

# Pinning and Rotating Physics Bodies

Pin a node so it's free to rotate about a certain point on its parent node.

## Overview

A common task in a physics simulation is to pin bodies together. Pinning locks the position of an object but allows it to rotate—for example, to fix a wheel to a vehicle. SpriteKit offers two options for pinning physics bodies—either using the `pinned` property or creating an `SKPhysicsJointPin` joint.

The `pinned` property offers convenience because it requires less code. If you wish to simulate friction, the physics body's `angularDamping` property is analogous to the joint's `frictionTorque` property. You must use a joint, however, if you want to control the rotation speed. In addition, use a joint to control the anchor point or limit the rotation angles—you do that by using `lowerAngleLimit` and `upperAngleLimit`.

## Pin a Node Using the Pinned Property

The following code demonstrates using the `pinned` property. The code creates a sprite node with an image of a pendulum (two circles of different sizes joined by a center rod). A physics body is created based on the generated texture, has its `pinned` property set to `true`, and is assigned to the node. The node is rotated 90 degrees—to align horizontally—so that gravity pulls the heavier end toward the ground.

```
let pinned = SKSpriteNode(imageNamed: "pendulum")

pinned.physicsBody = SKPhysicsBody(texture: pinned.texture!,
                                     size: pinned.size)

pinned.position = CGPoint(x: 320,
                          y: 320)

pinned.zRotation = CGFloat.pi / 2
pinned.physicsBody?.pinned = true

scene.addChild(pinned)
```

Because the node's physics body is pinned, it stays in position but rotates around its center.

## Pin a Node Using a Joint

The following code demonstrates using a physics joint pin. In this example, a static anchor is created and added to the scene. The sprite node is added as a child of the anchor node and a `SKPhysicsJointPin` joins the two together.

```
let anchor = SKNode()

anchor.position = CGPoint(x: 320,
                          y: 320)
anchor.zRotation = CGFloat.pi / 2
anchor.physicsBody = SKPhysicsBody()
anchor.physicsBody?.isDynamic = false

let jointed = SKSpriteNode(imageNamed: "pendulum")
jointed.physicsBody = SKPhysicsBody(texture: pinned.texture!,
                                     size: pinned.size)

scene.addChild(anchor)
anchor.addChild(jointed)

let pinJoint = SKPhysicsJointPin.joint(withBodyA: anchor.physicsBody!,
                                       bodyB: jointed.physicsBody!,
                                       anchor: anchor.position)

scene.physicsWorld.add(pinJoint)
```