

## Laser Maze Activity

### **Challenge**

Science North is interested in hiring a new security team to develop a protective laser system for their rare gem collection. This collection has eight rare gems and the extremely valuable “Oppenheimer Blue” Diamond, the world’s largest blue diamond.

To help you plan their exhibit hall, Science North has created a layout of their exhibit hall (step 2). The hall is 26m by 34m and broken into 9 sections. In order to best display the Oppenheimer Blue, it must be located in the center section.

To build the rest of the security system, Science North has asked you meet the following requirements:

- There cannot be more than two gems per section. Otherwise where they go is up to you.
- To protect a gem, the laser must block a burglar’s path to it from any of the doors or windows. Use the walls and lasers to adequately surround each diamond exhibit.
- The start of the laser can be placed on any of the walls.
- The laser must end at a sensor which can be placed on any of the walls
- You can use as many mirrors as you need however you will get one point for using 9 or fewer mirrors
- Using a concave mirror will increase your score by 2 points

**The team with the best score will be hired by Science North to create their security System.**

### **Step 1: Company Creation**

Use the provided space to create your company that will be working with Science North.

Company Logo	Company Name:
	Company Slogan:

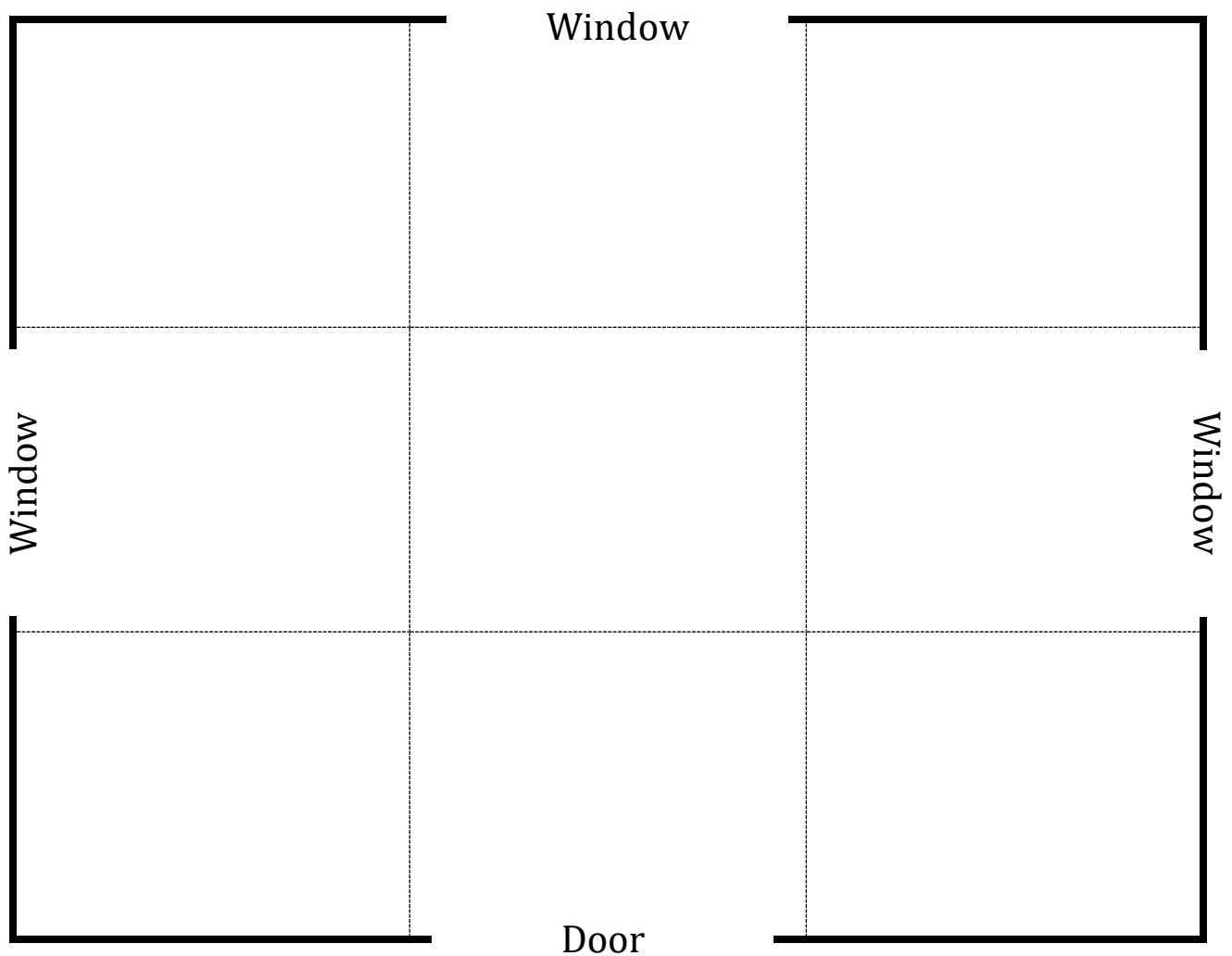
**Step 2: Planning**

Use the following schematic to determine the placement of your **laser**, **sensor**, **8 gems**, and **Oppenheimer Blue Diamond**. Lightly draw these using pencil.

Use a pencil to lightly trace where you think the laser beam will travel. Use a protractor to make sure that the angle of incidence equals the angle of reflection.

Once you are confident with your plan, use a coloured pencil or marker to indicate the location of the laser, sensor, gems and diamond as well as the path of the laser rays.

**Note:** The schematic is 13cm x 17cm. The actual exhibit hall that you'll be building a model of is 26m x 34m.



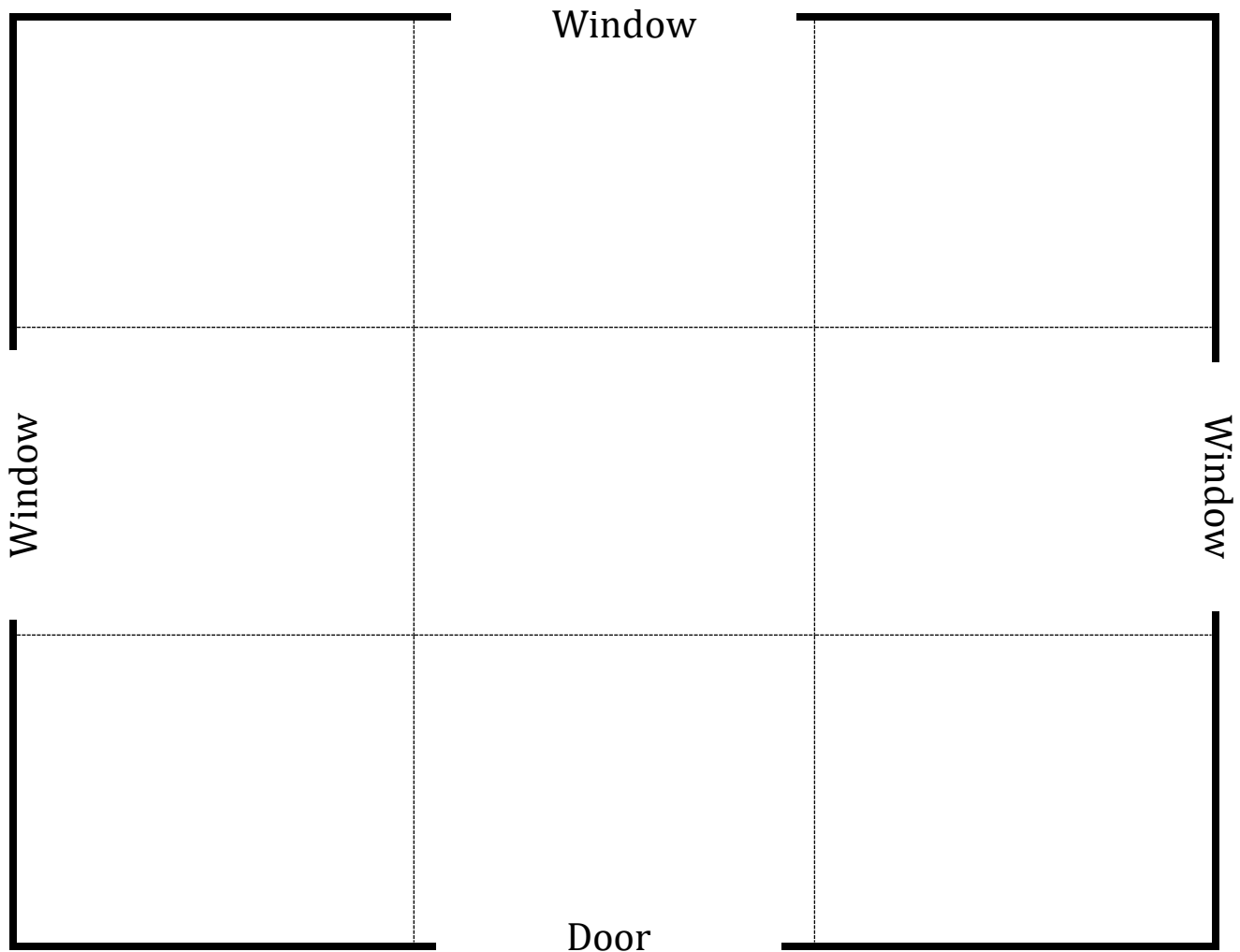
**Step 3: Building**

Using your plan to guide you, build a scale model of the 26m x 34m exhibit hall. Replicate the exhibit hall on a large piece of paper and use the laser pointer as your source of light and a piece of cardboard as the sensor. Prop up the mirrors using binder clips or small clothespins. Place the gems to keep them safe.

**Note:** You may modify and adjust your model as you go. The engineering design process is ongoing.

**Step 4: Final Design**

Use the schematic below to draw what your final configuration looked like.



**Step 5: Presentation**

Prepare a 1-minute presentation that you would use to sell your security system. Some things to consider include key features of the security system, why it's effective, why it's unique, what it costs, and why Science North should hire you above any other team.