Geometric Nets

Video Script

Scene		Full Transcript
1	**Charday:**	Wow! That's a lot of cardboard! Hi! It's Charday and this morning I'm at Hawkeye Corrugated Box Company. They produce and design boxes for every kind of product imaginable. From these funny looking little boxes to huge boxes big enough to fit a car! I bet you use boxes every day but never stop to think about how they are made. It's all about math. In fact, the construction of boxes relates to a topic in geometry, called nets. They're super cool! I'll show you! And then, we can box up another problem solved.
2	**Voice-Over Charday:**	Here at Hawkeye box, they design the boxes, print the boxes, construct the boxes **and** they ship the boxes! When they're working on a new box for a client, they have to consider several things. First, what the box is used for will determine its shape and dimensions. If it's too big, it will waste materials and cost too much. If it's too small, the product won't fit inside. Sometimes, there are other considerations, such as how the boxes will be displayed and stacked, the size of each face for advertising and the function of the box.
	Charday:	Cereal boxes like this, fit into your hand. You wouldn't want to pour your cereal out of this. See what I mean? Regardless of their size or shape, each box starts out as a pattern or a net. Nets are two-dimensional figures that can be folded into three-dimensional shapes. We can use this box, which is a cube, to make sense of nets.
	Voice-Over Charday:	I have traced each face of this box onto cardboard to show you what the net or pattern looks like. See? Here at Hawkeye box, they use computer programs to design the nets for their boxes. A cube has six square faces. So, the net is made of six squares. Each square shares a side with at least one other square.
	Charday:	Hawkeye has to add tabs to keep the box together. But you get the idea!
3	**Voice-Over Charday:**	Here's a pattern for the cube I just folded. See how it comes together? Here is another net for a cube. Try to visualize how it will fold. Check out this one! Try to visualize how **it** will fold. However, not every arrangement of six squares can be folded into a cube. Try

		to visualize what happens when you fold this. It doesn't work! That's a problem.
	Charday:	Most boxes are not cubes, they're rectangular prisms. Lets consider four important factors when working with rectangular prisms. The net must have the same number of rectangles as faces on the prism. For example, this prism has six rectangular faces. One, two, three, four, five and six. Got that? Now look at this pattern.
4	**Voice-Over Charday:**	Is it a net for a rectangular prism? No. There are only five faces so it won't work. When you fold it, one end is missing.
	Charday:	The net for rectangular prisms must have three pairs of congruent rectangles. The top and the bottom are congruent or exactly the same size and shape. The front and the back are congruent and the two ends are congruent. Here they are on the net. How about this pattern? It only has two pairs of congruent rectangles.
5	**Voice-Over Charday:**	These two rectangles are not the same size and shape. When you try to fold it, you get this. It doesn't quite work.
	Charday:	Here's another thing to remember about rectangular prisms. When they're folded, the congruent rectangles are opposite faces.
	Voice-over Charday:	Remember, the top and the bottom, the front and the back and the two ends. This looks like a net for a rectangular prism. It has six faces and three pairs of congruent faces but won't work because one of the two congruent rectangles is not in the correct position. This is what you get; it's not a net either.
6	**Charday:**	You also need to pay attention to the edges. Let me show you another pattern!
	Voice-Over Charday:	There are three pairs of congruent rectangles and it looks like the congruent rectangles will be opposite each other when folded. But can you tell what's wrong? Look at these edges. When the pattern is folded, these edges just don't match.
	Charday:	That's the fourth key point to working with nets for rectangular prisms. When folded, connecting edges must be the same length. There are many different nets that **could** work for rectangular prisms but sometimes the nets can be a

little complicated. It's important to be able to visualize how they will fold.

Voice-Over Charday: This is a net for a rectangular prism. Will it still fold into a rectangular prism if we move these two faces? Try to visualize it. It does! If you move one face back to the original position the net still folds correctly!

Visualize what would happen if we move and rotate one face. The net still folds into a rectangular prism.

Charday: Today we've looked at cubes and rectangular prisms. But, any three dimensional shape or box has a net. It's important to be able to visualize folding nets to help you put a lid on geometry. Problem solved.

I wonder what the nets for these look like!