

## [B-8] Gravity and Drag

### Objective

To understand and manipulate the effects of gravity and drag in Unity to simulate realistic or stylized physics behaviors for game objects. We'll also start practicing to design our own scenes from now on.

### Tasks

1. Create two spheres above the white plane: Name one sphere HeavyBall and the other LightBall.
2. Adjust Rigidbody Settings:
  - a. Add a Rigidbody component to both spheres.
  - b. Set the Mass of the HeavyBall to a higher value (e.g., 10) and the LightBall to a lower value (e.g., 1) to simulate weight differences.
  - c. For HeavyBall:
    - i. Enable Use Gravity.
    - ii. Set Drag to a low value (e.g., 1) to simulate a heavy object falling with minimal air resistance.
  - d. For LightBall:
    - i. Enable Use Gravity.
    - ii. Set Drag to a higher value (e.g., 3) to simulate how air resistance affects lighter objects.
3. Create a Script to Control Gravity: Name the script GravityControl. Attach it to an empty GameObject in your scene. This script will allow you to toggle gravity effects with a key press.
4. Implement Key Controls in the Script: Allow the user to press the 'G' key to toggle gravity on and off for both spheres. (Even if you toggle to turn gravity off, you'll still see the balls moving because of their momentum!)

**Answer key next page!**

### Answer Key

```
using UnityEngine;

public class GravityControl : MonoBehaviour
{
    public Rigidbody heavyBallRigidbody;
    public Rigidbody lightBallRigidbody;
    private bool gravityEnabled = true;

    void Start()
    {
        if (!heavyBallRigidbody || !lightBallRigidbody)
        {
            Debug.LogError("Rigidbody not assigned in GravityControl script.");
        }
    }

    void Update()
    {
        if (Input.GetKeyDown(KeyCode.G))
        {
            gravityEnabled = !gravityEnabled;
            heavyBallRigidbody.useGravity = gravityEnabled;
            lightBallRigidbody.useGravity = gravityEnabled;

            // Optional: Print the current state of gravity
            Debug.Log("Gravity enabled: " + gravityEnabled);
        }
    }
}
```

### Starter Code

```
using UnityEngine;

public class GravityControl : MonoBehaviour
```

```
{
    public Rigidbody heavyBallRigidbody;
    public Rigidbody lightBallRigidbody;

    // Use this for initialization
    void Start()
    {
        // Ensure the rigidbodies are linked in the inspector
        if (!heavyBallRigidbody || !lightBallRigidbody)
        {
            Debug.LogError("Rigidbody not assigned in GravityControl
script.");
        }
    }

    // Update is called once per frame
    void Update()
    {
        // Toggle gravity when 'G' is pressed
        if (Input.GetKeyDown(KeyCode.G))
        {
            // Placeholder for toggling gravity
        }
    }
}
```