[B-4] Applying forces

Objective

To understand and implement the concept of forces in Unity's physics system by using vector operations to apply forces to objects.

Tasks

1. Add a rigidbody component to the green sphere object.
2. In Start(), get the rigidbody component of the object.
3. In Update(), Script to apply force to the sphere when specific keys are pressed. Use “AddForce” to:
    a. Apply force forward when pressing the UP arrow key.
    b. Apply force backward when pressing the DOWN arrow key.
    c. Apply force to the left when pressing the LEFT arrow key.
    d. Apply force to the right when pressing the RIGHT arrow key.
    e. Apply force upward when pressing the SPACE key.
        i. With rigidbody, the object will be affected by physics. Gravity is also a force down so after ‘jumping’ the sphere should fall back down.

Answer key next page!

Answer Key

```
using UnityEngine;

public class Forces_Solution : MonoBehaviour
{
    public float forceMagnitude = 5.0f;

    private Rigidbody rb;

    void Start()
    {
        rb = GetComponent<Rigidbody>();
    }

    void Update()
    {
        // Apply a forward force when the user presses the Up arrow key
        if (Input.GetKeyDown("up"))
        {
            // Apply a forward force
            rb.AddForce(Vector3.forward * forceMagnitude,
ForceMode.Impulse);
        }

        // Apply a backward force when the user presses the Down arrow key
        else if (Input.GetKeyDown("down"))
        {
            // Apply a backward force
            rb.AddForce(-Vector3.forward * forceMagnitude,
ForceMode.Impulse);
        }

        // Apply a leftward force when the user presses the Left arrow key
        else if (Input.GetKeyDown("left"))
        {
            // Apply a leftward force
            rb.AddForce(-Vector3.right * forceMagnitude,
ForceMode.Impulse);
        }

        // Apply a rightward force when the user presses the Right arrow
key
```

```
        else if (Input.GetKeyDown("right"))
        {
            // Apply a rightward force
            rb.AddForce(Vector3.right * forceMagnitude, ForceMode.Impulse);
        }

        else if (Input.GetKeyDown(KeyCode.Space))
        {
            // Apply an upward force
            Vector3 forceDirection = Vector3.up;
            rb.AddForce(forceDirection * forceMagnitude,
ForceMode.Impulse);
        }
    }
}
```

Starter Code

```
using UnityEngine;

public class ForceApplication : MonoBehaviour
{
    public float forceMagnitude = 10.0f;

    private Rigidbody rb;

    void Start()
    {
        // Get the rigidbody component
    }

    void Update()
    {
        // Implement force application logic
    }
}
```