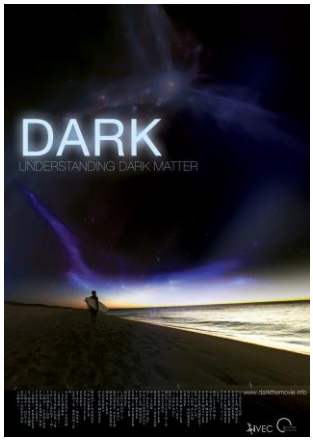
Educator Viewing Guide



Dark: Understanding Dark Matter (2012)
20 minutes

DARK explains and explores the nature of dark matter, the missing 80% of the mass of the Universe. The search for dark matter is the most pressing astrophysical problem of our time – the solution to which will help us understand why the Universe is as it is, where it came from, and how it has evolved over billions of years – the unimaginable depths of deep time, of which a human life is but a flickering instant. But in that instant, we can grasp its immensity and, through science, we can attempt to understand it. (darkthemovie.info)

Topics covered:

Astronomy, dark matter; galaxies, telescopes; supercomputer visualization

Interdisciplinary connections: computer programming and simulations, physics

Key Terms and Concepts:

Astronomy, Big Bang, Cosmic Web, Dark Matter, Galaxy, Radio Telescope, Simulation, Supercomputer

Combine with these KidSpace Activities:

Magnetic Lab
Investigate the push and pull forces of magnetism while guiding the unique material, Ferrofluid, a nanometer-sized particle that acts like a magnetic solid and liquid.

Launch Lab
Learn the force needed to send rockets into the air. Take aim with our stomp rockets while investigating science concepts: rocket design, force, gravity, altitude, resistance, and more.

PlaySpace!
Science begins with imagination. The space-themed playground offers many opportunities for space-themed play, space-related discoveries, and demonstrations of science concepts: gravity, friction, force, laws of motion, and more.

Learning Resources and Activities:

Create learning units designed around a visit to KidSpace! These web resources and activities are designed to illustrate concepts and ideas presented in the show. Many of these can be adapted to various age groups.

Educational Resources for Dark Matter Day; Interactions Collaborations
Dark Matter Day is celebrated on October 31, but these resources and activities can be done any time of year. Includes links to several activities about dark matter.
https://www.darkmatterday.com/educational-resources-dark-matter-day/

Dark Matter Possibilities; NASA Goddard Space Flight Center
This site provides directions, student worksheet, and links to resources for a research project about dark matter. Includes assessment rubric.
https://imagine.gsfc.nasa.gov/educators/galaxies/imagine/act_dark_matter.html

Dark Matter: Probing What You Can't See; Sonoma State University
This resource contains background information and activities designed to illustrate searching for dark matter. Includes activity lab sheet where participants investigate "hidden matter" between paper plates.
https://universe.sonoma.edu/activities/dark_matter.html

CERNland; An interactive website for kids; CERN
This "virtual theme park" contains games, multimedia applications, and videos designed to inspire children (7-12) with physics. Interactive website for children to learn about particle-physics, science news, atoms, and more. Available in multiple languages.
http://www.cernland.net

Exploring the Universe: Objects in Motion; NISE Network
This resource contains all downloads needed for participants to explore the complex and predictable ways objects in the universe interact with each other. Includes learning goals and videos (Spanish and English available).
http://www.nisenet.org/catalog/exploring-universe-objects-motion-2018

Exploring Magnetic Fields; American Association for the Advancement of Science (AAAS)
This site contains lesson plans and directions for two activities designed to explore magnetic fields. Includes material list, directions, student worksheets, assessment and extensions.
http://sciencenetlinks.com/lessons/exploring-magnetic-fields/

Black Holes; Universe in the Classroom, Astronomical Society of the Pacific
This resource includes background information about black holes, discussion of myths and science fiction about black holes and two activities: *Shrinking* and *A Scale Model of a Black Hole.*
https://www.astrosociety.org/edu/publications/tnl/24/24.html

Comprehension Questions:

Help learners process the concepts and ideas presented in the show with these questions.

1. What is the difference between radio telescopes and visual telescopes?
2. How do scientists know that dark matter exists?
3. What is the role of radio telescopes and supercomputers in understanding the existence of dark matter?
4. What discoveries do you think scientists will make with the new telescopes and supercomputers in development?

Further Research and Discussion

Ask learners to discuss the potential scientific applications to what is learned through Radio Astronomy Research. After the discussion, encourage students to conduct research about new discoveries in dark matter.

This show covers content that addresses Colorado Academic Standard in Science (Physical Science and Earth Systems Science). See Planetarium Show Academic Standard Chart for details by grade.