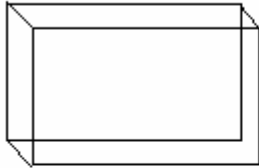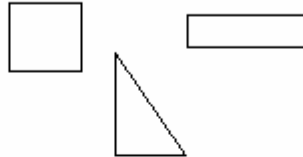# Black Box Procedure

Closeable Container
(approx. 3" x 4")
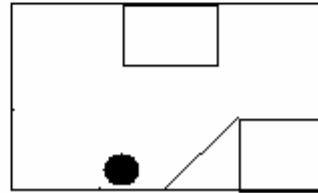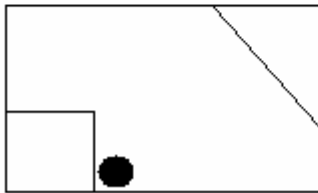
Card Board Wedges
(varying sizes)

Marble

Top-Down View of Two Sample Open Black Box Designs

Prior to Class

Create 4 Black Box Designs:
- Decide on 4 different placement schemes for various card board wedges inside the closeable container (see two samples in figure above).
- Label each design with a unique identifier (e.g., A,B,C,D or 1,2,3,4).

Assemble Black box Sets:
- Per the first black box design scheme, secure wedges inside closeable container with tape.
- Place a single marble inside the closeable container
- Close container and seal with tape (to ensure that students don't open the box)
- Label one side of the box with unique identifier for that design
- Repeat procedure for three remaining designs. This constitutes one set of black boxes.
- Assemble enough sets of black boxes so that every student has a single black box.

During Class

- Divide students into groups of four.
- Give each group a set of black boxes (so each student in the group will initially have one of the four types of black box).

- Inform students that each box has a marble and a cardboard maze the marble can go through.
- Inform students that their task is to draw on paper what they believe the maze in the box looks like. They can use any method to determine the shape of the maze <u>EXCEPT OPENING THE BOX</u>! The student is to label their drawing with the unique identifier on the black box.
- After 10 minutes, have students switch boxes with someone in their group and draw the maze in that black box. The new drawing is to be labeled with the unique identifier for the new box.
- Repeat this procedure until each student has drawn a maze for each of the four black box designs.
- Have each group of students compare their designs for similarities and differences for 10 minutes. (Collect all the black boxes while students are discussing designs).
- Ask the class how, we can verify which design is correct and which are incorrect.
- When a student inevitably states the boxes must be opened, indicate that they won't ever be able to open the boxes.
- Introduce concept of a "black box"…