

## **Exhibits**



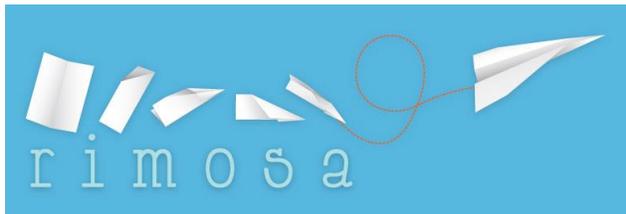
### **1. Zoetrope**

*Dimensions:* 3 feet by 3 feet by 30 inches high

*Description:* Invented in the mid 19<sup>th</sup> Century by Eadward James Muybridge, Zoetropes were precursors to modern films. They were essentially spinning drums with slits that allowed the viewer to observe the subtly changing images inside, allowing the images to appear, to the observer, to run together and effectively become “animated”.

Using the sheets of paper and provided, visitors can draw their own series of changing images, then place it in the zoetrope and use their muscles to set it spinning and start their creation moving!

*Concepts:* This exhibit makes use of the concept of “persistence of vision” – a term given to how the eye and brain work together to enable you to see, and how they also can be manipulated to enable you to see what isn’t really there (ie, a series of still images becoming a single animated feature)

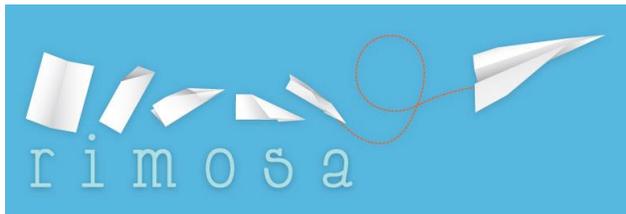


## 2. Flight Tube

*Dimensions:* 3 feet by 3 feet by 6 feet high

*Description:* Flight Tube allows visitors to experiment with the movement of items in turbulent air. The vertical air stream is generated by a large -carefully screened in- fan at the base of the exhibit, and directed upwards through a large, clear plastic tube. A variety of objects may be tossed in the open top or fed in through a space at the bottom and watched as it spins, floats, sinks or flies in the wind. Foam tinker-toys, cardboard tubes, paper cups, simple paper helicopters, ribbons and more create mesmerizing patterns as they move in the air. Visitors can also alter their materials with scissors, by folding or by joining pieces together to continuously experiment with different shapes, weights or sizes.

*Concepts:* This exhibit is a crowd favorite! Children and adults of all ages use their creativity and wonder as they create things that fly, spin, twist and dance.

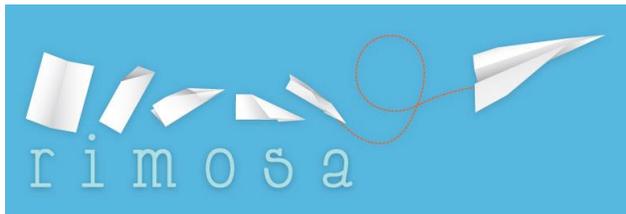


### 3. Wooden Wave

*Dimensions:* 3 feet by 3 feet by 30 inches high

*Description:* This exhibit looks a bit like a wooden xylophone. It consists of a box with a top made of beautiful wooden slats. Visitors twist one, or both, handles on the front of the box to make the slats undulate in a variety of waves. Visitors can look through one of two plexi windows, or pull the slats up one by one to see the mechanism of off-center cogs on two shafts that make these solid wooden pieces appear fluid.

*Concepts:* Although none of these concepts are explicitly stated, the inspiration behind this exhibit was the nature of wave motion – that even though it may look as if a wave is moving across the box towards you, the actual wooden pieces are moving only up and down – not horizontally. Some visitors try to make the wave come straight towards them through careful manipulation of the two handles – it's a bit like an etch-a-sketch. Others place balls or other materials on the top and make up games with their own rules.

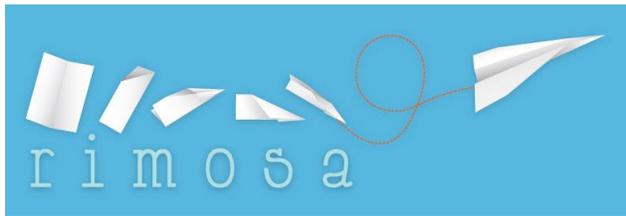


#### 4. Rainbow Drums

*Dimensions:* 3 feet by 3 feet by 3 feet high (at highest point)

*Description:* This exhibit consists of nine clear acrylic tubes ranging in height from 12 inches to 36 inches. These tubes are arranged in a circle on a sturdy 3' by 3' by 12" platform. Each tube has a few inches of colored water in the bottom, and large, multicolored flip-flops scattered around the outside. Visitors smack the tubes over their tops with the rubbery flip-flops to create a pleasing sound. For those who look closely, the action also creates ripples in the water at the tubes' bottoms.

*Concepts:* The inspiration behind this exhibit was "Blue Man Group" (who hasn't wanted to hit those drums and make paint fly!) although we tried to make it a bit tidier for mass consumption. We like the idea of multiple people using this exhibit at the same time to create new songs. One could also, if one wished, get into the science of sound waves and notice how the amount of air space in each tube effects the note it produces.

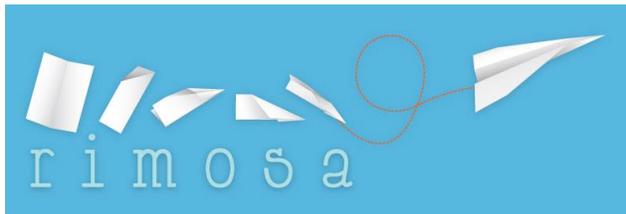


## 5. Sand Table

*Dimensions:* 3 feet by 3 feet by 30 inches high

*Description:* This exhibit is incredibly simple, yet mesmerizing. It consists primarily of a board with holes drilled through it, and deeply colored sand to pour through it. The board fits into a slot in the sand table so that when sand is poured onto it, visitors can look through a window below to see the sand fall, and pull the board up to see the pattern the falling sand made below. The table has spaces for two boards, and an additional two boards with different patterns of holes and lines that can be switched out. Measuring cups and large paint brushes lie in the sand table for whatever use someone may have for it.

*Concepts:* The designers were inspired by sand going through a sieve. It is a really simple concept – yet our evaluations from FooFest and Waterfire indicate that the sand table is the crowd favorite!

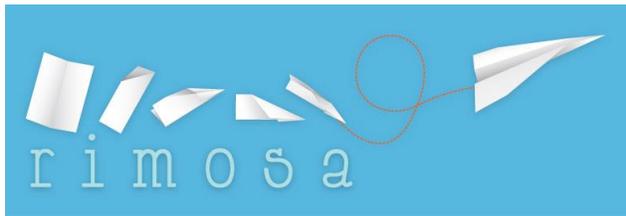


## 6. Magnetic Poetry

*Dimensions:* two panels, each 18 inches by 18 inches by 78 inches high

*Description:* This exhibit consists of a brightly painted magnetic wall, and large pieces of magnetic poetry. The magnetic walls are very lightweight, and are also tall and thin, so they will need to be attached to the wall, or to a heavy bookcase. This exhibit has successfully been shown at the Exeter Public Library and other public venues. We bring screws and mounting thread and will fix the exhibit in place.

*Concepts:* The designers wanted a place for literacy and creative synthesis of the art/science concepts in our other exhibits. This was a place to emphasize the fact that both science and art require communication.

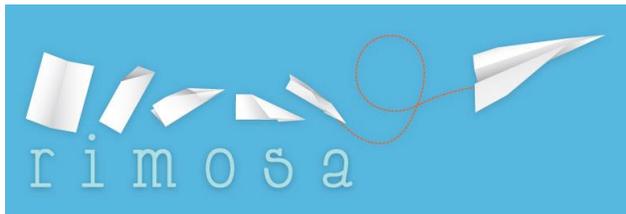


## 7. Light Pendulum

*Dimensions:* 3 feet by 3 feet by 40 inches high

*Description:* This exhibit consists of a low table, coated with photosensitive paint. Above the table, suspended by a copper frame, is a pendulum made from a flashlight with a uv bulb. Visitors must crank a hand-powered generator to recharge the flashlight. As the pendulum is set in motion, it describes its path in glowing green light on the table. The older parts of the path slowly fade away as the pendulum moves on. A black cloth hood over the top part of the copper frame helps keep ambient light at bay, so the images made in light are clearer.

*Concepts:* The designers were inspired by the intricate patterns inscribed by pendulums in sand – but we wanted something less messy and with an easier re-set! The light adds a “wow” factor of coolness as well. We recommend that this exhibit is places away from direct sunlight, and in as dim a place as possible.

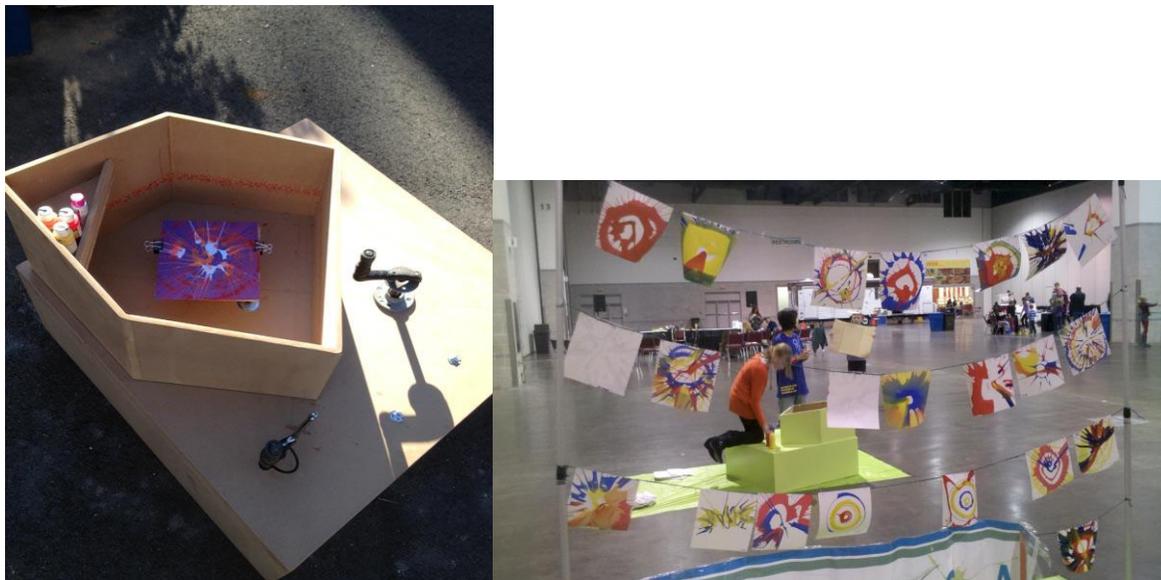
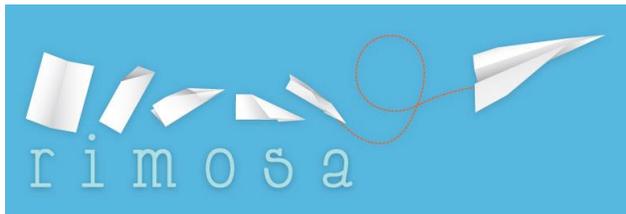


## 8. Gear Table

*Dimensions:* 6 feet by 3 feet by 5 feet high

*Description:* This exhibit consists of a 6' x 3' table, with an approximately 2.5' high back. Both the horizontal and vertical surface of the table are covered with metal, to which the magnet-tipped posts of gears of varying sizes stick. Some gears are permanently stuck to the surface and when spun, they have a pay-off (they move an accordion which makes music, or hit a bell, or cause optical illusions to spin). The goal is to move the magnetically attached gears so they interlock with the payoff gears and by turning one, you can cause more gears to spin.

*Concepts:* The designers were inspired by the movement of gears – how different sizes move at different rotational speeds and how linked gears move in opposite directions.

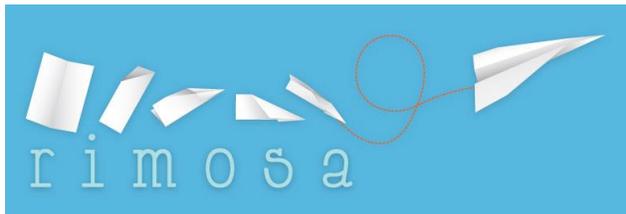


9. **Spin Art** [Unpainted on left. Painted “RIMOSA Green” and in use – with some examples hanging in foreground - at Bright Night 2012 on right]

*Dimensions:* 3 feet by 3 feet by ~24 inches high

*Description:* This exhibit was constructed from a bicycle (which can still be seen underneath if the exhibit is lifted). For each visitor, a new piece of paper is attached to the painting platform with alligator clips. Visitors may either squirt paint prior to turning the crank (what used to be the bicycle pedal) to cause the painting platform to spin rapidly, or start the paper spinning and then add paint as it spins. When they are done, they squeeze the hand-brake to stop the spinning and see what paint and centripetal force has created. They are always surprised! The paint is not only different colors, but each color is a different viscosity.

*Concept:* This exhibit takes advantage of the physics of rotation – the paint near the center moved very little and that near the edges is pushed away from the center. Additionally, different viscosities of paint move at different speeds. Although very simple in concept, when tested with local 7<sup>th</sup> and 8<sup>th</sup> graders, it was very popular. Each of the students reported that they were surprised by the motion of the paint (that it moved AT ALL). It became apparent that the toys and hands-on experiences with which many of us grew up are missing in today’s youth.



### 10. Naked Piano (background)

*Dimensions:* 55-60 inches long, 20-25 inches deep, ~45 inches high

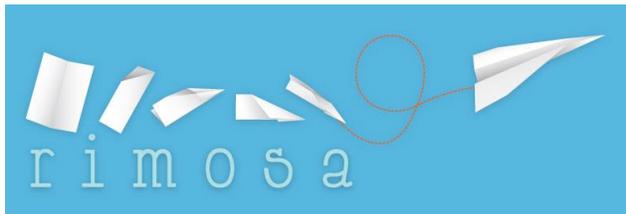
*Description:* This working, upright piano has had the covers removed so that visitors may see the intricate, mechanical inner workings as they press the keys, use the foot pedals or play a tune.

*Concept:* The combination of music with mechanics and demystification of a common instrument - including a "behind the scenes" feeling - is very compelling.

### 11. Cloth Wave (middle ground)

*Dimensions:* Center box - 3 feet by 3 feet by 30 inches high. Cloths - roughly 6 feet by 24 inches each. This may be displayed with all cloths attached, or any of the cloths may be removed to make a more streamlined exhibit.

*Description:* This exhibit is most effective and popular with large numbers of visitors present. Although there are no instructions (allowing for a number of games to be invented), visitors tend to place the three 5" diameter soft, cloth balls onto the cloths and, by lifting the end of the cloth rapidly up and down to make a wave, try to bump the ball into the center box. Some just see how high they can bounce the balls. Some simply like to look at the waves. In anticipation of visitors trying to sit on the cloth - each cloth is attached to the center box with Velcro. Too strong a pull on it will cause it to simply come off. Visitors then have the opportunity to do some quick problem solving and put it back together themselves!



*Concept:* This exhibit was part of the Transfer of Energy suite, an intended to show how energy can move from visitor, to cloth, to ball (and then originally the balls were supposed to hit chimes suspended from the ceiling to transfer the energy from motion to sound). We also see it as an exercise in creativity (what game can they invent with these balls and cloths) as well as gross muscle activity.

### **12. NOT Pictured: Bubble Wall**

*Dimensions:* 5 feet by 30" feet by 6 feet high.

*Description:* Designed from plans purchased from the San Francisco Exploratorium, our bubble wall is an exact copy of theirs. Visitors hoist a roughly 60 inch pvc bar out of a trough of soap solution to create a large (5 feet square) wall of bubble film swirling with color, as bubbles do. Visitors can blow gently to distort the wall and have it snap back when they cease.

*Concept:* This exhibit can be used to discuss surface tension, optics, nanscale science (the swirling colors are due to interference of light waves reflected by the "front wall" and "back wall" of the thin film which makes up bubbles, nanometers thick.) But it's really just fun to play with.