Martin has created an irrigation system to water the fields in his farm. The water flows from a lake at the top of the hill all the way down to six fields numbered 1 to 6 at the bottom. Along the water canals, Martin has installed four water gates (A, B, C, and D), where he can direct the water to flow either to the left or to the right, but not in both directions.

An example showing how these gates can be set to have the water flow to fields 1, 2, 5, and 6 is shown below.

**Problem 1:** Explain how Martin can set the water gates so that water flows to fields 2, 3, and 4.

*Want to check your answer? Use this online exploration to set each gate and see if you are correct.*

**Problem 2:** Martin wants to set the gates so that water flows to fields 2, 3, 5, and 6.

(a) Explain why this is not possible based on how the farm is currently set up.

(b) Explain how the water canals in the farm can be adjusted in order to make this possible.

   i. Can you achieve this by removing one existing canal from the irrigation system?
   
   ii. Can you achieve this by adding one new canal to the irrigation system?

*Do these changes affect your solution to Problem 1?*

**More Info:**

Check out the CEMC at Home webpage on Thursday, April 24 for solutions to Go with the Flow.

A variation of this problem appeared on a past Beaver Computing Challenge (BCC). The BCC is a problem solving contest with a focus on computational and logical thinking.