

4.

- a) The **world coordinate system** is a global coordinate system that defines position and rotation values of all GameObjects in a Scene. The origin is always placed at (0, 0, 0), and it is used for positioning, scaling, and rotating GameObjects in relation to the overall Scene.
 - i) Example: In Unity, an object placed at the world coordinates (0, 0, 0) is located at the origin of the Scene, no matter how it moves or rotates locally.
- b) The **local coordinate system** is a coordinate system that is relative to a GameObject's own transform function. The origin is centered at the GameObject's pivot point, and the axes are aligned based on the object's rotation.
 - i) Example: if a game object is rotated 180 degrees (upside down), its positive Y would be pointing downwards, instead of upwards like a normal object would.
- c) A **Vector3** is a data type used to represent 3D vectors in space. In Unity, they manipulate position and direction.
 - i) Example: Moving an object by Vector3 (0,1,0) would move it 1 unit in the Y direction.
 - 1) Vector3.forward is shorthand for Vector3(0, 0, 1) and moves an object positively along the Z-axis.
 - 2) Vector3.left is shorthand for Vector3(-1, 0, 0) and moves an object negatively along the X-axis.
- d) The **Rigidbody.AddRelativeForce** method is used to move objects relative to their orientation. It applies the force to a Rigidbody's local coordinate system using a Vector3 as a parameter.
 - i) Example: Rigidbody.AddRelativeForce(Vector3.up) would apply 1 unit of force to push the object up in the Y direction. Multiplying the Vector3 with values for the power of the force and DeltaTime can also be done to edit the amount of force applied per update.
- e) The **Input.GetKey** method is used to bind a key to an input that is recorded by Unity. It does this using a parameter with the KeyCode enum, which defines the keys on a keyboard.
 - i) Example: Input.GetKey(KeyCode.W) would check if the 'W' key is being pressed, and if put in an if statement, can be used to perform actions when W is pressed (like moving a player forward).