# Bill Nye the Science Guy

**Do-It-Yourself Science**

## Table of Contents

1. **Implementation Guide** ......................................................... 2–9  
   This descriptive guide will assist you in integrating the DVD science and education content into your instructional program.

2. **National Science Education Standards** .............................. 10-13  
   See the complete *National Science Education Standards (NSES)* correlated for this program.

3. **Episode Guide** ................................................................. 14  
   Step-by-step procedures make it easy to complete the experiments shown in the program.  
   “More Interesting Stuff to Do” gives more experiments that extend student learning.

4. **Lesson Planning Worksheet** .............................................. 15–16  
   This template helps you incorporate all the features of the Bill Nye DVD into your daily lesson plans.

5. **Student “Know / New” Chart** ........................................... 17  
   A “Know-New” T-Chart assesses students’ prior knowledge and what they learned.

6. **Student Recording Sheet** .................................................. 18  
   This handout gives you a standardized format that students can fill out as they conduct an experiment.

7. **Glossary** ................................................................. 19  
   Use the terms and definitions found here to assist you in direct vocabulary instruction.  
   The glossary terms are also found on the DVD.

8. **Quiz** ................................................................. 20  
   This written version of the interactive quiz on the DVD provides a ready-to-go written test. Multiple choice and true-false items address key concepts found in the standards and in the program.

9. **Quiz Answer Key** ........................................................... 21  
   A separate page contains the quiz answer key.
Implementation Guide

Welcome to Disney’s Bill Nye DVD collection! With the help of this Guide you can bring instructional DVDs into your science curriculum.

What’s on the DVD?
Bill Nye DVDs expand the educational features of Bill Nye the Science Guy programs. Each DVD provides students with science content through video clips aligned with National Science Education Standards (NSES) and a host of other resources.

Short video clips aligned with the NSES provide a unique opportunity for you to enhance your lessons using DVD technology. Now you can show a video clip, or even short segments of a clip, on command. But there are a host of other features, too! See the chart below for a summary.

From the Main menu, there are three chief sections:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Watch Program Menu</td>
<td>From this menu, you can play the program straight through or use the clips to customize your viewing.</td>
</tr>
<tr>
<td>Teacher Support</td>
<td>From this menu, you can access this Teacher’s Guide, the Glossary, Internet Links, and the Quiz.</td>
</tr>
<tr>
<td>Bonus Materials</td>
<td>Use this menu to try a different discussion starter, download a special screen-saver, or check out never-before-seen footage.</td>
</tr>
</tbody>
</table>

From the Watch Program menu, you can:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Play Program</td>
<td>Play the entire program from start to finish.</td>
</tr>
<tr>
<td>Bilingual Mode</td>
<td>View the entire program or clips in English or Spanish.</td>
</tr>
<tr>
<td>Glossary Mode</td>
<td>Make links to Glossary terms appear during the program.</td>
</tr>
<tr>
<td>Program Overview</td>
<td>View the program introduction, in which Bill discusses the topic covered.</td>
</tr>
<tr>
<td>Try This</td>
<td>Show students demonstrating science concepts.</td>
</tr>
<tr>
<td>Way Cool Scientist</td>
<td>Meet a real scientist who talks about his or her area of study.</td>
</tr>
<tr>
<td>Bill’s Demonstration</td>
<td>Look at a science demonstration conducted by Bill Nye.</td>
</tr>
<tr>
<td>Music Video</td>
<td>Enjoy a short music video that summarizes the topic in an age-appropriate and entertaining manner.</td>
</tr>
<tr>
<td>Science Standards</td>
<td>Take advantage of short video clips from the program, which are aligned with National Science Education Standards.</td>
</tr>
</tbody>
</table>
From the **Teacher Support** menu, you can:

<table>
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<tr>
<th>Feature</th>
<th>Description</th>
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<tbody>
<tr>
<td>Science Quiz</td>
<td>Give students a quiz to take independently or as a class. Seven to ten quiz items are aligned with the National Science Education Standards. The items are in multiple-choice or true-false format. Each wrong answer links to a standards-aligned video clip. At the end of the quiz, a scoring function reveals the number of correct initial answers.</td>
</tr>
<tr>
<td>Glossary</td>
<td>Check out definitions of key terms and view video clips that reinforce the concepts.</td>
</tr>
<tr>
<td>DVD Features</td>
<td>View a quick overview of the features found on the DVD.</td>
</tr>
<tr>
<td>Teacher’s Guide</td>
<td>Print out or view this comprehensive Teacher’s Guide in PDF format.</td>
</tr>
<tr>
<td>Internet Link</td>
<td>Link to the Bill Nye area of Disney’s Edustation Web site, where you can find links to Internet sites related to the content of each Bill Nye program.</td>
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From the **Bonus Materials** menu, you can:

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<tr>
<td>Bonus Material</td>
<td>Find out what wasn’t in the episode! In most cases, there’s more of the Way Cool Scientist interview, Bill Nye outtakes, and an extra discussion starter.</td>
</tr>
<tr>
<td>Additional Clips</td>
<td>See trailers of related DVDs and videos.</td>
</tr>
<tr>
<td>Screen-Saver</td>
<td>Download this cool screen-saver for your computer.</td>
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</table>

**The Planning Process**

This Guide provides a Lesson Planning Worksheet (see page 12), which can assist you in setting up your instruction around a topic. The following sections of this Implementation Guide are offered to assist your planning process:

- **Determining Objectives and Linking to Standards**
- **The Learning Cycle**
  - Explore
  - Apply
  - Extend
  - Assess
Determining Objectives and Linking to Standards

1. The NSES Teaching Standard A states that science teachers must “select science content and adapt and design curricula to meet the interest, knowledge, understanding, abilities, and experience of students.”

The NSES recommends that teachers “integrate . . . a practical structure for the sequence of activities, and the content to be learned.” The primary instructional model recommended by the NSES is inquiry into authentic student-generated questions about natural or designed phenomena. Since most state and local standards documents were derived from the NSES, you will find that your local and state standards match closely with content standards in the Bill Nye DVD.

Each DVD contains a menu of clips that are aligned with the NSES. You can review the standards and their aligned clips in the Science Standards menu under Watch Program. Also, the Standards listed on page 10 of this Guide allow you to look at additional NSES content standards that are addressed on the video. Here’s an example of the content standards and clips aligned with the Bill Nye DVD entitled *Blood and Circulation*:

### Life Science Standards (NSES) Addressed in *Blood and Circulation*

**Life Science:**
Structure and function in living systems

- Living systems at all levels of organization demonstrate the complementary nature of structure and function.
  
  Aligned clips:
  - 1 Blood vessels
  - 2 Heart pump and bloodstream
  - 3 Heart valves and blood circulation
  - 4 White blood cells
  - 5 Capillaries

- The human organism has systems for digestion, respiration, reproduction, circulation, excretion, movement, control, and coordination, and for protection.
  
  Aligned clips:
  - 6 Heart pump
  - 7 Heart muscle
  - 8 Pumping blood to brain
Sample Objectives for Blood and Circulation

In this activity students will:

■ Observe and describe a body system responsible for supply and transport.
■ Use this information to define a body system.
■ Ask questions about the circulatory system.
■ Explain how structure complements function in organs of the circulatory system.
■ Cite examples of current research related to this system.

3. Design a learning cycle of instructional experiences and assessments for the students to engage in that will help students meet these standards. Students may be given teacher-planned investigations or may be guided to design their own investigations.

The Learning Cycle

The learning cycle is a sequence of activities that involve students in the learning process. The sequence found here is based on research from Lawson, Abraham, and Renner published in 1989. That has been adapted to include: Explore, Apply, Extend and Assess:

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**Explore:** Involves assessing students' prior knowledge and providing opportunities for students to interact with content from the video.

**Apply:** Includes having students use the content learned during the Explore section in a new way that is meaningful to future learning.

**Extend:** Allows students to conduct further research around an area of interest within the topic.

**Assess:** Provides strategies meant to inform students and teachers about the content and processes that have been learned.

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Explore

The NSES Teaching Standard B states: “Teachers of science guide and facilitate learning.” This standard addresses the constant need to balance your predetermined goals with allowing students to set and meet their own learning goals.

*Focus and Support Inquiries:* Support student inquiries by making decisions about “when to provide information” and “when to connect students with other sources.” Knowing the best time to intervene is often determined by allowing students to ask questions and to explore concepts openly.

©Disney
The NSES Teaching Standard C states: “Teachers of science engage in ongoing assessment of their teaching and of student learning.”

Assess in Order to Guide Teaching: The Program Overview or the Discussion Starter on the DVD can be used to gauge students’ prior knowledge. You can use student responses to make decisions about appropriate instruction and adaptations in order to meet the needs of individual students. Assessment can be in the form of student reflections from standards-aligned video clips or answers to questions found on the science quiz. Or, as in the following example, a simple graphic organizer can facilitate a formative assessment.

Example: T-Chart from Blood and Circulation

1. Ask students to fill out the “Know-New” T-Chart (see page 14). Have them list what they already know about the circulatory system (heart, blood vessels, blood, etc.) on the left side of their charts.

2. Show the Program Overview for Blood and Circulation. On the right side of the chart, have students list new things they have learned from watching the clip. Walk around the room and assist students in filling in their T-Charts. Replay the program as necessary to allow students to review sections of interest.

3. Once students have completed their charts, ask them to share what they have listed in the “New” column. Write these on the board. Have students write their own working definitions of the circulatory system. Once students have completed their definitions, collect and review their work to assess prior knowledge.

Conduct direct vocabulary instruction in the Explore phase. Research suggests that:

- Students must encounter words in context more than once to learn them.
- Instruction in new words enhances learning those words in context.
- One of the best ways to learn a new word is to associate an image with it.
- Direct vocabulary instruction on words that are critical to new content produces the most powerful learning.

Use the DVD Glossary with the linked video clips to expose students to new vocabulary words in context, along with associated video images. You can also find a printed version of the glossary terms in this Guide on page 16.
Example: Using the Glossary for Direct Vocabulary Instruction

**Blood and Circulation**

1. Present students with a brief explanation or description of the new term or phrase from the glossary. For example: “Capillary: A small blood vessel that connects arteries and veins.”

2. Present students with a nonlinguistic representation of the new term or phrase. Show the video clip associated with the term “capillary.”

3. Ask students to generate their own verbal description of “capillary.”

4. Ask students to create their own nonlinguistic representation of “capillary.”

5. Periodically ask students to review the accuracy of their explanations and representations. This can be done after the Apply activities.

Apply

Based on the information you gained from the Explore assessments, design appropriate activities for your students. Check the experiments listed in the Episode Guide (see page 11) for explanations of the demonstrations from the Bill Nye program as well as for additional experiments designed to help apply the knowledge gained.

In the following example from *Blood and Circulation*, the standards-based video clips provide background information, and an experiment from the Guide helps students apply what they have learned about arteries and veins.

Example: The Structure and Function of Arteries and Veins

1. Have students begin “Know-New” T-Charts, focusing on what they already know about the structure and function of blood vessels, arteries, and veins.

2. Watch the following chapters from the Bill Nye DVD *Blood and Circulation*:
   - Blood vessels
   - Heart pump and bloodstream
   - Capillaries

3. Complete the “Know-New” T-Charts.

4. Give students copies of the Student Recording Sheet (see page 15) and have them fill the sheets out as they conduct their experiments.

5. Do the experiment entitled “Pump it Up!” from the *Blood and Circulation* Episode Guide, in which students observe the apparent effects of pressure on arteries and veins.

6. Write down any remaining questions about the structure and function of blood vessels, arteries, and veins.
Extend

The NSES Teaching Standard D states: “Teachers of science design and manage learning environments that provide students with the time, space, and resources needed for learning science.” School administrators, parents, and the community can assist teachers in providing local resources that make science lessons pertinent and meaningful.

Identify and Use Resources Outside of the School: “The school science program must extend beyond the walls of the school.” Each Bill Nye DVD contains resources designed to facilitate such understanding, including:

■ Way Cool Scientist, found in both Watch Program and Bonus Materials, in which scientists discuss their current areas of study. This real-world connection often results in a deeper student understanding of a particular career.

■ Disney's Edustation Web site, where relevant Internet links provide a starting point for students to further explore science topics.

■ Try these video clips, with activities parents and students can do at home. The questions generated by students from these experiences can be used as foundations from which they may conduct their own research.

■ Standards-aligned video clips and Bill’s demonstration video clips, which can help generate topics for further research. After viewing the clips, have students list their questions, perhaps about the most current developments in a topic. By conducting online or library research, students will find answers to their questions and will learn about a topic in greater depth.

Example: Conducting Student Research Using Blood and Circulation

Ask students to choose one of the questions they had after completing the activities from Blood and Circulation. An example of a student research question might be, “How has the technology related to artificial hearts advanced in the last ten years?” Explain to students that they will be conducting research to find answers to their questions. Some students may want to complete online or library research, others may want to ask an expert in the field, while others may want to design and conduct a scientific investigation. Encourage students to write a detailed procedure for finding answers to their questions. Ask students to find one or more examples of current research dealing with the circulatory system that is related to their question. Note: Students with similar questions may work together to complete the assignment.
Assess

Once students have conducted the research, you may choose to assess them in a number of different ways:

■ By having students write about what they learned in a journal.

■ By having students submit projects or reports.

■ By having students take the program quiz to gauge their understanding of certain facts in the video. You can either print the quiz (found in this Guide on page 18) and have each student complete it individually or use the DVD screen version and the scoring feature for whole-class assessment.

■ By designing other standards-aligned questions to augment those that are provided.

While the quiz will provide you with information about what the students have learned, it does not assess how students have processed the information. Below you will find assessment ideas that can be used to measure both content and process.

A Sample Assessment for Blood and Circulation

1. Explain to students that an important aspect of scientific inquiry is to communicate findings to others. In this assessment, students will present the following information to their peers:
   ■ The question they investigated.
   ■ The method that was used to find answers to their question.
   ■ Problems or successes during the search.
   ■ Answers to their question.
   ■ Current research related to their question.
   ■ New questions that have arisen.

2. Distribute the rubric found in the Lesson Planning Worksheet (see page 13) to students so they know how they will be assessed. Make sure students understand the criteria found in the rubric. Before you begin, you may want to allow students to make changes to the rubric so that it is clearer or makes more sense from their perspectives.

3. Allow students time to gather information to answer their questions and to prepare for their presentations. As students conduct this work, walk around the room and ask questions to assess their progress and provide input as needed.

4. Take a few minutes to clarify the rules of the presentation with the students. You may want to have multiple copies of the rubric available so that peers can rate the presentations.

5. As presentations are made, assess the quality of the student’s work as thoroughly and as equitably as you possibly can.

Congratulations! You have now completed the steps to set up a lesson plan using the Lesson Planning Worksheet. You have also explored many of the features of the Bill Nye DVD as well as the supplemental information found in this Teacher’s Guide. And most important, you’ve made significant strides toward incorporating DVD technology into your day-to-day instruction.
Grades K-4

Science as Inquiry

Abilities necessary to do scientific inquiry

- Ask a question about objects, organisms, and events in the environment.
- Plan and conduct a simple investigation.
- Employ simple equipment and tools to gather data and extend the senses.
- Use data to construct a reasonable explanation.

Understandings about scientific inquiry

- Scientific investigations involve asking and answering a question and comparing the answer with what scientists already know about the world.
- Scientists use different kinds of investigations depending on the questions they are trying to answer. Types of investigations include describing objects, events, and organisms; classifying them; and doing a fair test (experimenting).
- Simple instruments, such as magnifiers, thermometers, and rulers, provide more information than scientists obtain using only their senses.
- Scientists develop explanations using observations (evidence) and what they already know about the world (scientific knowledge). Good explanations are based on evidence from investigations.
- Scientists make the results of their investigations public; they describe the investigations in ways that enable others to repeat the investigations.
- Scientists review and ask questions about the results of other scientists’ work.

Physical Science

Properties of objects and materials

- Objects have many observable properties, including size, weight, shape, color, temperature, and the ability to react with other substances. Those properties can be measured using tools, such as rulers, balances, and thermometers.
- Materials can exist in different states—solid, liquid, and gas. Some common materials, such as water, can be changed from one state to another by heating or cooling.

History and Nature of Science

Science as a human endeavor

- Science and technology have been practiced by people for a long time.
- Although men and women using scientific inquiry have learned much about the objects, events, and phenomena in nature, much more remains to be understood. Science will never be finished.
- Many people choose science as a career and devote their entire lives to studying it. Many people derive great pleasure from doing science.

Grades 5-8

Science as Inquiry

Abilities necessary to do scientific inquiry

- Identify questions that can be answered through scientific investigations.
Design and conduct a scientific investigation. Use appropriate tools and techniques to gather, analyze, and interpret data. Develop descriptions, explanations, predictions, and models using evidence. Think critically and logically to make the relationships between evidence and explanations.

Understandings about scientific inquiry

Different kinds of questions suggest different kinds of scientific investigations. Some investigations involve observing and describing objects, organisms, or events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models. Current scientific knowledge and understanding guide scientific investigations. Different scientific domains employ different methods, core theories, and standards to advance scientific knowledge and understanding. Technology used to gather data enhances accuracy and allows scientists to analyze and quantify results of investigations. Scientific explanations emphasize evidence, have logically consistent arguments, and use scientific principles, models, and theories. The scientific community accepts and uses such explanations until displaced by better scientific ones. When such displacement occurs, science advances.

Physical Science

Motions and forces

If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and magnitude. Unbalanced forces will cause changes in the speed or direction of an object's motion.

Transfer of energy

Heat moves in predictable ways, flowing from warmer objects to cooler ones, until both reach the same temperature.

Earth and Space Science

Structure of the earth system

The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations.

Science and Technology

Understandings about science and technology

Scientific inquiry and technological design have similarities and differences. Scientists propose explanations for questions about the natural world, and engineers propose solutions relating to human problems, needs, and aspirations. Technological solutions are temporary; technologies exist within nature and so they cannot contravene physical or biological principles; technological solutions have side effects; and technologies cost, carry risks, and provide benefits.

History and Nature of Science

Nature of science

Scientists formulate and test their explanations of nature using observation, experiments, and theoretical and mathematical models. Although all scientific ideas are tentative and subject to change and improvement in principle, for most major ideas in science, there is much experimental and observational confirmation. Those ideas are not likely to change greatly in the future. Scientists do and have changed their ideas about nature when they encounter new experimental evidence that does not match their existing explanations.
Grades 9-12

Science as Inquiry

Abilities necessary to do scientific inquiry

- Identify questions and concepts that guide scientific investigations.
- Design and conduct scientific investigations.
- Use technology and mathematics to improve investigations and communications.
- Formulate and revise scientific explanations and models using logic and evidence.

Understandings about scientific inquiry

- Scientists usually inquire about how physical, living, or designed systems function. Conceptual principles and knowledge guide scientific inquiries. Historical and current scientific knowledge influence the design and interpretation of investigations and the evaluation of proposed explanations made by other scientists.
- Scientists conduct investigations for a wide variety of reasons. For example, they may wish to discover new aspects of the natural world, explain recently observed phenomena, or test the conclusions of prior investigations or the predictions of current theories.
- Scientists rely on technology to enhance the gathering and manipulation of data. New techniques and tools provide new evidence to guide inquiry and new methods to gather data, thereby contributing to the advance of science. The accuracy and precision of the data, and therefore the quality of the exploration, depends on the technology used.

Physical Science

Structure of atoms

- Matter is made of minute particles called atoms, and atoms are composed of even smaller components. These components have measurable properties, such as mass and electrical charge. Each atom has a positively charged nucleus surrounded by negatively charged electrons. The electric force between the nucleus and electrons holds the atom together.

Structure and properties of matter

- Atoms interact with one another by transferring or sharing electrons that are furthest from the nucleus. These outer electrons govern the chemical properties of the element.

Motions and forces

- Objects change their motion only when a net force is applied. Laws of motion are used to calculate precisely the effects of forces on the motion of objects. The magnitude of the change in motion can be calculated using the relationship $F = ma$, which is independent of the nature of the force. Whenever one object exerts force on another, a force equal in magnitude and opposite in direction is exerted on the first object.

Conservation of energy and the increase in disorder

- Heat consists of random motion and the vibrations of atoms, molecules, and ions. The higher the temperature, the greater the atomic or molecular motion.

Science and Technology

Understandings about science and technology

- Creativity, imagination, and a good knowledge base are all required in the work of science and engineering.
History and Nature of Science

Science as a human endeavor

- Individuals and teams have contributed and will continue to contribute to the scientific enterprise. Doing science or engineering can be as simple as an individual conducting field studies or as complex as hundreds of people working on a major scientific question or technological problem. Pursuing science as a career or as a hobby can be both fascinating and intellectually rewarding.

Nature of scientific knowledge

- Science distinguishes itself from other ways of knowing and from other bodies of knowledge through the use of empirical standards, logical arguments, and skepticism, as scientists strive for the best possible explanations about the natural world.
- Scientific explanations must meet certain criteria. First and foremost, they must be consistent with experimental and observational evidence about nature, and must make accurate predictions, when appropriate, about systems being studied. They should also be logical, respect the rules of evidence, be open to criticism, report methods and procedures, and make knowledge public. Explanations on how the natural world changes based on myths, personal beliefs, religious values, mystical scientific.
- Because all scientific ideas depend on experimental and observational confirmation, all scientific knowledge is, in principle, subject to change as new evidence becomes available. The core ideas of science such as the conservation of energy or the laws of motion have been subjected to a wide variety of confirmations and are therefore unlikely to change in the areas in which they have been tested. In areas where data or understanding are incomplete, such as the details of human evolution or questions surrounding global warming, new data may well lead to changes in current ideas or resolve current conflicts. In situations where information is still fragmentary, it is normal for scientific ideas to be incomplete, but this is also where the opportunity for making advances may be greatest.
Episod e Guide
Do-It-Yourself Science

Nifty Questions in This Episode

<table>
<thead>
<tr>
<th>Where does all food come from?</th>
<th>Plants! (Cows eat grass, etc.)</th>
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<tbody>
<tr>
<td>How many phases (states) does matter have?</td>
<td>Three: solid, liquid, gas.</td>
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<tr>
<td>Does air have pressure?</td>
<td>Yes! Gravity keeps air molecules together.</td>
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</table>

Awesome Answers

Experiments shown on the video:

CRUSHER
Objective: To demonstrate the effects of air pressure and gravity on a bottle.

- Fill a large bowl with ice cubes and cold tap water.
- Fill a 2-liter plastic bottle with hot tap water and put the bottle cap on tightly.
- Let stand for ten minutes.
- Remove bottle cap and empty hot water.
- Replace the bottle cap and submerge the bottle in the ice water.
- Observe the effect of internal and external air pressure.

EGG & I
Objective: To demonstrate the strength of shapes and structures.

- Place a 2-liter bottle cap on a flat surface with its open end facing up.
- Place the bottom of one egg on top of the bottle cap.
- Place another bottle cap on top of the same egg.
- Try balancing a book or other heavy object on top of the bottle cap.

More interesting stuff to do:

JOHNNY ROCKET
Objective: To demonstrate Newton’s Law of Action and Reaction; unbalanced forces produce motion.

- Tie one end of a 6-foot length of string to the back of a chair.
- Cut a 6-inch piece from a straw and thread the other end of the string through the straw.
- Place the straw at one end of the string.
- Blow up a balloon (long and slender if possible) and twist the end to keep the air in the balloon.
- While holding the balloon, tape it to the bottom of the straw. Make sure the straw will still slide on the string.
- Let go of the twisted end of the balloon and observe Newton’s Law of Motion.

ON THE MOVE
Objective: To demonstrate how potential energy is changed to kinetic energy.

- Tape one end of a ruler to the end of a desk.
- Cut three 12-inch pieces of strings and tape the ends of the strings to the free end of the ruler.
- Using small pieces of tape, tape a small ball to the end of each string hanging below the ruler. With the balls in place we have potential energy.
- Pull one ball back and release, allowing the ball to hit the next ball. This result is kinetic energy. This movement will continue until stopped by some other force, such as friction.
**Bill Nye the Science Guy**

**Lesson Planning Worksheet**

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<th>Lesson Title</th>
<th>National Science Educational Standards</th>
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<th>Materials Needed</th>
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Assess

As presentations are made, assess the quality of the student's work as thoroughly and as equitably as you possibly can. The following criteria can be used to assist in your assessment.

Name of Student

Question Investigated

<table>
<thead>
<tr>
<th>Initial Question</th>
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<tbody>
<tr>
<td>1 Question is broad and not well defined</td>
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<tr>
<td>2 Question is defined but limited to single-answer responses.</td>
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<tr>
<td>3 Question is clear and might elicit multiple responses that may lead to new ideas and additional questions.</td>
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<tr>
<td>4 Question is engaging and provokes new ways of thinking about an issue.</td>
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<table>
<thead>
<tr>
<th>Methods for Finding Answers</th>
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<tbody>
<tr>
<td>1 Students do not share planned or actual methods.</td>
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<tr>
<td>2 Students share methods but they are unclear or vague.</td>
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<tr>
<td>3 Students share methods but not the problems or successes of using the methods.</td>
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<tr>
<td>4 Students share methods and problems or successes in using the methods.</td>
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<table>
<thead>
<tr>
<th>Results</th>
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<tbody>
<tr>
<td>1 Student results are undefined.</td>
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<tr>
<td>2 Student results are incomplete and do not adequately answer the question.</td>
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<tr>
<td>3 Student results are complete, adequately answer the question, and include current research related to the question.</td>
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<tr>
<td>4 Student results are complete, include current research, and have resulted in one or more additional questions.</td>
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<table>
<thead>
<tr>
<th>Communication</th>
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<tbody>
<tr>
<td>1 Student is not prepared to speak.</td>
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<tr>
<td>2 Presenter has distracting mannerisms and avoids eye contact with the audience.</td>
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<tr>
<td>3 Presentation is clean and clear with some eye contact and very few distractions.</td>
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<tr>
<td>4 Presentation is exceptional and unique. Presenter uses regular eye contact and avoids distractions.</td>
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<tr>
<td><strong>Know</strong></td>
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<tr>
<td>Write down what you know about the topic of the video.</td>
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Bill Nye the Science Guy
Student Recording Sheet

Title of Experiment

Question: (What are you testing?)

Procedure: (Describe the experiment)

Materials: (List what you used)

Observations: (Record what happened)

Results: (Make your own data table)

Conclusions: (Use your observations and results to describe what you learned)
**AIR PRESSURE**

**Air pressure**
The action of a force of gaseous air molecules against some opposing force; it is distributed over the surface in contact with the air.

**GAS**

**Gas**
The phase (or state) of matter in which the atoms or molecules are completely separated from each other; gases take the form of the container that holds them.

**REFRACTION**

**Refraction**
The bending of light when it passes at an angle from one medium, such as air, through another medium, such as water.

**STATIC ELECTRICITY**

**Static electricity**
The result of temporary positive and negative electrical charges resulting from the transfer of electrons from one object to another.
True or False? Circle T or F

1. Science can only be done in a laboratory. T or F
2. A good experiment is repeatable. T or F
3. Carbon dioxide gas is invisible, so it is not matter. T or F
4. Water can bend light. T or F
5. A single upright egg can support the mass of a book, because all the weight of the book is centered directly above the small end of the egg. T or F
6. A negatively charged object will repel another negatively charge object. T or F
7. A raw egg floats in both tap water and salt water. T or F

Multiple Choice: Circle the letter of the best answer

8. Which of the following is a part of a good science investigation?
   A. Observation
   B. Repeatability
   C. Using things around you
   D. All of the above

9. When a person puts a card on top of a glass of water and then turns the glass upside down, the card holds the water because:
   A. Air pressure only pushes up on the card.
   B. Air pressure pushes up with more force than it pushes down.
   C. Air pressure pushes with the same force in all directions.
   D. None of the above

10. In the experiment shown in the program, the most mass that three upright eggs can support is:
    A. One book
    B. One book and one cinder block
    C. One book and two cinder blocks
    D. One book and three cinder blocks
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<td>10</td>
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**Static electricity**

**Refraction**