## Lesson 3: Construction Techniques 1: Perpendicular Bisectors

* Let’s explore equal distances.

### 3.1: Find All the Points!

Here are 2 points labeled and , and a line segment :



1. Mark 5 points that are a distance away from point . How could you describe all points that are a distance away from point ?
2. Mark 5 points that are a distance away from point . How could you describe all points that are a distance away from point ?
3. In a different color, mark all the points that are a distance away from both and at the same time.

### 3.2: Human Perpendicular Bisector

Your teacher will mark points and on the floor. Decide where to stand so you are the same distance from point as you are from point . Think of another place you could stand in case someone has already taken that spot.

After everyone sits down, draw a diagram of what happened.

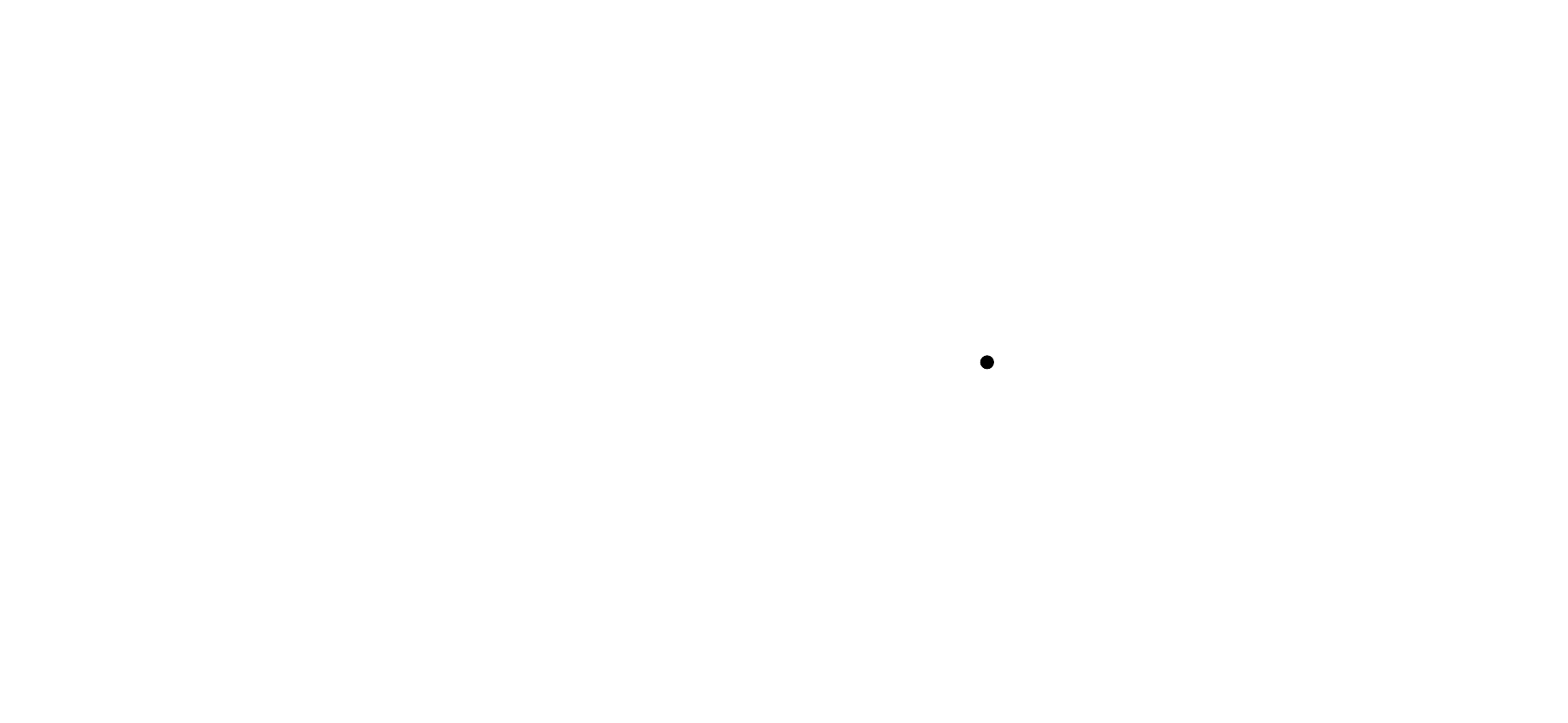
#### Are you ready for more?

In this activity, we thought about the set of points on the floor—a two-dimensional plane—that were equidistant from two given points and . What would happen if we didn’t confine ourselves to the floor? Start with two points and in three-dimensional space. What would the set of points equidistant from and look like?

### 3.3: How Well Can You Slice It?

Use the tools available to find the **perpendicular bisector** of segment .

After coming up with a method, make a copy of segment on tracing paper and look for another method to find its perpendicular bisector.



### Lesson 3 Summary

A **perpendicular bisector** of a segment is a line through the midpoint of the segment that is perpendicular to it. Recall that a right angle is the angle made when we divide a straight angle into 2 congruent angles. Lines that intersect at right angles are called perpendicular.

A **conjecture** is a guess that hasn't been proven yet. We conjectured that the perpendicular bisector of segment is the set of all points that are the same distance from as they are from . This turns out to be true. The perpendicular bisector of any segment can be constructed by finding points that are the same distance from the endpoints of the segment. Intersecting circles centered at each endpoint of the segment can be used to find points that are the same distance from each endpoint, because circles show all the points that are a given distance from their center point.





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