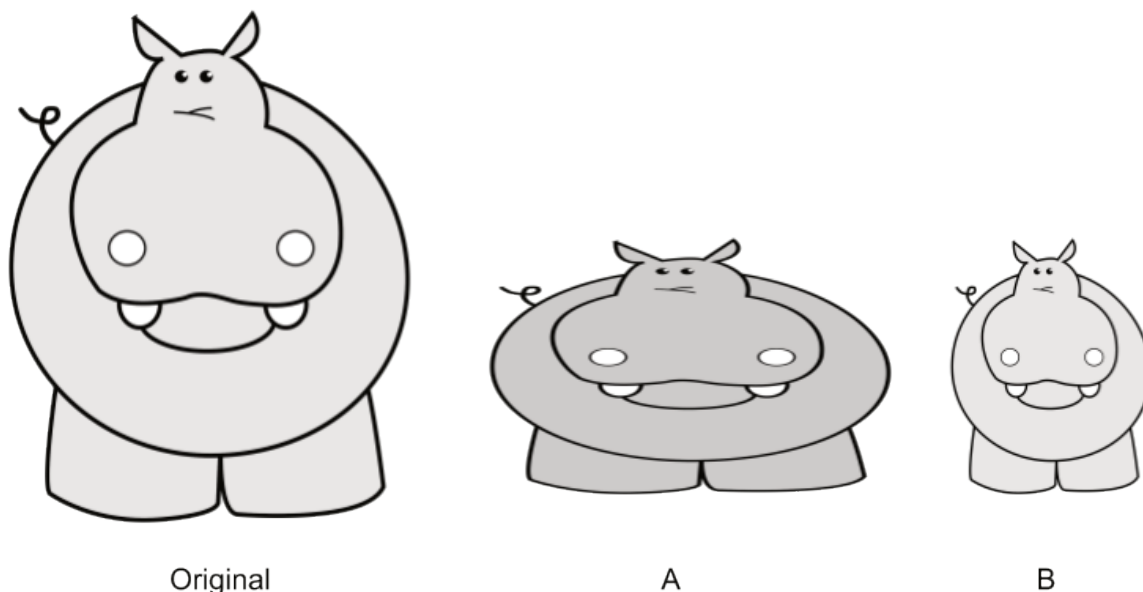# Lesson 1: Scale Drawings

- Let's make a scale drawing.

1.1: Is That the Same Hippo?

Original   A   B

Diego took a picture of a hippo and then edited it. Which is the distorted image? How can you tell?

Is there anything about the pictures you could measure to test whether there's been a distortion?
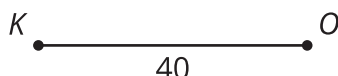
1.2: Sketching Stretching

A **dilation** with center O and positive **scale factor** r takes a point P along the ray OP to another point whose distance is r times farther away from O than P is. If r is less than 1 then the new point is really closer to O, not farther away.

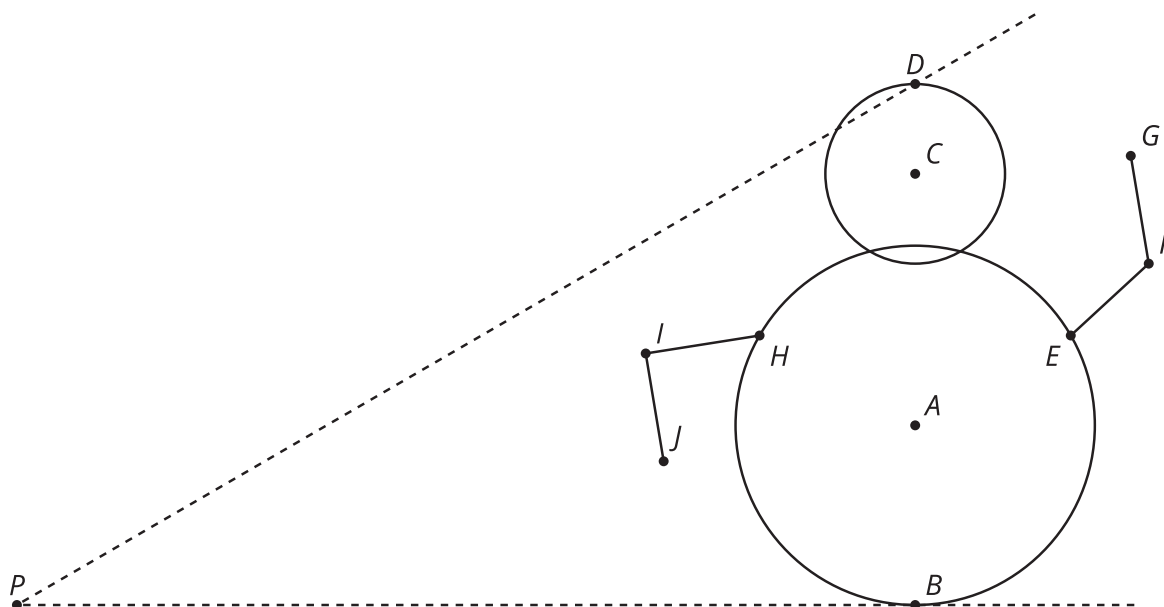1. Dilate H using C as the center and a scale factor of 3. H is 40 mm from C.

C •——————————————• H
            40

2. Dilate K using O as the center and a scale factor of $\frac{3}{4}$. K is 40 mm from O.

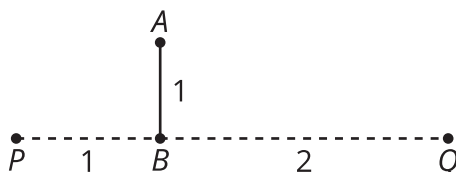K •——————————————• O
            40

1.3: Mini Me

1. Dilate the figure using center P and scale factor $\frac{1}{2}$.

2. What do you notice? What do you wonder?

Are you ready for more?

1. Dilate segment AB using center P by scale factor $\frac{1}{2}$. Label the result $A'B'$.

2. Dilate the segment AB using center Q by scale factor $\frac{1}{2}$.

3. How does the length of $A''B''$ compare to $A'B$? How would the length of $A''B''$ change if Q was infinitely far away? Explain or show your answer.

Lesson 1 Summary

A scale drawing of an object is a drawing in which all lengths in the drawing correspond to lengths in the object by the same scale. When we scale a figure we need to be sure to scale all of the parts equally or else the image will become distorted.

Creating a scaled copy involves multiplying the lengths in the original figure by a **scale factor**. The scale factor is the factor by which every length in a original figure is multiplied when you make a scaled copy. A scale factor greater than 1 enlarges an object while a scale factor less than 1 shrinks an object. What would a scale factor equal to 1 do?

For example, segment BC is a scaled copy of segment DE with a scale factor of $\frac{1}{4}$. So $BC = \frac{1}{4}DE$. If $DE = 6$, then $BC = \frac{6}{4}$ or 1.5.
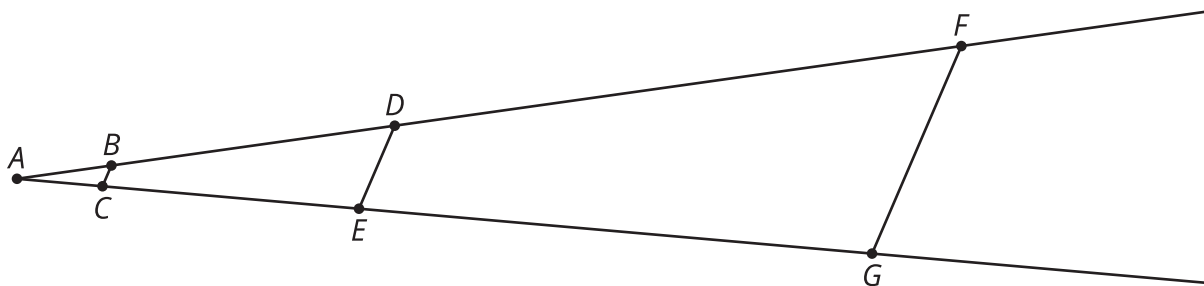
To perform a **dilation**, we need a center of dilation, a scale factor, and something to dilate. A dilation with center A and positive scale factor k takes a point D along the ray AD to another point whose distance is k times farther away from A than D is.

Segment FG is a dilation of segment DE using center A and a scale factor of 3. So $FA = 3 \cdot DA$. If $DA = 15$, then $FA = 45$.