Making Unique 3D Boxes

By Peter J. Wilson

(this is an excerpt from the upcoming book, ***Unique 3D Box Design and Construction***, coming in early 2017)

Although plenty of things intrigue young students, as they grow older they seem to crave more relevant ideas and subjects. They want to know what they are learning has some meaning. What could be more meaningful than the box from their cereal or macaroni and cheese? I say that in jest, but really, things they may use everyday or week are going to have some meaning. Once students are exposed to thinking about boxes, it is amazing how many they find.

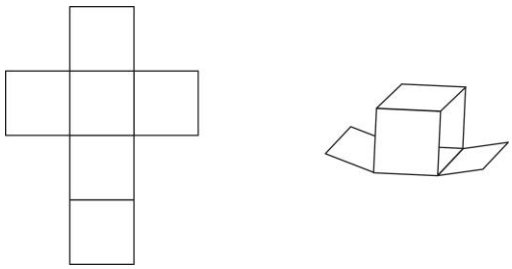
That's why the start of the year starts with the observation of consumer boxes. Bring in almost any box and have a discussion about the creation of that box from one piece of paper. Most kids never have thought about this before. In front of class, I talk about the 3D shape, but then begin to open it and look at the tab inside that most likely is glued to keep it together. Before tearing into the box, I make sure to walk around the room, making sure each student gets a chance to see the tab I'm talking about.

Once all the students have seen the inside, I begin to slowly open the box to let the flat, net shape become visible. It's like opening up a flower to see what's inside. Both the plain inside and the decorated outside are teaching tools. For example, the inside of a box designed as a plain, rectangular prism box has certain features that can be described: folding flaps, sizes of rectangles for sides, all from one piece of paper. The outside has its design elements, such as the photos and text used to get consumer attention. If we look closely, we can see UPC symbols, small print for certain text, and some registers for the printing process. Then there are the sides that are printed upside down compared to others. Why is that? All of these features can be pointed out and discussed.

The main point that emerges though, is that all of these boxes were created by someone who knows math. The math involved in designing a box out of one piece of paper is intense. Each bend, each curve, each tab, each flap, each length was calculated precisely to fit just right, at the cheapest cost to the manufacturer. Someone, or many people, had the job to design the box just right. And that understanding is the start of the box project.

Making a Cube

A cube is a basic shape students are familiar with, as most have used dice in their young lives. So, that is where the process starts. Although a cube is a familiar shape, that doesn't mean students have ever thought of a a cubic box and how it started as a flat net.



Option:

Before the actual box activity, hand out dice to help kids handle the faces of a cube, see the six sides and how they connect to each other.

Notes:

In class, after students understand the process of boxes, they usually start with a rough draft on standard paper. Once the design is approved as correct and workable, students redraw it on card stock, then cut and color, and then connect.

Other questions, please contact Peter Wilson:

Email: imaginactionwi@yahoo.com

Facebook: https://www.facebook.com/mumbojumboandbananapeppers/

Twitter: https://twitter.com/MJandBP

Phone: 414-517-5376

Steps to make a cube:

1. Hand out copies made of the cube net.
2. Mention that this is one way a "net" for a cube can be drawn.
3. Have students write the word "bottom" in the square in the middle of the other four surrounding it (this will then allow them to see that the four squares surrounding the "bottom" square will end up being sides folding up).
4. Ask students, "If those fives squares are the bottom and sides, what is the sixth square then?" (A: top)
5. Before cutting it out, ask students where they think tabs might be to connect different sides.
6. After a discussion on putting tabs onto the shape, demonstrate where they should go, and have students add tabs to their nets.
7. After checking each students tabs, have them each cut around the shape, careful to cut as straight as they can, and not cutting off the newly drawn tabs.
8. After students finish cutting, demonstrate how using a straight-edged ruler on bends can help make them "crisp." This crispness helps define sides to make them connect easier and also makes coloring of different faces easier.
9. As students finish adding bends, they can color whatever side they'd like to be on the outside of the cube when it is folded together (note: depending on the paper used and how you will be connecting the sides – hot glue, double-sided tape, glue stick – coloring tabs may make it harder to keep them connected to their respective sides).
10. Have students connect sides of the cube as it is folded, making sure to use glue guns, tape or glue sticks to connect tabs to the ir corresponding sides (tabs should be placed inside the box so they disappear on the folded box).

Other standard nets:

After making the cube, students may move onto other box designs. There are features to learn about on each new box. As they progress, each new box needs to be more complicated than the last one.

Other standard nets:

After making standard boxes or if students want more creativity, have them "freestyle" creating their own designs. This will take their problem-solving to a new level.