

What is Light refraction?

My favorite way to demonstrate refraction is to fill a clear glass partially with water, and place a spoon upright in it. The spoon appears to be bent at water level. The appearance of the spoon bending is caused by refraction of light. Every substance bends a ray of light to a different degree. The comparison of how fast light travels through air, and through the substance is expressed in its refractive index.

Example: Speed of light in air (Y1) 300,000 km/sec

Speed of light in a diamond (Y2) 124,120 km/sec

$$\text{Refractive Index} = \frac{Y1}{Y2} = \frac{300,000}{124,120} = 2.415$$

Light travels 2.415 times faster in air than in a diamond. Most gems refractive index (RI) are between 1.4 and 3.2. The higher the index, the more it bends light.

Most gems in jewelry have two Refractive Indexes. They are called doubly refractive. As light enters these gems, it is refracted and is divided into two rays.

In our gem lab at Koser Jewelers, we measure refraction with a GIA Refractometer. In the gem articles I wrote for our resource pages, I have included the RI's. The higher the gem's RI, the more fire and scintillation it will have.