

The term “two-dimensional” (2D) refers to a geometric or graphical representation that exists within two dimensions: length and width. In a two-dimensional space, objects can be measured along two axes, typically represented as the x-axis (horizontal) and the y-axis (vertical). This contrasts with three-dimensional (3D) space, which includes an additional dimension, depth.

In the context of various fields, “two-dimensional” can have different meanings:

Art and Design: In visual arts, a 2D drawing or image is typically flat and lacks the perception of depth. Examples include paintings, drawings, and photographs.

Computer Graphics: In computer graphics, 2D refers to images and graphics that are created and manipulated on a plane. This includes graphics for user interfaces, icons, and sprites in video games.

Mathematics: In mathematics, a coordinate system with two axes (x and y) is used to represent points in a 2D plane. The coordinates of a point are typically written as (x, y).

Physics: Two-dimensional models are often used for simplifying physical problems. For example, projectile motion can be analyzed in a 2D plane neglecting air resistance.

Materials Science: In the context of materials, 2D materials refer to substances that are one or two atoms thick. Graphene, a single layer of carbon atoms arranged in a hexagonal lattice, is an example of a 2D material.

Understanding two-dimensional concepts is fundamental in various disciplines and is a crucial building block for more complex ideas in fields like physics, computer science, and engineering.

Traditionally, surgeons relied on two-dimensional (2D) imaging for complex [neuroanatomy](#) analyses, requiring significant [mental visualization](#). Fortunately, nowadays advanced [technology](#) enables the creation of detailed [3D models](#) from patient scans, utilizing different [software](#). Afterward, these models can be experienced through [virtual reality](#) (VR) [systems](#), offering [comprehensive preoperative rehearsal](#) opportunities. Additionally, 3D models can be 3D [printed](#) for [hands-on training](#), therefore enhancing surgical preparedness. This technological integration transforms the [paradigm](#) of [neurosurgical planning](#), ensuring safer [procedures](#) ¹⁾.

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González-López P, Kuptsov A, Gómez-Revuelta C, Fernández-Villa J, Abarca-Olivas J, Daniel RT, Meling TR, Nieto-Navarro J. The Integration of [3D Virtual Reality](#) and [3D Printing](#) Technology as Innovative Approaches to [Preoperative Planning](#) in Neuro-Oncology. J Pers Med. 2024 Feb 7;14(2):187. doi: 10.3390/jpm14020187. PMID: 38392620.

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Last update: **2024/06/07 02:53**

