

The Series

The NASA "Why?" Files is a series of four 60-minute video (taped) programs with an accompanying web site. Each 60-minute video program is divided into four 15-minute segments. The series is designed to enhance the teaching of science and mathematics in grades 3-5.

Dear Educators,

Welcome to the NASA "Why?" Files our newest distance learning initiative. We are really excited about this series and hope that educators across the nation will use the NASA "Why?" Files to enhance and enrich the teaching of mathematics, science, and technology in grades 3-5. The 2000-2001 series of four 60-minute programs (1) supports the national mathematics, science, and technology standards, (2) uses scientific inquiry, including the scientific method and science process skills, and problem-based learning, and (3) introduces students to the excitement and exploration of real-world math, science, and technology. The NASA "Why?" Files includes a teacher guide, a video, and a web-based component.

The NASA "Why?" Files story line is based on the exploits of six ethnically diverse, inquisitive school children ages 8-12. The tree house detectives, as they are commonly known, meet in a tree house before and after school. The students and a retired science teacher, Dr. "D", use scientific inquiry to investigate a variety of issues and problems. In the 2000-2001 series, the tree house detectives investigate the "Case of the Unknown Stink," the "Case of the Barking Dogs," the "Case of the Electrical Mystery," and the "Case of the Challenging Flight."

The NASA "Why?" Files is FREE. All you have to do is visit the web site <http://whyfiles.larc.nasa.gov> and register. Off-air rights are granted in perpetuity. No fees or license agreements are required. Educators are granted unlimited rights of duplication, dubbing, broadcasting, cable casting, and web casting into perpetuity with the understanding that all materials associated with the NASA "Why?" Files are used for educational purposes. The lesson guides are in the public domain (i.e., not copyrighted). Neither the broadcast, the lesson guides, nor the web-based components may be used either in whole or in part, for commercial purposes without the expressed written consent of the Office of Education, NASA Langley Research Center.

Thank you for making the NASA "Why?" Files part of your classroom this year. If you have questions or comments, I would enjoy hearing from you. I can be reached by U.S. mail at the NASA Langley Research Center, Office of Education, Mail Stop 400, Hampton, VA 23681; by telephone at 757-864-2491; by fax at 757-864-8835; and by e-mail at t.e.pinelli@larc.nasa.gov

Sincerely,

Thomas E. Pinelli, Ph.D.
Educational Technology and Distance Learning Officer



The Series

Overview

The NASA “Why?” Files, offered by NASA Langley’s Office of Education as a distance learning initiative, is a series of four 60-minute video programs with an accompanying web site. The series is designed to enhance the teaching of science in grades 3-5. The program content is drawn from physical science, Earth science, life-biological space science, and computer science; is related to the National Science Teachers Association (NSTA) Standards; and reflects the National Council of Teachers of Mathematics (NCTM) Standards. The series implements problem-based learning and focuses on the application of the scientific method. Each video, the web site, and the supplemental materials are designed to model how children use the scientific method to solve problems and include such process skills as gathering and classifying data, establishing hypotheses, designing experiments, identifying variables, measuring, observing, predicting, and communicating results. Students simultaneously learn subject matter and develop process skills while engaging in solving real-world problems. The problem-based learning practices enable the students to become proactive and critical thinkers capable of self-guidance and assessment when involved in a problem-solving situation.

The video programs are fast paced, include animation, have a musical opening and closing, and are planned to appeal to children aged 8-10. The story line has six ethnically diverse, inquisitive school children (ages 10, 11, and 12; three males and three females), who are friends that meet in a tree house belonging to one of the children. They investigate the solution to a particular problem, and the NASA “Why?” Files series follows them through the

steps of their investigation and final conclusion. A companion teacher guide is available for each video program in the series. Each guide includes the program overview, related science and mathematics concepts, key vocabulary, and program discussion. In addition, the guide includes extension activities and web site information designed for classroom or home/family enrichment.

The NASA “Why?” Files web site technology components provide a learner-centered environment in which the educator monitors, questions, and challenges, while students construct meaning and direction that will lead to a solution.

To reach a solution, students go through the following stages: understanding the problem, learning about the problem, solving the problem, and reflecting on the process used to solve the problem. This process helps students develop crucial problem-solving skills to become life-long learners.

The NASA “Why?” Files will be delivered to school districts and educators by PBS instructional television. The teacher guides and the videos are free for educators. Copies of the teacher guide may be downloaded at the NASA “Why?” Files web site <http://whyfiles.larc.nasa.gov>



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Program Preparations

To generate student interest and to enhance the educational value of the program series, introduce each tape as you would any video or literature selection. Use the program summary for introductory ideas. List the key vocabulary words on the chalkboard or on a chart. Either go over the words and the meanings before presenting the video or remind the students to listen carefully for the words as they view the video so that the words and their meanings can be discussed after viewing.

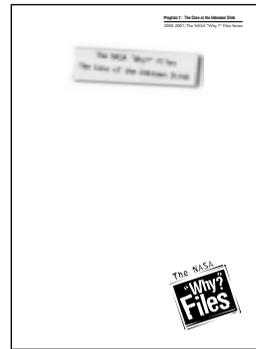
Keep the following in mind:

- (1) The series may be used, with the appropriate teacher follow-up instruction, to introduce the scientific method or to supplement/culminate previous classroom instruction and materials relative to the scientific method.
- (2) What's the Stink? (Program 1) should be used first since the story characters, the problem to be solved, and the scientific method will be introduced.
- (3) The remaining programs should be used as they relate to the teacher's curriculum.
- (4) The discussion questions and extension activities should be selected and/or adapted as appropriate for the developmental level of the students.

Each teacher guide reflects the content of a particular 15-minute segment of the 1-hour per program series. Adjust the information and activities in the guide according to the program segments used at a given time.

Encourage the students to use the NASA "Why?" Files web site for enrichment and technology application. The web site should generate student interest in exploring the use of the technology independently, rather than as a classroom instructional activity to obtain specific scientific information. The web page also contains some activities that families can enjoy together at home.

Program Components



The teacher guide for each of the four videos in the program series contains the following:

- *Series Overview*
- *Program Preparation*
- *Program Overview*
- *Science Concepts*
- *Mathematics Concepts*
- *Key Science Vocabulary*
- *Program Discussion*
 - *Before Viewing*
 - *After Viewing*
- *Program Extensions*
- *NASA "Why?" Files Web Site Information*

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Preparations for Using the Program

Research has shown that when technologies such as video and the Internet are integrated into the curriculum, a student-centered and interactive learning environment can be achieved. By integrating technology with existing curriculum, technology tools become an effective educational resource rather than one more component to fit into an already packed agenda. The design of the NASA “Why?” Files video and web site promotes a “marriage” of the two technologies. The video and web site are developed to address the national standards and provide students with an opportunity to enhance their science, mathematics, and educational technology skills.

Suggestions for Effective Use of the Video

To generate student interest and to enhance the educational value of the series, introduce each 15-minute program segment by using the Program Discussion to generate introductory ideas. Display the key vocabulary words and discuss the definitions. Remind the students to listen carefully for the words as they view the instructional program and to be prepared to discuss the vocabulary definitions after viewing.

The series can be used to introduce the scientific method and to supplement previous classroom instruction. Discussion questions and extension activities provided in the teacher guide can be adapted to the developmental level of the students. The teacher guide supports the instructional content of each 15-minute segment by providing a variety of related educational experiences for the students. Programs and their segments may be videotaped and shown at times that enhance instruction of a particular concept or topic.



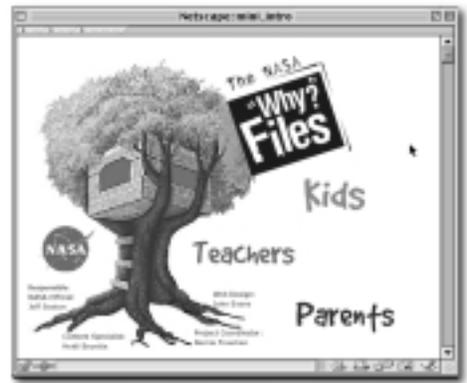
Some Approaches for Using the Program in the Classroom

- View one 15-minute segment and incorporate the lesson guide worksheets, on-line activities/experiments, and home activities/experiments.
- View all four segments of the video sequentially and then follow up with the lesson guide worksheets, on-line activities/experiments, and home activities/experiments according to each student's needs.
- View an individual segment to help introduce or reinforce a particular content area/concept that you are currently teaching in an existing unit.

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The NASA “Why?” Files Web Site

Encourage students to use the NASA “Why?” Files web site for enrichment and additional instructional enhancement. The web site should generate student interest in exploring the topics presented in the programs and develop technology skills. The web site also contains activities students can share at home.



<http://whyfiles.larc.nasa.gov>

Web Site Components

Research Rack

- Facilitates internet searches on specific content.
- Is an access point for summary information and glossary terms about the show’s topic.
- Is a point of reference for NASA research and missions.

Dr. D’s Lab

- Is a resource for assignments and exploration for each section of the video.
- Offers a family or classroom resource for experiments and exploration activities.

Problem Board

- Collection of interactive activities where students apply their technology skills and science inquiry skills.

NASA “Why?” Files Club

- Incorporates technology skills.
- Contains the tree house detectives’ biographies.

Feedback

- Has on-line evaluation of the NASA “Why?” Files.
- Encourages students to create their own web evaluation form they can use at home to ensure their on-line time is spent on quality sites.

Media Zone

- A resource for sound clips, animation, and screen savers to enhance on-line electronic presentations.

Experts’ Corner

- Encourages career exploration.
- Inspires students to define their roles within the school or community and to share an experience of how someone motivated them to pursue a hobby, sport, or practice.
- Provides practice using spreadsheets to catalog professional information that can be used as a resource for career week, writing biographies, or writing a paper that compares and contrasts various professions.

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Effective Integration of the Video and the Web Site

Suggestions for effective integration of the NASA “Why?” Files video, the *Case of the Unknown Stink* and the NASA “Why?” Files web site:

- Worksheets will be located in the teacher and parent portions under Resources.
- Home activities will be located in Dr. D’s Lab area inside the tree house.
- Problem-based learning and video enrichment on-line activities will be located in the tree house at the Problem Board.

Video Segments (Parts 1-4)

Part 1: What's the Stink?

- Students can take notes during the segment by using the on-line worksheet Question and Answer Data Collection Table found in the teacher resource portion of the web site.
- Students can complete the on-line worksheet, *Can We Make Sense of Our Senses*, as a cooperative activity with another student. This activity may be used as a warm-up activity prior to the video or as a closure activity as part of the learning extensions.
- Students can complete the home activities *Where’s the Odor?* and/or *Sweet Smells 101* as a home work assignment, as extra credit, or as a classroom activity.
- Students can visit the Internet Resources inside the Research Rack and read a news article by NASA that highlights a technological invention, the “Electronic Nose.” An image of the “Electronic Nose” is also available from JPL at <http://www.jpl.nasa.gov/news>
See NASA’s Jet Propulsion Lab News Release of June 6, 2000 at <http://www.jpl.nasa.gov/pictures/tech/enose/> (Electronic Nose picture and caption)

Part 2: Search for the Stink

- Students can take notes during the video by using the on-line worksheet, *Using the Scientific Process*. After each segment, pause and discuss the scientific process steps students took or task them with completing the worksheet in small groups after viewing the video segments.
- Students can complete the on-line worksheet, *Writing a Hypothesis*, as a classroom activity or as homework.
- Students can complete the home activity, *Eye on the Environment*, as a homework assignment or an extra credit activity.
- Students can implement the Science Journal Writing home activity in the classroom or at home. It may also be placed in their student portfolios for later growth assessment. *Note: By emphasizing journal writing in the classroom, students will develop an understanding of the importance of continuing the practice at home.*
- Students can visit an internet resource found at the Research Rack that pertains to animals and their sensing abilities to gain additional information about how animals use their sense of smell. <http://www.faculty.washington.edu/chudler/amaze.html>

Video Segments “Continued”

Part 3: We're Almost There

- Students can extend the concept of variables by completing the *Identifying Variables* on-line worksheet. The worksheets will help students make the connection between variables and other real world situations.
- Students can complete the home activity, *Designing a Wind Vane*, and use the wind vane to collect and record data over a period of time. The data can then be organized and communicated in graph form as part of an extension activity for the unit or another unit dealing with weather.
- Students can complete the home activity, *Smelly Traveler*, in class, as an investigation for a lab activity/grade, or as a homework assignment.

Students can visit two internet resources found at the Research Rack. Each pertains to kids' health and how human beings smell.
<http://faculty.washington.edu/chudler/chsmell.html>
http://kidshealth.org/kid/body/nose_SW.html

Part 4: This Is It!

- Students can complete the on-line worksheet, *Environmental Discussion*, as a small group activity to further extend the application of environmental awareness and to develop communication skills.
- Students can complete the home activity Environmental Awareness Contract as a homework assignment that provides an elapsed amount of time before it is due. The final product may be presented in poster format, as an oral report, or as a Power Point presentation.

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