NASA's Eyes NGSS Alignment

Here we list potential Next Generation Science Standards that NASA's Eyes could help address.
https://science.nasa.gov/eyes/

Skills

- Developing and Using Models: https://www.nextgenscience.org/search-standards?keys=&tid_1%5B%5D=109
    - 2-ess2-2-earths-systems
        - 2nd – Develop a model to represent the shapes and kinds of land and bodies of water in an area. [Assessment Boundary: Assessment does not include quantitative scaling in models.]
        - Eyes on Earth – Showing land and water
    - 5-ess2-1-earths-systems
        - 5th – Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]
        - Eyes on Earth – showing different spheres
    - ms-ess1-1-earths-place-universe
        - Middle School – Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. [Clarification Statement: Examples of models can be physical, graphical, or conceptual.]
        - Eyes on Solar System – Eclipses in Eyes
    - ms-ess1-2-earths-place-universe
        - Middle School – Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. [Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as students' school or state).] [Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.]
        - Eyes on Solar System and Exoplanets – Discuss gravity and orbits
    - hs-ess2-6-earths-systems
        - High School – Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. [Clarification Statement: Emphasis is on modeling biogeochemical cycles that include the cycling of carbon through the ocean, atmosphere, soil, and biosphere (including humans), providing the foundation for living organisms.]
        - Eyes on Earth – Discuss carbon cycle model
- Obtaining, Evaluating, and Communicating Information:

- k-ess3-2-earth-and-human-activity
    - K – Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.
    - Eyes on Earth – See weather patterns from space, explore hurricane events
- 2-ess2-3-earths-systems
    - 2nd – Obtain information to identify where water is found on Earth and that it can be solid or liquid.
    - Eyes on Earth – water levels and GRACE
- 3-ess2-2-earths-systems
    - 3rd – Obtain and combine information to describe climates in different regions of the world.
    - Eyes on Earth – Soil moisture and seasonal events
- 4-ess3-1-earth-and-human-activity
    - 4th – Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]
    - Eyes on Earth – CO and burning forests
- 5-ess3-1-earth-and-human-activity
    - 5th – Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
    - Eyes on Earth – anything, really
    - Choose a news feature, and the corresponding satellite: https://science.nasa.gov/climate-change/stories/
- ms-ps4-3-waves-and-their-applications-technologies-information-transfer
    - Middle School – Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.* [Clarification Statement: Examples could include solar cells capturing light and converting it to electricity; medical imaging; and communications technology.] [Assessment Boundary: Assessments are limited to qualitative information. Assessments do not include band theory.]
    - Any – Discuss how most NASA missions utilize solar cells and all space communications are in waves.
    - Optional discuss ongoing laser communication technology
- hs-ps4-5-waves-and-their-applications-technologies-information-transfer
    - High School – Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. [Clarification Statement: Emphasis is on a basic understanding that waves can be used for communication purposes. Examples could include using fiber optic cable to transmit light pulses, radio wave pulses in wifi devices, and conversion of stored binary patterns to make sound or text on a computer screen.] [Assessment Boundary: Assessment does not include binary counting. Assessment does not include the specific mechanism of any given device.]

        - Any – Discuss how all NASA missions communicate in digitized signals, and in fact it was, in part, NASA's need to communicate across the Solar System that pushed advancements in digitized information and systems.
    - hs-ess1-3-earths-place-universe

        - High School – Communicate scientific ideas about the way stars, over their life cycle, produce elements. [Clarification Statement: Emphasis is on the way nucleosynthesis, and therefore the different elements created, varies as a function of the mass of a star and the stage of its lifetime.] [Assessment Boundary: Details of the many different nucleosynthesis pathways for stars of differing masses are not assessed.]
        - Eyes on Exoplanets – visit different stars at different stages of the stellar life cycle

Content

- ESS1.B: Earth and the Solar System:
    - 5-ess1-2-earths-place-universe

        - 5th – Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. [Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.] [Assessment Boundary: Assessment does not include causes of seasons.]
        - Eyes on Solar System – Use constellations and explore the ecliptic
    - ms-ess1-1-earths-place-universe

        - Middle School – Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. [Clarification Statement: Examples of models can be physical, graphical, or conceptual.]
        - Eyes on Solar System – Eclipses in Eyes
    - ms-ess1-2-earths-place-universe

        - Middle School – Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. [Clarification Statement: Emphasis for the model is on gravity as the force that holds together the solar system and Milky Way galaxy and controls orbital motions within them. Examples of models can be physical (such as the analogy of distance along a football field or computer visualizations of elliptical orbits) or conceptual (such as mathematical proportions relative to the size of familiar objects such as students' school or state).] [Assessment Boundary: Assessment does not include Kepler's Laws of orbital motion or the apparent retrograde motion of the planets as viewed from Earth.]
        - Eyes on Solar System and Exoplanets – Discuss gravity and orbits
    - ms-ess1-3-earths-place-universe

        - Middle School – Analyze and interpret data to determine scale properties of objects in the solar system. [Clarification Statement: Emphasis is on the analysis of data from Earth-based instruments, space-based telescopes, and spacecraft to determine similarities and differences among solar system objects. Examples of scale properties include the sizes of an object's layers (such as crust and atmosphere), surface features (such as volcanoes), and orbital radius. Examples of data include statistical information, drawings and photographs, and models.] [Assessment Boundary: Assessment does not include recalling facts about properties of the planets and other solar system bodies.]

        - Eyes on Solar System – Use the Eyes Scale
    - hs-ess1-4-earths-place-universe
        - High School – Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. [Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.] [Assessment Boundary: Mathematical representations for the gravitational attraction of bodies and Kepler's Laws of orbital motions should not deal with more than two bodies, nor involve calculus.]
        - Any – Show that the Eyes simulation uses these equations, and go over predictable orbits, and the Mars transfers
    - hs-ess2-4-earths-systems
        - Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. [Clarification Statement: Examples of the causes of climate change differ by timescale, over 1-10 years: large volcanic eruption, ocean circulation; 10-100s of years: changes in human activity, ocean circulation, solar output; 10-100s of thousands of years: changes to Earth's orbit and the orientation of its axis; and 10-100s of millions of years: long-term changes in atmospheric composition.] [Assessment Boundary: Assessment of the results of changes in climate is limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.]
        - Eyes on Earth – CO2, and Temperature