

## Seeing Is Believing ...

Can we trust our senses? Can we rely on the human senses of sight, hearing, smell, touch and taste to make accurate observations? Methods of measurement that rely entirely on our senses are called *subjective* methods. Hot and cold, loud and quiet, hard and soft are subjective terms. What seems too cold for you may be too hot for a polar bear. What for you might be a comfortable loudness from your stereo may be painfully loud for someone else (like your parents). Sometimes our senses fool us. Sometimes we ignore our senses.

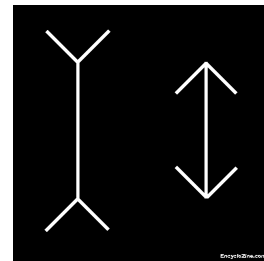
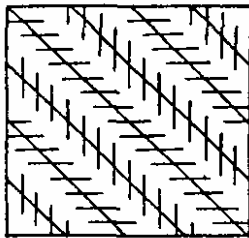
### Answer:

- List 2 more pairs of subjective terms.

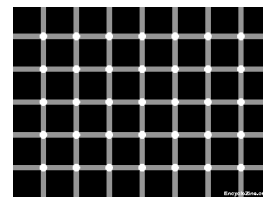
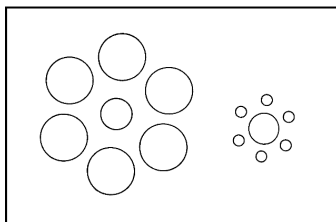


### To Do ...

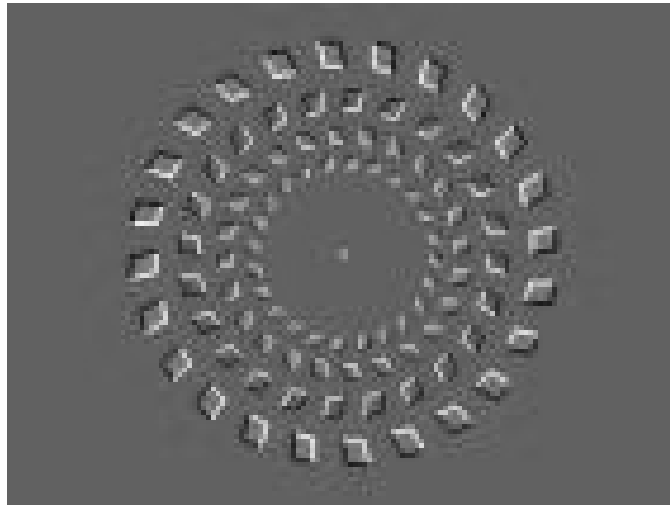
- Observe the figure below. Do the long slanted lines *appear* to be parallel? Are they?
- Look at the two vertical lines in the arrows below. How do their lengths compare? Measure them and see!



- Observe the center dots in the patterns below. Do they *appear* to be the same size? Measure both to check!
- Stare at the grid below. What do you observe? Are the center dots really changing?



- Now try this ... move your paper towards and away from your face while staring at the center dot. Do you believe what you see?



**Answer:**

- What does your experience with these perceptual/sensory activities tell you about the *reliability* of human senses as instruments for making measurements?

The simplest definition of science that I know of is "science is the act of learning *not* to fool ourselves." Therefore, science cannot rely on subjective measurements. During the 17<sup>th</sup> century, subjective methods were replaced with *objective* methods. "Instruments," not senses, were used to obtain precise measurements. (Of course, if we aren't careful, we can be fooled by our instruments too!)

**Answer:**

- In your own words, explain the difference between "subjective" and "objective."
- List 4 "instruments" with which you could make *objective* observations.
- What feature(s) do all four instruments have in common?
- Why is it so important to make objective observations in science?