

A Science Service Feature

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? WHY THE WEATHER ?

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PRIVATE RAINBOWS

When the children shout, "Come and see the rainbow", the purist could accuse them of inaccuracy. When the family assembles on the porch to enjoy the beauty of the colored bows and breathe the freshness of the air after the shower, each individual sees a rainbow or set of them which is different from that seen by anyone else. If two should change places they would also swap rainbows. Perhaps you do not think this is so? An experiment can demonstrate.

On a sunny day make a fine spray with the garden hose and look for rainbows. Now wink your eyes alternately in rather rapid succession, and note the rainbows shift with each wink, back and forth. Open both eyes at once and you can see two bows overlapping. You have one rainbow for each eye. Each bow is the result of the bending, internal reflection, and spreading of the component rays of sunlight that has entered and come back from the numerous drops. The angles of bending or refraction, are such that the colors are visible only within certain limited ranges of angular distance from the point opposite the sun. Thus when the spray is close at hand, the distance between one's eyes is greater than this limited range, and two bows appear. When the shower is farther away our two eyes see virtually one rainbow, but people side by side must see different ones, just as the two eyes saw different ones on the spray close by.

A rainbow seen reflected on a pond is not the same as that seen directly in the sky at the same time, and it is possible to see a reflected bow without any being visible by direct vision.

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