



Bronze Belt Ninja Guide
Activity 03 Prove Yourself:
Meaner Bird

PROVE YOURSELF: MEANER BIRD



Swapping out assets in Unity is a lot easier than dodging stalactites and stalagmites while flying through a cave. (*Stalactites are the rocks on the ceiling, while stalagmites are the ones sticking out of the ground.*)

Go into the folder where the Unity assets are provided (from the Download Unity Game Assets folder in SharePoint). The assets you'll need from this folder are:

"Activity 03 Prove Yourself - caveback1.png", "Activity 03 Prove Yourself - caveback2.png", and "Activity 03 Prove Yourself - stalagmite_1.png".

In this Prove Yourself we are going to accomplish:

- **Use " Activity 03 Prove Yourself - caveback1 .png" and " Activity 03 Prove Yourself - caveback2. png" as shown above as the background.**
- **Apply the " Activity 03 Prove Yourself - stalagmite_1.png" image to the obstacles in your existing Meany Bird game.**

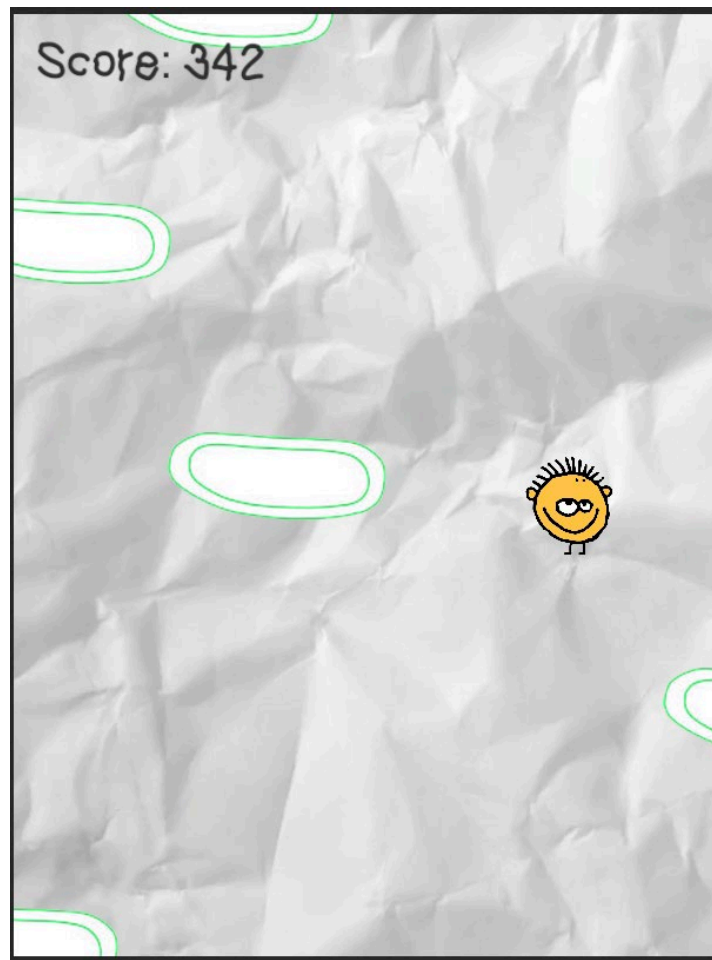
To get started follow the steps below:

1. Add the "caveback1", "caveback2", and "stalagmite1" images to your sprites folder!
2. Select the background object in the hierarchy and change its sprite to caveback1
3. Make the background image fit correctly by adjusting the scale property in the transform component to 1.7 for both X and Y.
4. Duplicate your background object and change the sprite of this duplicated background object to caveback2. Then set the z position to -1.
5. Update the z position of your bird object to -2 in order to get it to appear above both backgrounds.
6. Use Unity's move tool to move your "Ground" gameobject down. It should be barely on screen. The Y position should be somewhere around 0.67-0.70.
7. Duplicate your ground object and rename it Ceiling. Change the Y position of this new GameObject to around 12.55.
8. In both the "Ground" and "Ceiling" objects disable the sprite renderer components to hide the objects. They are still there even though the camera cannot see them!
9. Open the spikes prefab. Select "Spike (1)" in the hierarchy panel and change the property of its sprite to "stalagmite_1" Set the Y scale to around 5.32.
10. Click the Edit Collider button for Box Collider 2D and then utilize your mouse to drag the dots. Repeat the same steps (12 and 13) for Spike 2.

PHYSICS

When we throw a ball, there are a lot of forces at work that determine what happens to that ball and where it goes. Of course, the energy that you use to throw the ball is present, but there is also gravity pulling it down to the ground. In addition, there is the air that the ball is moving through, slowing it down. Also, there is rotation which can affect whether the ball moves in the direction you intended it to go.

Learning about forces gives you an idea of where the ball is going to go. Unity has a large set of tools to simulate physics and knowing about them can help you make better games.



WHAT GOES UP...

Centuries ago, a famous mathematician and physicist by the name of Sir Isaac Newton discovered the laws of motion and showed the world how it drove everything from rocks to the planets. What does that have to do with Unity? Newton showed us the mathematics that allows us to simulate the motion of objects in our computer environment. While we sadly won't be going into Newton's laws in this book, everything that we do regarding physics started with what he taught humans long ago.

THE NATURE OF THINGS

Objects with mass not only move, but they also accelerate. When they collide, they bounce based on their relative mass and energy. Physics helps us predict what happens when a force of any kind is applied to an object. While we don't need to understand the mathematics of physics to use it, knowing about the natural laws of mechanics and motion helps us not only figure out why things move, but how to make them move more accurately.

PHYSICS IN UNITY

For an object in Unity to act under the control of physics, it must have a **Rigidbody** component. This allows the object to respond to forces such as gravity and torque. The Rigidbody component allows you to choose the mass of an object (objects with more mass are more resistant to force from objects with less mass) and drag (how air resistance can slow it down).

THROWING IT OUT THE WINDOW

One thing that you can do on a computer that you can't do in the real world is ignore any of the laws of physics that get in our way. We can decide not to allow an object to be affected by forces like gravity, or to have it magically float in the air. We can make an object immovable, so that any object that collides with it, no matter the mass, doesn't make it budge. We can prevent it from rotating in just one or every axis.

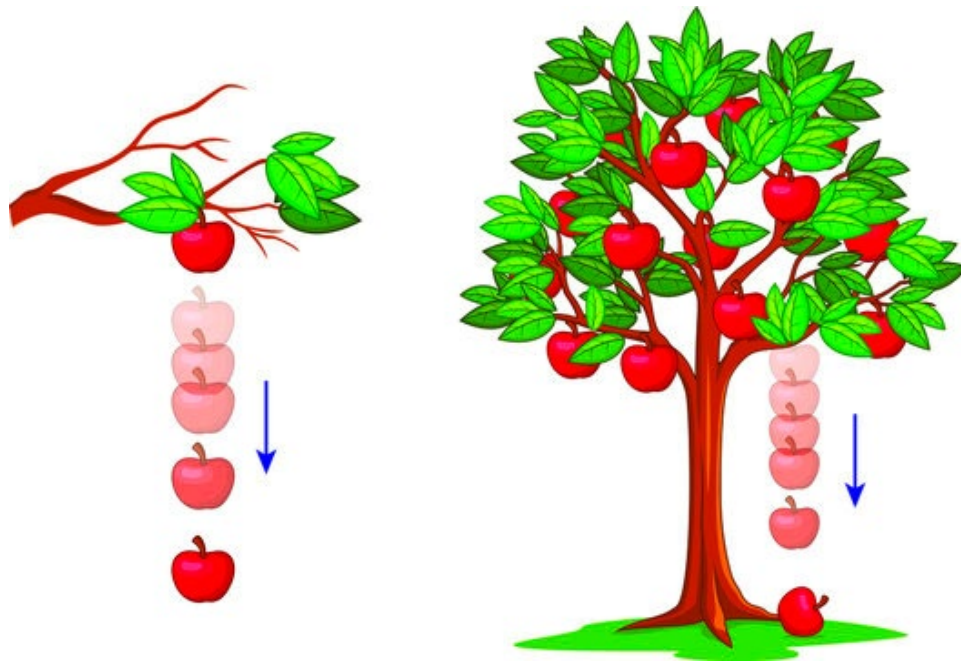


Image Source: https://stock.adobe.com/search/images?k=newton+apple+tree&asset_id=517182457

COLLIDERS

The Rigidbody is just one part of how Unity handles physics. Another part is the collider, which determines how and when one object touches another. As you might guess, it takes a lot of processing to keep track of all the edges of all the objects in a virtual world. To make things run smoother, Unity has simplified colliders that require less computations.

For instance, a model of a truck has many surfaces, from the top to the windshield, down to the wheels. Yet in a game, we can use a six-sided box to represent the top, bottom, and sides of the truck. As far as the game is concerned, it works just as well, and with the extra processing power, you can have many more trucks in your scene!