|  |  |  |  |
| --- | --- | --- | --- |
| **Surrounds** | Transitive | ***a*** and ***b*** have no interior points in common, and with holes filled ***b*** lies in the interior of ***a***. | A blue and white circle with a green center  Description automatically generatedA blue and green circle  Description automatically generated |
| **Shelters** | Transitive | ***a*** and ***b*** have no points in common, but the *Convex Hull* of ***a*** contains ***b***. | A blue and green object  Description automatically generated |
| **Disjoint** | Symmetric | ***a*** and ***b*** have no points in common. |  |
| **Borders** |  | The exterior boundaries of ***a*** and ***b*** have more than one point in common, but their interiors do not intersect. | A blue and green object  Description automatically generated |
| **Confines** |  | The interior boundary of one shape ***a*** and the exterior boundary of another shape ***b*** have more than one point in common, but their interiors do not intersect. |  |
| **Overlaps** | Symmetric | ***a*** overlaps ***b***: both have some but not all points in common. | A colorful drawing of a yellow blue and green object  Description automatically generated with medium confidenceA cartoon of a hat  Description automatically generated |
| **Partitions** | Transitive | All points of ***a*** lie in the interior of ***b***, no points of ***a*** lie in the exterior of ***b***, some points in ***b*** are exterior to ***a***, and the boundaries of ***a*** and ***b*** have more than one point in common. | A blue and yellow object  Description automatically generatedA blue and white circle with yellow center  Description automatically generatedA blue and yellow circle  Description automatically generated |
| **Overlaps** | Symmetric | ***a*** overlaps ***b***: both have some but not all points in common. | A colorful drawing of a yellow blue and green object  Description automatically generated with medium confidenceA cartoon of a hat  Description automatically generated A blue yellow and green circle  Description automatically generated A colorful circle with a yellow and blue circle  Description automatically generated A blue green yellow and orange circle  Description automatically generated |
| **Contains** | Transitive | All points of ***a*** lie in the interior of ***b***, no points of ***a*** lie in the exterior of ***b***, some points in ***b*** are *exterior to* ***a****, and the boundaries of* ***a*** *and* ***b*** *do not intersect.* | A cartoon of a fried egg  Description automatically generatedA blue and yellow egg  Description automatically generated |
| **Equals** | Symmetric, Transitive | The interiors of ***a*** and ***b*** intersect and no part of the interior of one geometry intersects the exterior of the other. | A yellow circle with black outline  Description automatically generated |