

Study Guide

Super Scientific Circus



Did you know? This performance is a public service of the Sampson CenterStage Performing Arts Series and the County of Sampson and is funded and underwritten through the financial contributions of many businesses, corporations, civic organizations, and individuals from across Sampson County and is provided **FREE** to students from across Sampson County.

On the day of the performance a complete list of Class Acts Sponsors will be distributed to each teacher.

How you can help! Please take a moment to have YOUR students write a note of appreciation to our sponsors! Our sponsors love receiving notes from students.

Many thanks to each Class Acts-Sampson CenterStage for Students Sponsor!

This study guide was prepared and provided as a courtesy of the *Class Acts-Sampson CenterStage for Students* series and is designed to aid in preparing students for an exciting performance...We encourage you to make use of this valuable resource designed to not only enhance each student's theatergoing experience; but to also complement their total educational experience.

GOING TO THE THEATRE (101)



Watching a live performance is very different than watching television or going to the movies. When you see a live performance you play a part too! Your role is an audience member. As an audience member you should obey the following instructions:

When you arrive, follow an usher to your seat. Your group may be assigned to specific areas or seats in the theatre. Please stay in the seat that you are given until the show is over.

Most theaters do not allow cameras, cellular telephones or recording devices. Please leave these at home or in your classroom.

Food, drink, candy and chewing gum are not allowed in the theatre.

Book bags and/or oversized handbags are not allowed in the theatre.

When the theater lights dim, it means the show is about to begin...Please be quiet.

Listen and watch carefully. Talking and making noise disturbs the performers on stage and your fellow audience members. Please hold your comments until after the performance. Of course when something is funny you may laugh. You may even cry when something is sad.

Show your appreciation by clapping when the performance is over and when the performers take a bow.

Stay seated after the show and an usher or your teacher will lead you out of the theater.

SPECIAL NOTE

This show will have a question and answer period following the performance. Please stay seated after the curtain call. If you have a question, raise your hand. Speak loudly and clearly when you are called upon.

Theatre Collaborators



When we see a show, we often think of only the performers on stage. However, many people come together to make a performance happen. Read the list of theatre collaborators and answer the discussion questions with a partner.

Performer - a person who entertains an audience; includes actors, singers, musicians.

Producer - someone who finds financing for and supervises the making and presentation of a show.

Musical Arranger - a musician who adapts a composition for particular voices or instruments or for another style of performance

Director - someone who supervises the actors and directs the action in the production of a show; the “visionary” for the show. The director also collaborates with designers to create the entire picture you see on stage.

Costume Designer - the person who creates costumes for actors to help define and express the character; works with the director and creates renderings of what costumes should look like.

Lighting Designer - imagines and creates the lights of a performance to enhance the mood and the setting.

Sound Designer - imagines and creates the music and other sound effects which help tell the story of a play

Set Designer - makes a map of each set and its changes

Props - items held or used by the actors on stage that help tell the story

Gels - pieces of plastic that are used in stage lights to change their color

THINK ABOUT IT!



Why is changing the color of lights or the use of props important for the mood in a scene?

DISCUSSION QUESTIONS...



1. If you were to work in the theater business, which theater collaborator would you rather be?
2. Which job seems most challenging? Why?

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Nature and Purpose of Program

The Super Scientific Circus is a program designed to help students understand that science can be appreciated in everything we see and do. We believe that science can be and is fun!

The program features circus skills, magic tricks, comedy and mime to illustrate fundamental scientific concepts such as gravity, the center of gravity, air pressure, the speed of sound and light, ultraviolet light, centripetal force, airfoils and more.

During the program students learn:

- how to make their own boomerang
- why a whip cracks
- how to put a needle through a balloon
- how ultraviolet light is different from white light
- how to balance a broom in the palm of your hand
- why spinning objects defy gravity
- why bubbles are always round

Ideas for Discussion

- The vocabulary list covers concepts that are either directly addressed or implied by the program. Review some of these terms and concepts with the students.
- What are some of the important scientific discoveries that students can think of? Who are some of the important scientists, and what have they discovered about the world we live in? (The two scientists mentioned by name in the show are Albert Einstein and Isaac Newton). How do scientific discoveries affect our daily lives?
- Is laughter valuable and does it contribute to learning? How does Trent the Mime use his face and body to elicit laughter. Why is the relationship between Trent and Mr. Fish so funny? (It is an historical relationship going back to the time of jesters and kings.) With whom do the students identify?

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VOCABULARY

Physics: The study of matter, energy, motion and force.

Physicist: A scientist who specializes in physics. Albert Einstein and Sir Isaac Newton are considered the greatest physicists of all time.

Matter: Any object. Anything that takes up space and has weight.

Force: A push or pull on an object. Gravity, electricity, and magnetism are invisible forces that act from a distance. Hitting a ball with a bat is a visible force that acts in contact.

Motion: A change of position wherein an object comes closer or moves farther away from another object.

Inertia: The resistance to change in motion. An object at rest wants to stay at rest unless some force moves it. A moving object wants to keep moving unless some forces stops it.

Friction: The resistance to motion between objects that touch. This is the force that causes a moving object to slow down or stop.

Centripetal Force: Any force that makes something move in a circle. If we play tether ball, it is the rope that provides the centripetal force to keep the ball moving in toward the pole.

Centrifugal Force: The opposite of centripetal force. A force that tends to move objects away from the center when going in a circle. Centrifugal force keeps the water in a whirling bucket from spilling out.

Gravity: An invisible force that pulls downward on objects. Gravity is stronger on earth than it is on the moon. There is no gravity in *outer* space.

Balance: When the downward pull of gravity is equal on all sides of an object, so it does not fall.

Center of Gravity: The point at which an object will balance. The weight of the object seems to be centered on that point.

Energy: The ability to do work—to make an object move.

Light: A form of energy that allows us to see. The sun is the greatest source of light on earth.

Refraction: The bending of rays of light. When light bends, or refracts, it sometimes creates a rainbow or spectrum. A magnifying glass works by refracting light through a lens.

Spectrum: The colors found in a rainbow of light - red, orange, yellow, green, blue, indigo, and violet.

Sound: Vibrating energy that allows the sense of hearing.

Speed of Sound: Sound travels through the air at a rate of 761 miles per hour, or 1100 feet per second, or 1225 kilometers per hour.

Sonic Boom: The explosive sound that is created when an object travels faster than the speed of sound. Similar to thunder, a sonic boom is created by supersonic jet aircraft.

Air Pressure: The amount of force that the air exerts upon all objects. Air pressure on the planet earth is 14.7 pounds per square inch at sea level.

Airfoil: Any surface that helps lift or direct an aircraft by making use of air currents. An airplane wing provides lift by causing air to pass at a higher speed over the wing than below it, thereby creating greater air pressure below than above.

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ACTIVITIES

Needle Through Balloon

Demonstrates: Air pressure and polymer effect.

You will need: Balloon, Scotch tape, shishkebob skewer or long pin.

Activity:

1. Blow up the balloon as much as you can, then let a third of the air out so it feels spongy.

2. Tie the balloon closed.

3. Put two squares of Scotch tape on opposite sides of the balloon.

4. Slowly push and twist the pin into the balloon through one piece of tape and out through the other.

Your balloon won't pop even with a pin through it!

Making a Boomerang

Demonstrates: Air speed, aerodynamics, and air pressure

You will need: Cardboard pizza box, scissors, ruler, marker.

Activity:

1. Take a 12" ruler, and trace around it on a pizza box.

2. Turn the ruler perpendicular to the tracing and trace it again.

You will have drawn a symmetrical cross.

3. Cut it out, and trim the corners of the edges so the ends are rounded off a little.

4. Bend the ends of the cross up a little.

5. Go outside.



6. Hold your boomerang straight up like the statue of liberty. The curves should face you.

7. Throw it into the air! You don't need to throw hard, but do throw in an upward direction.

Remember, it needs to start perpendicular to the floor. It won't work if you throw it on its side.

8. Catch the boomerang by letting it float down into an open hand, so you don't crush your boomerang.

9. Repeat. Have fun!

Balancing Objects

Demonstrates: The center of gravity.

You will need: A stick at least two feet long, a broom, a plastic baseball bat or a peacock

feather.

Purpose: Try to balance an object in your hand.

Activity:

1. Keep your palm flat or your finger straight.

2. Place the object you are going to balance in the palm of your hand, or on the tip of your finger.

3. Look at the top of the object, not at the bottom.

4. Let go of the object with the top hand, then move your bottom hand so that the bottom of the object stays directly underneath the top.

5. Don't stand still. You may have to move around to keep your hand under the top.

6. Practice balancing things on your chin, elbow and foot.

Finding the center of gravity is essential to all balance. See what else you can balance! Long things are easier to balance than short things. And remember, always watch the top and keep the bottom directly underneath it.



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Reading List

There are a plethora of books about science for children. A search on Amazon.com will yield 48 books. A few of our favorites are:

- *Janice VanCleave's Physics for Every Kid: 101 Easy Experiments in Motion, Heat, Light, Machines, and Sound* by Janice Pratt VanCleave: John Wiley and Sons, Inc., 1991.
- *The New Way Things Work* by David Macaulay: Houghton Mifflin/Walter Lorraine Books, 1998.
- *Teaching Children About Physical Science: Ideas and Activities Every Teacher and Parent Can Use* by Elaine Levenson: McGraw-Hill, 1994.
- *The Everything Kids Science Experiments Book: Boil Ice, Float Water, Measure Gravity—Challenge the World Around You* by Tom Robinson: Adams Media Corp., 2001.



Trent The Mime juggles soapbubbles.



Mr. Fish and his table of tricks.

The internet will also provide a wealth of information. A Goggle search of “science for children” will turn up 319 million links. Although we haven't yet examined all of them, one good one is:

- www.ed.gov/pubs/parents/Science/index.html

About the Performers

Mr. Fish, born John James Lepiarz, is a long-time circus performer. He toured for seven years with New York's Big Apple Circus. He has appeared on national television on HBO and ABC's *Great Circus Performances of the World*. A graduate of Oberlin College, Mr. Fish is the proud father of four children.

Trent Arterberry, mime extraordinaire, has performed at thousands of schools, theatres and festivals. He has performed at New York's Radio City Music Hall, headlined on the QE2 and SS Norway, and was named College Campus Performing Artist of the Year. Trent is the father of two daughters and a new baby son.

Visit www.TrentTheMime.com



AT HOME

Dear Parents,

Recently, your student attended a performance by Super Scientific Circus. Super Scientific is a program to help students understand that science can be appreciated in everything we see and do. Their think-outside-the-box educational performance helped to plant seeds designed to help grow creative, open-minded, engaged and open-hearted students.

Prior to attendance, teachers reviewed proper theatre etiquette with students and provided background information about the performance. Aside from the many benefits for students of simply experiencing theater, the material addressed in this performance supported many goals in the North Carolina Standard Course of Study.

As a parent, you are your child's best teacher. They can also teach you through their experiences. Ask your student about the performance they attended and read through this booklet. This is a wonderful opportunity to talk with your child about the performance they experienced.

Thank you for your participation in the arts.



DO IT!

A reviewer writes an opinion of the actors, sets, and director for a newspaper or magazine. Write your review of the performance for your family.
