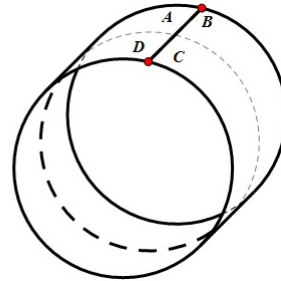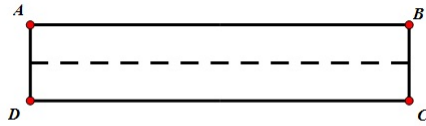# CHAMP Activity: The Möbius Band & Confused Ants

October 20, 2014
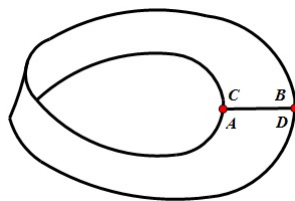
Part 1: How many sides?

Question 1: (with the whole class) How many sides are there on a piece of paper?

Question 2: (with the whole class) How many sides does a band without twists have?
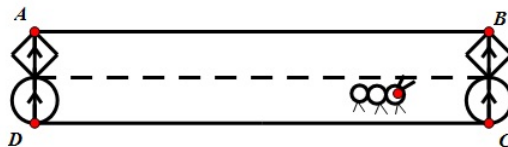
Instructions (Möbius Band!): To get a Möbius band, connect the opposite ends of a strip of paper, but twist one of the ends half way, then tape these ends together (use the strip with no lines).

Question 3: How many sides do you think the Möbius band has? Show your answer by drawing a line down the middle like we did with the regular band.
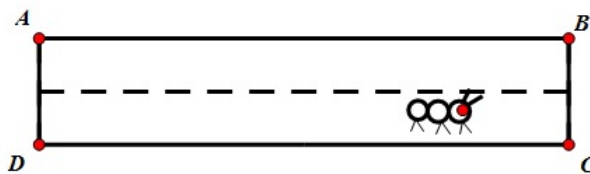
Part 2: Cutting the Möbius Band and Following the Ant

Question 1: (with the whole class) What happens when we cut the regular band down the middle line?

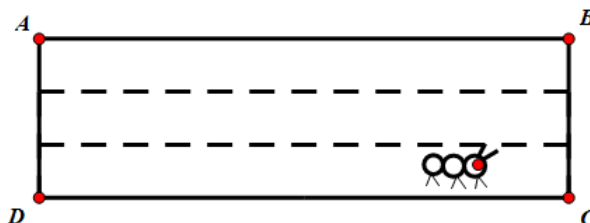**Question 2:** What happens if we cut the Möbius band down the middle line?

1. Take a lucky guess at what happens:

2. Try to use the ant and draw the portals to figure out what will happen:

3. Actually cut the Möbius Band!

Question 3: What happens if we cut the Möbius band into thirds (how many pieces do we get)?

1. Take a lucky guess again:

2. Try to use the ant and draw the portals again, but this time, there are three "lanes" for the ant to be in!
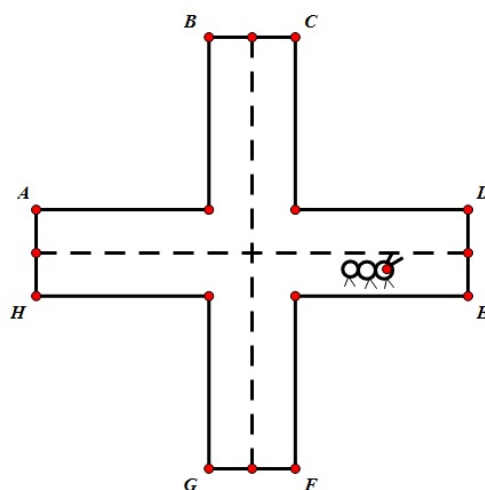

3. Actually cut the Möbius band into thirds (use the strip with lines already drawn).

The Ant Stuck on a Crossroads

Instructions 1: Take one of the crossroads you were given and connect the opposite ends: one pair with no twists and the other with a single half twist (like a Möbius band).
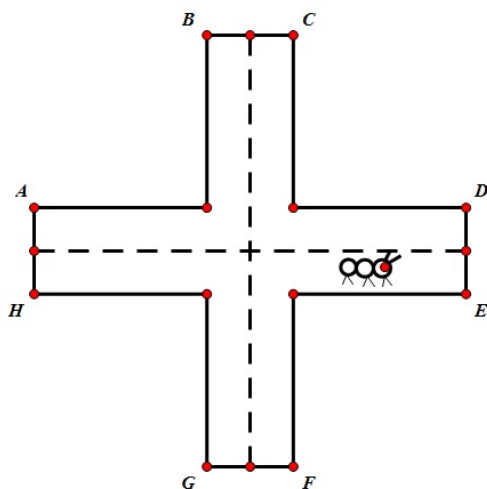
Question 1: What would happen if you cut down the middle of each loop?

1. Guess:

2. Where does the ant go? (Draw the Portals $\longrightarrow$)

3. Actually cut the twisted cross-roads!

Instructions 1: Take one of the crossroads you were given and connect the opposite ends with a half twist (both like a Möbius strip).

Question 1: What would happen if you cut down the middle of each loop?

1. Guess:

2. Where does the ant go? (Draw the Portals $\longleftarrow$)

3. Actually cut the twisted cross-roads!