Course Design Brief
Art Institute of Pittsburgh – Online

Course Details					
Course Title:	Computer 3D Modeling and Animation II			**Course Code:**	C222
Course Prerequisite(s):	C212: Computer 3D Modeling and Animation I				
Course Description:	Students will continue their study of material and animation techniques using a 3D computerized environment.				
Course Length:	5.5. weeks	**Contact Hours:**	44	**Credit Value:**	3
Required Text, & Materials:	Software's user reference files and help files				
Technology:	**Hardware:** PC: As a general guideline, students should have computer specifications of a Pentium IV CPU or greater, Windows 2000 or XP, and 2 GB RAM, Scanner, Printer **Software:** 3ds Max (latest version), Adobe Photoshop (latest version), Microsoft Office Professional (including Word, Excel, PowerPoint, Access and Outlook) **Internet Connection:** 56K or faster Internet connection is required for online courses, however broadband is strongly encouraged. **Browser:** Courses offered online are best viewed using Microsoft Internet Explorer v5.5/6.0 (PC), Safari 1.0 (MAC), or Firefox.				

Course Competencies:	Upon successful completion of this course, the student will be able to: 1. Create complex material and UVW mapping solutions. • Discuss the importance of applying UVW mapping coordinates. • Apply specific UVW mapping coordinates to simple and complex models. • Discuss UWV modifiers as they pertain to editing the UVW's on a mesh object. • Apply UWV modifiers to simple and complex mesh objects. • Identify and apply Unwrap UVW, Unwrap Editor, UVW Maps, and UVW Xform to simple and complex models. 2. Demonstrate the ability to apply basic material to 3D models. • Identify the material editor and specific map slots. • Render UVW templates for use in 2D software applications. 3. Exhibit the ability to apply animation techniques to 3D models. 4. Show the ability to use advanced controllers in animating and linking models. • Apply and manipulate helpers or dummy objects. • Apply animation constraints and animation controllers to 3D objects to assist with the animation process. 5. Manipulate animation curves to refine movement and timing. • Enhance the look of the animation through the use of animation editors. • Apply different tangent types to existing keyframes on animated 3D objects.
Materials and Supplies:	None

The percentages listed below reflect evaluation and assessment methods appropriate for online delivery of this course. These totals will differ from the on-ground ACO evaluation requirements because the instructional delivery and evaluation methodology of on-ground versus online require different assessment protocols for student outcomes to be effectively evaluated.

Discussion and Participation	20%
Critique Exercise	10%
Projects	70%

Analysis of Competencies

The table below describes the means by which each competency will be assessed. In addition, the table also includes the week(s) in which each competency will be covered along with the weight that each competency holds.

Competency	Planned Assessment Method	Week(s) in which Competency will be Covered
Create complex material and UVW mapping solutions.		1,2,3
Demonstrate the ability to apply basic material to 3D models.		1,2,3,5
Exhibit the ability to apply animation techniques to 3D models.		4,5,6
Show the ability to use advanced controllers in animating and linking models.		5,6
Manipulate animation curves to refine movement and timing.		4,5,6
Total		**100%**

Week 1 Snapshot		
• Create complex material and UVW mapping solutions. Apply specific UVW mapping coordinates to simple and complex models. • Demonstrate the ability to apply basic material to 3D models.		
Week 1 Reading Complete the following readings early in the week: • Week 1 online lectures From the help files, read the assigned sections from the following topics: • UVW Map Modifier • Unwrap UVW Modifiers • Edit UVWs Dialog • Material Editor • Material and Maps • Render UVs While reading, make note of pertinent and important facts. You will be required to reference your readings in discussions and apply them in this week's assignments.	Completion time: 1	hour

Week 1 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 1: Autobiography Before you begin, spend some time to get to know your peers. You may read the facilitator's autobiography, posted in the **Discussion Area**. By **Week 1, Day 1**, write a brief autobiography of at least 100 words discussing the following details: • Your name and location • Profession or area of study • Level of familiarity with 3D software • Academic or professional strengths • Reason for interest in the topics covered in this course • Expectations from this course Read, respond, and discuss the following questions to share your views on various aspects of 3ds Max with your peers: • What are some of the things you look for in a video game or an animated 3D movie? Provide a rationale to support your answer. • List at least three principles of animations and describe their importance to 3D animation. • Describe either a video game or a 3D-animated movie that you feel represents good use of animation principles or texturing techniques. Comment on at least two of your peers' autobiographies. You may ask questions or respond generally to the overall experience. Consider the discussions as a way of communicating your ideas and opinions in a traditional classroom.	N/A	N/A	*2 Hours*

Be clear in your communications. Format your autobiography according to MLA guidelines.

Evaluation Criteria:

Assignment 1 Grading Criteria	**Maximum Points**
Wrote a short autobiography with the elements listed and communicated ideas and opinions explicitly and clearly in writing.	8
Commented on at least two replies to other autobiographies posing questions and observations to enrich the discussion and displaying positive regard for others.	4
Provided rationale and examples to support your response to the three questions regarding texturing and animation.	8
Total:	**20**

Facilitator Notes

Complete and post your autobiography as an example. Encourage the students to read the autobiographies submitted by other students and to comment on them.

This assignment involves the introduction of each student. The additional questions will help establish rapport and build a community in the online environment. The discussion of real-life experiences will help you determine the students' perceptions about the topic.

Week 1 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 2: Discussion Questions By **Week 1, Day 3**, respond to the discussion questions assigned to you by the facilitator. Submit your responses to the appropriate **Discussion Area**. Start reviewing and responding to your peers' posts as early in the week as possible. You can ask a question, post a comment, or add a point to expand the discussion. Be honest, clear, and concise. Always use constructive language, even in criticism, to work toward the goal of positive progress. Make sure to use your course text or other research when possible in your responses. Support your statements with appropriate references wherever necessary. Follow current MLA guidelines for writing style, spelling, grammar, and citation of sources.	NA	*1,2*	*3 Hours*

Assignment 2 Grading Criteria	Maximum Points
Response Criteria:	
Met the criteria for the correct responses to the questions assigned.	4
Used vocabulary relevant to the current week's topics—at least five terms.	4
Participation Criteria:	
Used vocabulary relevant to the current week's topics—at least five terms.	4
Participated in the discussion by asking a question, providing a statement of clarification, providing a point of view with rationale, challenging a point of discussion, or making a relationship between one or more points of the discussion.	4
Justified ideas and responses by using appropriate examples and references from texts, Web sites, and other references or personal experience.	4
Total:	**20**

DQ 1: What are UVW coordinates, and what do U, V, and W describe? Why is it important to assign proper UVW coordinates to 3D models? Would you be concerned with creating UVW mapping coordinates? Why or why not? Justify your answer with appropriate rationale.

Evaluation Criteria: Students should have: o Explained what are UVW coordinates and stated what U, V, and W describe. o Explained why it is important to assign proper UVW coordinates to 3D models. o Explained and justified if they would be concerned with creating UVW mapping coordinates. **Facilitator Notes**: The intent of the assignment is to help students understand what UVWs are and how they can help the look of a 3D model. UVW mapping coordinates define how a texture map is aligned to an object. "U" represents the horizontal direction on a bitmap, "V" represents the vertical direction on a bitmap, and "W" represents the depth in a bitmap. The student answers may vary as to why they think it is important to assign UVW coordinates. They should be able to explain what U, V, and W mean when describing coordinates and how they are similar to XYZ coordinate systems. **DQ 2:** Why do you think it is important to have materials assigned to the objects to assist with the unwrapping process? What is the most suitable procedural map to be used on a material and eventually assigned to an object? What is the most suitable procedural map to be assigned to a material to help with the unwrapping process? How does having that material assigned to an object help? Explain your answers using appropriate examples and rationale. **Evaluation Criteria:** Students should have: o Explained why they think it is important to have materials assigned to the objects to assist with the unwrapping process.			

○ Explained the most suitable procedural map to be assigned to a material. ○ Discussed how the material once assigned to an object helps in the unwrapping process. **Facilitator Notes**: The intent of this question is for the students to get familiar with proper setup techniques that can help with the unwrapping process. If specific units are applied, having the display unit scale set to **US Standard** and **Feet w/Decimal Inches** in 3ds Max can help the students make sure the objects being created in the software are proportionate. This is not a necessity but is something that can be used in object creation. Some good options for setting up the user interface to help with unwrapping are making sure the viewports are set to **Smooth + Highlighted** and with **Edged Faces**. The students should be aware of the material editor and that using a checker map in the diffuse slot of a material is a very useful tool in the creation, manipulation, and alignment of texture coordinates. Having a checker map assigned to the diffuse slot of a material is a great was to visually see how coordinates are being manipulated and aligned. **DQ 3:** When working with complex or organic models, such as a character, why is it important to minimize distortion in the UVW coordinates before applying a texture? Explain what might occur if mapping coordinates were not addressed. **Evaluation Criteria:** ○ Explained why is it important to minimize the distortion in the UVW mapping coordinates before assigning any textures. ○ Explained what would be noticed if the stretching in the UVW coordinates were not addressed before applying a texture. **Facilitator Notes**: The main focus is to make sure the students address stretching in the UVW coordinates before applying textures. This is to help the students understand and figure out ways to eliminate distortion in textures once applied to an object. This will also get the students to read the checker material that was assigned to the object and make proper corrections to the UVW coordinates. The students should explain that improperly aligned or stretched UVW coordinates result in the applied			

textures not getting assigned correctly to the surface of the object. If this is not addressed before applying the texture, the object's UVW coordinates will have to be revisited and the distortion will have to be fixed in the texture. **DQ 4:** After an object's UVW coordinates have been manipulated and corrected and stretching has been minimized, do you think utilizing texture space in the Edit UVWs window is required? Why or why not? If mapping coordinates are outside of the defined texture space, how would that affect the texture once applied to the unwrapped object? **Evaluation Criteria:** o Explained with appropriate rationale why utilizing texture space in the Edit UVWs window is required. o Explained what the effect of a texture would be once applied to the object if UVW mapping coordinates were outside of the defined texture space. **Facilitator Notes**: The focus of this question is on the proper use and alignment of planar mapping coordinates within the square pixel texture space. The response to the question may vary but should emphasize the importance of having the planar mapping coordinates arrange in the texture space so that when a material is assigned to the object, the details of the texture have been predetermined. This will help the students understand and begin to concentrate on how they unwrap and arrange mapping coordinates in the Edit UVWs window. The students should be able to explain the importance of the texture space and why the individual mapping coordinates should be aligned to best fit the space. Any map or planar map outside of the defined square pixel texture space will be a part of the tiling of the texture.			

Week 1 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 3: **Assignment Title:** Assigning UVW coordinates to a primitive shape In this assignment, you will practice assigning UVW coordinates to a cube. Perform the following: ○ Create a box that has equal sides (a cube) and modify it to separate its UVW mapping coordinates. ○ Make sure that the cube has the proper UVW maps so that the different coordinates can be manipulated. ○ Organize, transform, and arrange the mapping coordinates properly to give the cube's UVWs a clean unwrap. ○ Save the file with the cube and the mapping coordinates as W1_A3_Lastname_Firstname.max and submit it to this **Discussion Area** by **Week 1, Day 4**. **Discussion** By the end of the week, use this **Discussion Area** to discuss the following: ○ Discuss some challenges that you came across while trying to create the cube's mapping coordinates for all six sides. ○ Describe at least one modifier assigned to the cube to assist with the manipulation of its mapping coordinates and discuss how did it help. ○ **Critique Exercise** By the end of the week, use this **Discussion Area** to review and comment on the assignment posted by at least two of your peers. Comment on whether or not they organized all six sides of the cubes, mapping coordinates correctly. Also provide constructive feedback if the mapping (texture)	NA	1,2	*1 hour*

space was used as efficiently as possible.

Assignment 3 Grading Criteria	**Maximum Points**
Used 3ds Max to create a cube and assign specific UVW coordinates to each of the six planar sides.	**5**
Organized the six individual planar UV sections of the cube in the texture space.	5
Made sure all six sides fit into the texture space and used texture space as efficiently as possible.	5
Discussed any challenges that might have made it difficult to assign planar mapping coordinates to the six sides.	5
Discussed some of the different techniques used to create UVW coordinates.	5
Reviewed and critiqued the submissions of at least two peers on the basis of the critiquing guidelines.	5
Total:	**30**

Facilitator Notes:

- Purpose of assignment:

  The purpose of this assignment is to give the students a better understanding of what UVW coordinates are and how to assign basic coordinates to a primitive shape. This will also get the students familiar with the user interface and where essential UVW tools are located.

- Assignment outcome:

  The outcome of this assignment will be a primitive cube that has specific UVW coordinates assigned, giving students the option of creating a custom texture to apply. The students will now have a better understanding of UVW coordinates and how they affect a primitive shape.

- Examples/resources/suggestions:

  Make sure that the students use both the UVW Map modifier and the Unwrap UVW modifier to assist with the completion of this assignment.

Have the student first look at the cube's UV layout in the Edit UVWs window to see how coordinates are assigned prior to assigning specific UVW coordinates. Refer to the UVW Map Modifier and Unwrap Modifier in the help files for the software. If students are unable to complete the assignment appropriately, you can guide them with these steps as and when you think they need some guidance: ○ Using a standard primitive box, change the creation method to cube and create a cube in the top viewport. Make sure that in the perspective view, Smooth + Highlights and Edge Faces is selected to see the mesh as a solid object. In the Modify panel, make sure to name the mesh appropriately. ○ In the Modify panel, add a UVW Map modifier through the modifier list. The UVW Map modifier should now appear above the box in the Modify stack. In the UVW Map Parameters, change the mapping from Planar to Box, which will apply a box gizmo to the cube. ○ Now apply another modifier to the stack. In the Modify panel, add an Unwrap UVW modifier through the modifier list. The Unwrap UVW modifier should now appear above the UVW Map modifier in the Modify stack. The bottom of the stack should have the box followed by the UVW Mapping modifier. On the top, the Unwrap UVW modifier should be seen. ○ In the Parameter rollout of the Unwrap UVW modifier, click the Edit option to open the Edit UVW's window. You will be able to see the cube's predefined UVW coordinates that the UVW Box Map assigned. Using the subobject/Face selection of the Unwrap UVW, select all six sides of the cube and separate them in the Edit UVWs window. ○ In the Edit UVWs window, use the Transform tool to scale and move all six sides of the cube into the texture space. • Pointer to the facilitator regarding the expected answers from the students: The students should be able to discuss the importance of basic UVW coordinates and UVW maps. They should be able to describe and demonstrate how to apply a specific mapping gizmo to the cube and organize the UVWs in the Edit UVWs window.			

Week 1 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 4 **Assignment Title:** Stretching and Arranging UVW Templates After practicing to assign UVW coordinates to a cube, you'll now use a box with unequal sides and create a proper mapping solution to minimize stretching. Perform the following: ○ Create a box with unequal sides and modify it to separate its UVW mapping coordinates. ○ Make sure that the box has the proper UVW maps so that the different coordinates can be manipulated. ○ Organize, transform, and arrange the mapping coordinates properly to give the cube's UVWs a clean unwrap. ○ Make sure to minimize distortion and stretching in the UVW mapping coordinates and to assign a material that has a checker map assigned to the diffuse slot. ○ Export the UVW mapping coordinates as a 1024x1024-square-pixel texture. ○ Save your work as W1_A4_Lastname_Firstname.max. In addition, save the UVW template as W1_A4_Lastname_Firstname.jpeg. Submit both the files to this **Discussion Area** by **Week 1, Day 5**. **Discussion** By the end of the week, use this **Discussion Area** to discuss the following: ○ How did assigning a material with a checker map to an object assist with unwrapping? ○ What were some noticeable differences between assigning UVW mapping coordinates to the cube in the previous assignment (all sides even) and the box (with unequal sides) in this assignment? **Critique Exercise**	NA	1,2	*2 Hours*

By the end of the week, use this **Discussion Area** to review and comment on the assignment posted by at least two of your peers. Comment on:

- How have the UVW coordinates been applied?
- Are there any stretching issues that need to be fixed?

Assignment 4 Grading Criteria	**Maximum Points**
Used 3ds Max to create a box with unequal sides and assigned specific UVW coordinates to each of the six planar side.	5
Organized the six individual planar UV sections of the box in the texture space.	5
Made sure all six sides fit into the texture space and used the texture space as efficiently as possible.	5
Assigned a check material and used that map to minimize stretching in the box.	5
Exported the UVW template as a jpeg.	5
Discussed why a checker map is applied to a 3D object and how is it used to help with UVW coordinates.	5
Reviewed and critiqued the submissions of at least two peers on the basis of the critiquing guidelines.	5
Total:	**35**

Facilitator Notes:

Purpose of assignment:

This assignment is to give the students a better understanding of what UVW coordinates are and how to assign basic coordinates to a primitive shape. This will also get the students familiar with the user interface and where essential UVW tools are located. Applying coordinates to a box this time and assigning a material to it will help the students understand stretching that occurs in some 3D objects. The students will now know how to spot stretching and be able to fix those issues to obtain the best possible UVW coordinates for a 3D model and render a UVW template that can be used in a 2D paint application.

- Assignment outcome:

The outcome of this assignment will be a box that has specific UVW coordinates assigned, giving students the option of creating a custom texture to apply. The students will now have a better understanding of UVW coordinates and how they affect a primitive shape. Because of the unequal sides that the box has, the students now will know about stretching, some issues with stretching, and how to fix those issues. • Examples/resources/suggestions: Make sure that the students use both the UVW Map modifier and the Unwrap UVW modifier in this assignment. Have the student first look at the box UV layout in the Edit UVWs window to see how coordinates are assigned prior to assigning specific UVW coordinates. Refer to sections on UVW Map Modifier and Unwrap Modifier in the help files for the software. Make sure that when the box is created, the sides are noticeably different in height and width than the top and bottom to better get the stretching point across. If students are unable to complete the assignment appropriately, you can guide them with these steps as and when you think they need some guidance: ○ Using a standard primitive box, make sure the creation method box is used. Create a box in the top viewport. The top and the sides of the box should not be equal. In the perspective view, select Smooth + Highlights and Edge Faces to see the mesh as a solid object. Name the box in the Modify panel appropriately. ○ Open the material editor (M) to view and assign a material to the box. In one of the empty material slots, add a checker map to the diffuse slot of the material. Name the material UVW_material and assign the material to the box. Make sure the checker map has been tiled in the U and V coordinates no less than 10 times. Click the Show Standard Map in Viewport button to see the newly assigned material in the perspective viewport. ○ In the Modify panel, add a UVW Map modifier through the modifier list. The UVW Map modifier should now appear above the box in the modify stack. In UVW Map Parameters, change the mapping from planar to box which will apply a box gizmo to the box with unequal sides. ○ Now apply another modifier to the stack. In the Modify panel, add an Unwrap UVW modifier through the modifier list. The Unwrap UVW modifier should now appear above the UVW Map modifier in the modify stack. The bottom of the stack should contain the box followed by UVW Mapping modifier in the middle and the Unwrap UVW modifier on the top.			

In the Parameter rollout of the Unwrap UVW modifier, click the Edit option to open the Edit UVWs window. You should see the box's predefined UVW coordinates that the UVW Box Map assigned. Using the sub-object/Face selection of the Unwrap UVW, select all six sides of the box and separate them in the Edit UVWs window. ○ In the Edit UVWs window, use the transform tools to scale and move all six sides of the box into the texture space. This time make sure to minimize stretching because the box does not have equal sides. Use the applied check material to assist in making sure there is no stretching in the UVW coordinates. The tiled check map should resemble black-and-white squares and not black-and-white rectangles. The rectangles in the checker map represent stretching in the UVW coordinates. ○ Using the Render UVW Template tool in the Edit UVWs dialog box, export a 1024x1024-square-pixel texture. The template should be saved in the jpeg format. • Pointer to the facilitator regarding the expected answers from the students: The students should be able to explain and demonstrate the ability to apply a material and use that material to see if an object's UVW coordinates are assigned correctly or if they need to be fixed. The checker map is a useful material to assist in a 3D mesh to create proper UVW coordinates.			

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<tr><th>Week 1 Assignments/Assessment</th><th>Resources</th><th>Competency Analysis</th><th>Completion Time</th></tr>
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Assignment 5: Final Project

Final Project Overview

As part of the final project, you will create a custom scene with proper UVW coordinates applied to objects that require to be animated.

The objective of the final project is to successfully model, texture, and animate an assembly line of a factory that uses multiple crane arms to manipulate different objects. There will be two crane arms, one placed at the start of a conveyor belt and the second placed at the opposite end. The first crane arm will pick up an object and place it onto the conveyor belt. The object will move down to the second crane arm. The second crane arm will pick up the object and place it into a bin or a container.

Three different objects will move from one end to the other. The objects can be inanimate and vary in size and shape. For example, the objects can be a soda can or water bottle, a rubber ball, or a building block. Once the three objects have been defined, you will create three containers or bins and place each object into its own specific container. You will be required to texture the crane's arms with custom graphics and markings to add interest to the mesh. All the objects must also be unwrapped and have proper textures applied to emphasize the look, including the containers they will end up in. The scene in which all this takes place should also have textures to add some aesthetics to the final render.

Week-wise distribution of the tasks of the final project:

Week 1	You'll create the crane arms, three inanimate objects, three bins, or containers, and the environment.
Week 2	You'll create a custom look for all the objects in the scene to better emphasize style and add aesthetics. This will require the object to have proper mapping coordinates, textures, and different materials applied.
Week 3	Using the different UVW mapping coordinates and UV templates, you'll continue to define the look of the scene. Using a 2D paint software application, you'll also create a custom look for the assembly line. Start to apply the material and textures to give the scene a factory-like look.
Week 4	You'll create proper linking and parenting of the different pieces that make up the crane arm mesh. You will also start placing the objects in the environment, making sure the containers are placed at the end of the assembly line.

</td><td>NA</td><td>1,2,</td><td>1 hour</td></tr>
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Week 5	You'll apply proper keyframing and motion to the crane arms and objects, making sure that the linking and hierarchy is correct. You'll add final touches including the use of constraints and other techniques to move the three objects into their respective bins. Using the function curves, you'll make any adjustments to improve the motion and timing of the animation.
Week 6	Based on the feedback and online critique, you'll revise the final animation to improve any inconsistencies within the animation and texturing.

Assignment Title: Creating the Scene

As part of this week's final project component, you will start thinking about the factory scene in which you will create crane arms manipulating different objects. You should begin to create concepts for the look and style of the different objects that will make up your final scene. Using proper techniques and principles, you will begin modeling the different assets that will be used to create UVW mapping solutions and animations.

In this assignment:

- Create the two crane arms. Make sure that they vary in style but still fit your overall concept.
- Model the three inanimate objects that the crane will be moving and the containers that each individual object will be placed within.
- Model the conveyor belt and place the two crane arms on either ends of the conveyer belt.
- Make sure all objects in the scene are named appropriately for easy identification.
- Save the file as W1_A5_Lastname_Firstname.max. The file should contain all factory scene objects. Submit the file to this **Discussion Area** by **Week 1, Day 6**.

Discussion

By the end of the week, use this **Discussion Area** to discuss the following:

- When starting a model, knowing how UVW mapping coordinates work and are created, did you approach modeling any different?

- When creating multiple objects with similar characteristics, what are some options for making workflow more proficient?

Critique Exercise

By the end of the week, use this **Discussion Area** to review and comment on the assignment posted by at least two of your peers. Comment on:

- Have all the required pieces been created?
- Has a consistent style been used?
- What do you think is working for the scene and what are the things that could be improved or adjusted?

You will track the work of the two peers throughout the course.

Assignment 4 Grading Criteria	**Maximum Points**
Used 3ds Max to createa factory scene that has two crane arms, a conveyor belt, three inaimate objects, and three containers.	**45**
Discussed their apporach on modeling and shared options for making workflow more proficient.	**5**
Made sure that all the objects are named appropriately for easy identification.	**5**
Reviewed and critiqued the submissions of at least two peers on the basis of the critiquing guidelines.	**5**
Total:	**60**

Facilitator Notes:

- Purpose of assignment:

  The purpose of this assignment is to help the students review modeling tools, techniques, and principles to begin the creation of the final scene. The objects created in this assignment will be used as key objects in the final animation.

- Assignment outcome:

The outcome of this assignment is to review the **Week 1** topics and start creation of the assets that will be used in the final animation. • Examples/resources/suggestions: Make sure that the students are using proper modeling techniques and that the typology is clean. Refer to box modeling/poly modeling techniques and the Editable Poly Modifier option to identify the proper tool that can be used to create the different pieces. • Pointer to the facilitator regarding the expected answers from the students: The students should be able to discuss the importance of good typology and how that can help when a model is getting ready to be unwrapped. They should be able to describe and demonstrate how to model using editable poly and editable mesh parameters to construct all the objects that will be used in the final scene.			

Week 2 Snapshot		
• Create complex material and UVW mapping solutions. Apply specific UVW mapping coordinates to simple and complex models. • Demonstrate the ability to apply basic material to 3D models.		
Week 2 Reading Complete the following readings early in the week: • Unwrap UVW Modifier • Edit UVWs Dialog • Unwrap Options Dialog • Pack UVs Dialog • Render UVs Dialog While reading, make note of pertinent and important facts. You will be required to reference your readings in discussions and apply them in this week's assignments.	Completion time:	2 hours

Week 2 Assignments

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<tr><th>Week 2 Assignments/Assessment</th><th>Resources</th><th>Competency Analysis</th><th>Completion Time</th></tr>
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Assignment 1: Discussion Questions

By **Week 2, Day 3**, respond to the discussion questions assigned to you by the facilitator. Submit your responses to the appropriate **Discussion Area**. Start reviewing and responding to your peers' posts as early in the week as possible. You can ask a question, post a comment, or add a point to expand the discussion. Be honest, clear, and concise.

Always use constructive language, even in criticism, to work toward the goal of positive progress. Make sure to use your course text or other research when possible in your responses.

Support your statements with appropriate references wherever necessary. Follow current MLA guidelines for writing style, spelling, grammar, and citation of sources.

<table>
<tr><th>Assignment 1 Grading Criteria</th><th>Maximum Points</th></tr>
<tr><td colspan="2">Response Criteria:</td></tr>
<tr><td>Met the criteria for the correct responses to the questions assigned.</td><td>4</td></tr>
<tr><td>Used vocabulary relevant to the current and previous weeks' topics—at least five terms.</td><td>4</td></tr>
<tr><td colspan="2">Participation Criteria:</td></tr>
<tr><td>Used vocabulary relevant to the current and previous weeks' topics—at least five terms.</td><td>4</td></tr>
<tr><td>Participated in the discussion by asking a question, providing a statement of clarification, providing a point of view with rationale, challenging a point of discussion, or making a relationship between one or more points of the discussion.</td><td>4</td></tr>
<tr><td>Justified ideas and responses by using appropriate examples and references from texts, Web sites, and other references or personal experience.</td><td>4</td></tr>
<tr><td>Total:</td><td>20</td></tr>
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DQ 1: When unwrapping a complex model, what are some of the different ways you can approach the

</td><td>NA</td><td>1,2,3</td><td>3 hours</td></tr>
</table>

task of unwrapping? What are some of the things you would consider before beginning to unwrap? Why? Justify your answers using appropriate rationale and examples. **Evaluation Criteria:** Students should have: o Identified at least two options for unwrapping a complex model and discussed ways to approach unwrapping. o Discussed at least three considerations that they should keep in mind before starting an unwrap. **Facilitator Notes**: The intent of this activity is to get the students to start thinking about how to approach unwrapping a more complex mesh. The answers may vary, but the students should talk about how the model was created, look at what the most important areas of the model are, and discuss how the texture is going to be applied. The main focus of this discussion is to have the students think about how to approach a complex model and how they should unwrap and texture that model. **DQ 2:** What are texture seams? Do you think they are important to consider when unwrapping a model? Why or why not? What do texture seams represent on the mapping coordinates? **Evaluation Criteria:** o Defined what texture seams are. o Explained whether seams are important in the unwrapping phase. o Explained what seams represent on different mapping coordinates. **Facilitator Notes**: The intent of this activity is to get the students to start thinking about texture seams and why they are important when unwrapping a model. The answers may vary, but the students should talk about the seams as representing the edges of the different UVW maps of a model. The seams are visualized as green lines that border different planar mapping coordinates and help show the different mapping clusters. The main focus of this discussion is to have the students think about how texture seams work and how			

they can be a good way to visualize mapping clusters and mapping boundaries. The seams can be used to piece together the different mapping coordinates or mapping clusters. This is a lot like putting together the pieces of a puzzle. **DQ 3:** What can you do to the different mapping clusters of a model to simplify and minimize them? Share an example scenario to explain how you can reduce mapping clusters and the benefit it confers. **Evaluation Criteria:** o Explain how to minimize and simplify all the different mapping clusters that are contained within a model. **Facilitator Notes**: The intent of this activity is to get the students to start thinking about how to minimize texture seams and reduce the different pieces that form a part of a model's unwrap. The answers may vary, but the students should talk about how target welding and welding vertexes and edges together can be used to create one unified cluster out of many. **DQ 4:** For what reasons would you want to export an unwrap? Describe at least two scenarios in which you would choose to do so. What are some of the important things to consider when getting an unwrap ready for exporting? Why? Justify your answers with appropriate examples and rationale. **Evaluation Criteria:** o Described at least two scenarios in which they would choose to export an unwrap. o Described some important issues to consider when exporting an unwrap. o Justified their answers with appropriate examples and rationale. **Facilitator Notes**: The intent of this activity is to get the students to start thinking about how to use an unwrap and what should be expected of that unwrap before it is exported. The students should also think how the exported UVWs can be used to improve the look of a model. The answers may vary, but the students should discuss that before exporting an unwrap, all different mapping coordinates must be packed into the texture space. They should also mention seams and how they can be minimized to arrange the mapping			

coordinates. They should also check how the different clusters have been arranged, aligned, and transformed to better use the texture space. The main focus of this discussion is to have the students start getting unwraps ready for exporting and manipulating outside of the 3D application.			

Week 2 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 2 **Assignment Title:** Creating a Gun Turret A gun turret is a device that provides a mechanism for using a projectile firing weapon. It lets the weapon be aimed and fired in many directions. The turret provides a rotating weapon platform. In this assignment, you will create a gun turret using the techniques you have learned so far. Perform the following: ○ Create a gun turret using box or poly modeling techniques and parameters found in the editable poly or editable mesh modifier. ○ Apply mapping coordinates to the gun turret, making sure that seams and stretching are minimized. ○ Organize the mapping clusters, utilize the texture space efficiently, and export a UVW template to be used in a 2D paint application. ○ Create a 640 x 480 render of the gun turret from the perspective view, with the checker material assigned. Leave the default lighting on when rendering and make sure that the gun turret is in the three-fourth view, with the barrel of the gun visible. Change the color of the background to enhance the view of the gun turret with the checker material, making the black-and-white checker pattern more visible. Use your creativity to enhance the gun turret. ○ Save the render as W2_A2_Lastname_FirstnameScreenshot.jpeg. ○ Export the UVW Template as a 1024 x 1024 texture and save it as W2_A2_Lastname_Firstname_UVWTemplate.jpeg. You will use this template in the next assignment. ○ Submit both the render and the UVW template to this **Discussion Area** by **Week 2, Day 4**. **Discussion** By the end of the week, use this **Discussion Area** to discuss the following:	NA	*1,2,3*	*3 Hours*

- How did the knowledge about UVW mapping coordinates and their working affect the creation of the model?
- What were some of the things you thought about when packing the UVW mapping clusters? How were the clusters arranged?

Critique Exercise

By the end of the week, use this **Discussion Area** to review and comment on the assignment posted by at least two of your peers. Comment on:

- **Screenshot:** Does the model have the style of a gun turret and follow proper typology and rendering requirements as listed in the assignment instructions?
- **UVW Template:** Have the seams and stretching been minimized while retaining the shape of the gun turret? Have the UVW clusters been efficiently arranged, transformed, and packed into the texture space?

Assignment 2 Grading Criteria	**Maximum Points**
Created a gun turret using appropriate box or poly modeling techniques and parameters found in the editable poly or editable mesh modifier.	10
Applied mapping coordinates to the gun turret, making sure that seams and stretching are minimized and utilized the texture space efficiently.	10
Exported a 1024 x 1024-texture UVW template to be used in a 2D paint application.	10
Created a 640 x 480 render of the gun turret with proper render requirements as listed in the assignment.	10
Reviewed and critiqued the submissions of at least two peers on the basis of the critiquing guidelines.	10
Total:	**50**

Facilitator Notes:

- Purpose of assignment:
  The purpose of this assignment is to have the students review modeling techniques while concentrating on how that model will be unwrapped and textured. This will give the students an idea of how to go about unwrapping the different assets for the final scene.

- Assignment outcome:
  The outcome of this assignment will be a low poly gun turret that has proper UVW mapping coordinates applied. The gun model will be use in the next assignment to practice applying textures to a model. Here's a sample that you can share with the students if necessary.

- Examples/resources/suggestions:

  Make sure that the students are using Editable Poly or Editable Mesh tool to create the shape of the gun turret. Use the reference file to review editable poly/mesh modifiers and subobjects.
  The gun model should have a relatively low poly count and good typology flow.
  Make sure the students use the Unwrap UVW Modifier to create the mapping coordinates. In the Edit UVWs dialog, they should use the Render UVWs Template tool to export out the 1024 x 1024-square-pixel texture. There should be no overlapping UVWs and the seam and stretching must be minimized.
  Use sample images as a reference for what a gun turret can look like and how the mapping coordinates can appear after being packed and exported.

- Pointer to the facilitator regarding the expected answers from the students:

  The students should be able to discuss how their gun turret was modeled when they knew it was

going to be unwrapped. They should be specific about what mapping clusters used more of the texture space and why they were laid out the way they were. When arranging the different mapping clusters, students should be aware of direction, spacing, and the importance of each piece for the texture. How the texture will be created and applied should also be considered because the look of the texture depends on how it was unwrapped. They should also be able to make suggestions on the UVW template and how they can improve on the layout, seams, and stretching.			

Week 2 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 3 **Assignment Title:** Creating and Applying a Texture In this assignment, you will use the UVW template rendered out of the Unwrap UVW editor of the gun turret in Photoshop. You'll create a custom texture to be applied to the mesh (gun turret) to give it a distinct style. Perform the following: ○ Use the exported 1024 x 1024-square-pixel UVW template in Photoshop to create a custom texture for the gun turret to give it a distinct appearance. The texture should be designed to look like a gun that has been fired and that has received some battle damage and natural weathering. Apply different markings to this effect. ○ Once the texture has been created, apply the newly created map back to the gun turret model. Use the material editor to enhance the map more to give the surface a specific look. ○ Set up the gun turret in the perspective view to be rendered with lighting, textures, and a floor plane. ○ Save the Photoshop texture (without the wireframe of the mapping coordinates) as W2_A3_Lastname_Firstname_Texture.jpeg. ○ Create a 640 x 480 render of the final gun turret from the perspective view and save it as W2_A3_Lastname_Firstname_Gun_Turret.jpeg. Make sure to pick an angle that best suits your model. Lighting should help accent the newly applied texture and cast shadows onto the floor plane. ○ Submit both the JPEG files to this **Discussion Area** by **Day 4**. **Discussion** By the end of the week, use this **Discussion Area** to discuss the following: ○ How did the UVW template affect the creation of the final gun turret texture? ○ How would you change the UVW mapping clusters arrangement to improve the texture painting	NA	*3*	*2hours*

process in Photoshop? Why would you make those changes?

Critique Exercise

By the end of the week, use this **Discussion Area** to review and comment on the assignment posted by at least two of your peers. Comment on the final gun turret render providing specific feedback on the following:

- How the applied texture works or does not work on the gun mode, style, and aesthetics?
- Did the use of lighting affect the render in a positive or negative way?

Assignment 3 Grading Criteria	**Maximum Points**
Create a 640 x 480 render of the final gun turret with appropriate light, textures, and a ground plane.	20
Saved the gun turret texture as a 1024 x 1024-square-pixel jpeg without the wireframe of the mapping coordinates.	10
Exported the textured map from Photoshop, applied it to the gun turret model, and used the material editor to enhance the map to give the surface a specific look.	10
Participated in the discussion based on the discussion guidelines.	10
Reviewed and critiqued the submissions of at least two peers on the basis of the critiquing guidelines.	10
Total:	**60**

Facilitator Notes:

- Purpose of assignment:
  The purpose of this assignment is to have the students use their exported UVW template in a 2D paint program to create a custom texture that will be applied to a model. The students will learn how their approach of applying UVW mapping coordinates affects how the final texture is created and assigned back to the model? They will also see how lighting affects the look of the texture and whether any inconsistencies appear in the model's texture once it is rendered.

- Assignment outcome:
  The outcome will be a 3D mesh that has been modeled, unwrapped, textured, and lit. This will give the students a good idea of what it takes to complete a scene from start to finish. The students will

also be able to model and unwrap a mesh more efficiently knowing that a custom texture will be applied. They get a look at how a 2D paint application helps in the creation of a 3D scene and how lighting plays a major role in a texture's appearance. • Examples/resources/suggestions: Make sure the students export the final texture from Photoshop with the original mapping coordinates wireframe off. In the reference files, refer to the sections on lighting in 3ds Max and how shadows work. Also check the sections on applying materials and applying lights. If you have some students' samples available, it would be a good idea to show students how different looks can be achieved. • Pointer to the facilitator regarding the expected answers from the students: The students should talk about how the UVW mapping clusters were arranged and how that affected the creation of the final texture. They should be able to point out that the important features of the gun and the areas of interest should have been the most dominant UVW clusters in the unwrap. The proper arrangement, rotation, and scaling of the mapping clusters will affect how the texture is created and how it will look once applied. Lighting plays an important part in the visualization of the final render. It can show off the material or surface type (metal, concrete, plastic, and so on) and any imperfection in the material. Lighting can also be used to cover up improper UVW coordinates and hide ugly stretching and seams. Lighting helps make a low poly mesh look more complex with the application of different maps, bump, spec, and reflection among others.			

Week 2 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 4 **Assignment Title:** Final Project Last week, you created all the objects you'll require for your final scene. This week, you'll unwrap and apply proper UVW mapping coordinates to the objects. Perform the following: ○ Make sure that the objects in the final scene have proper UVW mapping coordinates so custom textures and material can be applied to define a style to the scene. ○ Organize, transform, and arrange the mapping coordinates properly to give the objects' UVWs a clean unwrap. This will be important in the texture creation of the different objects in the scene. ○ Make sure to minimize distortion in the UVW mapping coordinates and ensure that proper materials are assigned to assist in this step. ○ Export the UVW mapping coordinates to be used in the creation of the textures during next week's final project component. Make sure that all UV templates have proper square pixel dimensions to paint the textures in Photoshop. Depending on the importance of the model, a variety of sizes can be used. These include textures with dimensions of 256 x 256, 512 x 512, and 1024 x 1024 square pixels. ○ Save the 3ds Max file as W2_A4_Lastname_Firstname.max. Make sure that all the objects have the checker material applied to them so it is easy to view the mapping coordinates in the viewports. ○ Submit the file to this **Discussion Area** by **Week 2, Day 5**. **Discussion** ○ By the end of the week, use this **Discussion Area** to discuss some possible techniques on how unwrapping a large scene can be minimized. **Critique Exercise** By the end of the week, use this **Discussion Area** to review and comment on the assignment posted by at	NA	*1, 2*	*5 Hours*

least two of your peers. Comment on the final scene and how it is starting to take shape. Provide specific feedback on the following:

- Are all the objects in the scene unwrapped? Do they have the checker material applied to get a better look at how the mapping coordinates have been applied?
- Are there improper mapping coordinates? Is any stretching evident in the scene?

Assignment 4 Grading Criteria	**Maximum Points**
Unwrapped all the objects for the final scene.	20
Applied checker material to see how the mapping coordinates have been applied.	10
Discussed possible techniques on how unwrapping a large scene can be minimized.	10
Reviewed and critiqued the submissions of at least two peers on the basis of the critiquing guidelines.	10
Total:	**50**

Facilitator Notes:

- Purpose of assignment:
  The purpose of this assignment is to get the students to unwrap the objects that have been modeled for the final scene. This will help fine tune the students' ability to apply proper mapping coordinates to a variety of objects with different dimensions.
- Assignment outcome:
  The objects that were modeled for the final project last week will now have proper mapping coordinates assigned to help with the texturing process that will be completed in the following week.
- Examples/resources/suggestions:
  Refer to key topics in the help files. These include Unwrap UVW Modifier, seams, and packing UVW coordinates.

  Ask students to refer to **Week 2: Assignment 2** to see how UVW coordinates were applied correctly and incorrectly.

• Pointer to the facilitator regarding the expected answers from the students: The student should explain that using copies of objects that have been unwrapped and overlapping UVW mapping coordinates can speed up the workflow of unwrapping a large scene.			

Week 3 Snapshot		
• Create complex material and UVW mapping solutions. Apply specific UVW mapping coordinates to simple and complex models. • Demonstrate the ability to apply basic material to 3D models.		
Week 3 Reading Complete the following readings early in the week: • Animation Concepts and Methods • Time Configurations • Reference Coordinate Systems • Set Key Animation Mode • Auto Key Animation Mode • Track View • Dope Sheet • Track View Workspace • Using Dummy Objects/Dummy Helpers • Animation Preferences While reading, make note of pertinent and important facts. You will be required to reference your readings in discussions and apply them in this week's assignments.	Completion time: 3	hours

Week 3 Assignments

<table>
<tr><th>Week 3 Assignments/Assessment</th><th>Resources</th><th>Competency Analysis</th><th>Completion Time</th></tr>
<tr><td>

Assignment 1: Discussion Questions

By **Week 3, Day 3**, respond to the discussion questions assigned to you by the facilitator. Submit your responses to the appropriate **Discussion Area**. Start reviewing and responding to your peers' posts as early in the week as possible. You can ask a question, post a comment, or add a point to expand the discussion. Be honest, clear, and concise.

Always use constructive language, even in criticism, to work toward the goal of positive progress. Make sure to use your course text or other research when possible in your responses.

Support your statements with appropriate references wherever necessary. Follow current MLA guidelines for writing style, spelling, grammar, and citation of sources.

<table>
<tr><th>Assignment 1 Grading Criteria</th><th>Maximum Points</th></tr>
<tr><td colspan="2">Response Criteria:</td></tr>
<tr><td>Met the criteria for the correct responses to the questions assigned.</td><td>4</td></tr>
<tr><td>Used at least five vocabulary terms relevant to the current and previous weeks' topics—at least five terms.</td><td>4</td></tr>
<tr><td colspan="2">Participation Criteria:</td></tr>
<tr><td>Used vocabulary relevant to the current and previous weeks' topics—at least five terms.</td><td>4</td></tr>
<tr><td>Participated in the discussion by asking a question, providing a statement of clarification, providing a point of view with rationale, challenging a point of discussion, or making a relationship between one or more points of the discussion.</td><td>4</td></tr>
<tr><td>Justified ideas and responses by using appropriate examples and references from texts, Web sites, and other references or personal experience.</td><td>4</td></tr>
<tr><td>Total:</td><td>20</td></tr>
</table>

</td><td>NA</td><td>3,4,5</td><td>2hours</td></tr>
</table>

DQ 1: What are some of the important user interface options useful when animating? What are some preferences that can assist with animation? **Evaluation Criteria:** Students should have: o Described some useful user interface option that can help in the animation process. o Described some preferences that can assist with animation. **Facilitator Notes**: The intent of this question is to get the students to look at the software and make sure that it is set up to best support animation. Students should also make sure that different preferences are set up that can assist with animation and make the workflow a bit easier. The answers may vary. However, the students should describe using the proper reference coordinate system and local coordinate system and discuss the differences between these coordinate systems. They should refer to the different time configurations and the timeline. The main focus of this discussion is to have the students get comfortable with animation terms, preferences, and the interface. **DQ 2:** What is the importance of frame rate and how does that affect setting keyframes? What is the difference between Auto Key mode and Set Key mode? What are their benefits? Share examples of instances when you would prefer to use one mode over the other. Justify your choice. **Evaluation Criteria:** o Described what frame rate is and why it is important in animation. o Explained the different between Auto Key and Set Key modes and discussed their benefits. o Shared examples of when they would prefer to use one mode over the other and justified their choice. **Facilitator Notes**: The intent of this question is to get the students familiar with frame rate and setting keys. The answers may vary, but the students should describe frame rate, state how the differences in frame rate can affect keyframing. The main focus of this discussion is to get the students familiar with the basic set up for animation and how to set keys using different key modes.			

DQ 3: When animating, why is an object's trajectory important? How does an object's pivot point affect how that object is animated? Give appropriate examples to support your answer. **Evaluation Criteria:** o Described what trajectory is and why it is important in animation. o Explained how a pivot point works and how it affects an object when animated. **Facilitator Notes**: The intent of this question is to get the students familiar with an object's trajectory that is created once an object is animated. The students will also get familiar with pivot points and how these points can affect the animation of an object. The answers may vary, but the students should describe what the trajectory is in relationship to an object being keyframed. The trajectory can be a useful tool in refining an object's animation and to see the object's positioning. They should discuss that all objects have a pivot that determines how the object transforms. The main focus of this discussion is to familiarize the students with the generated path that is created when an object is animated and how to use that path to refine the animation. **DQ 4:** What physical factors should you consider when animating an object? Why are they important? Provide examples to support your answer. **Evaluation Criteria:** o Describe some physical factors that should be recognized when an object is animated. o Explained why it is important to consider these physical factors. **Facilitator Notes**: The intent of this question is to familiarize the students with the object they will be animating. This will get the students to think about what they want from the object's animation and how they can achieve it. This will also help the students to start thinking about the physical properties of an object and see how physics can affect the animation's look and feel.			

The answers may vary, but the students should describe how the weight of an object will affect the look and movement. The physics of the object, momentum, gravity, and weight will all be useful physical factors in ensuring that an animation turns out the way it was intended. The main focus of this discussion is to get the students to think about what they want from an animation and how they can achieve it.			

Week 3 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 2 **Assignment Title:** Domino Animation In this assignment, you'll apply the learning gained so far to animate a row of dominoes toppling over. Perform the following: o Create a domino and add slight details to the edges to improve the look. Make sure there are a total of four dominoes in the scene. There should be a ground plane that the dominoes are placed on. Use lighting and shadows to enhance the look of the scene and show the contact of the dominoes with the ground plane and each other. o Make sure the dominoes are aligned so that when they are animated falling over, they come in contact with the other. o Animate the dominoes toppling over till all four have fallen to the ground. Make sure to refine the keyframes once they are set to help with motion, timing, and weight. o Render the entire animation as a 320 x 240-pixel QuickTime movie, save the file as W3_A2_Lastname_Firstname_.mov. Submit the file to this **Discussion Area** by **Week 3, Day 4**. **Discussion** By the end of the week, use this **Discussion Area** to discuss the following: o Discuss any issues that you might have come across when animating the dominoes. o What was the most difficult part of the process when trying to make the dominoes interact with each other? **Critique Exercise** By the end of the week, use this **Discussion Area** to review and comment on the assignment posted by at least two of your peers. Comment on the following:	NA	*3,4,5*	*3hours*

- How does the animation look?
- Does the dominoes look like they are interacting with each other and do they give the impression of having weight?
- How is the timing or the pacing of the dominoes falling over?

Assignment 2 Grading Criteria	**Maximum Points**
Created a domino model and the scene setup as stated in the instructions.	**20**
Rendered the animation as a 320 x 240 QuickTime movie.	5
Discussed any issues faced when animating the dominoes	5
Reviewed and critiqued the submissions of at least one peer on the basis of the critiquing guidelines.	10
Total:	**40**

Facilitator Notes:

- Purpose of assignment:
  The purpose of this assignment is to give the students a chance to learn about 3D animation, keyframing, and function curves. The students will start working with pivot points and local coordinate systems to improve the workflow of their animation. The students will also start to look into rendering and render setting for an animation.
- Assignment outcome:
  The students will have an animation that helps focus on timing and weight. This will help them get an idea of how animation works and how to make adjustments to the function curves in the different track view editors. The students will start to get more familiar with animation tool, presets, and preferences that can help with the animation process.
- Examples/resources/suggestions:

  Create a domino using an Extended Primitives/Chamfer Box. This will give the domino a more refined shape than using a standard primitive box will. Once a domino is created, duplicate it to a total of four dominoes. Making copies will speed up the workflow and will ensure they all have the same dimensions.

Align the dominoes back-to-back, leaving some room in between each so that when one domino tips over it impacts the next and so on, till all four dominoes get overturned. The students should have their pivot points adjusted so it appears at the base to help with the rotation. A dummy object can be implemented as well to assist with the transformation (rotation and position). Students should use the local coordinate system when adding keys. They can use either Auto Key or Set Key mode. Using proper keyframing, timing, and motion, the objective is to successfully overturn all four dominoes, making sure the animation is natural. The dominoes should not blow through each other, but adding lights and shadows will help to ensure that they do not. Suggest to students that they can set up dominoes or objects that can be substituted to see how the dominoes fall and interact with each other and what their timing is. Use the software reference file to review these topics: Track View Editors, Set/Auto Key modes, Pivot Points, Local Coordinate System, and Render Setting for Animation. The students should be animating in the local coordinate system, and they must adjust the pivots points of the dominoes to help with the positioning and keyframing. Dummy objects can be a useful tool to help in the animation and keyframing of the dominoes. • Pointer to the facilitator regarding the expected answers from the students: The students' answers will vary, but they should talk about how working with 3D mesh, objects do not naturally collide with each other. Some issues might be that as one domino was keyed to interact with another, the geometry was blowing through, affecting the look of the two objects colliding or coming in contact with each other. Encourage them to talk about how the pivot points' placement affected the animation and positioning of the dominoes and the differences in the coordinate systems (local, view, and world).			

Week 3 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 3 **Assignment Title:** Rubber Ball Bounce **Assignment Idea from Design Brief**: Using a sphere, create a ball bounce. The 3D sphere should be animated and keyframed to have the physical properties of a rubber ball bouncing. In this assignment, you'll apply the learning obtained so far to create a bouncing rubber ball. The animation should look as realistic as a physical rubber ball bouncing off a floor. Perform the following: ○ Use a standard sphere and animate it to resemble the physical properties of a rubber ball. ○ Give the sphere the aesthetics of a rubber ball. Think about techniques other than animation that can help you achieve the desired aesthetics and apply them in your animation. ○ Add a floor plane and lighting with shadows to enhance the look of the animation. ○ Render the animation as a 320 x 240 QuickTime movie and save the file as W3_A3_Lastname_Firstname.mov. Submit the file to this **Discussion Area** by **Week 3, Day 5**. **Discussion** By the end of the week, use this **Discussion Area** to discuss the following: ○ What techniques or steps did you use to achieve a natural look for the rubber ball bouncing in a 3D environment? ○ How did the lighting and material help or affect the animation? **Critique Exercise** By the end of the week, use this **Discussion Area** to review and comment on the ball bounce animation posted by at least two of your peers. You should focus on how naturally the ball bounces and how well the ball bounce imitates a real rubber ball bouncing.	NA	*2,3,4,5*	*2hours*

Assignment 3 Grading Criteria	Maximum Points
Created a ball bounce aniamtion as stated in the instructions and submitted a 320 x 240 QuickTime movie of the same.	**20**
Added textures and enhanced the material to provide the sphere the look of a rubber ball.	10
Used lighting and shadows effectively to show the contact of the ball to the floor plane.	10
Discussed the techniques you used to get a natural look for the bouncing rubber ball and explained how the lighting and material affected the animation.	10
Reviewed and critiqued the submissions of at least one peer on the basis of the critiquing guidelines.	10
Total:	**60**

Facilitator Notes:

- Purpose of assignment:
  The purpose of this assignment is to continue building on animation techniques and principles. The students will have to focus on how real objects move, interact, and react within an environment. The physical properties of an object are very important to consider when creating an animation. How students study these properties and then apply them to their animations is critical to the success of the animations.

- Assignment outcome:
  The students will start to study and apply real movement and physical properties of an object to a computer-generated simulation. The students will look at an object's weight, momentum, trajectory, and other physical properties to successfully animate the object in a 3D environment.

- Examples/resources/suggestions:

  Encourage students to think about and use principles of animation such as squash and stretch, anticipation, and staging to create a realistic animation.

  Students can use dummy objects to animate a 3D object with multiple pivot points. The dummy can be used to set the object's position and rotation, and scale. Linking should be used when creating proper hierarchy between the dummy object and the mesh.

Make sure that the students are using material or textures to enhance the look of the rubber ball. Adjusting the material type to match the look of a rubber surface can include specular levels, glossiness, and different maps. The ball should be well lit and have shadows to help show the ball coming into contact with the floor plane. The lighting should not mask or hide the ball in shadows, or take away from the motion and trajectory of the ball. The ball should lose momentum as the animation concludes to help give the ball a more natural feel. Use past animation files and have the students study the actual motion of a ball bouncing to use as a reference. After setting the initial keys and the initial positions, turning on the animation's trajectory (motion panel) can help refine the animation. • Pointer to the facilitator regarding the expected answers from the students: The students' answers may vary, but they should talk about how using a real rubber ball and studying its motion was used to assist when animating the computer-generated ball. They should mention manipulation of the function curves and the tangents, including how the keys ease in and out. In addition, viewing the animation's trajectory once the initial keys and positions were set could help fine tune the look of the bouncing ball. The lights casting shadows should show how the ball contacts the floor plane and whether the ball goes through the floor plane. The light will also affect how the material that was applied to the ball looks if it has the surface type of a rubber ball. The material's specular level, glossiness, and any extra maps will help the look of the rubber ball's surface.			

Week 3 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 4 **Assignment Title:** Final Project This week, using the different UVW mapping coordinates and UVW templates created in **Week 2**, you'll continue to define the look of your scene. Using a 2D paint software application, create a custom look for the assembly line. Start to apply the material and textures to give the scene a factory-like look. Perform the following: ○ Take the UVW templates you exported in the previous week and import them into Photoshop to create custom textures and materials for your scene's objects. Make sure to enhance the look of the textures by manipulating them in the material editor. ○ Render two screenshots from two different angles in the perspective view of your factory's scene. All of the objects in the scene should have the materials and textures applied. Save these two screenshots in the JPEG format at a resolution of 640 x 480 pixels. Name them as W3_A4_Lastname_Firstname_Scene1.jpeg and W3_A4_Lastname_Firstname_Scene2.jpeg, respectively. ○ Render one close-up of any object in the scene to showcase the details in the texture. Make sure to pick angles that showcase the materials and textures that were applied. Save the file in the JPEG format at a resolution of 640 x 480 pixels. Save it as W3_A4_Lastname_Firstname_Closeup.jpeg. ○ Submit all the three files to this **Discussion Area** by **Week 3, Day 5**. **Discussion** By the end of the week, use this **Discussion Area** to discuss the following: ○ Did the exported UVW templates help or cause issues when painting the different textures in Photoshop? How?	NA	*1,2*	*5 hours*

- What issues, if any, did you recognize once the textures were applied back to the 3D models? Did they turn out the way you intended?

Critique Exercise

By the end of the week, use this **Discussion Area** to review and provide constructive feedback on the assignment posted by at least two of your peers. Comment on how the final scene is taking shape once the textures were applied. Provide specific feedback on the following:

- Does the scene have a factory look and do the different objects in the scene have a consistent theme with the textures?
- What are some things, good or bad, about the one close-up object that was rendered to show the quality and details of the texture?

Assignment 4 Grading Criteria	**Maximum Points**
Rendered a close-up showcasing the details in the objects' texture.	**10**
Rendered two screenshots from two different angles showcasing the scene and the textures that were applied.	**20**
Participated in discussion and critique exercise based on the guidelines.	10
Total:	**40**

Facilitator Notes:

- Purpose of assignment:
  The purpose of the assignment is to build on the final scene and take the UVW templates that were exported in the **Week 2** final project component and add details to those unwraps. The students will get more practice in creating custom textures using 2D paint applications. They will also practice applying materials and enhancing them through the material editor.
- Assignment outcome:
  The outcome of this assignment will be a fully textured environment of their final scene.

• Examples/resources/suggestions: Use the final renders of the gun turret as an example to show how an object should look with the final texture applied and what issues need to be addressed, such as stretching, seams, and placement of the texture. Make sure that the scene has a constant theme throughout and that the scene does not look disconnected. You can also suggest that students look at video games to understand how an entire level of the games has a unified theme or how an entire game has a certain look or theme to the texturing. • Pointer to the facilitator regarding the expected answers from the students: The students' answers will vary, but they should talk about how the UVW mapping coordinates have been packed into the texture space and how the scaling of the mapping clusters affect the detail of certain areas of the texture. A smaller mapping cluster could affect the amount of detail in that area. The areas of an object's mapping coordinates that are a main focus should utilize more of the texture space. Tell students that they can overlap the mapping clusters of similar areas to optimize the texture's space and speed up how much of an unwrap needs to be painted. The students should explain whether there were seam issues and stretching issues once the textures were applied.			

Week 4 Snapshot		
• Exhibit the ability to apply animation techniques to 3D models.		
Week 4 Reading Complete the following readings early in the week: • Constraint Concepts • Link Constraint • Assign Controllers • Link Strategy • Linking and Unlinking Object While reading, make note of pertinent and important facts. You will be required to reference your readings in discussions and apply them in this week's assignments.	Completion time:	2 hours

Week 4 Assignments

<table>
<tr><th>Week 4 Assignments/Assessment</th><th>Resources</th><th>Competency Analysis</th><th>Completion Time</th></tr>
<tr><td>

Assignment 1: Discussion Questions

By **Week 4, Day 3**, respond to the discussion questions assigned to you by the facilitator. Submit your responses to the appropriate **Discussion Area**. Start reviewing and responding to your peers' posts as early in the week as possible. You can ask a question, post a comment, or add a point to expand the discussion. Be honest, clear, and concise.

Always use constructive language, even in criticism, to work toward the goal of positive progress. Make sure to use your course text or other research when possible in your responses.

Support your statements with appropriate references wherever necessary. Follow current MLA guidelines for writing style, spelling, grammar, and citation of sources.

<table>
<tr><th>Assignment 1 Grading Criteria</th><th>Maximum Points</th></tr>
<tr><td colspan="2">Response Criteria:</td></tr>
<tr><td>Met the criteria for the correct responses to the questions assigned.</td><td>4</td></tr>
<tr><td>Used vocabulary relevant to the current and previous weeks' topics—at least five terms.</td><td>4</td></tr>
<tr><td colspan="2">Participation Criteria:</td></tr>
<tr><td>Used vocabulary relevant to the current and previous weeks' topics—at least five terms.</td><td>4</td></tr>
<tr><td>Participated in the discussion by asking a question, providing a statement of clarification, providing a point of view with rationale, challenging a point of discussion, or making a relationship between one or more points of the discussion.</td><td>4</td></tr>
<tr><td>Justified ideas and responses by using appropriate examples and references from texts, Web sites, and other references or personal experience.</td><td>4</td></tr>
<tr><td>Total:</td><td>20</td></tr>
</table>

DQ 1: What does a parent-child relationship mean in a 3D animation? How does it affect computer-

</td><td>NA</td><td>4,5</td><td>2 hours</td></tr>
</table>

generated animation? What are some of the important factors in making sure hierarchy has been created properly? Justify your answer with appropriate examples and rationale. **Evaluation Criteria:** Students should have: o Explained what a parent-child relationship or hierarchy is and described how it affects computer-generated animation. o Explained the important factors to be considered when creating a hierarchy. **Facilitator Notes**: The intent of this question is to familiarize students with some key animation techniques and terms. Creating a parent-child hierarchy between multiple objects is very important in the animation process and will get the students to think about more advanced methods of animating multiple objects that share a common connection. The answers may vary. The students should talk about the parent-child relationship being the order in which multiple objects are linked or parented together. This will create a relationship between the objects and affect how those objects are animated. The most important factor when creating hierarchy is the order in which the objects are linked. This linking determines which object will be the parent and which objects will be its children. **DQ 2:** What is the primary benefit of a parent-child relationship? Give an example of how linking objects together could help in the animation process. **Evaluation Criteria:** Students should have: o Explained a primary benefit of having parent-child relationship o Given an example of how linking could help in the animation process **Facilitator Notes**: The intent of this question is to explain the benefits of creating a parent-child hierarchy. The examples that students share will help them apply their understanding to a scenario and help you to assess students' understanding of the application of parent-child relationship.			

The answers may vary, but the primary benefit for creating a parent-child relationship is to be able to move or animate complex objects together in a 3D environment. Using this relationship, different components of a complex objects can be moved together properly. A good example of how hierarchy can be very affective is a 3D character model with moving arms and legs. The model's foot can be animated independently from the leg, but when the knee moves back and forth, the foot moves with it. This is an example of a parent-child relationship and how it can help in animation. By creating proper linking, you can animate a complex object as a whole or manipulate the children linked to the parent. There can only be one parent (root), but there can be many children branching off of that parent. **DQ 3:** You are animating a computer-generated object and want to ensure more accurate timing, weight, and other physical properties of the motion. What can you adjust on keyframes to achieve the desired result? **Evaluation Criteria:** Students should have: o Explained what can be adjusted on keyframes to ensure more accurate timing, weight, and other physical properties of the motion. **Facilitator Notes**: The intent of the question is to explain how keyframes can be adjusted by manipulating keyframes' tangents. This will help the student understand how motion eases in and out of keyframe and how different tangents can help achieve the look they want. The main focus is on the different tangent types, function curves, and easing in and out. The students' answers may vary, but the students should talk about tangents and how they adjust the easing in and out of a keyframe's function curve. The type of tangent and each adjustment made affects the timing and transforms the object's animation. **DQ 4:** How can a dummy object assist with animation? State as least two benefits of using dummy objects. Give an example of an instance where you would benefit from using a dummy object. **Evaluation Criteria:** Students should have: o Explained what a dummy object is and how it assists in animation.			

○ Explained at least two benefits of using dummy objects. **Facilitator Notes**: The intent of this question is to familiarize the students with helpers, more specifically dummy helpers. This will introduce them to their benefits and how they can be used to help in the animation process. The students answers may vary, but they should mention that a dummy object is a wire cube with a central pivot. The dummy object will not render but can be linked to other objects to be used in the animation process. Dummy objects are very beneficial in hierarchical linkage. A benefit of the dummy object is that the dummy has a central pivot and when other objects are linked to it, the dummy object allows for multiple pivots points to be used.			

Week 4 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 2 **Assignment Title:** The Pencil Animation **Assignment Idea:** In this assignment, you'll animate a pencil along a path to give the impression that it is writing your name in cursive writing. Perform the following: ○ Create a pencil using basic modeling techniques and apply colors to the different sections of the pencil to enhance the look of the mesh. In addition, create a floor plane that will give the impression of paper. ○ Create a path to for the pencil to follow. The path should resemble your first name when written in cursive. Refine the path so there is a natural flow to the spline. ○ Using constraints and function curves, make adjustments to the animation to give the impression that the pencil is writing your name. ○ In the perspective view, render out the entire animation as a 320 x 240 QuickTime movie. Ensure that spline is visible in the final render. ○ Save the file as W4_A2_Lastname_Firstname.mov and submit it to this **Discussion Area** by **Week 4, Day 3**. **Discussion** By the end of the week, use this **Discussion Area** to discuss the following: ○ How did using a path help or cause problems in making the pencil look like it was writing your name? ○ What were some of the adjustments made to enhance the look of pencil writing? **Critique Exercise**	NA	*2,3,4,5*	*3hours*

By the end of the week, use this **Discussion Area** to review and comment on the assignment posted by at least two of your peers. Comment on the following:

- Did the pencil animation have a natural feel of someone writing a name?
- How was the timing and the flow of the spline path?
- What are some options to improve on the animation, if any?

Assignment 3 Grading Criteria	**Maximum Points**
Created a pencil mesh with colors to enhance its look and make it appear like a real pencil.	**10**
Developed a path animation giving the impression that the pencil is writing your name.	**20**
Discussed the role of path in the animation and stated the adjustments made to enhance the look of pencil writing	**5**
Participated in discussion and critique exercise based on the guidelines.	**10**
Total:	**45**

Facilitator Notes:

- Purpose of assignment:
  The purpose of this assignment is to have the students use constraints and paths to assist in the animation process. This will give them other techniques to apply when animating and build on previous techniques.

- Assignment outcome:
  The students will now be able to apply constraints and use paths to assist with their animations. They will also practice keyframing, function curves, and animation principles to fine tune the look of the animation.

- Examples/resources/suggestions:

  The students will use a path constraint and the motion panel to help adjust the motion along the path.

• Pointer to the facilitator regarding the expected answers from the students: The answers will vary, but the students should talk about how a path can help move an object throughout a scene. Defining a path makes it easier to achieve the desired motion. Some issues that students may face include adjusting the look of the pencil and timing the pencil once it is on the path. The students can adjust path constraint parameters to help the animation look more natural. These specifically include the following path parameters: Follow, Bank, and Velocity.			

Week 4 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 3 **Assignment Title**: Animating Balls with Different Weights In this assignment, you will further your learning on animation principles and create another bouncing ball animation. However, this time you will exhibit the role weight, size, and motion play in an animation by creating an animation for a bowling ball and a ping pong ball. Perform the following: ○ Use a standard sphere and animate it to resemble the physical properties of a bowling ball and a ping pong ball. ○ Think about techniques other than animation that can help you achieve the desired aesthetics for the two balls and apply them in your animation. ○ Add a floor plane and lighting with shadows to enhance the look of the animation. ○ Render the animation as a 320 x 240 QuickTime movie and save the file as W4_A3_Lastname_Firstname.mov. Submit the file to this **Discussion Area** by **Week 4, Day 4**. **Discussion** By the end of the week, use this **Discussion Area** to discuss the following: ○ How did you approach the ball bounce this time when compared to the rubber ball bounce from the previous assignment? ○ How did the rubber ball bounce help the setup and keying of this animation? **Critique Exercise** By the end of the week, use this **Discussion Area** to review and comment on the ball bounce animation posted by at least two of your peers. You should focus on how naturally the ball bounces and how well the ball bounce imitates the real bounce.	NA	*2,3,4,5*	*4 hours*

Assignment 3 Grading Criteria	**Maximum Points**
Created a ball bounce animation as stated in the instructions and submitted a 320 x 240 QuickTime movie of the same.	**20**
Added textures and enhanced the material to provide the spheres the look of a bowling and a ping pong ball.	10
Used lighting and shadows effectively to show the contact of the balls to the floor plane.	10
Discussed the difference in approach this time as compared to the last assignment and explained if the rubber ball bounce animation from the last assignment helped the setup and keying of this animation.	10
Reviewed and critiqued the submissions of at least one peer on the basis of the critiquing guidelines.	
Total:	**50**

Facilitator Notes:

- Purpose of assignment:
  The purpose of this assignment is to continue building on animation techniques and principles. The students will have to focus on how real objects move, interact, and react within an environment. The physical properties of an object are very important to consider when creating an animation. How students study these properties and then apply them to their animations is critical to the success of the animations. Through this assignment, students will get an opportunity to work on two contrasting objects in weight, size, and motion in one file.

- Assignment outcome:
  The students will start to study and apply real movement and physical properties of an object to a computer-generated simulation. The students will look at objects' weight, momentum, trajectory, and other physical properties to successfully animate the objects in a 3D environment.

- Examples/resources/suggestions:

  Students can use dummy objects to animate with multiple pivots points. The dummy can be used to set the sphere's position and rotations, the sphere's pivot, placed at the base, for any squash and stretch. Linking should be used when creating proper hierarchy between the dummy object and the mesh.

  Make sure that the students are using material or textures to enhance the look of both the balls.

The balls should be well lit and have shadows to help show the balls coming into contact with the floor plane. The lighting should not mask or hide the balls in shadows, or take away from the motion and trajectory of the balls. The balls should lose momentum as the animation concludes to help give the balls a more natural feel. The trajectory of two balls in this animation will vary. Use past animation files and have the student study the actual motion of a ball bouncing to use as reference. After setting the initial keys and the initial positions, turning on the animation's trajectory (motion panel) can help refine the animation. • Pointer to the facilitator regarding the expected answers from the students: The students answers may vary, but they should talk about how using a real ball and studying its motion was used to assist when animating the computer-generated balls. They should mention manipulation of the function curves and the tangents as to how the keys ease in and out. In addition, viewing the animation's trajectory once the initial keys and positions were set could help fine tune the look of the bouncing balls. The lights casting shadows should show how the ball contacts the floor plane and whether the ball goes through the floor plane. The light will also affect how the material that was applied to the ball looks as if it has the surface type of a ping pong and a bowling ball.			

<table>
<tr><th>Week 4 Assignments/Assessment</th><th>Resources</th><th>Competency Analysis</th><th>Completion Time</th></tr>
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Assignment 4

Assignment Title: *Final Project*

This week, you'll create proper linking and parenting of the different pieces that make up the crane arm mesh. You'll continue to define the look of your scene by placing the objects throughout the environment and making sure the containers are placed at the end of the assembly line.

Perform the following:

- Use the modeled objects, unwrapped and textured for the final scene, to create proper linking for the crane arms.
- Make all objects other than the two crane arms invisible so the emphasis of the 3ds Max file is on the linked objects, displaying a proper child-parent relationship.
- Save the file as W4_A4_Lastname_Firstname.max and submit it to this **Discussion Area** by **Week 4, Day 5**.

Discussion

By the end of the week, use this **Discussion Area** to discuss the following:

- Why and how does the order in which objects are linked affect the animation process?
- **Critique Exercise**

  By the end of the week, use this **Discussion Area** to review and comment on the assignment posted by at least two of your peers. Provide constructive feedback on the linking of crane arms and the appropriateness of the order and parent-child relationship.

<table>
<tr><th>Assignment 3 Grading Criteria</th><th>Maximum Points</th></tr>
<tr><td>Submitted the .max file with just the two crane arms visible, with each arm linked properly to attain correct parent-child relationship.</td><td>30</td></tr>
<tr><td>Discussed why and how does the order in which objects are linked</td><td>10</td></tr>
</table>

</td><td>NA</td><td>4</td><td>2hour</td></tr>
</table>

affect the animation process.				
Reviewed and critiqued the submissions of at least two peers on the basis of the critiquing and discussion guidelines.	10			
Total:	**40**			

Facilitator Notes:

- Purpose of assignment:
  The purpose of this assignment is to create proper hierarchy or parent-child relationship between multiple objects to give the impression that when animated they can work as a whole unit, as well as individual pieces. This will introduce to the students processes and techniques that can be applied to more advanced animation setups.

- Assignment outcome:
  The students will have the two crane arms that make up a portion of the final animation linked and ready for keyframing.

- Examples/resources/suggestions:

  Describing how a human arm works and how the joints and bones affect each other is a good example of how the crane arm should work. Use reference files of previous assignments and reference files from the software application.

- Pointer to the facilitator regarding the expected answers from the students:
  The students should describe if correct order has been achieved when linking the different pieces of the two crane arms. If the correct order has not been achieved, they should describe how to fix the linking and what the correct order should be. The students should talk about how the parent affects the child, but how a child can be manipulated independently based on the number of objects being linked.

Week 5 Snapshot		
• Create complex material and UVW mapping solutions. Apply specific UVW mapping coordinates to simple and complex models. • Demonstrate the ability to apply basic material to 3D models. • Exhibit the ability to apply animation techniques to 3D models. • Show the ability to use advanced controllers in animating and linking models. • Manipulate animation curves to refine movement and timing.		
Week 5 Reading Complete the following readings early in the week: • Render Frame Window • RAM Players • Make Preview/View Preview • Render Settings While reading, make note of pertinent and important facts. You will be required to reference your readings in discussions and apply them in this week's assignments.	Completion time:	2 hours

Week 5 Assignments

Week 5 Assignments/Assessment	**Resources**	**Competency Analysis**	**Completion Time**
Assignment 1: Discussion Questions By **Week 5, Day 3**, respond to the discussion questions assigned to you by the facilitator. Submit your responses to the appropriate **Discussion Area**. Start reviewing and responding to your peers' posts as	NA	*3,4,5*	*2 hours*

early in the week as possible. You can ask a question, post a comment, or add a point to expand the discussion. Be honest, clear, and concise.

Always use constructive language, even in criticism, to work toward the goal of positive progress. Make sure to use your course text or other research when possible in your responses.

Support your statements with appropriate references wherever necessary. Follow current MLA guidelines for writing style, spelling, grammar, and citation of sources.

Assignment 1 Grading Criteria	**Maximum Points**
Response Criteria:	
Met the criteria for the correct responses to the questions assigned.	4
Used vocabulary relevant to the current and previous weeks' topics—at least five terms.	4
Participation Criteria:	
Used vocabulary relevant to the current and previous weeks' topics—at least five terms.	4
Participated in the discussion by asking a question, providing a statement of clarification, providing a point of view with rationale, challenging a point of discussion, or making a relationship between one or more points of the discussion.	4
Justified ideas and responses by using appropriate examples and references from texts, Web sites, and other references or personal experience.	4
Total:	**20**

DQ 1: When animating an object traveling from one destination to another in a 3D environment, what techniques can be used to ensure accurate motion and direction? In the final project scene you are developing, where would you want to apply these techniques? Explain how it will help enhance your scene.

Evaluation Criteria:

Students should have:

○ Explained what can be used to ensure that an object's motion and direction are accurate in a 3D environment. **Facilitator Notes**: The intent of this question is to get the students start thinking about path animation and whether it is possible to apply to their final project's animation. The focus is on the use of constraints and how they can be applied to assist in the animation process. The students answers will vary, but they should talk about constraints and, more specifically, path animation in this case. Attaching an object to a predefined path created to follow a specific direction will ensure that the object's motion while traveling from one destination to another is more accurate. **DQ 2:** How can two different objects be animated together to the look like both are moving at the same time and pace without slipping or improper movement? Share at least two examples. Share an example from your final project scene where you would need to animate two objects together at the same time and pace. **Evaluation Criteria:** Students should have: ○ Explained how to have two different objects move at the same time without improper movement or slipping. **Facilitator Notes**: This question will focus on the use of constraints and, more specifically, a link constraint. The intent of this question is to get the students to start thinking about how constraints can help while animating their final project scene. The use of a link constraint can be a very useful tool in animating the three different objects of their final project scene. The answers may vary, but the students should talk about applying a link constraint from one object to another to ensure that they both move at the same time without having to key each separately. By keying the two objects separately, there is a chance that the objects' motion could look disjointed. By using a link constraint from one object to another, students can form a connection between the objects for a specified time frame. **DQ 3:** What is the difference between hierarchical linking and a link constraint? Share an example of when you would use hierarchical linking and when you would use a link constraint.			

Evaluation Criteria: Students should have: ○ Explained what the difference id between linking and a link constraint. **Facilitator Notes**: The focus of this question is to build on the previous question and help the students identify the difference between two types of linking when animating. The intent of this question is that the students will know how and when to apply the different linking techniques to help with their animations. The answers may vary, but the students should explain what the difference is between a link constraint and a hierarchical linking. The link tool is used to create a parent-child relationship between two objects and a link constraint is used to create an object linking between two objects. One of the key differences between linking two objects in a hierarchy and linking two objects using a constraint is that a hierarchical link cannot be animated, whereas a link constraint can be animated. **DQ 4:** Other than keyframing the different objects in the final project animation, what are other options to help make the objects look like they are traveling down the conveyor belt? Provide at least two such options, and explain how they would help achieve the desired result in the final project animation. **Evaluation Criteria:** Students should have: ○ Explained what other options could improve the look of the objects traveling down the conveyor belt. **Facilitator Notes**: The focus of this question is to emphasize what else can be animated and keyframed in the final project animation to help get a realistic look for the assembly line. The intent of this question is to get the students thinking about what other options can enhance the look of the scene while animating. The answers may vary, but students should talk about how animating the conveyor belt texture can give the impression of movement. Keyframing the offset of the texture applied to the conveyor belt's surface and defined markings within the texture can be very useful techniques to enhance the look of the assembly line. With the three objects moving down the conveyor belt and with the added touch of the animated texture, students can further enhance the look of the final project.			

Week 5 Assignments/Assessment	Resources	Competency Analysis	Completion Time
Assignment 2 **Assignment Title:** *Final Project* This week, you'll animate the two crane arms manipulating the three objects as they travel across a conveyor belt and end up in marked containers. Perform the following: ○ Use the modeled objects, unwrapped and textured to animate the final scene. The first crane arm will pick up an object and place it on the conveyor belt. The object will travel to the other end, where the second arm will place the object into its corresponding container. ○ Utilize all animation techniques discussed during this class and try to successfully move three objects from one side of the conveyor belt to the other. All three objects must end in their appropriate containers. ○ Add final touches and adjust the animation to refine and polish the motion. ○ Use lighting and shadows to add interest and depth to the environment. ○ Render the final animation from a perspective that showcases all of the objects in the scene and the animation of those objects. ○ Save the final, production-quality render as a QuickTime movie. Name it as W5_A2_Lastname_Firstname_Final.mov. Submit the file to this **Discussion Area** by **Week 5, Day 5**. Note: You'll revise the animation next week based on the feedback you receive from your peers and the facilitator this week. **Discussion** By the end of the week, use this **Discussion Area** to discuss the following: ○ Discuss your animation process. What different techniques did you use to create the final render?	NA	3,4,5	*5 hours*

- Did you use constraints and helpers in the animation? How did they assist in the animation?

Critique Exercise

By the end of the week, use this **Discussion Area** to review and comment on the assignment posted by at least two of your peers. Provide constructive feedback on what can be done to improve the overall look-and-feel of the animation.

Assignment 2 Grading Criteria	**Maximum Points**
Submitted a final animation that makes good use of animation principles, exhibits proper timing, and meets the requirements as listed in the final project requirements.	**50**
Used hierarchy and link constraints to ensure the crane arms move as one complex unit, and the objects being moved and manipulated look like they are attached to the crane when bieng lifted.	**10**
Used proper lighting, shadows, and render quality in the animation.	10
Discussed the techniques you used to create the final render and explained how the constraints and helpers assisted in the animation.	10
Reviewed and critiqued the submissions of at least two peers on the basis of the critiquing and discussion guidelines.	10
Total:	**90**

Facilitator Notes:

- Purpose of assignment:
  The purpose of this assignment is to add animation to the objects that make up their final scenes. This will allow the students to apply different tools, techniques, and principles learned over the last few weeks into a complex animation.

- Assignment outcome:
  The students will have an animation of three different objects being manipulated by two different crane arms. The objects that have been modeled and textured will be put into motion and be rendered out with lighting, giving the scene a more professional, high-quality look.

- Examples/resources/suggestions:
  Use all the different weekly assignments for this class as a reference for different animation techniques that can be applied to the final project. Ask students to keep previewing their animation

to ensure they are on right track. The students should use a link constraint to help with the look of the crane arms picking up the three different objects. Dummy objects can be applied to objects in the animation to assist with keyframing position and rotation. When using the link constraint, use the Motion tab to help with the frames in which the objects will be linked. When animating the link between the objects and the crane arm, the students will switch between adding the link and linking to the world to break the link under the link parameters. Use samples of the final to get a good idea of what the animation should look like and how constraint and helpers can assist with the process. **Note to the Reviewer**: The SME will provide the samples when developing the lectures. • Pointer to the facilitator regarding the expected answers from the students: The students should discuss their animation process and include whether or not they used helpers and constraints while animating the scene. They should discuss different techniques that they applied from previous lessons. Some techniques can be the use of helpers, constraints, key modes (set or auto), and animations editors.			

Week 6 Snapshot		
• Create complex material and UVW mapping solutions. Apply specific UVW mapping coordinates to simple and complex models. • Demonstrate the ability to apply basic material to 3D models. • Exhibit the ability to apply animation techniques to 3D models. • Show the ability to use advanced controllers in animating and linking models. • Manipulate animation curves to refine movement and timing.		
Week 6 Reading NA	Completion time:	2 hours

Week 6 Assignments

<table>
<tr><th>Week 6 Assignments/Assessment</th><th>Resources</th><th>Competency Analysis</th><th>Completion Time</th></tr>
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Assignment 1: Discussion Questions

By **Week 6, Day 2**, respond to the discussion questions assigned to you by the facilitator. Submit your responses to the appropriate **Discussion Area**. Start reviewing and responding to your peers' posts as early in the week as possible. You can ask a question, post a comment, or add a point to expand the discussion. Be honest, clear, and concise.

Always use constructive language, even in criticism, to work toward the goal of positive progress. Make sure to use your course text or other research when possible in your responses.

Support your statements with appropriate references wherever necessary. Follow current MLA guidelines for writing style, spelling, grammar, and citation of sources.

<table>
<tr><th>Assignment 1 Grading Criteria</th><th>Maximum Points</th></tr>
<tr><td colspan="2">Response Criteria:</td></tr>
<tr><td>Met the criteria for the correct responses to the questions assigned.</td><td>4</td></tr>
<tr><td>Used vocabulary relevant to the current and previous weeks' topics—at least five terms.</td><td>4</td></tr>
<tr><td colspan="2">Participation Criteria:</td></tr>
<tr><td>Used vocabulary relevant to the current and previous weeks' topics—at least five terms.</td><td>4</td></tr>
<tr><td>Participated in the discussion by asking a question, providing a statement of clarification, providing a point of view with rationale, challenging a point of discussion, or making a relationship between one or more points of the discussion.</td><td>4</td></tr>
<tr><td>Justified ideas and responses by using appropriate examples and references from texts, Web sites, and other references or personal experience.</td><td>4</td></tr>
<tr><td>Total:</td><td>20</td></tr>
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DQ 1: When trying to get an animation's timing to look more realistic and the motion more accurate, what technique would you use? Why?

</td><td>NA</td><td>3,4,5</td><td>2 hours</td></tr>
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Evaluation Criteria: Students should have: o Explained what would make an animation's timing look more realistic and accurate. **Facilitator Notes**: The focus of this question is on the Track Editor–Dope Sheet, which is used to assist in adjusting keys and timing. The intent of this question is to get the students to use the Dope Sheet as a tool to adjust keys to help with the animation's timing. The answers may vary, but the students should discuss the Dope Sheet and how it is used to adjust the timing of an animation. The Dope Sheet displays keyframes over time as a graph and make it easier to adjust timing. All the keys in the Dope Sheet are visible and can be used to isolate keys in an animation or scale an entire section or group of keys. You should reference how this process is taken from traditional animation and how exposure sheets or "x" sheets were used to assist in the traditional animation process. **DQ 2:** What are the benefits of making a preview of an animation? What are some benefits when rendering a sequence over a movie file out of a 3D application? **Evaluation Criteria:** Students should have: o Explained the benefits of creating a preview of an animation. o Explained the benefits of rendering a sequence over a movie file. **Facilitator Notes**: The focus of this question is creating animation previews through the software and file types. The answers may vary, but the students should talk about how the make preview function can be used to help show the animation playback prior to setting up a final production-quality render. It benefits the animation process because the preview allows you to do a quick render of the scene without wasting time on a high-quality render. It also allows you to see the timing of the animation more accurately than in the software's playback. The software will try to play the animation back at its set frame rate, but the preview will do a much better			

job. Rendering a sequence can be very useful because it allows you to render single frames that can be used in other applications. Some file types allow you to embed alpha channel information (transparency) in the rendered sequence. This can come in handy when compositing sequences and working with elaborate scenes. A sequence can be beneficial when a computer has errors or crashes. A sequence can be rendered again from a point when the error occurred, and a movie file will have to be rendered from the beginning. **DQ 3:** In a live action footage, what is a natural occurrence when objects are moving quickly? How can that be simulated in a 3D environment? **Evaluation Criteria:** Students should have: ○ Explained what occurs in live action footage when objects are moving quickly and how it can be simulated in a 3D environment. **Facilitator Notes**: The focus of this question is to get the students to think of some natural occurrences in a live action footage that can be applied to computer-generated footage. Students should keep their final project scenes in mind when thinking about this. Encourage them to discuss what they would do in their final projects to give a high-quality, professional feel to the animation. The answers may vary, but the students should talk about how quick-moving objects caught on film naturally have a motion blur. The speed the object is traveling with will determine how visible and pronounced the motion blur is. The students should also talk about how motion blur can be set to achieve the same look in their computer-generated animation. **DQ 4:** Using your experiences when creating your final project scene, share the lessons you learned about this kind of production. Highlight your own strengths and weaknesses in the production of the animated scene using 3ds Max and share what you would do differently if you were to take this course again. **Evaluation Criteria:** Students should have: ○ Highlighted their strengths and weaknesses in the production of the animated scene using 3ds Max. ○ Shared what they would do differently if they were to take this course again.			

Facilitator Notes: This question is designed to elicit feedback from the students about the lessons or realizations they gained during this course. They should discuss their own work ethics and habits, and what they would do differently if they had to do it over again with the knowledge and experience they now have.			

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Assignment 2

Assignment Title: *Final Project*

Based on the feedback and online critique you received for your final scene, revise your animation to improve any inconsistencies with animation and texturing. Make adjustments to enhance the look of the animation.

Render an updated QuickTime movie to show the changes that have been made to improve the look of the animation. Render the file at a resolution of 320 x 240 pixels and save it as W6_A2_Lastname_Firstname_Final_Update.mov. Submit the file to this **Discussion Area** by **Week 6, Day 2.**

Discussion

By the end of the week, use this **Discussion Area** to discuss the following:

- Discuss the techniques you used to adjust and refine the look of the final animation.

Critique Exercise

By the end of the week, use this **Discussion Area** to review and provide constructive feedback on the adjustments made to the final animation of the two peers you have been following throughout the course.

<table>
<tr><th>Assignment 2 Grading Criteria</th><th>Maximum Points</th></tr>
<tr><td>Submitted the revised movie file incorporating the feedback received, improving any inconsistencies, and making adujstments to enhance the look of the animation.</td><td>30</td></tr>
<tr><td>Discussed the techniques you used to adjust and refine the look of the final animation.</td><td>10</td></tr>
<tr><td>Reviewed and critiqued the submissions of at least two peers on the basis of the critiquing and discussion guidelines.</td><td>10</td></tr>
<tr><td>Total:</td><td>50</td></tr>
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</td><td>NA</td><td>3,5</td><td>3hours</td></tr>
</table>

Facilitator Notes: • Purpose of assignment: The purpose of this assignment is to allow the students to use the feedback of the class to make adjustments to their animations. It will allow the students a chance to get a fresh take on their final deliverable and then use that constructive criticism to improve the look of the animation. • Assignment outcome: The outcome is a more refined and polished animation to give the final deliverable a more professional look. • Examples/resources/suggestions: Make sure to review the students' suggestions and use that as a means to help the students fine tune their animations. The students should concentrate on how the easing in and out of the keys are set. They should look at adjusting the keys tangents and making adjustments to timing. They can accomplish this by using the Track View–Curve Editor and Track View–Dope Sheet. Tell students that any changes they make to the scene, including the changes in texturing and lighting, should help enhance the aesthetics of the final animation. • Pointer to the facilitator regarding the expected answers from the students: The students should talk about what tools and techniques were used to adjust the animation. The students should discuss the use of the different track editors, tangent types, and function curves. They should also talk about the different issues with timing and how manipulating keys or scale keys helps adjust the pacing of the animation.			