

# 2 TheatreSquared

Professional Theatre in Northwest Arkansas



## PRE SHOW EXERCISES

### FUN BRAIN FACTS:

The average brain weighs around 3 pounds.

The brain is the fattiest organ in the body.

The brain is 80% water.

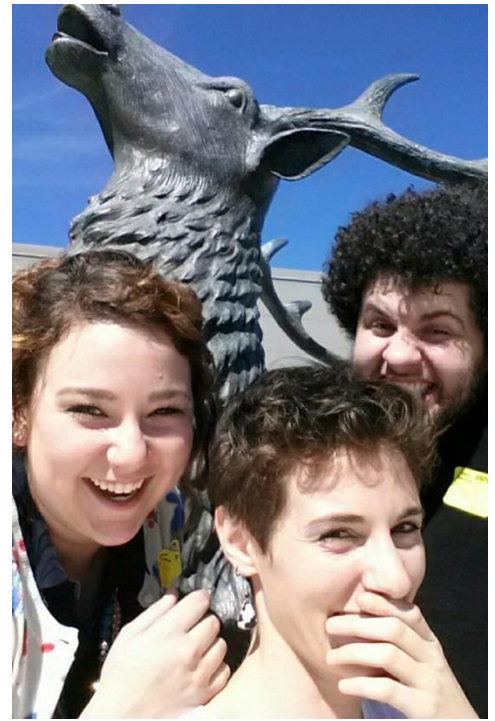
The left side of your brain is used for problem solving, math and writing.

The right side of your brain is used for art, music, and other creative work.

While you're awake, our brain generates 25 watts of power – enough to light a light bulb!

The human brain is over three times as large as the typical mammal with an equivalent body size. .

### BRAINY VOCABULARY



**Spinal Cord** - The information superhighway of the body. It carries information to the brain and instructions back.

**Medulla Oblongata** - Helps control the body's autonomic functions (things you don't need to think about to perform) like respiration, digestion and heart rate. Also acts as a relay station for nerve signals going to/from the brain

**Cerebellum** - Mostly deals with movement. It regulates and coordinates movement, posture and balance.

**Amygdala**- It helps in storing and classifying emotionally charged memories and triggers emotional responses.

**Hippocampus**- processes and stores new and temporary memory for long term storage.

**Hypothalamus** - Monitors and controls your appetite, thirst, other autonomic functions and motor functions.

**Thalamus**- THE relay station in the brain. Most of the sensory signals, auditory (sound), Visual, Somatosensory (from your skin and internal organs), go through this organ on their way to other parts of the brain for processing.

**Frontal Lobe**- responsible for functions such as reasoning, problem solving, judgment, impulse control.

**Parietal Lobe**- involved in processing pain and touch sensation.. It's also associated with cognition (including calculating location and speed of objects), movement, orientation, recognition and speech.

**Temporal Lobe**- involved in auditory (sound) sensation and is where the Primary Auditory Cortex and Wernicke's Area (language recognition) are located.

**Occipital Lobe**- controls visual sensation and processing. The Visual Cortex resides here.

**Broca's Area** - This part of the cortex controls speech, language recognition and facial nerves.

### **WATCH OUT, EGG-HEAD!**

Objective:

Students will explore the fragility of a human brain, and understand the importance of protecting it.

Materials:

One raw egg per student or group

Extra eggs

Materials to make a “helmet” – newspapers, tape, straws, etc.

Markers to decorate the eggs and the helmets.

Procedure:

1. Spread newspaper or trash bags on a hard floor surface.
2. Instruct the students that the egg will represent a brain. The egg shell represents the skull.
3. Drop one egg on the floor, allowing it to break. This brain was not protected by a helmet.
4. Have students work in groups to create the best “helmet” for their egg. They can also decorate the eggs or the helmets.
5. Have students drop their helmeted eggs from 4 feet above the ground.
6. Have students explain why their helmet protected or failed to protect their egg.

Extension Exercise:

This egg-drop can also be organized as a contest to see who can engineer the best helmet. You will need to have a few different heights to drop the helmets, which can be achieved by standing on a chair and/or a ladder. You might even have another teacher go onto the roof to drop the helmets. You will also need to record the results.

### **THINKING INSIDE THE BOX**

Making sound boxes is a fun experiment that requires students to concentrate on their sense of hearing.

Materials:

Empty boxes, cans or other containers.

Multiple like objects (pennies, marbles, rice, paper clips)

Procedure:

1. Place objects inside the empty box without students seeing.
2. Shake the box and have students listen to the sound.
3. Have students record on a sheet of paper what they think is in the box.
4. Reveal the contents of each box and see who was correct.

Extension Exercise:

Have students take an empty container home. Have them put like items inside from their home. Have students shake their box and have the class guess what might be inside.

## **SENSITIVITY TESTER**

(experiment from [pbskids.org/zoom/activities/sci/sensitivitytester.html](http://pbskids.org/zoom/activities/sci/sensitivitytester.html))

When something pushes on our skin a message is sent along the nerves to our brains. Some parts of our bodies have more nerve endings than others. For example, our upper arms don't have many nerve endings so if an object with two points touches us, both points might only touch one nerve and our brain will only perceive one point.

**Objective:** Students will work with a partner to explore the way that information travels from the skin to the brain.

**Materials:**

5 paper clips

3 index cards

pen and paper for charting

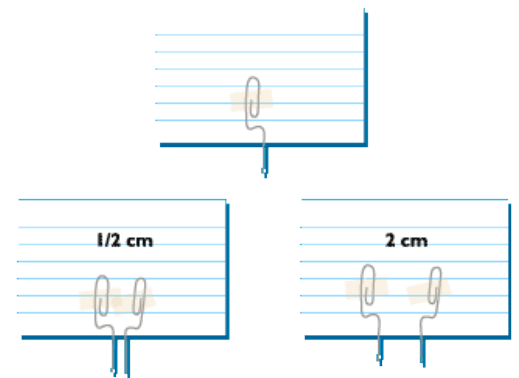
**Procedure:**

1. Unbend 5 paperclips and tape them to index cards making sure that the unbent point sticks out at least 1/2" over the edge of the card.
2. Make one card with just one paperclip, one card with two paper clips spaced 1/2 centimeter apart and one card with two paperclips spaced 2 centimeters apart.
4. Draw a chart for recording your results. In separate rows along the left side of your paper, write "upper arm", "forearm", "palm", and "fingertips". Across the top of your paper make two columns for each person. Above the left column for each person write the name and "right". Above the right column for each person write the name and "wrong".
5. Close your eyes while your partner gently touches your arm with one of the cards. Guess whether the card has one or two points.
6. Your partner will record whether each guess is either right or wrong.
7. Repeat the experiment on your lower arm, palm and fingertip.
8. When your arm is done, switch roles and test your friend's arm.
9. Compare your results. Which part of your arm felt more sensitive to touch while you were doing the experiment? Were you both more sensitive in the same parts of your arms?

**Extension Exercise:**

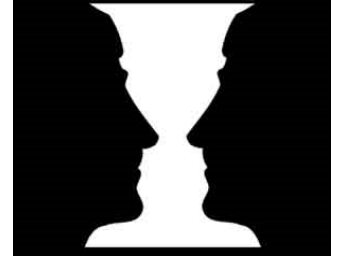
Have the students use their data to draw a map to make it easier to see which parts of their arms were more sensitive than others.

They can trace around their arms to make an outline for their maps, and create a color-coding system to illustrate sensitivity.



### FACE OR VASE?

What do you see? A face or a vase? This type of figure was first illustrated by a psychologist named Edgar Rubin in 1915. It is very difficult to see both the faces and the vase at the same time. This happens because it is difficult for our eyes to focus on the foreground and background of an image at the same time. Which do you see?



### FIND YOUR BLIND SPOT

Even people with perfect vision have a blind spot.

The blind spot is the area on the retina that lacks receptors that respond to light. An image that falls on this region will NOT be seen. It is in this region that the optic nerve exits the eye on its way to the brain. Find your blind spot by looking at the image below.

1. Close your right eye. Hold the image about 20 inches away.
2. With your left eye, look at the +. Slowly bring the image (or move your head) closer while looking at the +. At a certain distance, the dot will disappear from sight...this is when the dot falls on the blind spot of your retina. Reverse the process. Close your left eye and look at the dot with your right eye. Move the image slowly closer to you and the + should disappear.



### DEPTH PERCEPTION

How does depth perception work? How does it help us see better?

Of the five senses, we rely most heavily on our sense of sight to collect information about the world. We use it to recognize shape, movement, distance and color. Seeing with two eyes rather than one is called “binocular vision”, and it allows us to understand depth and three dimension. Have a friend help you with an experiment.

#### **Procedure**

1. You are going to conduct an experiment examining how single vision differs from “binocular vision”. How do you think the loss of sight in one eye will affect the subject’s ability to perceive depth and distance?
2. Write your prediction out on a sheet of paper.
3. Have the subject (your partner) sit in a chair. Have them cover one eye with an eye patch or their hand.
4. Stand about 2 feet away holding a cup, hold a paper clip or a penny about two feet above the cup and move it slowly from front to back.
5. Have the subject say “drop it” when they believe that the object is directly over the cup.
6. Repeat the procedure three times.
7. Write down the number of times the object went into the cup out of the three trials.
8. Repeat the trial with both eyes open and record the results.
9. Now move ten feet away from the Subject and repeat the experiment.

#### **Observation**

Write down any other interesting things you noticed while doing this experiment. Was your prediction accurate?

## LEARN MORE ONLINE

[kidshealth.org/kid/htbw/brain.html](http://kidshealth.org/kid/htbw/brain.html)  
(Information about the brain and its functions)

[kids.niehs.nih.gov/braint.htm](http://kids.niehs.nih.gov/braint.htm)  
(brain teasers and explanations)

[faculty.washington.edu/chudler/interr.html](http://faculty.washington.edu/chudler/interr.html)  
(neuroscience for kids)

[sandlotscience.com/](http://sandlotscience.com/)  
(online optical illusions)

<http://www.lumosity.com/brain-games>  
(online brain games)

[scilearn.com/resources/classroom-resources](http://scilearn.com/resources/classroom-resources)  
(additional classroom resources)

[educationworld.com/a\\_lesson/lesson/lesson183.shtml](http://educationworld.com/a_lesson/lesson/lesson183.shtml)  
(activities to teach the five senses)

[pbskids.org/zoom/activities/sci](http://pbskids.org/zoom/activities/sci)  
(science experiments for kids to do at home)

[uwtv.org/programs/displayevent.aspx?rID=4909](http://uwtv.org/programs/displayevent.aspx?rID=4909)  
(a 30-minute streaming video about the brain with students)

# POST SHOW WORKSHOP

## Science Tableau

(To be led by T2 Teaching Artists)

Count off into groups of 5-7

Before jumping into the poem, the teaching artist will teach the basics of tableau. Introduce the idea of tableau as a frozen picture that tells a story. Compare it to an illustration in a story book. Explain that the picture is frozen in action, so like a statue in a museum. Advise the students to use different levels which will help it look active and dynamic.

These steps are very important and key in making tableaus with limited time. Write them somewhere visible to all if you can.

1. What am I making?
2. What parts do we need?
3. What part will I play?

Before diving into the poem, the students practice making tableaus. Practice in this order: bicycle (object,) roller coaster (object, people, point of view,) and Injustice (abstract, idea.)

### Tableau One

3-Minute Challenge

Each small group makes a tableau after the passage below is read aloud. Read it twice.

One of the most amazing endeavors man has ever undertaken is the exploration of space. A big part of the amazement is the complexity. Space exploration is complicated because there are so many problems to solve and obstacles to overcome. You have things like:

- The vacuum of space
- Heat management problems
- The difficulty of re-entry
- Orbital mechanics
- Micrometeorites and space debris
- Cosmic and solar radiation
- The logistics of having restroom facilities in a weightless environment

But the biggest problem of all is harnessing enough energy simply to get a spaceship off the ground. That is where rocket engines come in.

### Tableau Two

5-minute challenge

Give each group 1-2 stanzas (depending of the size of the group) in the order the groups (1-8.) The small groups will read their stanzas together aloud and analyze before jumping into creation. Keep reminding the whole group to follow the order of the essential questions from above. Encourage them to rehearse!

At four minutes add one more step: the groups give their tableaus a title. Now they need to practice saying the title in unison in a full voice.

The groups take turns making tableaus in the order of the poem. The teaching artist will say "in 5,4,3,2,1...Title- GO!"

Tables Turned  
by William Wordsworth

1.  
Up! up! my Friend, and quit your books;  
Or surely you'll grow double:  
Up! up! my Friend, and clear your looks;  
Why all this toil and trouble?

2.  
The sun above the mountain's head,  
A freshening lustre mellow  
Through all the long green fields has spread,  
His first sweet evening yellow.

3.  
Books! 'tis a dull and endless strife:  
Come, hear the woodland linnet,  
How sweet his music! on my life,  
There's more of wisdom in it.

4.  
And hark! how blithe the throstle sings!  
He, too, is no mean preacher:  
Come forth into the light of things,  
Let Nature be your teacher.

5.  
She has a world of ready wealth,  
Our minds and hearts to bless—  
Spontaneous wisdom breathed by health,  
Truth breathed by cheerfulness.

6.  
One impulse from a vernal wood  
May teach you more of man,  
Of moral evil and of good,  
Than all the sages can.

7.  
Sweet is the lore which Nature brings;  
Our meddling intellect  
Mis-shapes the beauteous forms of things:—  
We murder to dissect.

8.  
Enough of Science and of Art;  
Close up those barren leaves;  
Come forth, and bring with you a heart  
That watches and receives.

Reflection: Experiential knowledge, observation, science is everything. We are in science, we are science.