**Activity 5.2.2a Proof of the Perpendicular Bisector Theorem**

The Perpendicular Bisector Theorems says that the locus of points that are equidistant from the endpoints of a segment is the perpendicular bisector of the segment.

To prove this theorem we need to prove two things:

1. If a point lies on the perpendicular bisector of a line segment, then it is equidistant from the endpoints of the segment, and
2. If a point is equidistant from the endpoints of a segment, then it lies on the perpendicular bisector of the segment.

Prove part (1):

Given: $\overleftrightarrow{DC }$is the perpendicular bisector of $\overbar{AB}$
 *P* lies on $\overleftrightarrow{DC}$

Prove: *PA* = *PB*



Prove part (2)

Given: *PA* = *PB*
 *C* is the midpoint of $\overbar{AB}$

Prove: $\overleftrightarrow{PC }⊥$ $\overbar{AB}$