# Unit 2 – Lesson 3. Animation Controller and Garden Defender 1st Challenge

**Aim:**

* How does Unity handle animation?
* What is Humanoid Animation and how do we use it in our game
* What is Animation Controller and how do we use it in Unity game?

**Objectives:** After the lesson, students will be able to:

* Create animation controller
* Apply and arrange animation clips to animation controller
* Create or modify animations for humanoid game characters

**CLASS PROCEDURE:**

***Do Now:***

Open the Garden Defender in Unity. Work with your partner to make the scarecrow walk around with animation. Use the Unity documentation online as reference and find out how to add and set an Animation Controller in Unity.

<https://docs.unity3d.com/Manual/AnimatorControllerCreation.html>

1. How do we create a new Animation Controller?
2. How do we add animation clips to the Animation Controller?
3. How do we arrange the animation clips?
4. How do we make the scarecrow walk around, stop idling, and then walk around again?

***Discussions / Presentations – WE REPEAT THE IMPORTANT TOPICS AT LEAST THREE TIMES!***

1. Unity’s animation system is based on the concept of [Animation Clips](https://docs.unity3d.com/Manual/class-AnimationClip.html), which contain information about how certain objects should change their position, rotation, or other properties over time. Each clip can be thought of as a single linear recording. Animation clips from external sources are created by artists or animators with 3rd party tools such as Max or Maya, or come from motion capture studios or other sources.
2. Animation Clips are then organized into a structured flowchart-like system called an Animator Controller. The Animator Controller acts as a “[State Machine](https://docs.unity3d.com/Manual/AnimationStateMachines.html)” which keeps track of which clip should currently be playing, and when the animations should change or blend together.
3. A very simple Animator Controller might only contain one or two clips, for example to control a powerup spinning and bouncing, or to animate a door opening and closing at the correct time. A more advanced Animator Controller might contain dozens of humanoid animations for all the main character’s actions, and might blend between multiple clips at the same time to provide a fluid motion as the player moves around the scene.
4. Unity’s Animation system also has numerous special features for handling humanoid characters which give you the ability to [retarget](https://docs.unity3d.com/Manual/Retargeting.html) humanoid animation from any source (Eg. motion capture, the asset store, or some other third-party animation library) to your own character model, as well as adjusting [muscle definitions](https://docs.unity3d.com/Manual/MuscleDefinitions.html). These special features are enabled by Unity’s [Avatar](https://docs.unity3d.com/Manual/class-Avatar.html) system, where humanoid characters are mapped to a common internal format.
5. Each of these pieces - the [Animation Clips](https://docs.unity3d.com/Manual/class-AnimationClip.html), the [Animator Controller](https://docs.unity3d.com/Manual/class-AnimatorController.html), and the [Avatar](https://docs.unity3d.com/Manual/class-Avatar.html), are brought together on a GameObject via the [Animator Component](https://docs.unity3d.com/Manual/class-Animator.html). This component has a reference to an Animator Controller, and (if required) the Avatar for this model. The Animator Controller, in turn, contains the references to the [Animation Clips](https://docs.unity3d.com/Manual/class-AnimationClip.html) it uses.

***Pair – sharing Activity #2 / HW (Will be graded as 10 HW points):***

Use the Garden Defender scene and assets provided, work with your partner and create a simple game with animations. Here are the rules:

1. Make the garden bigger.
2. Add more plants and some benches.
3. Add some particles (water, fire, smoke, etc.)
4. Add some bugs, bunnies, critters.
5. Add a couple of bunnies and bugs. The bunnies and bugs run around inside of the garden ***randomly (in random speed, random directions, might do nothing at all sometimes)***, not falling under the terrain. They cannot pass through each other, or the plants or other characters.
6. The scarecrow walks around, forward, backward, idle, occasionally dance.
7. Add a gnome to your game, and add a script so that the user can control the gnome to move around in the garden.
8. When a bunny or a bug touch a vegetable, the vegetable “shrink” and make a loud scream sound and disappear.
9. The player needs to control the gnome to drive the bunnies and bugs away before they can touch the vegetable.

Be creative and be reasonable. Also add music and sound to your project. Enjoy!