exploration. Voyage will use space exploration to foster interest in the studies of space, living in space, space travel, Mars exploration, math and physics, to name a few. Experiencing Voyage will create interest in STEM careers.

**Star Night** with Astronomy experts and enthusiasts will share the night sky through their telescopes. Telescopes and constellations apps on phones or iPads can be used by students to talk about constellations in the sky that evening.

Apps:

- Sky View Lite

- Sky Guide

- Night Sky

- Star Chart

- Star Gazer

- Star Walk

**Tulsa Astronomy Club:** [www.astrotulsa.com](http://www.astrotulsa.com)

The Tulsa Astronomy Club website contains a series of lessons that explain about constellations, planets, phases of the moon, seasons and telescopes. Voyage offers a unique experience combining the real world of astronomy with a scale model. Models allow people to learn new knowledge in a way that elicits an emotional response and new understanding. It can put an object or objects into a format that makes it possible to understand by anyone.





# **Broken Arrow High School**

## **Site of Voyage Solar System**



March 31, 2021

Dr. Jeff Goldstein  
Director of Voyage: Scale Model Solar System

**RE: CITY OF BROKEN ARROW GRANT IMPLEMENTATION PLAN**

Dear Dr. Goldstein:

Please find this letter as my unequivocal support for the Broken Arrow Citizen Committee's submission for a grant to permanently install a *Voyage Scale model of the Solar System* in Broken Arrow. It was very exciting to learn about this potential project when we met with Dr. Clarence Oliver to discuss the committee's plan to apply to be one of the five grant recipients.

If awarded the grant, this endeavor would be invaluable to the growth and viability of our city in a number of areas including marketing, tourism, education, and economic development. It would be an honor to be chosen for an exhibition such as the first Voyage scale model of the solar system that was installed at the prestigious Smithsonian Institute in Washington, D.C.

The City will make a concerted effort to partner with Broken Arrow Public Schools and the Broken Arrow Chamber to increase public knowledge about this project in order to make it a long-term success.

If you need further information, please do not hesitate to contact me at 918-259-8419 or [mspurgeon@brokenarrowok.gov](mailto:mspurgeon@brokenarrowok.gov).

Sincerely,

Michael L. Spurgeon  
City Manager



March 31, 2021

To Whom It May Concern:

Broken Arrow Public Schools has authorized the permanent installation of the Voyage stanchions on our property located off Albany Street, between Broken Arrow High School, Creekwood Early Childhood Center, and Creekwood Elementary schools. As you will see on the stanchion location map, we are able to accommodate the entirety of the Voyager along the sidewalk that spans between the three schools. For your convenience, we have listed the addresses of the three adjacent properties below:

Broken Arrow High School: 1901 E. Albany Street, Broken Arrow, OK 74012

Creekwood Early Childhood Center: 1351 E. Albany Street, Broken Arrow, OK 74012

Creekwood Elementary School: 1301 E. Albany Street, Broken Arrow, OK, 74012

We are thrilled to have the Voyager be a part of the Broken Arrow community!

Thank you,

Janet C. Vinson, Ph.D.

Superintendent

Broken Arrow Public Schools