SCHOLASTIC

Tom Snyder Productions®

Seasons

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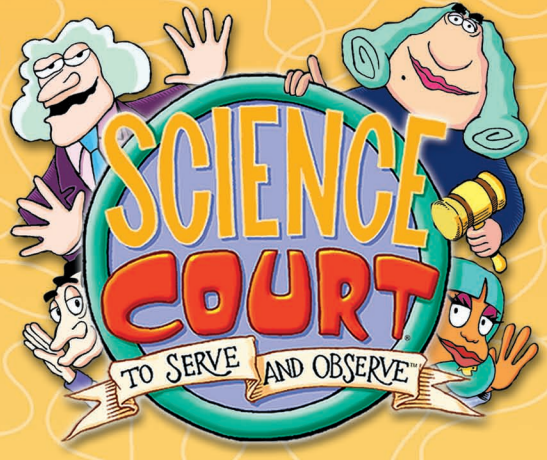

This Teacher's Guide belongs to:

_____

(Teacher name here)

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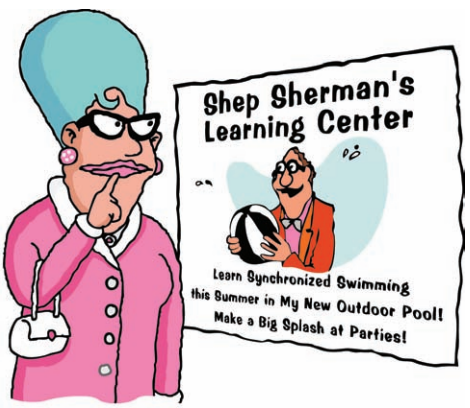
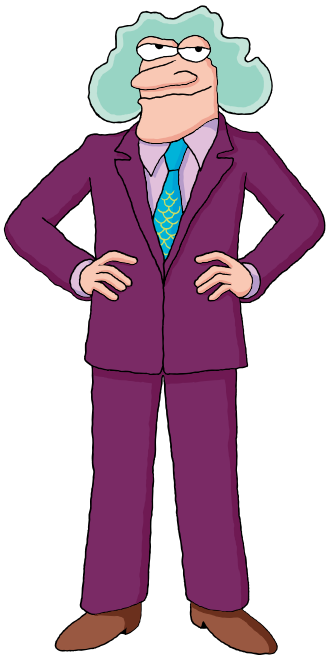


Overview



What Is Science Court?

This *Science Court* package is one of a series of classroom programs designed to teach fundamental concepts in elementary and middle school science. A humorous courtroom drama provides the vehicle for demonstrations and explanations as lawyers battle over a case.

The trial is being covered by courtroom correspondent, Jen Betters. The students, working in cooperative teams, act as courtside commentators. At various breaks in the trial, Jen leads the students through a review of the facts, a hands-on activity, and a prediction about what will happen next. At the end of the trial, the students predict how the jury will vote. *Science Court* is fun, funny, and a great learning experience.

Science Court is a software program for the classroom, used with a whole group of students and led by a teacher. The activity uses technology to get people in a group to interact, not with a machine, but with each other.

How Long Does It Take?

Typically, it takes teachers three class periods to complete this *Science Court* title. There are four parts to the courtroom drama. At the end of Parts 1, 2, and 3, your class can do one or more hands-on activities. Students will then work in teams to answer six questions and predict what will happen next. Depending on how far you wish to carry the hands-on activities, you can expect to get through one to two parts in a class period. In Part 4, students predict the jury's verdict. This prediction will take only part of a class period.

What You Get & What You Need

What You Get

- ***Science Court*** **CD-ROM** — Including the *Science Court* software, an electronic Teacher's Guide and worksheets, and Word Wall vocabulary files.

- ***Science Court*** **Teacher's Guide** — Including a complete set of reproducible student Information Sheets and Hands-On Activities.

What You Need

- **Computer with CD-ROM drive** — Refer to the chart below to determine the requirements for your computer.

Type	Minimum Processor	Operating System(s)	Minimum RAM	Other
Macintosh Computer	G3 500 MHz	Mac OS X 10.4 Mac OS X 10.3	256 MB RAM	Audio speakers
Windows Computer	Pentium III 500 MHz with sound	Windows XP Pro Windows 2000 Windows Vista	256 MB RAM	Projector (recommended)

- **Copies of the reproducible Information Sheets and Hands-On Activities.** These are found in the back of this Teacher's Guide and also can be printed directly from the software program. There are four different Information Sheets for each part of the trial. See page 41 for more details.

- **Materials for the Hands-On Activities** following Parts 1, 2, and 3 of the trial. The amount of materials depends on how you organize the activities. You can gather one set of materials as a demonstration for the whole class or gather enough materials for each student. Refer to the Preparation section for a complete list of all the materials needed for each Hands-On Activity.

- **Copies of the assessment materials** in the Reproducibles section of this Teacher's Guide.

Learning Objectives

In *Science Court: Seasons,* Heather Hancock gets a chilly reception when she takes an early summer vacation in June in Australia. The Australians are saying winter is coming. Winter in June? Heather investigates a little and finds out that Earth is actually moving away from the Sun. Convinced she's uncovered that there won't be any summer this year, Heather returns home to North America with great suspicion. She had paid Shep Sherman for outdoor synchronized swimming lessons, which can't happen if there's no summer. She wants her money back, but Shep doesn't have it. Did Shep know all along that summer wasn't coming? Is it all a big swindle? We'll find out the answers in Science Court.

Students learn these scientific concepts:

- Earth's elliptical orbit around the Sun
- the difference between weather and climate
- how Earth is tilted on its axis
- the reason for seasons on Earth

Students learn in hands-on activities to:

- illustrate relative distance
- demonstrate the effect of tilt on how sunlight strikes Earth's surface
- model the Earth-Sun relationship

Students learn how to work as a team by:

- becoming members of an interdependent group
- listening and talking with others
- sharing a common goal

Students learn content vocabulary:

- axis
- climate
- direct
- elliptical
- equator
- equinox
- gravity
- hemisphere
- kilometer
- orbit
- relative distance
- revolve
- solstice
- tilt
- weather

Research Basis

What Our Students Don't Know in Science

The most recent available data on student performance paints a disheartening picture of what our students know and can do in science. On the 2005 National Assessment of Educational Progress (NAEP) examinations, only 29 percent of 4th graders scored at or above the targeted proficient level. Of 8th graders, also 29 percent hit that mark, and a mere 18 percent of 12th graders achieved proficiency. In the decade between 1996 and 2005, the achievement of 4th graders reflects some gains. The results among 8th graders remain flat, while the achievement among 12th graders has actually declined (The Nation's Report Card: Science 2005). And students in large urban districts lag behind their peers in the rest of the nation (The Nation's Report Card: Science 2005 Trial Urban District Assessment).

What do these assessments tell us about the particular gaps in student science learning? The National Assessment Governing Board (NAGB), which sets the standards for science achievement on the NAEP, differentiates student performance among three levels — basic, proficient, and advanced. Most U.S. students, regrettably, remain stuck in the basic level. They show "some of the knowledge and reasoning required for understanding;" they're able to "follow procedures;" and they have "the ability to identify basic scientific facts and terminology." Essentially, at the basic level students can recall information and follow direction. At the proficient and advanced levels, however, students begin to demonstrate "solid understanding." These students can assess, evaluate, and plan scientific investigations appropriate to their grade level. They can infer relationships, explain their understanding of scientific phenomena, and apply science to real-world problems (NAGB, 2000). Moving from basic to proficient, from recall and procedure to understanding and application, is the gap we must fill in order to improve the science performance of our nation's students.

Obstacles to Comprehension

Why has traditional instruction failed to raise student achievement in science from the level of basic recall and direction-following to deep understanding? In the last two decades, science education research has explored how the ideas that children bring with them to science class affect their learning. Students come to school with (often faulty) preconceived views in all areas of science — astronomy, biology, physics, chemistry, and so on. (For a bibliography of the thousands of studies and articles in the area of children's preconceptions in science, see Duit, 2003; and for a summary of those studies, see Wandersee, et al., 1994.) These concepts emerge from a variety of sources, including children's early experiences with the physical

world, and they can be very resilient, even in the face of new teaching (Fisher, 1985; Carey, 1986; summarized in the National Research Council's *Taking Science to School*, 2006). Instead of revising their understanding, children often simply incorporate the new information the teacher conveys into their existing incorrect conception.

Instruction for Science Success

Conceptual misunderstandings in science abound. Students believe that the changing distance from the Sun causes the seasons. They believe sounds can be heard in the vacuum of space and think that dinosaur fossils are real bones. These kinds of fundamental misconceptions can block the road to true understanding. Fortunately, research has revealed instructional elements and approaches that have proven effective in building deep and lasting understanding. Research has shown:

1. the importance of addressing students' naïve concepts directly;
2. the need for students to articulate their understanding independently;
3. the usefulness of multimedia in providing access to complex concepts;
4. the value of providing multiple pathways for acquiring and demonstrating understanding;
5. the relationship between academic vocabulary and academic success; and
6. the necessity of providing support to those teachers who have a limited knowledge of science themselves.

Science Court incorporates these validated instructional elements in a multi-modal, multimedia-rich program that attacks naïve concepts directly. Each title in the series identifies common naïve conceptions and moves learners toward the acquisition and application of correct scientific notions.

The program reaches all types of learners through its use of multiple forms of media and avenues for demonstrating understanding. The entire class watches the trial before breaking into small groups to address and discuss the concept and make predictions about the trial. Through a mix of visuals, print materials, and hands-on activities, students invalidate the incorrect notion and come to understand the correct scientific concept.

Individual assessments capture students' retention of the new information and their ability to apply it in new contexts. The *Science Court* approach overcomes the obstacles to accurate conceptual learning and builds the skills and comprehension that are characterized as proficient and advanced on the NAEP.

Sources

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This Research Basis was excerpted from *Teaching Science for Understanding: The Research Behind Science Court*, available from the research reports section of www.tomsnyder.com.

Preparation

Quick Checklist

Before class gather the following materials:

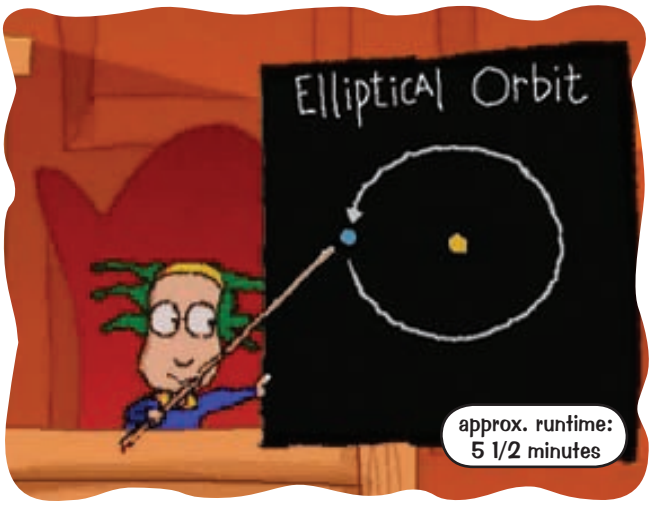
- ❑ *Science Court* CD-ROM
- ❑ Computer
  A projector or large-screen monitor is recommended.
- ❑ Materials for hands-on activities
- ❑ Reproduced copies of the student sheets
- ❑ A class list showing group composition
  Assign each group a number. The program can use these numbers and the letters on the Information Sheets to choose students randomly to answer questions and participate in discussions.

Before class preview the following:

- ❑ The content on pages 12–15
- ❑ The software program itself for 15 minutes

Previewing Content

Part 1 — Is It The Distance?



Summary:

Heather Hancock thinks Shep Sherman is trying to swindle her. Heather has paid Shep for outdoor synchronized swimming lessons this summer, but Heather doesn't think there will be a summer. You see, Heather went to Australia for an early summer vacation. But the June temperatures were quite chilly. And the Australians were talking about winter coming. Maybe Shep knew there would be no summer, and he's just trying to make an easy buck by selling swimming lessons he knows he won't have to give.

Heather, represented by attorney Doug Savage, takes Shep to Science Court. During the trial, expert Julie Bean explains that Earth's orbit is elliptical. That means that sometimes Earth is closer to the Sun than other times. And as summer approaches, Earth has been moving 5 million kilometers farther away from the Sun. Is that extra distance what causes the seasons?

In the Hands-On Activity, students use toilet paper sheets to explore relative distance in space.

Questions & Answers:

Students discuss and answer questions about how Earth orbits the Sun.

Q1 What is Earth's curved path around the Sun called?

Answer: **The curved path Earth follows around the Sun is called its orbit.**

Q2 If you are 8 years old, how many times have you and Earth gone around the Sun since you were born?

Answer: **Earth completes one orbit around the Sun every year. So, if you're 8 years old, you and Earth have gone around the Sun 8 times since you were born.**

Q3 How would you describe the shape of Earth's orbit around the Sun?

Answer: **Earth's orbit is in the shape of an ellipse, which is a stretched-out circle. It can also be thought of as egg-shaped.**

Q4 Is Earth always the same distance from the Sun?

Answer: **No. Because Earth's orbit isn't a perfect circle, its distance from the Sun will change slightly as it orbits the Sun.**

Q5 What is the average distance of Earth from the Sun?

Answer: **The average distance of Earth to the Sun is 150 million kilometers, or 93 million miles.**

Q6 Why does Tim say that a distance of 5 million kilometers is no big deal?

Answer: **Compared to the average 150 million-kilometer distance of Earth from the Sun, the distance of 5 million kilometers isn't that much. It's like one extra block on a 3-mile hike.**

Prediction & Answer:

Students predict whether or not the court will agree that distance from the Sun is what causes the seasons.

Does changing distance cause the seasons?

Answer: yes ☐ no ☒

Part 2 — How Does The Tilt Do It?

Summary:

Shep's attorney, Alison Krempel, questions Dr. Bean about how much difference that 5 million kilometers makes. Dr. Bean explains that Earth averages a distance of 150 million kilometers from the Sun. Relative to that large distance, 5 million kilometers isn't much. It's not what causes the seasons.

Another expert, Professor Parsons, then takes the stand. He says that Earth is tilted on its axis as it orbits the Sun. Doug still isn't convinced that distance isn't the cause of seasons. He says the tilt makes one part of Earth closer to the Sun than other parts, and that's the cause. Parsons says no. It has to do with the way the Sun's rays hit the surface of the planet. What does Parsons mean?

In the Hands-On Activity, students use a flashlight and a flat surface to see the difference between direct and indirect rays of sunlight as they strike Earth.

Questions & Answers:

Students learn and answer questions about how Earth is tilted on its axis as it revolves around the Sun.

Q1 Which of these pictures shows the correct tilt of Earth?

Q2 What is a planet's axis?

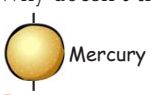
Answer: An axis is an imaginary center line around which a planet spins.

Q3 Is every planet tilted on its axis as it orbits the Sun?

Answer: No. Some planets, like Venus, are not tilted on their axes.

Q4 Which picture below shows direct rays, and which shows indirect rays?

Q5 Why doesn't this planet have changing seasons?



Answer: Because the planet isn't tilted, the Sun's rays strike the planet the same way as it orbits the Sun. That means no changing seasons.

Q6 Just to make sure you were listening: If Heather says it's raining outside now, is she describing the weather or the climate?

Answer: She's describing weather, which are the conditions outside at a certain time.

Prediction & Answer:

Students predict how Professor Parsons will explain how the tilt of Earth makes things warmer or cooler.

Explain how Earth's tilt makes things warmer or cooler.

Answer: The more directly the Sun's rays strike a surface, the more concentrated and warming they are. When the rays strike indirectly, or at an angle, they get spread out over a larger area and aren't as strong.

Part 3 — Why Winter In Australia?

Summary:

With Stenographer Fred's help and a water hose, Professor Parsons demonstrates the difference between direct and indirect rays. A water spray against a flat surface is direct and concentrated. Fred goes flying. A spray against a tilted surface is spread out over a larger area; it doesn't pack as much ooomph.

Doug still doesn't quite get it all. If we're tilted toward the Sun now, why is it so cold in Australia? How will Professor Parsons explain that one?

In the Hands-On Activity, students learn about the seasons in each hemisphere and illustrate the Earth-Sun relationship.

Questions & Answers:

Students answer questions about the equator and how Earth is divided into a Northern and a Southern Hemisphere.

Q1 What do you call the imaginary line that divides Earth in half and creates the two hemispheres?

Answer: **The equator is an imaginary line that divides Earth into two halves.**

Q2 In what hemisphere is the United States located?

Answer: **The United States is located in the Northern Hemisphere.**

Q3 In what hemisphere is Australia located?

Answer: **Australia is located in the Southern Hemisphere.**

Q4 Does all of Earth experience summer at the same time?

Answer: **No. When it's summer in one hemisphere it's winter in the other.**

Q5 When it's summer in the Southern Hemisphere, what season is it in the Northern Hemisphere?

Answer: **When it's summer in the Southern Hemisphere, it's winter in the Northern Hemisphere.**

Q6 Does a country located on Earth's equator have changing seasons?

Answer: **No, not really. The middle of the globe receives direct rays from the Sun year-round so is not much affected by Earth's tilt.**

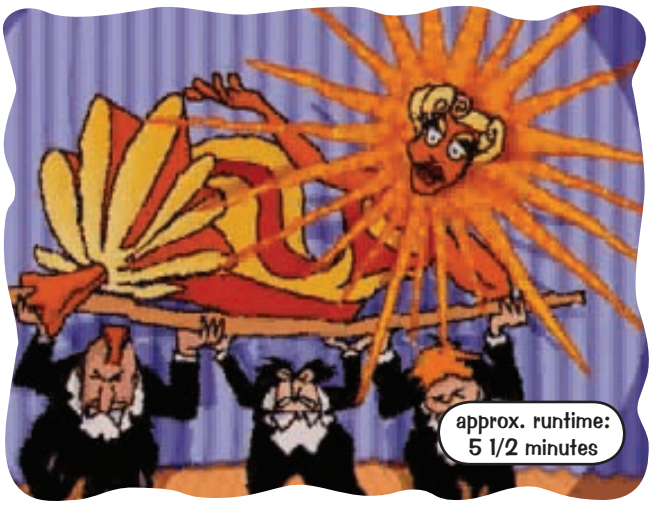
Prediction & Answer:

Students predict how Professor Parsons will explain why it's winter in Australia when it's summer in the Northern Hemisphere.

Predict how Professor Parsons will explain why it's winter in Australia if it's summer here.

Answer: **While we in the Northern Hemisphere may be tilted toward the Sun in June, the Southern Hemisphere is tilted away from the Sun. And Australia is in the Southern Hemisphere. So while we have summer in the Northern Hemisphere, it's winter in the Southern Hemisphere.**

Part 4 — Predicting the Verdict



Summary:

Professor Parsons nicely illustrates how the tilt of Earth points one hemisphere toward the Sun while the other is pointed away. The one getting more direct sunlight has summer. The hemisphere getting indirect sunlight has winter. Even Doug finally gets it.

In the closing argument, Doug says that Shep doesn't know the first thing about synchronized swimming. That prompts Shep and Judge Stone to dive into the pool for an impromptu demonstration. For her closing argument, Alison dresses up as the Sun and sings a song to Earth summarizing what has been presented at tilt and seasons.

Student Predictions:

Students discuss, debate, and predict what the jury's verdict will be.

The Verdict:

The jury finds Shep Sherman not guilty of running a scam. They then all sign up for Shep's class and jump into the pool.

Preparing for the Hands-On Activities

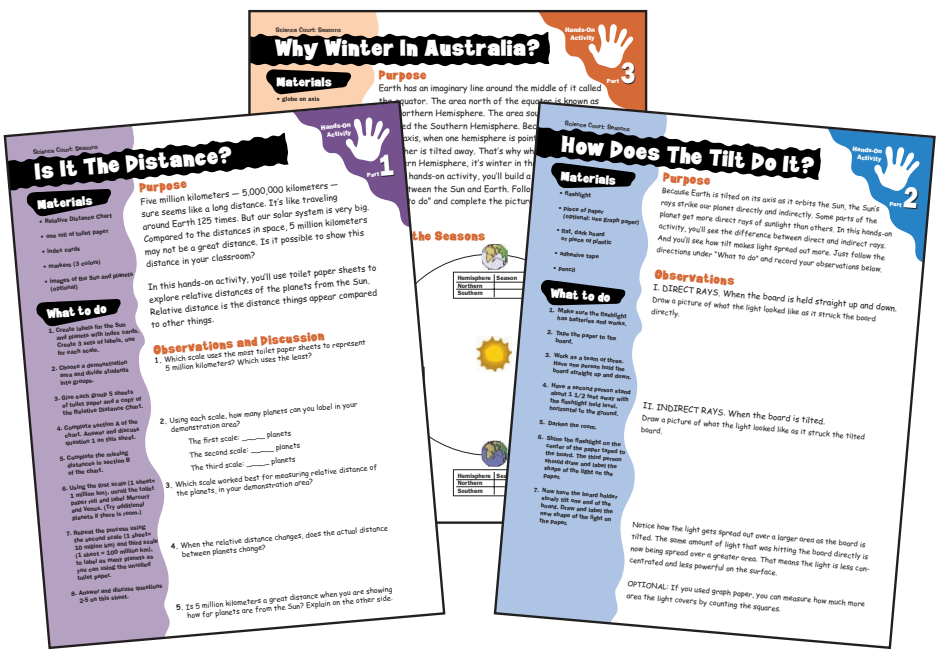
Students will be more engaged in challenges to scientific misconceptions when they are actively predicting, observing, and summarizing scientific phenomena. The hands-on activities in *Science Court* complement the key ideas in each part of the humorous trial. You can generally complete these hands-on activities in 15-20 minutes with your class.

Preview each activity by printing and reading the hands-on activity sheet. It's a blueprint for the hands-on activity, with a list of materials, step-by-step instructions, and an area for students to record observations, results, and analyses. You can choose to reproduce one hands-on activity sheet per group or one per student.

Decide how you want to conduct each hands-on activity. You can have students work in small groups, or you can demonstrate for the whole class and call on students to participate in the demonstration.

Gather materials ahead of time. Most of the materials are common supplies; others might require a visit to your school's science resources.

For any hands-on materials that are not currently available in your classroom or science center, you can contact Delta Education, the largest producer of curriculum-based elementary school science kits in the United States. Visit the Web site at www.delta-education.com, or call 800-258-1302.

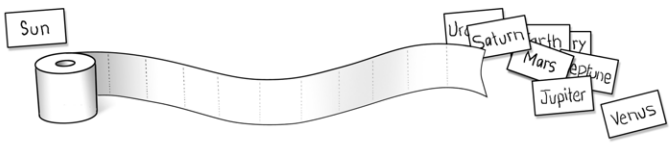


Hands-On Activity for Part 1

In this activity students use toilet paper sheets to display proportional spacing and explore relative distance in space.

Materials:

- Relative Distance Chart
- one roll of toilet paper
- index cards
- markers (3 colors)
- images of the Sun and planets (optional)



Hands-On Activity for Part 2

In this activity students simulate the effect of tilt on the power of the Sun's rays.

Materials:

- flashlight
- flat, dark piece of wood or plastic

Hands-On Activity for Part 3

In this activity students build a month-by-month model of Earth as it revolves around the Sun.

Materials:

- flashlight
- model of Earth tilted on its axis

Implementation

Classroom and Group Management

You have many options for creating learning groups in your classroom. We've found that it works best to assign students to groups deliberately and in advance of the class period. Ideally, teams should have diversity and a good balance of skills and personalities. Keep the same groups through the *Science Court* activity. Use your class list and your intuition to:

- Divide the number of students by four.
- Create groups with four students in each group.
- Assign remaining students to create some groups of five.
- Examine the makeup of each group and move student names among groups to balance the abilities and personalities.

Here's a chart format to help you, with extra spaces for any groups of five. Use a pencil so you can rearrange as needed:

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6
Student A						
Student B						
Student C						
Student D						

Assess the physical layout of the room and adjust student desks if necessary. You'll use the computer and a projector or interactive whiteboard to display the software program, but a good portion of work takes place away from the computer when students are doing hands-on activities and answering questions. Students will need space to work together as a group.

Supports appear throughout the program to assist with classroom and group management, including:

- An overview to prepare students (and yourself!) called **How Science Court Works**
- Step-by-step screen directions to sequence the activity
- Audio for students to hear directions for the activity
- Audio for students to hear the questions and the answers
- Extra audiovisual support for using hands-on worksheets
- Extra audiovisual support for the answering process
- Random Student Picker for the teacher to call on students

Activity Walkthrough

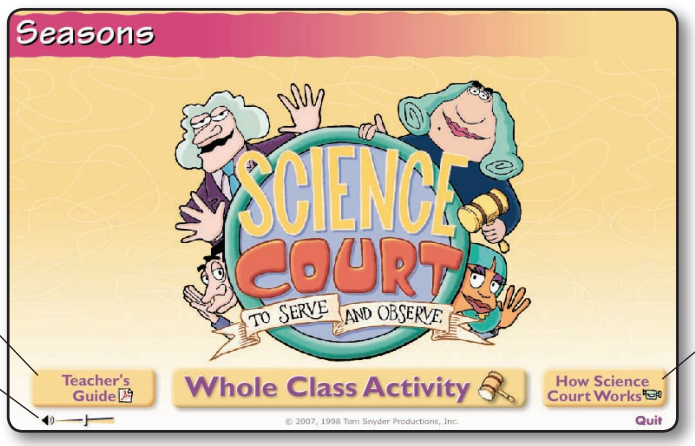
The software program will lead you through the classroom activity. Three parts of the trial include an animation, a hands-on activity, a set of questions, and a prediction. The final trial part is an animation with closing arguments and a prediction on the verdict. Throughout the program, the software offers specific supports for classroom management.

No installation is required. You can use the program directly from the CD-ROM without installing it to the computer.

You can also copy the program to a hard drive using the instructions in the Read Me file on the CD-ROM, in compliance with your license agreement (1-computer license or multiple-computer license).

❶ Launch the Program

Double-click the *Science Court* program icon. The title screen will appear.



Electronic Teacher's Guide

Volume control (slide with mouse down)

Quick overview for you and your class

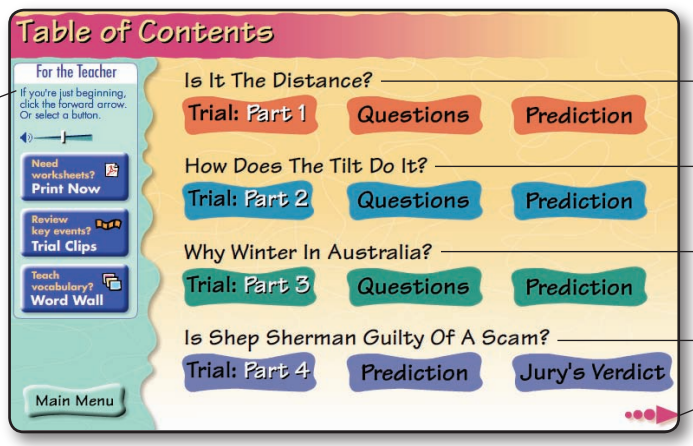
Click **How Science Court Works** if this is the first use with your class.

Click **Whole Class Activity** to continue.

❷ Table of Contents

The Table of Contents is where you start and resume the whole class activity. After you select a trial part from the Table of Contents, you will see a set-up screen before the animation. Make sure all of your students can see. If you're starting from the beginning, you'll see an introduction to the case.

At the end of Part 1, Jen Betters, our *Science Court* correspondent, will summarize what's happened. She will then guide students through a set of questions about the content and a prediction about what will happen next in the trial.



Quick reminder of purpose for the teacher

The main scientific idea of each part

Forward arrow

Click the forward arrow to start the activity.

❸ Set Up

The software program helps you manage each part of the activity in the classroom and gives you a step-by-step sequence.

- Click **Audio** to hear the directions read aloud and play them for your students. You can use this on each screen.

- Click **Print Now** to open the reproducibles in a PDF reader, such as *Adobe Acrobat*, and print them. Skip this step if you've already reproduced the worksheets.

Photocopy the reproducibles before class. You can print from the software program, or you can photocopy them from the printed Teacher's Guide.

- Close the PDF reader and click the Set Up screen to return to *Science Court*.

Student Worksheets

Students, working in cooperative groups, answer six questions on the worksheets. A group will work together to answer the questions. Everyone has the same six questions, but each of the four Information Sheets has a different quote from a key participant in the trial. This quote will help students answer the questions by allowing each student to contribute a valuable piece of information to his or her group.

Click **Word Wall** to open this feature.

The Word Wall is a resource for reinforcing vocabulary used in *Science Court*: *Seasons*. Before your class watches Part 1 of the trial, you may want to confirm that they know these background vocabulary terms:

- revolve
- tilt (n.)

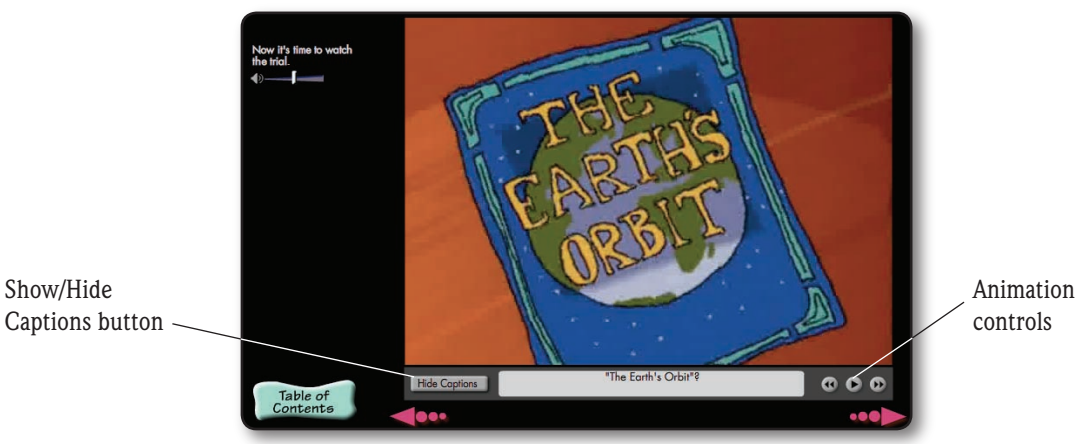
Refer to the vocabulary section later in this Teacher's Guide for specific uses of the Word Wall.

Click **Exit the Word Wall** when you are finished.

Click the forward arrow to watch the trial.

❹ Trial Animation

The animation begins automatically. Enlarge the application window to take advantage of your whole screen.



Watch the trial with your class.

Click the forward arrow when the animation has finished playing.

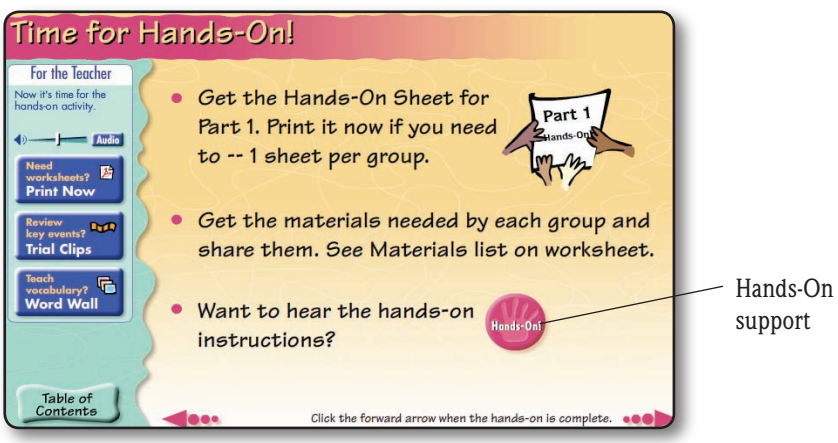
❺ Time for Hands-On

This is the point at which your class does the hands-on activity. The purpose is to shed light on the unfolding trial and related scientific concepts.

You have some choices:

- You can have each group do the activity, or you can demonstrate the activity for the class.
- You can reproduce one hands-on sheet for each group, or you can reproduce one for each student.

The information about the activity (materials, instructions, and recording results) is located on the hands-on worksheet for each part. Before class, you should have gathered the materials listed on the hands-on worksheet.



Click the **Hands-On** button to give your class a brief audiovisual overview for using the hands-on worksheets.

Conduct the hands-on activity with your class.

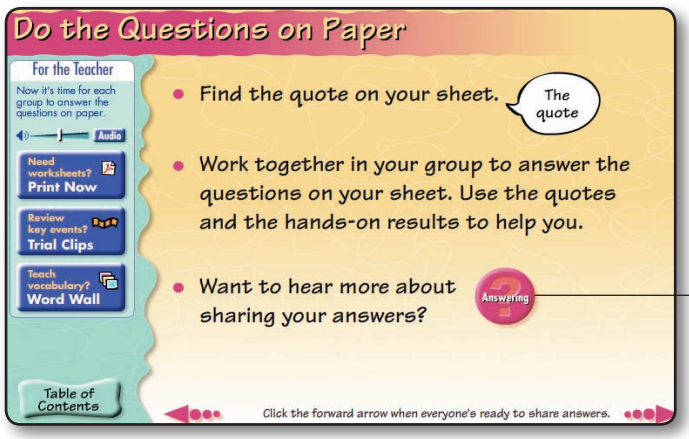
For extra classroom management support during the hands-on activity, consider using some additional display tools, especially if you have an interactive whiteboard:

- Open the PDF file to go over the sheet with the class. Use interactive whiteboard markers, the spotlight, and window-shade (reveal) tool to guide the class in the hands-on activity.
- Use a large digital clock display to help keep track of time. (The hands-on activities should take about 15-20 minutes.)

Click the forward arrow when you are finished with the hands-on activity.

❻ Do the Questions on Paper

This is the point at which students work in small groups to exchange information and answer the 6 questions on their sheets. You should circulate among the groups in the classroom while they work.



Support for the answering process

Click the **Answering** button to give your class a brief audiovisual explanation of the answering process.

Key expectations for students are:

- Working cooperatively with other members of their group
- Exchanging information found in the different quotes on student sheets
- Answering all 6 questions
- Making sure each student in the group can answer each question
- Being able to answer the questions verbally without reading the worksheets
- Being prepared to be called on randomly

Give the class time to work.

For time management, consider using a large digital clock display to help keep track of time. (Answering the questions should take about 10-15 minutes.)

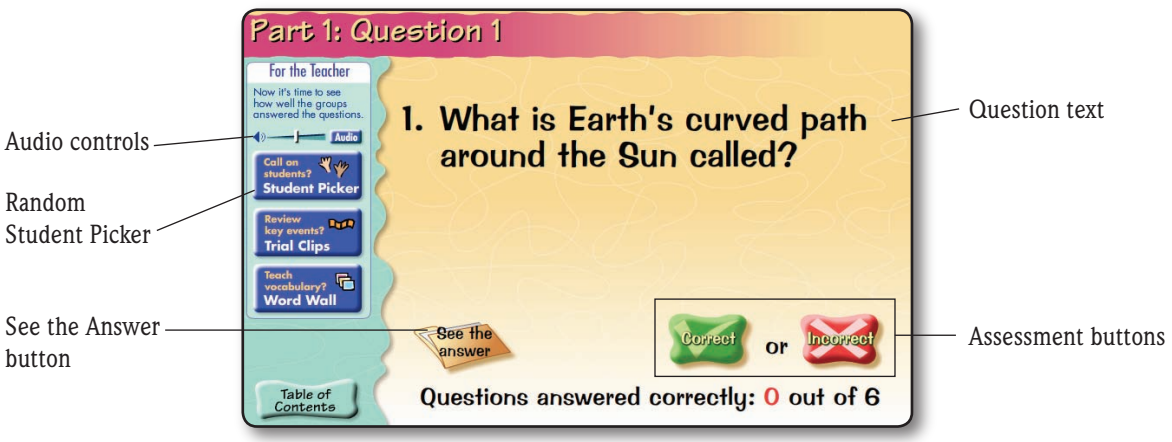
Click the forward arrow when the class is ready to share their answers.

❼ Questions and Answers

You, the teacher, will manage the sharing and assessment of student answers. The basic guidelines are to:

- Call on students randomly using the Student Picker button.
- Ask students to answer without reading from their worksheets.
- Be tough but fair in evaluating student answers and explanations.

As a class, students must answer 4 of the 6 questions correctly to continue. If fewer than 4 are marked correct, the program starts over with Question 1.



Click the **Audio** button to hear Jen Betters read the question aloud.

Click the **Student Picker** to call on groups and students in a group.

Enter the number of groups into the Student Picker. Make sure you have assigned each group a number. Students will be identified by the A, B, C, or D on their worksheets.

Using the Random Student Picker

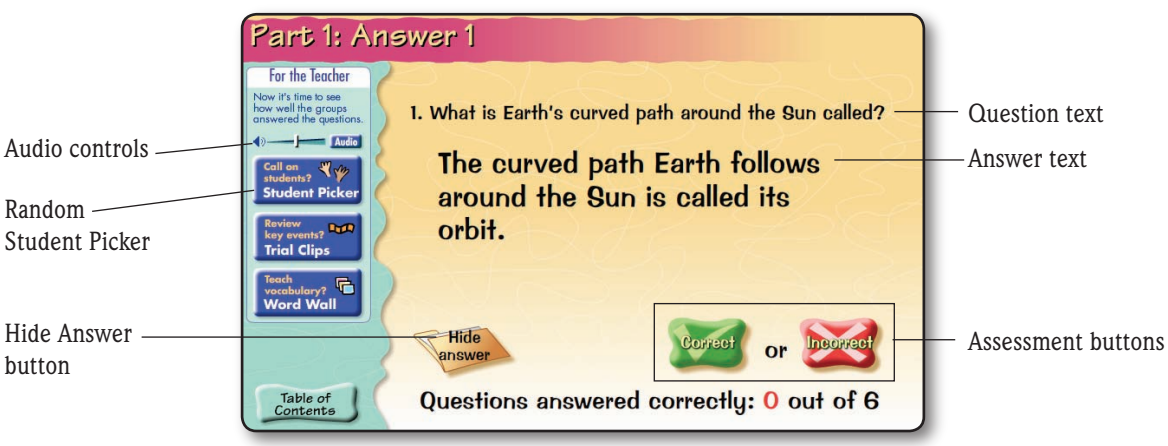
Use the Random Picker as much as you want to solicit answers from as many students as you want. Be creative, and use this feature to create fun and suspense.

There are a few different ways of using the Random Student Picker to call on students. Use the Random Picker to select a group and to select a student.

- Use the Random Picker to select a group, then you select which one of the students will answer.
- Use the Random Picker to select a group, then ask the group to select which one of them will answer. (Don't let them select a group member more than once.)
- Use the Random Picker to select a student who has worksheet A, B, C, or D, and ask for a volunteer.
- If a student is having difficulty answering, use the Random Picker to select another student to help the first one, making it a team effort.

Click **See the Answer** to display an answer with the question.

This feature helps you evaluate student answers the moment they are offered. The answers in the program are a guideline for accurate student answers. Keep your ear tuned to the quality of student answers.



You are in charge, and you are the one to assess whether an answer is correct. You can ask several students in succession to articulate answers to the same question. You can ask one student to answer each question.

Student answers will vary, particularly with questions that ask students for examples. Some answers should be used to provoke short class discussions. Some answers, such as drawings, may be best presented and explained by writing on the board.

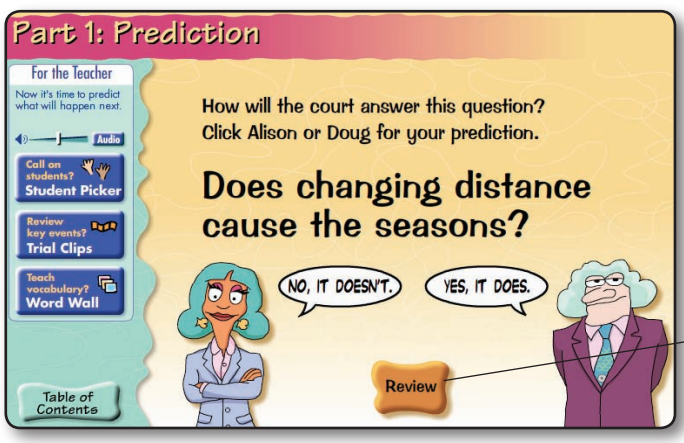
The class cannot continue past this point until they get at least 4 of 6 answers correct.

❽ Prediction

The class will predict what happens next in the trial. The bottom right corner of each worksheet asks students for their predictions.

At this point in the activity, you can poll the class (using the Random Picker) to offer their predictions and support them with explanations.

During some parts of the trial, students must make a choice between two characters (usually Alison Krempel and Doug Savage, the attorneys arguing the case).



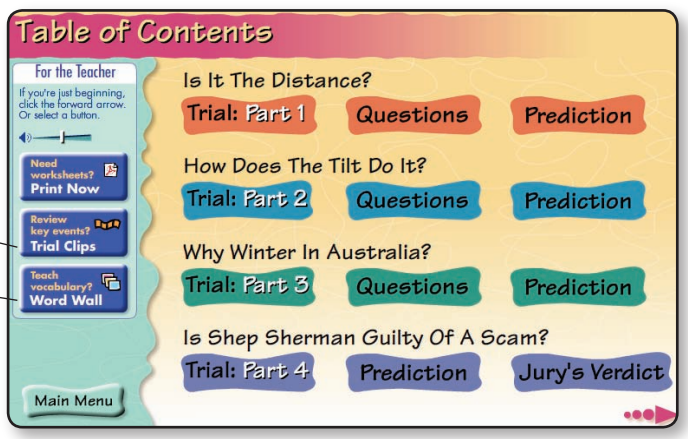
Click **Review** if students need a reminder about the events leading up to this point in the trial.

❾ Stopping and Resuming the Whole Class Activity

After a prediction, it's a good stopping point for the activity. This walkthrough went through Part 1 of the trial. Parts 2 and 3 are similar. Part 4 is the trial's conclusion, without the questions and the hands-on activity.

- Click **Table of Contents** any time you want to navigate to a specific part of the trial.

You'll use the Table of Contents whenever you resume the program.



The Table of Contents has some other features to try.

- Click **Trial Clips** if you are resuming the activity and students need a reminder about the events in the trial.

- Click **Word Wall** for access to this vocabulary resource. See page 32 for more information.

- Press CTRL-Q on the keyboard to quit the program.

⑩ Follow Up: Appealing the Verdict

If the students disagree with the verdict reached by the jury or any of the judge's rulings along the way, they can appeal the decision to a higher court. Have students write up their arguments, including all relevant scientific evidence and demonstrations. Students can send their appeals by regular mail to:

Tom Snyder Productions

100 Talcott Avenue

Watertown, MA 02472

ATTN: Appeals Science Court

Or email to:

sciencecourt@tomsnyder.com

Extending Vocabulary with the Word Wall

Science Court provides a good opportunity for vocabulary instruction. Students need explicit attention on vocabulary to support their learning in science. Effective teaching practices for vocabulary include:

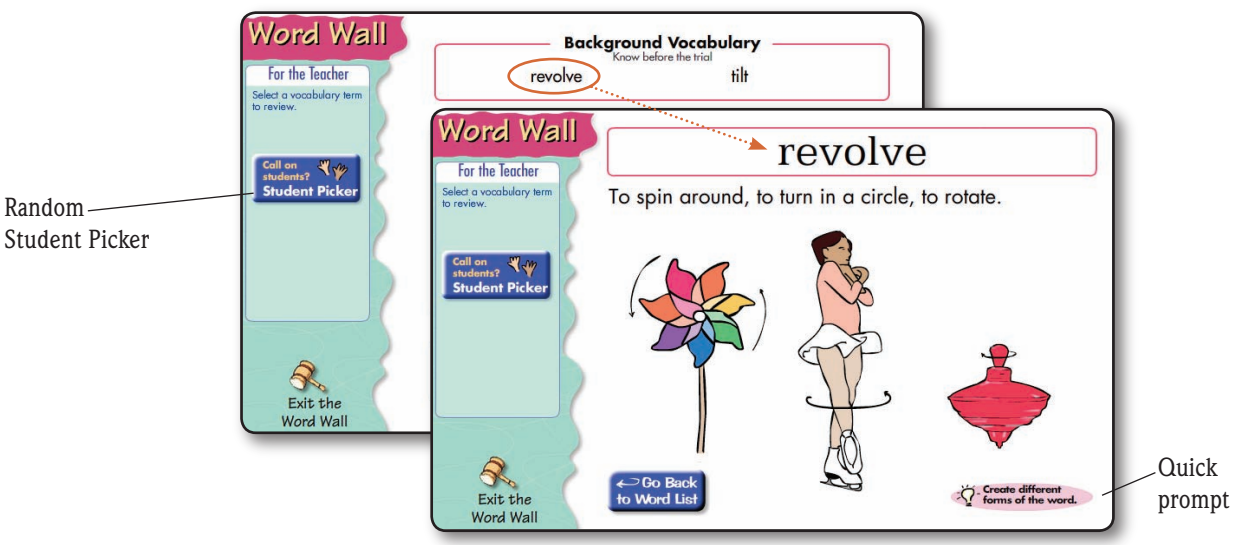
- Embedding vocabulary instruction within a context, in this case, the *Science Court* activity
- Providing multiple exposures to vocabulary terms, and using multiple representations
- Asking students to generate a response to vocabulary terms, enabled by the quick prompts that appear on the definition screens
- Giving students an expectation of being called on to participate, using the Random Student Picker

Within Science Court

The program has a Word Wall to complement the vocabulary exposure students receive in the main trial activity. The Word Wall provides students with a framework of the language they need to comprehend the *Science Court* topic and demonstrate their understanding during the activity (verbal, written, and visual representations).

At any point in *Science Court*, you can call up the Word Wall. **Background vocabulary** are the terms students should know before they watch the trial. **Activity vocabulary** are the terms that appear in Parts 1, 2, and 3 of the trial. (Some definitions are used in the question-and-answer activity.) **Additional vocabulary** are terms that further support the *Science Court* topic.

Click a term to see a definition screen with a visual example.



Use the Random Student Picker to call on students to read the term and its definition, and to respond to the quick prompt that may appear in the lower right corner. The quick prompt helps you generate a few moments of class discussion around the term. The example shown on the previous page prompts students to "Create different forms of the word," which gives your students a chance to connect "revolve" with revolves, revolving, revolution, and so on.

These are some quick prompts you may see:

- Give an example.
- Find the root of the word.
- Create different forms of the word.
- Connect this to the trial.
- Use the term in a sentence.
- Think of a word that means the same thing.
- Think of a word that means the opposite.

Beyond Science Court

You can use the Word Wall in many ways. The CD-ROM has a Teacher's Guide directory, or folder, that has Word Wall files in multiple formats:

- Microsoft PowerPoint
- Promethean Flipchart (version 2.5+)
- SMART Notebook (version 9.5+)

Some ideas for further vocabulary projects include:

- Record audio for each definition screen
- Add your own contextual images to the definition screens
- Print the vocabulary definition screens in small (card) or large (wall) formats
- Cover up the term, or the definition, to create a vocabulary challenge
- Build your own definition screens for other science topics for a class library

Assessment

Science Court offers teachers many assessment opportunities as students engage in discussion with one another, complete worksheets and quizzes, and tackle hands-on experiments. Frequent class discussions help teachers monitor students' growing mastery of the content and understanding of concepts. In addition, the resources in this *Science Court* Teacher's Guide provide teachers with critical assessment feedback.

Assessment Components

Worksheets and In-Class Assessment

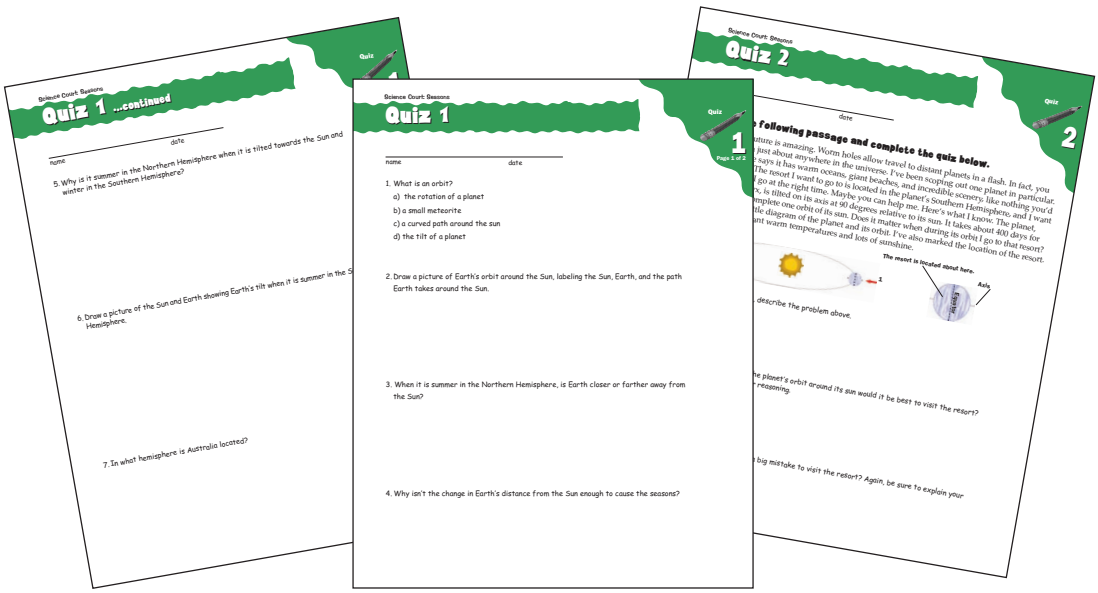
The *Science Court* worksheets are an easy way to assess a group's understanding of key science concepts. Working collaboratively, students respond to 18 open-ended questions based on information presented in the story. Answer keys are included at the end of this Teacher's Guide. During the class activity you can also make note of students' understanding and articulation when they are called on to share answers.

Assessment Rubric

The assessment rubric can be used to assess Quiz 2 and the hands-on experiments. You can also use it for your own custom assessments with *Science Court*, or for students' lab reports, presentations, or any other performance-based tasks. *(The assessment rubric is located on page 36.)*

Quizzes

This *Science Court* title includes a two-part quiz. Quiz 1 contains multiple-choice and short-answer questions about science vocabulary and concepts presented in the program. Quiz 2 goes a step further, asking students to apply what they've learned to a new situation. An answer key with sample student responses is provided for teachers. *(Quizzes and answer keys are included in this Teacher's Guide as well as in a separate compilation booklet of Science Court assessments.)*



Quiz 1 checks for understanding that Earth has an elliptical orbit around the Sun, that Earth is tilted on its axis as it revolves around the Sun, and that tilt is what causes the seasons. Quiz 2 asks students to demonstrate an awareness of the Earth-Sun relationship and the impact of that relationship on climate.

Learning from the Assessment

Assessment can do more than just measure what students have learned. It can also be used to generate new learning. For instance, build on students' understanding of orbits, revolution, and axis to introduce the concept of rotation. The rotation, or spin, of a planet on its axis is what causes day and night. Talk about how long Earth's rotation takes. Also, using diagrams of Earth's orbit around the Sun, talk about how the length of day changes on parts of the planet during different seasons. Since Earth's equator is always pointed toward the Sun, the length of day varies very little over the course of the year. On planets with different tilts, the situation may be very different.

Science Court Assessment Rubric

Use this rubric, in combination with the sample answers, to help you assess student performance on Quiz 2. Use the sample answers to assess correct and incorrect answers. Then, use this rubric to assess your students' abilities to think and communicate scientifically. You can also use this rubric to assess student work on hands-on experiments or other projects you assign. (Permission is granted to copy for educational use.)

3 – responses demonstrate understanding and are consistently thoughtful, accurate, and complete

2 – responses demonstrate understanding, but contain errors or lack detail

1 – responses demonstrate limited understanding

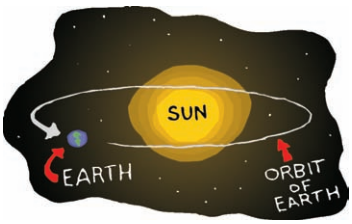
0 – no understanding is demonstrated

Student Name:_____ Assessment: _____ Date: _____	3	2	1	0	N/A
Problem Statement Student understands the problem and is able to articulate it in his or her own words.					
Scientific Ideas Student demonstrates a thorough understanding of scientific concepts and ideas.					
Terminology and Language Student uses scientific terminology and language appropriately and correctly.					
Supporting Materials Student uses supporting materials such as diagrams, graphs, and pictures to support scientific explanations.					
Application of Knowledge Student effectively and accurately applies scientific knowledge, skills, and methods to new situations.					
Scientific Inquiry and Method Student uses his or her understanding of science processes and methods to effectively plan and conduct a systematic investigation.					
Technology and Instruments Student uses technology and simple instruments appropriately and correctly to gather and process data.					

Rubric based on the National Science Education Content Standards

Beyond Science Court

The concepts that underlie Seasons provide a foundation for further research.

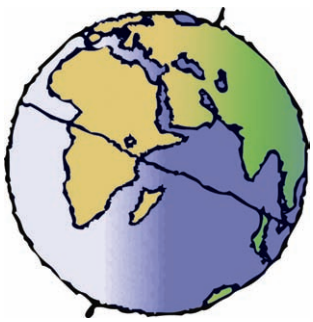


More Activities

Here are some suggestions for extending what students have learned in *Science Court*.

Night and Day

Earth's tilt as it revolves around the Sun causes the seasons, but what causes night and day to happen? Research the cause of night and day and these related questions: Does the length of daylight remain the same over the course of a year? Is the length of daylight the same on all parts of Earth at the same time? How does Earth's tilt on its axis affect day and night?



Defend the Decision: Long and Short

Doug Savage isn't convinced that we got the full picture in the trial. Some things still seem strange. For instance, the longest day of the year in the Northern Hemisphere is in June. That's the day we receive the most hours of sunlight. The shortest day is in December. If the directness of the Sun's rays is what causes Earth to warm up and cool down, then why aren't the longest and shortest days also the warmest and coldest? Does everything make sense, or should the verdict of not guilty be overturned? Research Doug's question and build evidence to answer it.

School-Home Connection

As you know, students who talk about their classroom learning experiences outside the classroom are more likely to have a deeper understanding of concepts and greater retention of information. One of the ways to get them to "talk about it" is to enlist the cooperation of parents in the home. When parents express interest in what students are learning in school and students respond by explaining and showing what they have done in the classroom, comprehension and retention increase dramatically.

The letter in the Reproducibles section enlists the cooperation of parents in helping their youngsters continue to learn . . . right in their own homes. The letter tells about *Science Court*, and suggests that parents ask their children to tell them about the courtroom trial and to explain what science concepts were introduced. It encourages parents to have their children share hands-on activities, particularly those that can be duplicated in the home.

Here are two steps you can take to foster a powerful school-home connection around *Science Court*.

- Photocopy the letter and send it home with each student, or print it in a class newsletter that is sent to all parents.
- Duplicate and send home one or more of the hands-on activities from the *Science Court* Teacher's Guide. (Most of the materials are easy for parents to gather.)

Technical Support

If you experience problems with *Science Court*, you have several resources, including the Read Me file on the CD-ROM, our Customer Service Team, and our Web site. Visit our Web site technical support area for Frequently Asked Questions (FAQs).

Contact us through the ways listed below:

Toll-free:

800-342-0236 (U.S. & Canada only)

Hours:

Monday through Thursday, 8 A.M. to 7 P.M. (EST); Friday, 8 A.M. to 5 P.M. (EST)

Email:

tech@tomsnyder.com

Web:

www.tomsnyder.com
www.tomsnyder.com/contactus/faq.asp

When you call, please have the following information available:

- Software title and version number
- Your computer's operating system
- Your computer's memory (RAM)
- Your computer's speed and processor type

If possible, please have the telephone near the computer when you call.