

Please use the following resources to learn about biometrics and facial recognition.

Watch this Video: [USPTO video on Biometrics](#)

Answer these questions:

- What physical traits can be used for biometric measurements?
- What makes a trait useful for a biometric measurement?
- What are some of the uses of biometric identification?

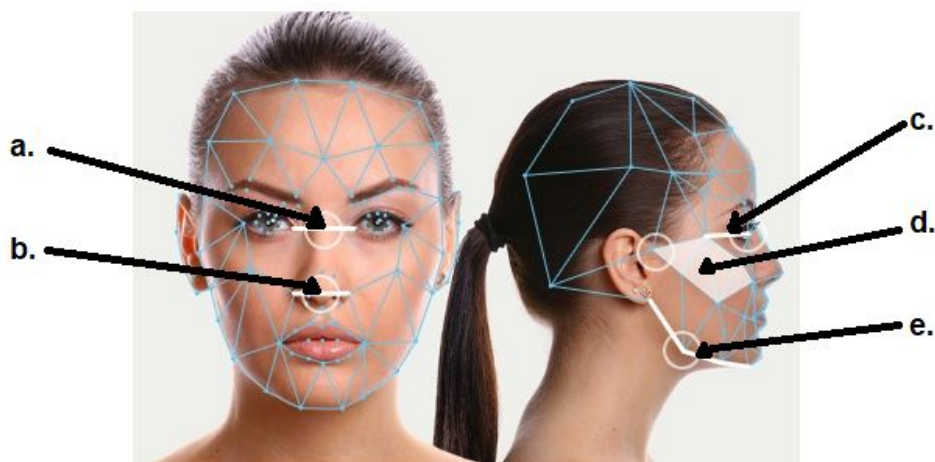
Activities: Follow these directions to take biometric measurements that let you compare faces. Remember to measure *in millimeters*.

You will need:

<ul style="list-style-type: none"> ● 5 photographs of faces, all about the same size. <ul style="list-style-type: none"> ○ Magazine covers ○ School portraits, from several grades ○ you can also take a photo and print it out 	<ul style="list-style-type: none"> ● pencil ● paper ● ruler with millimeter markings
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1. Choose three facial “landmarks” to measure. Some common ones are:
 - a. Distance between the eyes
 - b. Width of the nose
 - c. Size of the eyes
 - d. Shape of the cheeks
 - e. The length of the jaw line

In order to do this, you’ll pick some specific points on each face, and measure the distance between them. The image below shows “a” and “b” in the left image and “c”, “d”, and “e” in the right image.



<http://drrajivdesaimd.com/2018/12/03/facial-recognition-technology/>

2. Make a chart on your paper to record your data. Your chart headings should match your landmarks.
 - a. Hint: you don't have to use all of these. Pick 2-3 you can see in all of your pictures.

Subject	distance between eyes	width of nose	Size of eye	shape of cheekbones	length of jawline

3. Compare the measurements for your images. How good is your facial recognition system?
 - a. If you used photos from magazines, could you identify the people from your set of measurements?
 - b. If you used images of people in your family, do you notice similarities?
 - c. If you used school portraits of the same person taken in different years, compare the measurements from year to year. How much does your face change as you grow?

Make observations & use Claims, Evidence, and Reasoning!

1. **Claim:** It is important that a biometric measurement be stable throughout a person's life.
 - **Evidence:**

 - **Reasoning:**

2. **Claim:** It is important that images used for biometric measurements be a standard size, and show the person in the same position (for example, facing forward for a facial recognition system).
 - **Evidence:**

 - **Reasoning:**