# Chapter 8

# b2.Body class

**Inherits:** Nothing

## Supported platforms

- All platforms

**Available since version:** Gideros 2011.6

## Description

A rigid body. These are created via `b2.World:createBody`.

## Common uses and examples

Creating Box2d body and moving Bitmap along the body

```
require "box2d"
local world = b2.World.new(0, 10, true)

--create ball bitmap object from ball graphic
local ball = Bitmap.new(Texture.new("ball.png"))
--reference center of the ball for positioning
ball:setAnchorPoint(0.5,0.5)

ball:setPosition(100,100)

--get radius
local radius = ball:getWidth()/2

--create box2d physical object
local body = world:createBody{type = b2.DYNAMIC_BODY}
local circle = b2.CircleShape.new(0, 0, radius)
local fixture = body:createFixture{shape = circle, density = 1.0,
friction = 0.1, restitution = 0.2}
ball.body = body

--add to scene
stage:addChild(ball)
```

```
stage:addEventListener(Event.ENTER_FRAME, function()
       -- edit the step values if required. These are good defaults!
    world:step(1/60, 8, 3)
       ball:setPosition(ball.body:getPosition())
       ball:setRotation(math.rad(ball.body:getAngle()))
end)
```

## 8.1 b2.Body:applyAngularImpulse

**Available since version:** Gideros 2011.6

### Description

Applies an angular impulse.

### Syntax:

```
b2.Body:applyAngularImpulse(impulse)
```

### Parameters:

- impulse: (number) the angular impulse in units of kg*m*m/s

## 8.2 b2.Body:applyForce

**Available since version:** Gideros 2011.6

### Description

Applies a force at a world point. If the force is not applied at the center of mass, it will generate a torque and affect the angular velocity. This wakes up the body.

### Syntax:

```
b2.Body:applyForce(forcex, forcey, pointx, pointy)
```

### Parameters:

- forcex: (number)
- forcey: (number)
- pointx: (number) the x coordinate of the world position of the point of application
- pointy: (number) the y coordinate of the world position of the point of application

## 8.3 b2.Body:applyLinearImpulse

**Available since version:** Gideros 2011.6

### Description

Applies an impulse at a point. This immediately modifies the velocity. It also modifies the angular velocity if the point of application is not at the center of mass. This wakes up the body.

### Syntax:

```
b2.Body:applyLinearImpulse(impulsex, impulsey, pointx, pointy)
```

### Parameters:

- impulsex: (number) the x coordinate of the world impulse vector, usually in N-seconds or kg-m/s
- impulsey: (number) the y coordinate of the world impulse vector, usually in N-seconds or kg-m/s
- pointx: (number) the x coordinate of the world position of the point of application
- pointy: (number) the y coordinate of the world position of the point of application

## 8.4 b2.Body:applyTorque

**Available since version:** Gideros 2011.6

### Description

Applies a torque. This affects the angular velocity without affecting the linear velocity of the center of mass. This wakes up the body.

### Syntax:

```
b2.Body:applyTorque(torque)
```

### Parameters:

- torque: (number) , usually in N-m

## 8.5 b2.Body:createFixture

**Available since version:** Gideros 2011.6

### Description

Creates a fixture and attach it to this body. If the density is non-zero, this function automatically updates the mass of the body. Contacts are not created until the next time step. The fixture definition is given as a ordinary table. The fields of the fixture definition table are:

- `shape` (Section 26): (b2.Shape) The shape, this must be set.
- `friction`: (number) The friction coefficient, usually in the range [0,1].
- `restitution`: (number) The restitution (elasticity) usually in the range [0,1].
- `density`: (number) The density, usually in kg/m$^2$.
- `isSensor`: (boolean) A sensor shape collects contact information but never generates a collision response.
- `filter`: (table) Contact filtering data. The definition of contact filtering data is given at `b2.Fixture:setFilterData` function. (Section 15.4)

The unset fields gets default values. `Warning`: This function is locked during callbacks.

### Syntax:

```
b2.Body:createFixture(fixtureDef)
```

### Parameters:

- fixtureDef: (table)

## 8.6 b2.Body:destroyFixture

**Available since version:** Gideros 2011.6

### Description

Destroy a fixture. This removes the fixture from the broad-phase and destroys all contacts associated with this fixture. This will automatically adjust the mass of the body if the body is dynamic and the fixture has positive density. All fixtures attached to a body are implicitly destroyed when the body is destroyed.

- *Warning:** This function is locked during callbacks.

### Syntax:

```
b2.Body:destroyFixture(fixture)
```

### Parameters:

- fixture: (b2.Fixture) the fixture to be removed

## 8.7 b2.Body:getAngle

**Available since version:** Gideros 2011.6

### Description

Returns the current world rotation angle in radians.

### Syntax:

```
b2.Body:getAngle()
```

## 8.8 b2.Body:getAngularDamping

**Available since version:** Gideros 2012.2.2

### Description

Returns the angular damping of the body.

### Syntax:

```
b2.Body:getAngularDamping()
```

## 8.9 b2.Body:getAngularVelocity

**Available since version:** Gideros 2011.6

### Description

Returns the angular velocity.

### Syntax:

```
b2.Body:getAngularVelocity()
```

## 8.10 b2.Body:getGravityScale

**Available since version:** Gideros 2012.2.2.1

### Description

Returns the gravity scale of the body.

### Syntax:

```
b2.Body:getGravityScale()
```

## 8.11 b2.Body:getInertia

**Available since version:** Gideros 2012.2.2

### Description

Returns the rotational inertia of the body about the local origin in kg-m$^2$.

### Syntax:

```
b2.Body:getInertia()
```

## 8.12 b2.Body:getLinearDamping

**Available since version:** Gideros 2012.2.2

### Description

Returns the linear damping of the body.

### Syntax:

```
b2.Body:getLinearDamping()
```

## 8.13 b2.Body:getLinearVelocity

**Available since version:** Gideros 2011.6

### Description

Returns the linear velocity of the center of mass.

### Syntax:

```
b2.Body:getLinearVelocity()
```

## 8.14 b2.Body:getLocalCenter

**Available since version:** Gideros 2012.2.2

### Description

Returns the local position of the center of mass.

### Syntax:

```
b2.Body:getLocalCenter()
```

## 8.15 b2.Body:getLocalPoint

**Available since version:** Gideros 2012.09.6

### Description

Returns the local coordinates of a point given the world coordinates.

### Syntax:

```
b2.Body:getLocalPoint(x, y)
```

### Parameters:

- x: (number) x coordinate of the world point
- y: (number) y coordinate of the world point

## 8.16 b2.Body:getLocalVector

**Available since version:** Gideros 2012.09.6

### Description

Returns the local coordinates of a vector given the world coordinates.

### Syntax:

```
b2.Body:getLocalVector(x, y)
```

### Parameters:

- x: (number) x coordinate of the world vector
- y: (number) y coordinate of the world vector

## 8.17 b2.Body:getMass

**Available since version:** Gideros 2012.2.2

### Description

Returns the total mass of the body in kilograms (kg).

### Syntax:

```
b2.Body:getMass()
```

## 8.18 b2.Body:getPosition

**Available since version:** Gideros 2011.6

### Description

Returns the world body origin position.

### Syntax:

```
b2.Body:getPosition()
```

## 8.19 b2.Body:getWorldCenter

**Available since version:** Gideros 2012.2.2

### Description

Returns the world position of the center of mass.

### Syntax:

```
b2.Body:getWorldCenter()
```

## 8.20 b2.Body:getWorldPoint

**Available since version:** Gideros 2012.09.6

### Description

Returns the world coordinates of a point given the local coordinates.

### Syntax:

```
b2.Body:getWorldPoint(x, y)
```

### Parameters:

- x: (number) x coordinate of the local point
- y: (number) y coordinate of the local point

## 8.21 b2.Body:getWorldVector

**Available since version:** Gideros 2012.09.6

### Description

Returns the world coordinates of a vector given the local coordinates.

### Syntax:

```
b2.Body:getWorldVector(x, y)
```

### Parameters:

- x: (number) x coordinate of the local vector
- y: (number) y coordinate of the local vector

## 8.22 b2.Body:isActive

**Available since version:** Gideros 2011.6

### Description

Returns the active state of the body.

### Syntax:

```
b2.Body:isActive()
```

## 8.23 b2.Body:isAwake

**Available since version:** Gideros 2011.6

### Description

Returns the sleeping state of this body. Returns `true` if body is awake (not sleeping), `false` otherwise.

### Syntax:

```
b2.Body:isAwake()
```

## 8.24 b2.Body:isBullet

**Available since version:** Gideros 2012.09.6

### Description

### Syntax:

```
b2.Body:isBullet()
```

## 8.25 b2.Body:isFixedRotation

**Available since version:** Gideros 2012.09.6

### Description

### Syntax:

```
b2.Body:isFixedRotation()
```

## 8.26 b2.Body:isSleepingAllowed

**Available since version:** Gideros 2012.09.6

### Description

### Syntax:

```
b2.Body:isSleepingAllowed()
```

## 8.27 b2.Body:setActive

**Available since version:** Gideros 2011.6

### Description

Sets the active state of the body. An inactive body is not simulated and cannot be collided with or woken up. If you pass a flag of true, all fixtures will be added to the broad-phase. If you pass a flag of false, all fixtures will be removed from the broad-phase and all contacts will be destroyed. Fixtures and joints are otherwise unaffected. You may continue to create/destroy fixtures and joints on inactive bodies. Fixtures on an inactive body are implicitly inactive and will not participate in collisions, ray-casts, or queries. Joints connected to an inactive body are implicitly inactive. An inactive body is still owned by a b2.World object (Chapter 29) and remains in the body list.

### Syntax:

```
b2.Body:setActive(flag)
```

### Parameters:

- flag: (boolean) active flag

## 8.28 b2.Body:setAngle

**Available since version:** Gideros 2011.6

### Description

Sets the current world rotation angle in radians.

### Syntax:

```
b2.Body:setAngle(angle)
```

### Parameters:

- angle: (number) world rotation angle in radians

## 8.29 b2.Body:setAngularDamping

**Available since version:** Gideros 2012.2.2

### Description

Sets the angular damping of the body.

### Syntax:

```
b2.Body:setAngularDamping(angularDamping)
```

### Parameters:

- angularDamping: (number) new angular damping of the body

## 8.30 b2.Body:setAngularVelocity

**Available since version:** Gideros 2011.6

### Description

Sets the angular velocity.

### Syntax:

```
b2.Body:setAngularVelocity(omega)
```

### Parameters:

- omega: (number) the new angular velocity in radians/second

## 8.31 b2.Body:setAwake

**Available since version:** Gideros 2012.2.2.1

### Description

Set the sleep state of the body. A sleeping body has very low CPU cost.

### Syntax:

```
b2.Body:setAwake(awake)
```

### Parameters:

- awake: (boolean) set to true to wake body, false to put it to sleep

## 8.32 b2.Body:setBullet

**Available since version:** Gideros 2012.09.6

### Description

### Syntax:

```
b2.Body:setBullet(flag)
```

### Parameters:

- flag: (boolean)

## 8.33 b2.Body:setFixedRotation

**Available since version:** Gideros 2012.09.6

### Description

### Syntax:

```
b2.Body:setFixedRotation(flag)
```

### Parameters:

- flag: (boolean)

## 8.34 b2.Body:setGravityScale

**Available since version:** Gideros 2012.2.2.1

### Description

Sets the gravity scale of the body.

### Syntax:

```
b2.Body:setGravityScale(scale)
```

### Parameters:

- scale: (number) new gravity scale of the body

## 8.35 b2.Body:setLinearDamping

**Available since version:** Gideros 2012.2.2

### Description

Sets the linear damping of the body.

### Syntax:

```
b2.Body:setLinearDamping(linearDamping)
```

### Parameters:

- linearDamping: (number) new linear damping of the body

## 8.36 b2.Body:setLinearVelocity

**Available since version:** Gideros 2011.6

### Description

Sets the linear velocity of the center of mass.

### Syntax:

```
b2.Body:setLinearVelocity(x, y)
```

### Parameters:

- x: (number) x coordinate of the linear velocity
- y: (number) y coordinate of the linear velocity

## 8.37 b2.Body:setPosition

**Available since version:** Gideros 2011.6

### Description

Sets the world body origin position.

### Syntax:

```
b2.Body:setPosition(x, y)
```

### Parameters:

- x: (number) x coordinate of the position
- y: (number) y coordinate of the position

## 8.38 b2.Body:setSleepingAllowed

**Available since version:** Gideros 2012.09.6

### Description

### Syntax:

```
b2.Body:setSleepingAllowed(flag)
```

### Parameters:

- flag: (boolean)