

WE FIND THAT WE LIVE ON AN INSIGNIFICANT PLANET
OF A HUMDRUM STAR LOST BETWEEN TWO SPIRAL ARMS
IN THE OUTSKIRTS OF A GALAXY WHICH IS A MEMBER OF
A SPARSE CLUSTER OF GALAXIES, TUCKED AWAY IN SOME
FORGOTTEN CORNER OF A UNIVERSE IN WHICH THERE
ARE FAR MORE GALAXIES THAN PEOPLE.
-CARL SAGAN, P. 205

THE BIG IDEA(S)

WHAT THIS MEANS FOR STEM EDUCATORS

- The universe is so massive and as humans we are a small part of this universe.
- We think the world revolves around us but in reality we only have a tiny understanding of the universe around us.
- Humans have always tried to make sense of the natural world – first with stories and later with science.

- Our knowledge of the cosmos/universe is limited. There is much to be learned.
- Learning takes place through trial and error.
- Ideas that may lead to amazing discoveries may seem bizarre at first; do not stifle creativity.
- Embark on a voyage based on a question first.
- Just because someone has a valid idea, that does not mean that all their ideas are valid. It is important to evaluate each theory and idea independently.
- Theories and ideas have evolved over the centuries.
- Culture and beliefs have and continue to play a big part in scientific discoveries.

PERFORMANCES OF UNDERSTANDING

- Students pose their own questions. W.O.W. moments that lead to independent learning.
- Question, research, debate, justify, revise, generalize
- Create a timeline of the universe or planet Earth and mark important events.
- Create a scale model of the solar system, or the galaxy, or the universe.
- Research important scientists and their discoveries and create Memes based on research.

WHAT QUESTIONS DOES THIS RAISE?

- How does the scale of the universe impact our understanding of our place in the universe?
- What else is out there in the universe? Are we alone?
- What knowledge has been lost over the decades? Centuries? Millenia?
- Can we teach for conceptual understanding without full knowledge of the subject?