

One Step Beyond

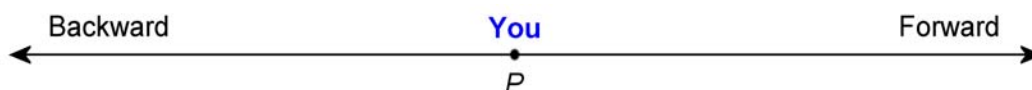
Suppose you're walking home on a bright, clear afternoon. It's a perfect day. The sun is shining and the air is crisp. Suddenly, a four-dimensional object passes right in front of you. What do you see? Nothing? The past? The future? An object you can't possibly describe or draw? The meaning of life?

Since you haven't knowingly experienced the fourth dimension, describing what you would see is a difficult problem. One good problem solving technique that can be applied to many types of problems is to begin with simple examples and see if they reveal anything about more complex cases. Using this technique might help describe what a four-dimensional object might look like.

We'll begin with the simplest case.

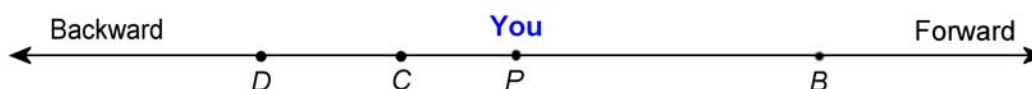
Limits of a One-Dimensional World

Suppose you're a point living in a one-dimensional world. Since even one-dimensional beings can have a name, we'll call you P .



Your entire world is the one-dimensional line on which you live. You can only move forward and backward. You can only see forward and backward. There is no up and down and there is no left and right. These are meaningless terms in your one-dimensional world.

One of your neighbors is a point and your other neighbor is a line segment. The point is B , and the line segment is \overline{CD} . To you, however, your neighbors are both points because you can only see point B and point C . You can only imagine what lies beyond them. You have no idea why C says he's part of something much bigger than you, and C doesn't understand why you continue to think he's a point just like you.



Life is rather dull in a one-dimensional world. You have no way to meet new neighbors because you have no way to move around your current neighbors to see what's beyond them. You've talked about other dimensions with your neighbors, but no one has been able to visualize what another dimension might look like. Then one day the unthinkable happens. A figure from a two-dimensional world, an equilateral triangle, passes through your one-dimensional world. What do you see?