Clocca Concepts Bead Lines:
The Milky Way Story Curriculum Guide

The Milky Way Story Beadline is sold in single sets (Command Cards included). Each set includes the materials necessary to create 1 beadline (necklace).

Items Included:

- Milky Way Story Command Cards (included)
- 12 Symbol Beads (i.e., Sun, Earth, asteroid belt,etc…)
- Scale Beads (small black, long black, silver ring)
- Jewelry cord

Anthropologists, psychologists, and historians believe that storytelling has been with us since the beginning of our existence - in fact, they argue that storytelling is that which *defines our humanity*. For thousands of years, as people struggled to survive, they passed through stories what wisdom and knowledge they accumulated. In early times, storytelling was used to explain significant and often confusing events such as storms, tidal waves, lightening, and fire. Special types of stories about heroes and Gods were used to bind individuals to common belief systems. Moral tales conveyed the first codes or laws that ensured the harmony, cooperation, and ultimately the success of early human populations. Story telling has been the main way in which human cultures and civilizations have transferred knowledge of past events, chronicled present events, and inspired hope for future events.

Clocca Concept's Bead Lines introduces students to the Milky Way story – the order of planetary bodies from the Sun and scaled according to Astronomical Units (AU). Bead Lines allow students to use mnemonic devices (beads as symbols of events) to tell a story. The Milky Way Story begins the central body of our galazy – the Sun and the journey between the major planetary bodies to the furthest reaches – Pluto, the dwarf Planet. Bead lines can incorporate both generic and specific events. They can be short or extremely long. For the Milky Way Story, we decided to keep it simple but with enough specific details to make an interesting story and keepsake necklace. It is a long beadline…but that only adds to the visual impression.

While this story is certainly an impressionistic lesson, it also incorporates a distance scale into the bead line. As such, the distances used between are close approximations based on the Astronimical Unit (AU) The color of the scale beads represents are black – however there are 2 sizes. Those planetary bodies closest to the Sun are not whole units (AU) and thus we created a scale that would work when the distances became large numbers.

The Scale:

For general reference, we can say that one astronomical unit (AU) represents the mean distance between the Earth and our sun. An AU is approximately 93 million miles (150 million km). It's approximately 8 light-minutes.

More exactly, one astronomical unit (AU) = 92,955,807 miles (149,597,871 km).

1 small black seed bead = 1/10 AU

2 long black seed beads = 1 AU

1 AU = 150 million km

This allows students to count the distance on the beadline! To make the counting easier, we also decided to add the silver ring bead after each AU. So after each 10 small black seed beads (no matter how many other symbolic beads are in between them), you would place a silver ring bead OR after every 2 long black seed beads. This allows the student to count Astronomical Units easily on the beadline.

Directions for Use:

1. Place Milky Way Story Command Cards in order from the Sun to Pluto.
2. Lay out the jewelry cord and the beads.
3. Note to students the use of scale beads:
    - 10 Small Black Seed Bead = 1 AU = 2 long black seed beads
    - 1 AU = 150 million km
4. Beginning with the Sun, follow instructions presented on the Command Cards.
5. When the story is complete, tie each end of jewelry cord into a knot.
6. Have student recite their story to another student(s).

Background Notes:

For general reference, we can say that one astronomical unit (AU) represents the mean distance between the Earth and our sun. An AU is approximately 93 million miles (150 million km). It's approximately 8 light-minutes.

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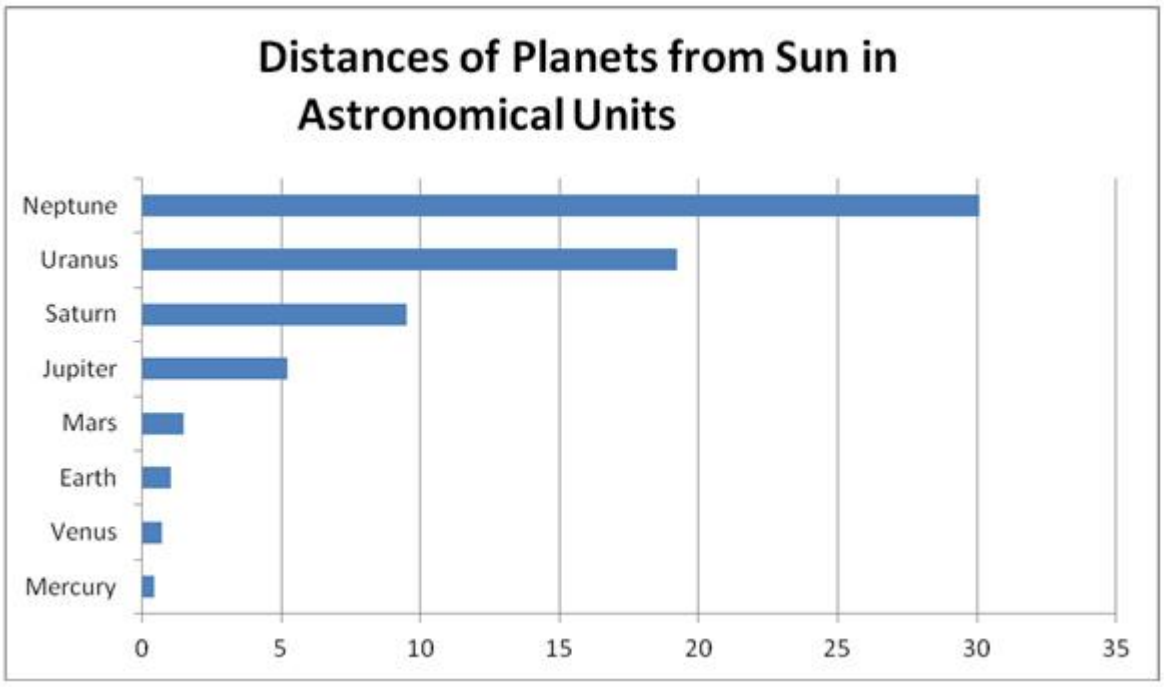
Earth's orbit around the sun isn't a perfect circle. So Earth's distance from the sun changes throughout the year. Astronomers give the Earth's changing distance throughout the year relative to the astronomical unit, too. For instance, when the Earth is at *perihelion* – its nearest point to the sun for the year, in January – it's about 0.983 AU from the sun. When our planet swings out to *aphelion* – its farthest point, in July – we're about 1.017 AU away from the sun.



Mean distance (semi-major axis) from sun to each planet, in AU.

Mercury: 0.387 AU
Venus: 0.723 AU
Earth: 1.000 AU
Mars: 1.524 AU
Jupiter: 5.203 AU
Saturn: 9.582 AU
Uranus: 19.201 AU
Neptune: 30.047 AU

Mean distance from sun to some dwarf planets, in AU.

Ceres: 2.767 AU
Pluto: 39.53 AU
Eris: 67.958 AU
Sedna: 518.57 AU

Mean distance to Kuiper Belt, farthest spacecraft, Oort Cloud, in AU.

Kuiper Belt: 30 to 55 AU

Farthest spacecraft: Voyager 1: 137.053 AU (as of October 2016)

Oort Cloud: 5,000 to 100,000 AU

Amount of distance in a light-year, in AU

One light-year = 63,240 AU