Student Worksheet

Scanning Probe Microscopy (SPM)

Make a Prediction

1. We cannot see items on the nano scale with an optical microscope. How would we figure out the shape of something that we cannot see.

_____

_____

_____

Procedure
1. Take a piece of paper and pen.
2. Stand in front of each box, place your hand, cotton swab, or bamboo skewer into the box and scan its bottom surface.
3. On the table on page 2, draw a picture of what you think the bottom surface of each box looks like.
4. What do you think each object is? Record your answer in the table.
5. What do your group members think each object is? Record your answer in the table.

Record Your Observations
Draw a picture of the object in each box. Write what you think it is. Write what other students think it is.

SPM Box Observations

	Your Drawing	What You Think It Is	What Others Think It Is
Box 1			
Box 2			
Box 3			
Box 4			
Box 5			
Box 6			

NNIN Document: NNIN-1112

Rev: 12/07

Analyze the Results

1. Were you able to identify the objects in the SPM boxes?

    _____

    _____

2. Was it as easy or difficult as you expected? Explain.

    _____

    _____

    _____

    _____

3. Can you think of possible problems that might arise when trying to use a real SPM to "observe" something at the nanoscale?

    _____

    _____

    _____

4. What will be the smallest feature that you can identify with the tools you have been using?

    _____

    _____

    _____

5. Which part of an SPM system does the box, your finger (or swab or skewer), represent in this model?

    _____

    _____

    _____

6. Can we use such method to identify nanoscale objects?

_____

_____

_____

Draw Conclusions

7. Think of three other kinds of tips you could use to probe objects in the SPM boxes. Choose the one that you think would do the job best. Try it out. Did it improve your results? Why or why not?

_____

_____

_____

_____

_____