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Introduction

Operation: Science Quest is a series of interactive, multi-media learning modules for students in grades 1-6. They provide instruction in "hard-to-teach" science concepts by creating an engaging and hands-on learning environment. Each module is approximately 20 minutes long and contains animations, simulations, mini-lessons, assessment quizzes, and other interactive features. **Operation: Science Quest** includes a performance reporting and tracking tool to help teachers assess and address gaps in students' knowledge.

Macmillan/McGraw-Hill Science is the K-6 Life, Earth and Physical Science curriculum market leader. **Operation: Science Quest** can supplement core instruction, provide assessment and remediation, and reinforce essential science skills. It can also be used independently to teach students complex scientific processes and concepts. Strong visual and audio elements enhance the learning experience and appeal to different kinds of learners. By presenting science concepts and processes in a variety of contexts and narrative frames, **Operation: Science Quest** will help students connect what they learn to the outside world.

EACH QUEST CONSISTS OF:

- An *introduction* to the quest, characters, and science challenge.
- *Pre-assessment** questions to build on prior knowledge.
- *Mini-lessons* which serve as the main instruction and explore the quest topics in depth.
- *Activities and interactives* so students can experiment hands-on with the variables, conditions, and concepts.
- *Post-assessment* quizzes to help teachers gauge what students have learned and identify areas that may need additional instruction.
- *Bonus.* Interactive videos that elaborate on a concept or idea from the main instruction.

  * Pre-assessment questions appear in Grades 3-6.

There is one **Operation: Science Quest** CD per grade, each with six quests: two for Life Science, two for Earth Science, and two for Physical Science. The six quests on each CD are linked by a theme that invites students to join the characters in a science challenge.
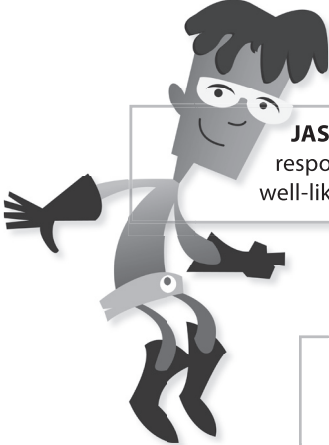
Characters

AMY: an energetic athlete, Amy leads the team in enthusiasm.

EMMA: sharp, analytical, and cultured, Emma has traveled around the world.

HENRY: a witty and smart problem-solver who is fascinated with gadgets.

JASON: the responsible and well-liked team leader.

MARIA: sharp and inquisitive, Maria is quick to speak and eager to learn.

NOTE: *Only Emma, Jason, and Maria appear in Grades 1-2 quests. All five characters appear in Grades 3-6 quests. The characters shown above are from Grade 5.*

Installation and Troubleshooting

SYSTEM REQUIREMENTS:

WINDOWS

- 450 MHz Intel Pentium II processor (or equivalent) and later
- 128MB RAM
- Operating systems: Windows 98, Windows ME, Windows 2000, Windows XP, Windows 2003 Server

MACINTOSH

- 500 MHz PowerPC G3 and later
- 128MB RAM
- Operating systems: Mac OS X 10.1.x or higher

GETTING STARTED:

Insert the CD and click on 'START_HERE' to launch the Flash standalone player application (unless the application starts on its own after inserting the CD). This application contains both the Flash player needed to play the movies, and the navigation page, which allows you to choose the quest.

At the start of the quest, the student will create a personalized Avatar, or character. Once the Avatar has been named and customized, click DONE to begin the module. The Avatar is not saved on the CD or hard drive, and must be customized each time a quest begins.

SOFTWARE REQUIREMENTS:

Operation: Science Quest media is contained in a standalone application called the Macromedia Flash Standalone Player or Projector. It contains everything needed to play the Flash movies on the CD, as long as the minimum system requirements listed above are met.

Troubleshooting:

AUTO-LAUNCHER PROBLEMS

The auto-launch will not work if that feature is turned off on your computer (in your CD hardware control panel), or under Mac OS 10.1 and higher. Open the CD and manually launch the "START_HERE" application, which will run the pre-configured CD-installed Flash Player/Projector.

SOUND PROBLEMS

Check that your computer meets the minimum system requirements. The system should have at least 128 MB of RAM in order to play the audio smoothly. You may need to close other applications while viewing the animations in order not to overload the processor.

NO SOUND

Check that your computer can play sounds from sources such as an mp3 file. Check that the volume in your system's sound control panel is turned up, and that headphones or external speakers are plugged in. In some computer labs, the sound may be turned off by default.

POOR ANIMATION PERFORMANCE

In some cases, a few frames of the animation may skip. This is normal when the Flash Player cannot keep up with the sound. If the problem persists, try closing any open applications. If the animation is unable to play smoothly from the CD, try copying the contents of the CD to your local hard drive and playing from there. Check the minimum system requirements and make sure your computer has at least 128 MB of RAM.

ANIMATION SEEMS TO BE STUCK OR LOADING

It may take a few seconds for each scene to load during the course of a single quest, depending on the speed of your processor. This is normal, and the next scene should begin as soon as it has finished loading.

SAVING INFORMATION

You will need to print the report at the end of each quest in order to save the student's performance. If you close the application window, the student's customized Avatar information and their performance on interactive exercises will be reset.

When pausing during a quest, keep the Player window open to avoid resetting the animation to the beginning.

Interface Features:

TOOLBAR

Each **Operation: Science Quest** module contains a toolbar at the bottom of the screen that highlights a variety of features. At any time during the quest, students may click on the buttons to look up definitions, take notes, get help, or read closed-captioned text.

Toolbar for Grade 5

GLOSSARY

Clicking on this button will bring up a two-panel window with Glossary terms on the left and definitions on the right. Students may click on the audio icon to hear the word and definition read out loud. The number of terms in the Glossary varies by grade.

JOURNAL

Students may click on the pencil button (in grades 1-2) or the book button (in grades 3-6) to take notes about what they're learning. The Journal contains a "Print" option so students can print their notes at any time during the quest. Journal contents will also be printed with the Teacher's Report at the end of the quest.
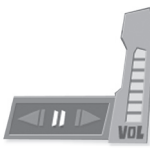
HELP SCREEN

This button is for the Help Screen. Students may mouse over the different parts of the screen to learn more about each feature, or click on the "Show Me Everything" button in the middle of the screen for a mini-tutorial.

CLOSED CAPTIONING

Clicking on this button will bring up closed-captioned text that matches the audio heard during the quest word-by-word. This feature benefits ELL students, students with hearing impairments or learning disabilities, and may also appeal to students who just wish to follow along by reading.

NAVIGATION AND VOLUME

Navigation buttons allow students to rewind, fast forward, pause, or play the quest according to their needs. Clicking the Next arrow will skip to the next section of the animation. The Back arrow can be used to jump backwards within each scene of the animation, but not to previous scenes. (Note that during interactive exercises these two features are not enabled, to ensure that students complete the exercises). The volume may be adjusted or turned completely off.

At the end of the quest, students will reach a screen with the options to Print, Exit, or proceed to the Bonus. Selecting Print will print the following three items: students' Journal notes, the Teacher's Report, and the grade-specific award certificate.

TEACHER'S REPORT

The Teacher's Report lists the student's performance on the pre-assessment and post-assessment quizzes of each quest, including the final scores and number of incorrect attempts.

AWARD CERTIFICATE

The award certificate is designed and customized for each grade's theme. It congratulates students by name for successfully completing their mission.

Quest Themes and Topics

GRADE 1 Theme: Junior Rangers

The characters team up with a park ranger at a local state park. Completion of each quest is rewarded with a Junior Ranger Badge.

LIFE, EARTH, OR PHYSICAL SCIENCE	QUEST#	TOPIC
Life	1	Plants and Animals
Life	2	Adaptations
Earth	3	The Sun
Earth	4	Weather
Physical	5	States of Matter
Physical	6	Properties of Matter

GRADE 2 Theme: Treasure Hunters

The characters are explorers searching for lost treasure deep in the jungle. Completion of each quest is rewarded with a Treasure Note.

LIFE, EARTH, OR PHYSICAL SCIENCE	QUEST #	TOPIC
Life	1	Plant Life Cycles
Life	2	Animal Life Cycles
Earth	3	Soil
Earth	4	Fossils
Physical	5	Objects in Motion
Physical	6	Sound

GRADE 3 Theme: Secret Agents

The characters are agents working for a secret government agency to combat a band of villains called BUNK. Completion of each quest is rewarded with a Debunking Award.

LIFE, EARTH, OR PHYSICAL SCIENCE	QUEST #	TOPIC
Life	1	Biomes
Life	2	Environmental Changes
Earth	3	Days and Seasons
Earth	4	Planet Earth
Physical	5	Physical and Chemical Changes
Physical	6	Light Energy

GRADE 4 Theme: Science Island

A husband-and-wife research team calls on the characters to assist in exploring a newly discovered, deserted tropical island. Completion of each quest is rewarded with a Science Challenge Award.

LIFE, EARTH, OR PHYSICAL SCIENCE	QUEST #	TOPIC
Life	1	Classification
Life	2	Interdependence of Organisms
Earth	3	Rocks and Minerals
Earth	4	Changing Landforms
Physical	5	Electricity
Physical	6	Magnetism

GRADE 5 Theme: Intergalactic Science Challenge

Team Earth has decided to enter the Intergalactic Science Challenge. Completion of each quest is rewarded with an Intergalactic Challenge Award.

LIFE, EARTH, OR PHYSICAL SCIENCE	QUEST #	TOPIC
Life	1	Photosynthesis and Respiration
Life	2	Body Systems
Earth	3	Gravity and Orbits
Earth	4	Atmosphere and Weather
Physical	5	Chemical Reactions
Physical	6	Mixtures and Compounds

GRADE 6 Theme: Job for a Day

As part of the "Job for a Day" program, the characters are teamed up with professionals working in the trenches of their fields. Completion of each quest is rewarded with an Honorary Scientist Certificate.

LIFE, EARTH, OR PHYSICAL SCIENCE	QUEST #	TOPIC
Life	1	Ecosystems
Life	2	Energy for Life
Earth	3	Weather Patterns
Earth	4	Earth's Moving Plates
Physical	5	Solar Radiation
Physical	6	The Power of Convection Currents

Teaching with
Operation: Science Quest

Operation: Science Quest has multiple instructional purposes and can be used before, during, or after a lesson. Students can be assigned to work individually, in pairs, in small groups, or as a class. In addition, *Operation: Science Quest* can be used in the classroom, computer lab, or at home, which provides flexibility in lesson planning and a range of options for teaching. Teachers can tailor their instruction to target specific skills, engage different kinds of learners, monitor students' progress, and save valuable time. Here are some suggestions:

- **Lesson Opener:** With its storyline framework, important missions to accomplish, fun dialogue, and colorful characters, *Operation: Science Quest* can be an effective hook to engage students and introduce them to the lesson.

- **Homework Assignment:** Each quest can be completed at home during students' own time and at their own pace. Students may be directed to write about what they've learned, summarize important ideas, or answer pre-assigned questions, saving class time for discussion.

- **Journal Entry:** The Journal in each quest can be used as a tool for cross-curricular instruction and literary skill-building. Students may be assigned to write journal entries that solicit personal responses and develop language arts skills such as identifying cause and effect, comparing and contrasting, and generating questions.

- **Vocabulary Instruction:** The Glossary highlights important words used during the quest and may be used for vocabulary instruction. Students can review definitions, pronunciations, and identify how the words are used during the quest.

- **Review and Reinforcement:** Because of their focus on "hard-to-teach" concepts, the quests can serve as a means for reviewing and reinforcing the most important and complex information in each lesson. Students will benefit from repeated instruction in these areas.

- **Remediation:** Students who are having trouble grasping difficult concepts will also benefit from the one-on-one tutorial style that *Operation: Science Quest* makes possible. At-risk students can be engaged with instruction that provides a diverse set of experiences and multiple ways of learning.

- **Small Group Instruction:** *Operation: Science Quest* may be used in small groups to encourage cooperative learning and peer tutoring as students work together to complete each quest. Teachers may assign groups to focus attention on particular sections, angles, or concepts within the quest.

- **Whole Group Instruction:** When completed as a class, each quest provides opportunities for both direct and facilitative instruction. Mini-lessons in the quest can be elaborated on with more in-depth instruction and may be used to activate class discussion.
- **Research:** Each quest can serve as a springboard for future research assignments, providing material and topics that students can choose from to investigate further.
- **ELL Instruction:** Features such as the Glossary and closed-captioning, and visual elements such as illustrations and labels, have been created with ELL students in mind. Whether used individually or with an instructor, *Operation: Science Quest* can help ELL students develop language skills without falling behind in learning science content with the rest of the class.
- **Formative Assessment:** *Operation: Science Quest* builds opportunities to assess how students are learning through teacher observation, analysis and discussion of student work, and feedback provided by the Teacher's Report. Teachers can use this information to make beneficial changes in their instruction.

Correlations to *Macmillan/McGraw-Hill Science* and Science Standards

References to *Operation: Science Quest* appear throughout the *Macmillan/McGraw-Hill Science* program to integrate its use into the core instruction. In the Student Edition, students are directed to explore lesson-specific science concepts in corresponding quests that investigate these concepts in new contexts. These references are clearly identified by the Science Quest logo.

Operation: Science Quest is also referenced in the Teacher Edition to highlight its use as an instructional resource. A chart with detailed correlations of quest topics to *Macmillan/McGraw-Hill Science* content for each grade can be obtained online at: www.operationsciencequest.com

Operation: Science Quest content has also been aligned with state and national science standards. A chart with lesson-by-lesson correlations for each grade can be obtained online at: www.operationsciencequest.com

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