Name: _____Date:_____Class:_____

Student Worksheet 1
Laser Box

Safety

Never shine a laser into a person's eyes, as permanent damage may occur. Always keep the laser on the desktop and only shine the beam into the box.

Introduction

The number of transistors on integrated circuits, which form the basis of computer hardware, have doubled every year since the 1970's, and continue to increase. In 2012, the highest transistor count in a commercially available CPU was more than 2.5 billion transistors. Modern computer chips contain parts that are too small to see even with a microscope. These parts occur on the nanoscale – 1to 100 nm. How do you design and build something that you cannot even see? How do you know you have built anything? This lab will help you to understand some of the challenges that are faced by people trying to study nanoscale "things" they cannot see, and allow you to find creative ways of overcoming this obstacle.

Materials:
- a "black" box
- a mounted laser pointer
- graph paper
- pen or pencil
- ruler

Question: What is inside of the box?

Procedure

1. Lay graph paper on the table next to the output and the input sides of the box. Record the relative position of the graph paper in relation to the box.
2. Place your laser so that it shines through a gap in the input side.
3. Record on the graph paper where the laser entered the box, and where it exited the box.
4. Move the laser around to different positions, and continue to record observations on the graph paper.
5. In the box above, draw the different patterns that you have observed on the "output" side of the box. Label the position of the different patterns. See the example below.

Example answer:

1 inch from left. 3 dots.

3 inches from left. Tall oval.

7 inches from left. 3 stacked ovals.

10 inches from left. Normal dot.

6. Determine what materials are in the box, and exactly where they are located. Use this information to complete the diagram of the inside of the box on the back of this worksheet.

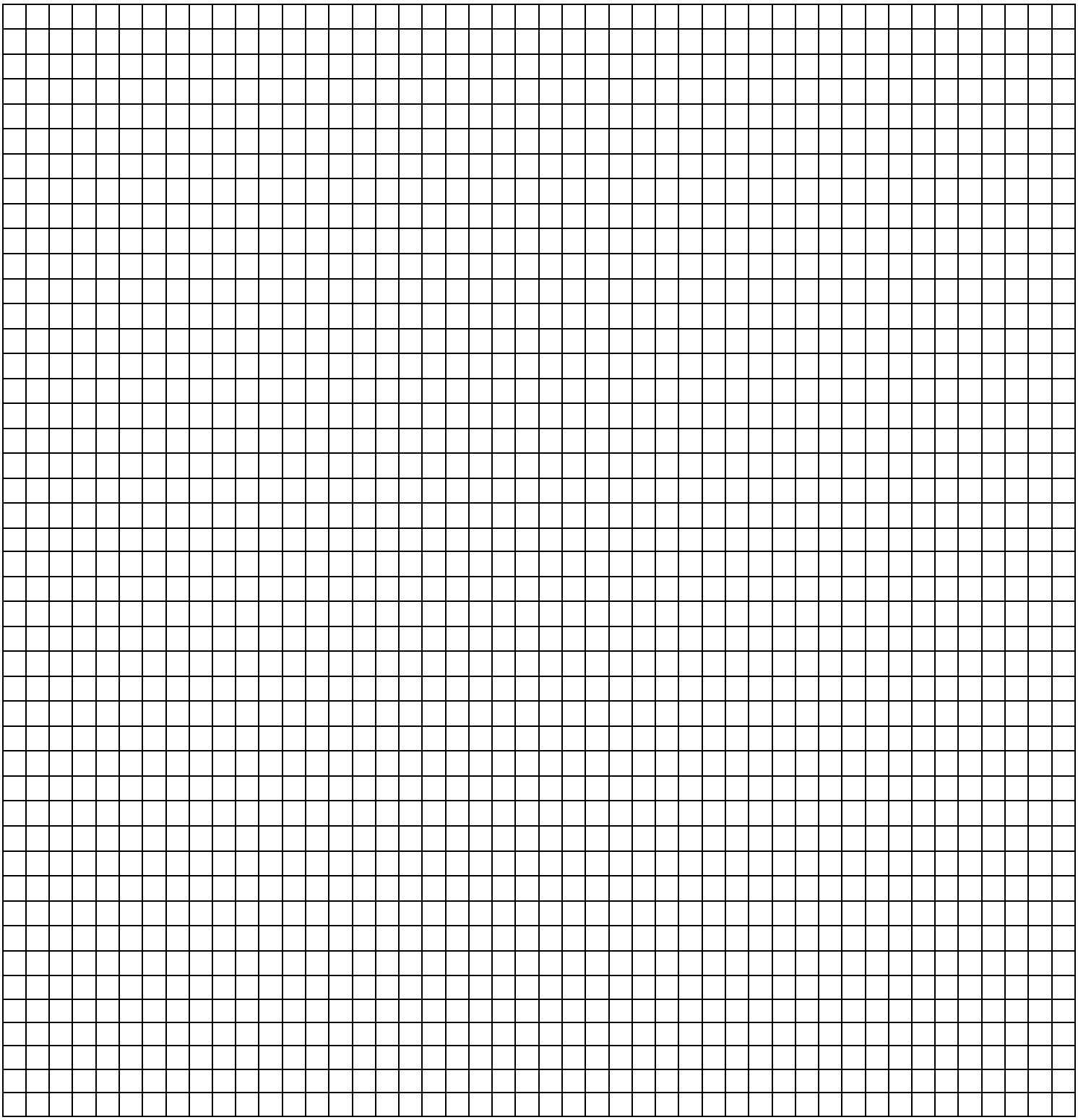
*Development and distribution partially funded by the **National Science Foundation***

NNIN Document: NNIN-1346

Rev 08/2013

In the grid below, draw all of the objects that you think are in the box. Be sure to label each object, and put it in the position you expect it to be in. Each square on the drawing represents a square centimeter.

Input **Output**



*Development and distribution partially funded by the **National Science Foundation***

NNIN Document: NNIN 1346

Rev 08/2013