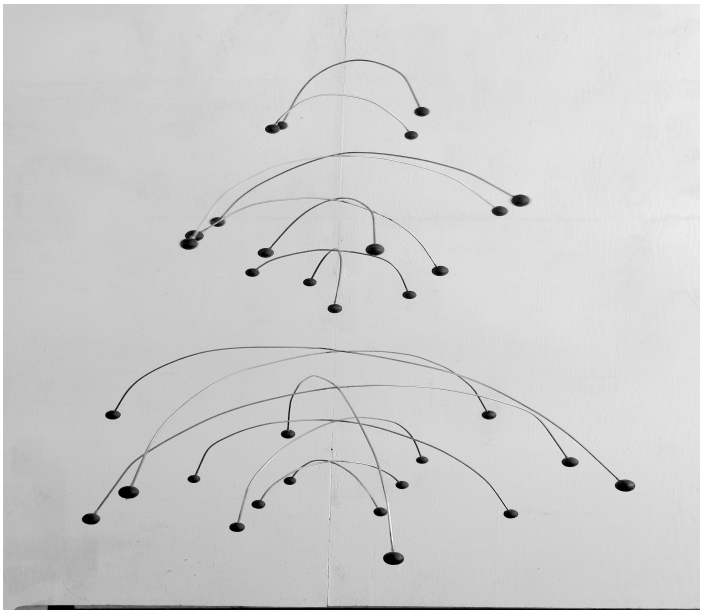

# Mobiles and Balancing Toys

Mobiles are a readily recognized artifact found in various environments from baby cribs to atriums of large buildings and art museums. They have an intrinsic appeal. A close cousin to the mobiles is various kinds of balancing toys. Alexander Calder was a creator of both types. They appeal to people of all ages and offer a rich opportunity for exploration in both art and science.

In the outline of the activities I suggest starting off by making a cardboard model of a human body. This could be done in art class and the model decorated. In science students systematically manipulate this model to see how the orientation of the model changes as the arms and legs are moved to different positions. A preliminary discussion begins about how objects such as a human body are balanced. The next activity involves making balancing toys which could be done in the art class. Students can design their own toys. In science these toys are systematically manipulated to further develop an understanding of how objects are balanced.

In the process of exploring and systematically analyzing the various objects, the concept of physical equilibrium can be developed as well as the concept of moment arms.

In art students can move on to designing different kinds of mobiles drawing on these previous experiences with toys. Follow up discussions can focus on what makes particular arrangement more pleasing than others. What does the role of symmetry or broken symmetry play in making it pleasing? Students can study the works of Alexender Calder which can be found on the internet.

Possible Materials: cardboard, nails, string and a few other simple materials.
The science activities mentioned are described in greater detail in the curriculum guide: *Mobiles and Balancing Toys* from the Curriculum project Models in Technology and Science available from Kelvin,berniezubrowski.

| ART | SCIENCE |
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| **Balancing a Model of a Human Body**<br><br>The same cardboard model constructed in science can be manipulated into different positions placing the arms, legs and head in different positions. Students can be challenged to arrange these appendages so that they express different kinds of movement. They can be decorated and made into a life size doll. | **Balancing a Model of a Human Body**<br><br>A cardboard model is constructed and manipulated to find out how it balances horizontally and vertically. |
| | **Balancing different kinds of objects**<br>Students are challenged to balance different kinds of cardboard shapes such as triangles, squares, rectangles. |
| | A preliminary follow up discussion focuses on how these objects are balanced vertically or horizontally. |
| **Balancing Toys**<br>Students are challenged to make toys in the shape of a human body that balance on a point and express different emotions. Or, they can create small models of circus performers who have balancing in their acts. | **Experimenting with a Mobile**<br>A simple symmetrical mobile is systematically explored where different parts are moved around and weights are added to see how this effects the horizontal balancing. |
| **A Simple Mobile**<br>A simple symmetrical mobile is constructed using either a horizontal piece of cardboard or thin dowels. This is a type of mobile that has several levels of different lengths.<br>Next, they make a simple symmetrical mobile using shapes and designs that they create from their own imagination. | |

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| **Other kinds of Mobiles**<br>An asymmetrical mobile is constructed using narrow rectangular pieces. Students can come up with variations of mobiles that look and move differently than the simple symmetrical mobile.<br><br>**Alexander Calder**<br>Some of the mobiles of Alexander Calder can be presented from the internet or from books about him. Students can compare and contrast different kinds of mobiles; They can try to articulate why a particular one appeals to them. What are ways that Calder varies the arrangement of objects on the mobiles? | **Experimenting with a More Complex Mobile**<br>An asymmetrical mobile is systematically explored to discover what happens when the different parts are moved around.<br><br>**A simple balance**<br>Students use a simple balance to systematically explore how hanging different number of weights on different places of the balance can result in the beam remaining horizontally balanced.<br>A follow up discussion moves students to formulate some rules about balancing weight on this type of beam. Depending on age of students they can formulate an algebraic formula. |