

Name:

Date:

Class:

## KWL Chart and Design Guide

**ASK:** How can we, as materials scientists, model atomic scale designs for hardware for next-generation computers?

Use the KWL chart below to work independently or with your team to clarify what you already know about computer technologies, memristors, and the use of computer simulations to design models.

Know	Want to Know	Learned

**RESEARCH:** Read the information provided about memristors and computer simulations. Use the space below to record your notes. If you have extra time, you can use reliable internet resources to perform further research and learn more.

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# IMAGINE & PLAN: Memristor Model Plan Sketch

Your model should show the atomic scale structure of a material that can act as a memristor, where the configuration of the atoms inside is what determines the rate of signal transmission. In your model, the time it takes the marble to go down the ramp represents the signal transmission rate.

Your initial desired signal transmission rate is \_\_\_\_\_ seconds (+/- 0.5 seconds).

Examine the materials available for construction, then sketch your plan here: **Label all materials.**

Top of Ramp ..... Bottom of Ramp

PREDICT: Draw an arrow to predict the path that the electron "signal (marble) will take.

## TEST

Set up your model on the testing station in the classroom. Use the timer to measure the amount of time needed for the marble to travel down the ramp, simulating the signal transmission. Perform three trials, record your results, and then determine your average signal transmission time:

	Trial 1	Trial 2	Trial 3	Average
Time (sec)				

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## IMPROVE

**Discuss as a team:** Was your time too high? Too low? What could you change to make your model fit the desired criteria more closely (smaller size or marble time closer to the specified desired time)? ***Adjust your design based on your new plan. Update your sketch above.***