THE MAGIK THEATRE

Where Imagination Is Education

Dr. Krashundbang

Script
by
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Classroom Guide
Grades 4 - 5

How to Use This Guide

This classroom guide for *Dr. Krashundbang* is designed for Texas students in Grades 4 and 5. It offers activities and information to help you integrate a performance of *Dr. Krashundbang* into English language arts (ELA), mathematics, science, social studies, music, art, and theatre curricula.

All activities in this guide are linked to Texas Essential Knowledge and Skills (TEKS) content standards.

For students outside Texas, this guide's ELA and math activities also are linked to Common Core standards. At the back of this guide, you will find a list of the guide activities and their related Texas and Common Core standards.

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1: Dr. Krashundbang – How It Works

Static Electricity Stick
The stick has a battery inside it. Dr. Krashundbang presses a button on the stick, which activates the battery to generate a negative static charge. He then drops a tinsel shape onto the stick to quickly transfer the negative charge to the stencil. Since like charges repel each other, the negatively charged tinsel shape floats above the negatively charged stick.*

Energy Ball
The Energy Ball has two buttons on its surface. These buttons are actually electrodes that function like a switch. Inside the ball are a sensing circuit, tone generator, light emitting diodes (LEDs), and a battery. Whenever somebody or something completes the circuit by touching both electrodes at the same time, the Energy Ball makes a sound and its LEDs flash.*

Magnets
A magnet in the simplest terms is a metal (usually iron) that is attracted to other metals. It has a magnetic field. You might be surprised just how many things around you work by magnetism or electromagnetism. There are magnets in your refrigerator holding the door closed. Magnets read and write data (digital information) on your computer's hard drive and on cassette tapes in old-fashioned personal stereos. More magnets in your hi-fi loudspeakers or headphones help to turn stored music back into sounds you can hear.

Every electric appliance with an electric motor in it (everything from your electric toothbrush to your lawn mower) uses magnets to turn electricity into motion. Motors use electricity to generate temporary magnetism in wire coils. The magnetic field thus produced pushes against the fixed field of a permanent magnet, spinning the inside part of the motor around at high speed. You can harness this spinning motion to drive all kinds of machines.

Identical Arcs
This is an illusion of comparison. The psychology textbooks tell us that a segment of a circle seems much longer if it is placed under an identical segment in such a way that the ends are even at one end. The secret is that the longer outside edge of the bottom arc is being compared against the shorter inside edge of the top arc. When the inside curve of the top arc is placed next to the outside curve of the bottom arc, the bottom arc always appears to be bigger. The illusion is even convincing when the top arc is centered over the bottom arc.*

Air Pressure Mat
The mat is held down by atmospheric pressure, which is approximately 15 pounds per square inch. A quick calculation leads to a total of 1,620 pounds of pressure pushing down on the mat! No wonder it seems like the mat is glued to the stage. Even the smallest pebbles under the mat can lead to leaks and breaks in the seal. That's why it's so easy to lift the mat by the edge or the corner.*

(continued on next page)

* Explanation courtesy www.SteveSpanglerScience.com

Skewer Through a Balloon

Balloons are made of a thin sheet of a rubber called latex, a polymer made of long chain-like molecules, or strands, that are all tangled together. There are also bonds between the strands, call cross-links. This tangled, cross-linked network of molecules can be stretched, but when you let go, it returns to its original shape. Such a material is called an elastomer.

When a very sharp skewer is *slowly* pushed, with twisting, into the balloon, the polymer chains are pushed aside, but remain bonded, so the balloon does not break. (It helps, too, if the skewer is coated with an oil, such as mineral oil or vegetable oil. It slides in more easily, and the oil helps seal the hole.) When a balloon is blown up, the polymer strands are more tightly stretched around the sides than they are at the tied end or the nipple end. It's easier to push the skewer in at the ends, where the strands have more "give." Around the side of the balloon, where the strands are stretched more tightly, they are more likely to break. Once a tear begins, it continues to enlarge, the air rushes out of the balloon, and it pops.

When you give the balloon a sharp poke with the skewer, the strands are broken, and the balloon pops.**

Smoke Ring Cannon

If you throw a chunk of rock through the air, the rock flies along and the air swirls around it. But what happens when you throw a chunk of AIR through the air? Sometimes you get a ring of air. When any object moves through the air, it must push the air out of the way. As the air in front of the chunk makes room for it, the chunk moves forward, and an empty space is left behind. As the air ahead of the chunk is spread apart, it makes the air inside the chunk spread apart as well. As the chunk moves forwards, its outer layer is dragged backward. A central stream of air starts moving forward through the chunk, and the chunk swirls inside.

When Dr. Krashundbang introduces stage-smoke, it turns into a moving donut-shape inside a spherical blob of air. Or it becomes a ball with a vortex-ring inside.

**Explanation courtesy www.CoolScience.org

2: Discussion Questions

Before the Performance

Dr. Krashundbang is a stage show. What is a stage show?

- How is a stage show similar to a TV show or movie?
- How is it different?

Who performs the parts (roles) in a stage show?

- What kinds of skills do you think performers need to have to perform in shows?
- Who else works on shows? (Remember: you may not see them on stage!)

During the Performance

When you watch a stage show, you are a member of the audience. What kinds of things should you do as an audience member? Examples:

- Pay attention
- Laugh when something funny happens
- Clap if you enjoy something

What kinds of things should you *not* do as an audience member? Examples:

- Talk to your neighbor
- Use a cell phone during the performance
- Yell at the actor (unless he asks you to!)

After the Performance

What did you think of the show?

- Did you learn anything from *Dr. Krashundbang*?
    - If so, what did you learn?

Describe the performer in the play.

- What did he do to make his character special?
- How did he use his body to play his character (using voice, movement, etc)?

Describe the character's costume.

- What did Dr. Krash's costume tell you about that character?
- Did Dr. Krash add to or take away any part of his costume during the show?
- If so, why do you think he needed to change the costume?

Describe the props of the show.

- How did they help you understand Dr. Krashundbang's character?
- Have you ever used equipment similar to Dr. Krashundbang's props?

Did the play have music or sound effects in it?

- If so, were they only in the background, or did they help emphasize the demonstrations?
- What instruments did you hear in the music or sound effects?

If you were going to direct *Dr. Krashundbang*, how would your production be different from the show you saw by Magik?

3: Write Your Own Story

In *Dr. Krashundbang*, a scientist uses fun experiments and props to demonstrate scientific principles. Using the worksheet below, plan a story about a character who must explain something complicated to a second character who doesn't understand. On a separate sheet of paper, write a first draft of your story. After sharing your story with your class and your teacher, gather feedback and use it to revise your story. When you finish, share your final story with your class again. How are your classmates' stories similar? How are they different?

CHARACTERS

Main character:
Age:
Male or female?:
Physical description:
Personality:

Second character:
Age:
Male or female?:
Physical description:
Personality:

Other characters:

SETTING

Where:

When:

PLOT

How does your story begin?

How does your main character meet or know the second character?

What is the main conflict between your main character and the second character?

What is the climax of your story?

How does your story resolve? (What happens after the climax?)

4: Word Problems

Mad scientists only have one fear: angry mobs! There were 100 people at the bottom of his castle this morning. Later that day another 570 angry people arrived, and by the end of the night another 300 people showed up. How many people are in the mob?

The mad scientist is building a monster. He spent 60 hours working on it one week, 70 hours working on it the week after, and 80 hours building the monster this week. How many hours of work has the doctor put in to build his ultimate creation?

Werewolves began attacking the mad scientist's town. The town had 1,500 buildings, but at the end of the day only 127 of them remained. How many buildings were destroyed by the werewolves?

These monsters have a taste for radishes. There were 4,325 radishes in the garden, but the monsters consumed 2,999 of them in a raid. How many radishes remain?

Looking at 12 radishes, the mad scientist knew he did not have enough to complete his task. He needed to multiply his efforts by 150 to save the town. How many radishes will he need in all?

After injecting all the radishes with a werewolf-reversing serum, it was now time to transport the goods. The mad scientist filled 11 crates with 120 radishes each. How many radishes did he load all together?

The scientist has taken care of most of the town and now he must face 50 elite werewolves that can shoot lasers from their eyes. He has 500 radishes in his possession and he must use them all to defeat the elite beasts. How many radishes will he give to each werewolf if he distributes them equally?

The mad scientist has saved the day and now we have to rebuild the town. If the mad scientist creates 700 robots to rebuild 25 different districts, how many robots can work in each area?

5: Technology in Our Society
When a person uses scientific principles to make a tool, they have created technology.

Think of all the ways that you use tools — technology — in your everyday life. Remember: tools aren't limited to hammers and screwdrivers, and technology isn't always powered by electricity. Tools are any technology you use to make a particular job easier.

- What technology did you use to get ready for school this morning?
- What kinds of technology do you use in your classroom?
    - ...in the lunchroom?
    - ...in gym class?
    - ...on the playground?
    - ...to do your homework?
- What kinds of technology do you use in your free time?

Choose two different technologies — one you use at school and one you use at home — and explain how each one makes it easier for you to do work.

Think back to your answer to the first questions above (the technologies you use at home, in school, and in your free time. Choose one technology you use in each of those instances and imagine what your life would be like without those tools.

- Do you think there were people in history who had to do without those tools?
    - If so, how do you think they got their work done?
- How did the invention of those tools change life for people?

Technology is changing all the time, as new tools are created to help us do our work. Think of a kind of work that is difficult to do with our current technology. Describe a tool you would invent to make that work easier or more enjoyable.

- Do you think that tool will ever be invented? Why or why not?
- If you invented it, what would you call it?
- How would it change the lives of people who used it?
- What other tools might your invention lead to?

Research Exercises
Choose a scientist or inventor.

- Research the scientific innovations or technological inventions that person was responsible for.
- How did that person's work affect your everyday life?
- How did that person's work affect life in Texas?
- How did his or her work affect our world as a whole?

Choose a technology.

- Research to find out who invented that technology.
- How did that invention affect everyday life?
- How did that invention affect life in Texas?
- How did that invention affect our world as a whole?

6: Create a Diorama

Teacher: For this exercise, provide modeling materials with a variety of colors and textures, as well as structural materials, such as cardboard and glue. Equalize student access to materials by making this an in-class exercise, rather than an at-home exercise.

A diorama is a three-dimensional ("3-D") scene. A diorama tells a story: it includes a setting, at least one character, and some kind of action.

Using materials provided by your teacher, make a diorama that shows a moment from *Dr. Krashundbang*. Think about what your setting should look like, who you want to be in the scene, and what you want them to do.

When you finish, share your diorama with the class. Answer these questions:

- Where does your diorama take place?
- Who is in your diorama?
- What are they doing?
- Why did you choose this scene to depict?
- What materials did you use to make your diorama? How did you build it?
- Did any of your classmates make the same scene as yours?
    - How are your dioramas similar?
    - How are they different?
- Did any of your classmates make the scene right before or after yours? Can you tell the whole story with your class's dioramas?

Use the space below to make a planning sketch of your diorama.

7: Exploring Sound in Music

Play samples of several different musical pieces for your students. Make sure students have room to move around. Point out different tempos and rhythms to encourage change in dance/ movement. Help students find the beat of a piece by clapping, marching in place, snapping your fingers, etc. Use this exercise as an exploration of sound. Encourage children to add dance/ movement to their listening experience, by asking them to represent the sounds they're hearing with their bodies:

- How would they use their bodies to represent...
    - ...soft sounds?
    - ...long sounds?
    - ...short sounds?
    - ...repeating sounds?

In *Dr. Krashundbang*, a scientist shows how some everyday objects can do unusual things. Using a variety of everyday objects*, lead students through a discussion of musical qualities:

- Demonstrate musical qualities
    - loud vs. soft sounds
    - high-pitched notes vs. low-pitched notes
    - fast rhythms vs. slow rhythms
- Ask students to emulate your examples using instruments, their voices, or their bodies (e.g.,clapping their hands, snapping their fingers, clicking their tongues)
- Ask students to sort instruments
    - sort single-pitch instruments separately from multi-pitch instruments
    - sort single-pitch instruments from low-pitched to high-pitched
- Create a simple rhythmic pattern
    - ask students to repeat it
    - ask students to create and repeat their own simple rhythmic patterns
- Create a simple melody
    - ask students to repeat it
    - ask students to create and play their own simple melodies
- As a class, create a composition that uses a variety of sounds to create a mood (happy, creepy, sneaky, etc)

**Including:*

- *cardboard oatmeal can (with lid)*
- *rubber band*
- *chopsticks*
- *metal spoons*
- *plastic bucket*
- *plastic storage bin*
- *pots and pans*
- *pot/pan lids*
- *wooden spoon*
- *plastic cup with lid, filled ¼ full with dry beans or rice*
- *cardboard tubes*
- *glasses with different levels of water*

TEXAS

Grade 4

Activity	*Standard(s)*
1	Science 112.15.b.2-6
2	Fine Arts 117.16.b.5
3	ELA 110.15.b.15-16
4	Math 111.16.b.3-4
5	Soc Studies 113.15.b.20
6	Fine Arts 117.14.b.1-2, 4
7	Fine Arts 117.15.b.1-2, 4

Grade 5

Activity	*Standard(s)*
1	Science 112.16.b.2-6
2	Fine Arts 117.19.b.5
3	ELA 110.16.b.15-16
4	Math 111.17.b.3
5	Soc Studies 113.16.b.23
6	Fine Arts 117.17.b.1-2, 4
7	Fine Arts 117.18.b.1-2, 4

COMMON CORE

Grade 4

Activity	*Standard(s)*
3	ELA W.4.3, 5
4	Math 4.OA.3

Grade 5

Activity	*Standard(s)*
3	ELA W.5.3, 5
4	Math 5.OA.1-2