**V201.03 Letter of Application: (2 questions)**

Complete a letter of application or a letter of intent for a job- 12 font readable, spell check, The letter should be one page in length, usually 3-4 paragraphs long.

Use an introductory paragraph that indicates what job you are applying for and any special credentials you may have.

In the next two paragraphs, highlight your academic degrees and work experience. Tell the employer about any special qualifications.

In closing, indicate that you are interested in being contacted for an interview. Tell when and how you may be contacted. Express your enthusiasm for this opportunity.

Job resume or electronic portfolio- In your resume be sure to include the following: Personal Information, Career Objective, Education, Work Experience, Honors and Activities, Special Skills, and References.

**V.201.03 Complete a job interview. (2 Questions)** – Interview process is the most important aspect in the job seeking process.

1. Research the company beforehand and memorize important facts.
2. Arrive early but not more than 15 minutes.
3. Make a good impression. Dress neatly, appropriately and conservatively. Do not dress trendy or outlandish. Do not wear a lot of perfume or cologne.
4. Be enthusiastic and demonstrate a good attitude.
5. Stand up straight and use proper posture. Use eye contact.
6. Be brief and accurate with answers. Try to avoid one-word answers.
7. Do not criticize past employers.
8. Prepare a resume and work samples to give the prospective employer. Have a list of references with addresses and phone numbers.

**V202.01 Computers Store information (4 Questions)**

Bits- AKA “Binary Digits” operate as a binary numbers only possible value is 0 and 1. Smallest unit of measurement

Bytes- make up of 8 bits. With 8 bits in a byte (28), you can represent 256 values ranging from 0 to 255.

Kilo K 210 = 1, 024 thousand

Mega M 220 = 1,048,576 million

Giga G 230 = 1,073,741,824 billion

Tera T 240 = 1,099,511,627,776 trillion

Peta P 250 = 1,125,899,906,842,624

Exa E 260 = 1,152,921,504,606,846,976

Hard drive- Are where all of your programs and data are stored. The hard drive is the most important of the various locations of permanent storage. The Hard drive plays a role in Performance, Storage capacity and software support, therefore having a good hard drive is significantly important to your computer.

Parts of a Harddrive-

Platters- A platter is a round magnetic plate that constitutes part of a hard disk. Hard disks typically contain up to a dozen platters. Most platters require two read/write heads, one for each side of the platter.

Tracks are concentric circles on the surface of a disk where data can be written. A typical floppy disk has 80 (double-density) or 160 (high-density) tracks.

Sectors are pie-shaped wedges on a track (dark area of illustration.) A sector is the smallest unit of space on the hard disk that any software can access. A sector contains a fixed number of bytes (i.e. 512).

Clusters or blocks are made up of two or more sectors. Occasionally, the operating system marks a cluster as being used even though it is not assigned to any file. This is called a lost cluster.

Disk Defragment- is a process where data is relocated so that it can be accessed more quickly thus speeding up programs.

“Crashing” -- the flight is disrupted by dust and the head “crashes” into the platter, scratching it. The platters are stored in sealed containers to prevent dust from entering. A crash also can occur by bumping or moving the unit while it is running.

RAM- Random Access Memory,a type of computer memory that can be accessed randomly; that is, any byte of memory can be accessed without touching the preceding bytes. It loses its contents when the power is turned off.

ROM (“read-only memory”) refers to special memory used to store programs that boot the computer and perform diagnostics.

**V202.02 Pixel Values (4 qustions)**

Digital images from Remote Sensing- is the process of gathering information without touching it, such as remote sensing or your eye seeing light. Digital images are composed of pixels arranged in rows and columns.

Each pixel carries a numerical values or digital number (DN).

 A digital image contains pixels that are arranged in rows and columns. Each pixel carries a numerical value or #

Multi-spectral Remote Sensing - Recording energy in the red, green, blue, IR, UV, or other parts of the electromagnetic spectrum.

A LUT (Look-Up table)\*color\* is used to show the scale relationship between each pixel’s DN and its assigned color or gray brightness value.

BRIGHTNESS is the intensity of white in an image.

CONTRAST is the difference between the lightness and darkness of an image.

Density slicing allows you to highlight a range of pixel values in the LUT.

**V202.04 Trends (2 questions)**

Informational visualization is the use of interactive graphical interfaces to display, measure, and understand large amounts of data.

Linear -- (one dimensional), usually sequential lists. A typical Internet search result would be an example. This is the least complex type of visualization.

Temporal -- data uses time as the one dimension (i.e. timelines, animations, project timelines, and video representations).

Two dimensional -- (not to be confused with 2D representations) data is associated with geographic Information systems, such as a map.

Three dimensional -- is usually real world data, and is concerned with position and orientation. Virtual reality is an example

Tree or hierarchical -- data has a unique parent and 1 or more siblings. [Examples](http://www.cs.umd.edu/hcil/treemap/demos/) include classification systems, and parent child relationships.

 

Task Gallery – a way that employs 3D space to organize data. The space is that of multiple rooms in which documents are ‘hung’ on walls until they are needed.

 

Galaxy Visualization -- the image of stars in the night sky to represent a set of documents



Theme View -- the topics or themes within a set of documents are shown as a relief map of natural terrain. The mountains in the Theme View indicate dominant themes. The height of the peaks indicates the relative strengths of the topics in the document set.

 

Theme River -- helps users identify time-related patterns, trends, and relationships across a large collection of documents. The themes in the collection are represented by a "river" that flows left to right through time.



Fractal Projections -- Information is organized and viewed as fractal spaces.

 

Catch -- Computer Aided Tracking and Characterization of Homicides is a collection of tools that assist the crime analyst in the investigation process.

**V203.01 2D Visualization(10 questions)**

A. Apply advanced fills to selected closed 2D objects.

1. The basic fill options include uniform or solid, fountain or gradient, and pattern. The uniform fill is produced from single colors.

2. The fountain fill is made up of gradients, formed by multiple colors. The pattern fill is made up of bitmap and vector files and can be made from any shape or texture.



3. Pattern fills can be edited for tiling, placement, and size.

B. Use color definitions in 2D objects.

1. Colors can be defined using CMYK definitions, RGB or HSB (V) definitions.

2. Custom colors are predefined colors that can be created or selected from a list such as PANTONE or TRUMATCH.

3. Colors can be fixed palettes or process color. Fixed color is referred to as color matching systems and process color is referred to as color models.

C. Draw and edit curves in 2D objects.

1. The basic curve tools are the freehand or pencil tool and the Bezier tool. Curves can be manually closed or automatically closed.

3. The freehand or pen tools are used to produce freeform lines without constraints.

4. The Bezier tool is used to generate precision curves and paths. This tool is preferred for accurate tracing and path assignments (text orientation.)

5. All curves can be edited into a variety of shapes by shape node or anchor points adjustments. Editing of the shapes can be achieved with the use of a knife tool, and the erase tool.

D. Working with shapes

1. The basic shapes used in vector programs are the rectangle, star, spiral, ellipse, and polygon.

2. All shapes have specific properties to change the physical characteristics, stroke width, and shape. Shapes can be modified by using transformation or shaping features.

E. Paintbrush and artistic media tools

1. The paintbrush tool and the artistic media tool can be used to apply existing images to a design. Existing images can include fall leaves, bubbles, footprints, and grass.



2. These tools can also add a calligraphic effect. An angled tip produces this effect or nib, which creates a tapered line that gets thicker or thinner depending on the angle of the tip or nib.



3. Another choice for these tools is the Art Brush or brush. This brush stretches predefined art choices along a path. Some of the selections include artistic arrows, gradients, and color swatches.



F. Transform tools

1. The blend tool produce objects between two different objects in sequence. Blends can occur along paths and altered by using the blend properties.



2. Objects can be rotated, scaled, and mirrored (reflected).

3. The free transform tool will allow you to perform many transforms to an object at the same time. You can scale, rotate and skew and even distort with one motion.

G. Advanced text techniques

1. Text can be colored, reshaped, and filled in a 2D vector program. Text can also follow a path, fit inside a box, be vertical, or act as a vector element. Most of the options available in a word processor are available in vector programs.

H. Using object outlines

1. Different widths (points) can be applied to the outline of objects or lines in an image.

2. Using the property bar will allow the designer to change the line color, the line style, the end shapes, the line caps, and corners.

I. Layer management

1. A designer must learn to navigate among the objects in the scene if the design is complex. Layers allow for organization of type, images, backgrounds, and effects and multiple shapes.

J. Importing and exporting pictures.

2. Other techniques for moving objects in and out of applications include importing, opening files, and exporting.

3. Opening a foreign file creates a new drawing while importing brings the file into your existing drawing.

4. Files can be exported in several common formats including EPS, Tiff, GIF, BMP, JPEG, and Targa files. The exported selection will depend on how it is going to be used in the other software applications.

K. Printing and postscript in vector images

1. Printing is basically controlled by your operating system. There are several printer options to choose from to print a wide range of formats including, labels, cards, letterhead, tabloids, and other layout styles.Print options include printing selected objects, selected pages, and different impositions. Imposition is the way the pages are arranged on a printed sheet for publishing.

3. Color can be printed in several ways:

a. One color (black, red, blue etc.)

b. Multicolor, which is more than one color (two, three, four, etc.)

c. Full color, also called process color -- this method is used in most high quality printing magazines and publications. It is produced by using transparent inks magenta, cyan, yellow and black to print the widest range of continuous tone colors possible with modern printing equipment.

**V203.02 Advanced Imaging Techniques (6 questions)**

Producing a Bitmap Image- preferred color mode (color, pixel depth.).Then choose a color background or transparency. Next, determine the correct image size and resolution: monitor resolution is set at 72 -96 dpi; photographic quality is between 150 and 200 dpi; for simple black and white line art, the resolution should match the printer.

There are three color swatches used in the painting: Paint, paper, and fill.

The more popular production of bitmap mages are photomontages, vignettes, silhouettes, collages, and posters (2-4 tones.) Each method can incorporate a variety of photo imaging techniques and processes.

Image Re-sampling- is to control the resolution and the size of the image so it will match its output. Re-sampling can also be used to convert the image into different units of measurement such as centimeters, points, picas, pixels, and inches.

Masks- Are the preferred tools to selecting parts of a bitmap image such as:

Shapes, brushes, lasso, scissor, and magic wand tools. When a match is selected you will see the marching ants on the screen.

Paintbrush tools- Paintbrushes modify pixels of a bitmap image using selected colors.

 the paint tools, the effect tools, the clone tools, and the image sprayer tool.

The effect tool- is used to produce a variety of effects by modifying the pixels in a variety of ways. Some of the effects include smear, smudge, and brightness.

Image properties can be modified using the image adjustment tools.

**V203.05 WebPages (8 questions)**

Protocols- are rules or formats that have been agreed-upon for transmitting data. Protocols have been established to make sure that all of the varying networks can exchange information over the Internet.

Servers that are accessible to the World Wide Web are used to store web pages. There are several types of computer servers,

Uniform Resource Locator (URL) Is a unique name given to each website. If you have access to the Internet and know the URL, you can find and display a specific web page. The pathname specifies the location of the Web page.

HTML (HyperText Markup Language) supports links to other documents as well as graphics, audio, and video files.

Links or hyperlinks are- text or images on a Web page that connect to other pages on the Web.

Kbps = Kilobytes per second is the measurement of the speed at which information is transferred.

Types of Internet Connection-

Modem *--* connects over a telephone line, the slowest connection method

ISDN -- uses a digital telephone line, transfers at 64 Kbps to 128 Kbps.

Cable Modem -- transfers information using a television cable, speeds up to 3,000 Kbps.

DSL – The fastest internet connection. Uses sophisticated modulation schemes to pack data onto copper wires which offer transfer rates from 1,000 Kbps to 9,000 Kbps.

HTML- is a universal language used to create web pages. It is made up of text and HTML tags which allows you to display your page on any computer that has a software browser installed

Web page structure consists of **two** basic parts: it starts with <HTML><HEAD> and ends with </BODY></HTML>. All the information you want to include in your Web page fits in between the <BODY> and </BODY> tags.

A tag is a command inserted into a document that specifies how the document, or a portion of the document, should be formatted. Tags are enclosed within **< >** brackets Text within the tags can be upper or lower case, but are not typically mixed.

Attribute is used to add additional information to a tag. describes a characteristic such as bolded text For example, when describing a horizontal rule **<**hr>, the “width” attribute will specify the width of that line either as a percentage of the page or as the number of pixels <hr width = “50%”>.

HTML Codes:

tag of <br> will: Stop text and begins a new line

<html></html>= Starts and ends an HTML document

<b></b>Bold - creates bold text

<head></head> Contains information about the web page that Does not appear on the web page.

<p></p> Paragraph - Adds a line of space before and after the information between the tags.

tag of <hr> will Create a horizontal line

tag of <a href=”xxx”> text</a> Create a hyperlink to another page.

<h4>HELLO</h4> Set the size for the enclosed text.

**V.204.01 Summarize Advanced 3d Modeling(24 Questions)**

Lighting: CG (computer graphics) lighting typically includes four elements.

1. Where in the scene the light is located (usually specified by X, Y, Z coordinates from the keyboard or by mouse operations)
2. *Intensity* of the light or how bright it is (usually specified with a range where the higher the number, the brighter the light)
3. Color RGB values, i.e. black=0,0,0, white=255,255,255, pure red=255,0,0)
4. *Angle of incidence* specifies that the more a surface is angled away from a light, the darker it appears. When the angle is 90˚ to the surface, the surface is lighter.

Types of CG (computer graphics) lights

1. *Point light*s (*omni lights* or *local lights)* simulate a single light bulb. light equally in all directions.
2. *Spotlights* Directional light

1. Spotlights produce a circular pattern of light known as the *hotspot*. The intensity of the light fades with an increase in its distance from the centerline of the cone to its edge. This fading is known as *dropoff*.

1. *Ambient* light simulates the overall amount of light in the world around you.

1. Ambient light does not come from any one point, nor does it extend in any one direction. Ambient light does not cast shadows; it lights all objects evenly and uniformly throughout the scene.

1. *Infinite* or *directional* light sun rays that are parallel to each other, but that shine only in one direction.

1. All objects in the scene receive the same amount of light. Great Rendering light

Colored light

 a. Colored lights are used for special effects.

 b. Colored lights emphasis mood. For examples, red (warmth), orange, and yellow imply passion or anger, green implies peacefulness, and blue (cool) implies sadness or depression.

e. Objects in the real world derive their color, in part, from the reflections of objects around them. .

The classic lighting layout (suggested as a starting point for lighting) consists of three lights.

b. *Key light* – the primary light source in the scene. It is usually placed off to the side of the main feature in the scene. It is the strongest, brightest light. Typically it is the only light in the scene set to cast shadows. Local lights and spotlights are often used as key lights.

c. *Fill light* – the real world contains a certain amount of ambient light that is always present. In the computer scene the only light that appears is that which is inserted. The fill light is usually 25% – 50% the strength of the key light and is used to add enough light to soften the light provided by the key and to reduce or eliminate unwanted shadows. Place the fill light opposite the key.

d. *Backlight* – adds depth to the scene by separating the objects from the background, giving them more of a defined shape. As the name implies the light is placed behind the objects in the scene and is about 50% – 100% the intensity of the key.

Lighting moods

a. *High key lighting* places the key light in front of and above the items in the scene to create interior, daylight scene.

b. Low *key lighting* is a key light placed higher in the scene than in the High Key setup

c. *Frontal lighting* it places the key in front of the scene, but it also places the key high above the scene to produce an effect similar to an overhead light would produce.

d. *Side lighting* places the key light at eye level that simulates sunlight.

*Attenuation* simulates the diminishing (fading) of a light’s intensity over a distance. Most computer graphics programs do not include attenuation as a default; it must be set if you want your scene to emulate natural lighting.

a. *Decay* measures the amount of fade or lessening of intensity

b. *Falloff* describes how the light energy is dispersed

c. Objects close to a light source appear brighter; the farther they are away darker they should appear.

Shadows play an important role in lighting.

Shadows add depth and realism to a scene. The angle of your light source determines the length and size of the shadows.

**C.Mapping**

1. Texture Mapping

a. Surfaces may have single colors or they may have multiple color patterns, which are commonly referred to as *textures*. Even materials like metals which seen to be 1 color, when closely examined, have varying shades and colors mixed in random patterns.

b. The term *texture* in 3Ds Max refers to image patterns rather than the “feel” of materials.

d. *Surfacing* (applying textures to surfaces) makes objects appear realistic.

*Projection mapping* -works sort of like a film projector by projecting the texture patterns onto the surface of the objects. Textures may be projected from several directions at one time.

UVW space is how the map is applied to an object. The U = X-axis, the V = Y-axis, and the W =Z-axis.

UV mapping solves the distortion problems that occur when applying image maps (textures)to complex surfaces.

 Many 3D graphics programs allow texture image scaling and placement controls.

1. Texture images are composed of 2D pixels.
2. When applying the image map, the 3D surface is divided up into the same number of rectangular polygons as there are pixels on the image to be applied. This process assigns the grid pattern to the 3D surface to coincide with the XY dimensions of the 2D texture.

 By applying UV scaling and placement restraints the most appropriate fit of the image can be obtained.

1. Scale commands – Allows you to change the size of the material rectangle in relation to the object’s surface.
2. Placement commands – Alters the UV position of the material rectangle in relation to the object’s surface.
3. Repetition commands – Controls tiling by specifying the number of times the pattern repeats over the surface.

 By manipulating UV controls, it is also possible to apply textures to parts of surface as well as the entire surface.

Bump Mapping (bump texture mapping)

a. Bump maps simulate the roughness of surfaces even though the surfaces are perfectly flat. Surface roughness might include the unevenness of a brick surface, the weave of a fabric, the bumpiness of an orange, or the craters of a planet.

c. The illusion of roughness can be created because an irregular surface would have light and dark areas caused by the surface normal’s pointing in different directions.

d. *Aptitude* or *intensity* settings allow the user to determine the height and depth of bumps.

Reflection and Refraction

1. A reflection map creates the illusion of shiny metals and glass by reflecting rays off the object’s surface.
2. Reflections look more realistic if specular (color, size and shape of highlights) levels and glossiness (shininess) are varied according to the material being described.
3. Some non-metallic materials may need a polished look.
4. Various materials have a different index of refraction based upon the density of the materials.

Environmental Mapping

1. The environment can provide a realistic background. Is it foggy? Is it the dusty blackness of space? The use of atmospheric conditions to the entire scene instead of to a single object.

2. Environmental mapping allows the reflection of an image onto the surfaces of the objects within the scene. If you placed a cloud in your environment not only would it display on your background it would also be reflected to other objects.

You can change the background color so that the color appears everywhere object geometry is not present.

Pictures saved as jpegs can be used to add a background scene much like backdrops are used in stage productions.

**V204.02 Animation(8 questions)**

Animation is the process of giving life or movement to drawings or objects.

Student generated animation

1. Students can manually transform, move, and/or modify 3D objects. Students can manually set animation parameters.
2. Manual animation changes will create key frames. Key frames are frames that demonstrate major action. A computer will fill in the frames between each key frame. These filled in frames are called tweens.
3. Pivot points (axis origin) can be adjusted.A door hinge has a pivot point on the side of the door. The door’s pivot point needs to be moved from the default (center) to the edge.

Computer generated animation

1. Students can apply computer-generated transformations, movements, and/or modifications of 3D objects and settings of animation parameters.
2. Morphing is changing an object’s geometry from one shape to another.

Used for facial animation. Morphing blends from one object into another object. Materials can also be morphed.

1. Controllers can add animation. An object can be made to follow a path in a path controller.
2. Animation can simulate environmental effects such as detonation, gravity, water movement

Particles can be rendered. Particles can include sprays, rain, or snow. There are different types of particle systems available with different parameters that can simulate physical forces of nature.

Timeline for 3D animation

1. Frame rate is the number of frames used in an animation and how fast they will run.
2. Students can lengthen or shorten an animation by adding or subtracting frames.
3. Students can make adjustments to key frame for editing purposes.
4. Students can set the frame rate and number of frames.

1. 24 frames per second is used for editing motion-picture film.

2. 25 frames per second is used for editing *PAL* (European standard.)

3. 30 (29.97) frames per second is used for editing *NTSC* (North American standard) video (television.)

1. Students will be able to calculate the number of frames and play rate in an animation.

1. Using NTSC, a 120-frame animation will play for about 4 seconds.

120frames/30frames per second = 4 seconds

2. If a NSTC animation plays for 10 seconds, then there are 300 frames.

10 seconds = 300 frames/30 frames per second.

1. Loop animation -- animations can be looped many times. This is useful in repeating a needed movement such as a bouncing ball.
2. Animating Cameras

1. Camera movement allows your audience to know more about the environment.

a. Architects use walkthroughs to show clients what the proposed structure will look like. The camera follows a defined *path*, which is a line of motion the viewer takes as they walk around or through the building.

b. *Look At* tools automatically point a camera’s Z axis at a selected object’s axis origin and keeps the camera pointed at the object regardless of the path. In some programs, the *look at* tool can be used to control not only cameras but also other tools such as a light.

c. Attaching a camera to an object is a simple way of getting the camera into the action. An example would a roller coaster ride where the camera is glued to a passenger car and set to look ahead as the objects in the scene pass.

d. Motion *blur* tools blur everything in the scene, which can add realism to the scene.

Hierarchy and Linking

1. To achieve realistic action, you must study movement.

2. Hierarchies allow the user to move the entire object and/or select and move individual components. An example is the model of a truck, which consists of wheels and a body. The wheels need to rotate around their axes while moving forward with the body in a defined direction.

4. Hierarchical structures allow the individual parts to be moved, rotated, scaled, colored, or textured independently.

5. Computer graphics programs allow the parts to be linked using different hierarchies, the most common being the *Parent-Child* and the *Sibling*.

a. The highest element within the hierarchy is the parent or in our example, the entire truck.

b. The lower levels would be the children or in our truck example, the individual wheels.

c. The child(ren) will follow the parent wherever the parent goes in a *Parent-Child* relationship.

d. Children may have sub-parts, which would be children of the children.

e. Where the individual links are equal and do not contain a “highest level,” you have a sibling relationship.

Render and Output

1. Rendering will allow an animation or scene to be used in other applications. Also, files can be rendered using different file formats and different compressions.
2. Output can include a single frame, an active time segment, and a range of frames. The larger the output size, the longer the rendering time.
3. Basic post-production editing are effects that are added to a scene after the scene has been rendered.
4. Lens Flare -- adds a sense of reality by recreating the effects that occur in real camera lenses such as streaks of light and secondary flares. Glows, rings, and streaks are some common effects that can be added to a lens flare.
5. Depth of field can be controlled. Objects inside of the focal range can become blurred while the main subject stays in focus. Depth of field is determined by the focal point and focal parameters.
6. Environmental mapping will add a map to the environment. This is useful for adding clouds to a sky or stars to a background.
7. Blurs can be added to scenes or images to give the illusion of movement.

10. Atmospheric effects can also be added when rendering. Examples include fog, volume fog, combustion, and volume light. Adding fog to a scene can add realism.

11. Once files are created, they can be converted from one format to another depending on the software application.

**204.03 Video Editing (10 questions)**

Video post-production

Video editing software (such as Adobe Premiere) offers the opportunity to enhance animation productions with sound, still images, and scene transitions.

Digital versus analog

1. Analog media (VHS) must be digitized or converted to a digital format before a computer can work with the material.(linear) devices record light and sound as continuously changing electrical signals described by a continuous change of voltage.

2. Digital (AVI File-DVD)media is stored in a format that a computer can read and process directly.

a. Digital cameras, scanners, and digital audio recorders can be used to save images and sound in a format that can be recognized by computer programs.

b. Digital media may come from images created or sound recorded directly by computer programs.

 Sufficient computer resources are needed for digital video editing.

a. Fast processors are needed to process the video. Additional RAM beyond customary requirements is needed. Very large hard drives are needed

Specifying project settings

General settings

a. Timebase specifies time divisions used to calculate the time position of each edit, expressed in frames per second (fps).

1. 24 is used for editing motion-picture film

2. 25 for editing *PAL* (European standard)

3. 29.97 for editing *NTSC* (North American standard) video (television)

b. Frame *rate* indicates to the number of frames per second contained in the source or the exported video. Whenever possible, the timebase and frame rate agree. The frame rate does not affect the speed of the video, only how smoothly it displays.

c. *Timecode* is a way of specifying time. Timecode is displayed in hours, minutes, second and frames (00;00;00;00). The timecode number gives each frame a unique address.

Video setting

a. Frame *size* specifies the dimensions (in pixels) for frames. Choose the frame size that matches your source video. Common frames sizes include:

1. 640 x 480 – standard for low-end video cards;

2. 720 x 486 – standard-resolution professional video;

3. 720 x 480 – DV standard; and

4. 720 x 576 – PAL video standard (Used in Europe.)

*Aspect ratio* is the ratio of width to height of the video display.

1. *Pixel aspect ratio* is the ratio for a pixel while the *frame aspect ratio* is the width to height relationship for an image.

2. 4:3 is the standard for conventional television and analog video.16:9 is the motion picture standard.

3. Distortion can occur when a source image has a different pixel aspect ratio from the one used by your display monitor. Some software may correct for the distortion.

CODECs (compressor/decompressor) specify the compression system used for reducing the size of digital files. Digital video and audio files are very large and must be reduced for use on anything other than powerful computer systems. Examples are QuickTime or Windows.

1. *QuickTime* (movie-playing format for both the Mac and Windows platform) - Cinepak, DV-NTSC, Motion JPEG A and B, Video

1. *Video for Windows* (movie-playing format available only for the Windows platform) – Cinepak, Intel Indeo, Microrsoft DV, Microsoft Video1

*Color bit depth* is the number of colors to be included. The more colors that you choose to work with, the larger the file size and in turn, the more computer resources required.

1. 8-bit color (256 colors) might be used for displays on the Web.

2. 24-bit color (millions of colors) produces the best image quality.

3. 32-bit color (millions of colors) allows the use of an alpha channel .

4. 1-Bit color is black and white

The editing process

1. Visual and audio source media are referred to as *clips,* referring to short segments of a film project.

a. Clips may be either computer-generated or live-action images or sounds that may last from a few frames to several minutes.

b. Bins are used store and organize clips in a small screen space. Bin is another film industry metaphor, which is where editors hung strips of film until added to the total production. Bins are also referred to as folders.

4. Common digital outputs

a. Audio Video Interleave (avi) – for use on Windows only computers, good for short digital movies.

b. QuickTime – a cross platform Apple format that is popular for Web video.

c. RealVideo – RealNetworks streaming video is an extremely popular format.

5. Video editing programs may be exported to other multimedia programs (such as *Macromedia Director* or *Authorware*) for addition editing or integration with other materials such as *Flash* programs.

**V205.01Cells(4 questions)**

Animal Cells -- The bodies of all living organisms are made of cells; without cells there would be no life.



1. Cell membrane- is responsible for the controlled entry and exit of substances.

a. The membrane is a double layer of lipids (Called phospholipids which is a water-fearing molecule.) along with numerous proteins that are important to cell activity. These proteins include receptors, pores, and enzymes. The contents of the membrane float together in a “Fluid Mosaic” manner.

1. Nucleus
2. The Nucleus controls every part of the cell and its functions. It is a membrane-bound organelle surrounded by a double membrane. It communicates with the surrounding cell through numerous nuclear pores.
3. Within the nucleus is the DNA. When a cell is dividing, the DNA and surrounding protein condense into chromosomes that are visible by microscopy.
4. The prominent structure in the nucleus is the nucleolus. The nucleolus produces ribosome and RNA.
5. Mitochondria

a. Mitochondria provide the energy needed by the cell ( AKA respiration.) They are the power centers of the cell and have different shapes depending on the cell type.

b. Mitochondria are double membrane-bound organelles. The outer membrane is fairly smooth, unlike the inner membrane, which is highly convoluted, forming folds called cristae. The cristae increase the inner membrane's surface area. It is on these folds that food (sugar) is combined with oxygen to produce ATP - the primary energy source for the cell.

1. Golgi bodies

a. The Golgi apparatus is a single membrane-bound structure. It is actually a stack of membrane-bound vesicles that are important in packaging large molecules for transport throughout the cell. Golgi bodies is the packaging (Vesicles) and shipping center of the cell.

1. Ribosome
2. Ribosomes look like tiny dots in the cytoplasm of the cell. Sometimes they float free and sometimes they are attached to the endoplasmic reticulum. Ribosomes are the site of protein synthesis. They read the code found in RNA, and assemble proteins needed by the cell for growth and internal functions.
3. Endoplasmic reticulum

 Throughout the cell is a vast amount of membrane called the endoplasmic reticulum, or ER for short. The ER connects with the outer nuclear membrane and the cell membrane. These membranes function as channels in the cell.

c. Endoplasmic reticulum look "smooth" (smooth ER) and some appear "rough" (rough ER.) The rough ER appears rough because ribosomes are on the membrane surface. Smooth and Rough ER have different functions. Smooth ER is important in the production of fats and membrane proteins. Rough ER is important in the synthesis of other proteins.

1. Vacuole
2. Membrane bound organelles that store substances for the cell. Vacuoles export or import substances in the cell by fusing with the cell membrane.

Plant Cells- Plant cells have two more organelles than the animal cell: the cell wall and the chloroplast. The vacuole is also much larger in a plant cell.



1. Cell Wall

The cell wall is used for support of the plant. It is made up of a fiber called Cellulose to help perform this job. Cellulose cannot be digested by living organisms. The cell wall is connected to a cell membrane. The membrane is responsible for the controlled entry and exit of substances.

2. Chloroplast

1. The chloroplast is the site for photosynthesis where the cell takes sunlight, water, and carbon dioxide to make glucose for the plant and oxygen for the world. Chlorophyll is the green pigment found in the chloroplast. The chlorophyll collects the sun’s energy. Structure includes an outer membrane with stacks of grana inside. These grana, or “stacks of coins,” are made up of membrane-bound chambers called thylakoids.

3. Vacuole

Membrane-bound organelles that store substances for the cell. Vacuoles export or import substances in the cell by fusing with the cell membrane.

**Plate Tectonics V205.03 (4 questions)**

Theory of Plate Tectonics- The surface of the Earth is broken into large pieces of earth called plates. Evidence suggests that the separate continents we know today migrated from this one large land mass known as Pangea.

\*Plate tectonics are a combination of two earlier ideas, continental drift and sea-floor spreading.

Plate Boundaries- Many changes and movements in the earth’s crust originate along Lithospheric plate boundaries.

Divergent Boundaries- are two plates moving apart from each other. The process by which the plates move apart can also be referred to as ***sea floor spreading****.*

Convergent boundaries are the direct collision of one plate with another.

Oceanic*-*continentalconvergence *–* One type occurs when a plate with oceanic crust at its leading edge collides with a plate with continental crust at its edge.

Continent-continent convergence *-* A second type of collision occurs when two plates with continental crust at their leading edges come together.

Oceanic-oceanic convergent-The third type of collision along convergent boundaries occurs between oceanic crust and oceanic crust.

Transform fault boundaries- occur were two plates are grinding past each other.

Measuring Plate Movement-

Global Positioning System (GPS) is a constellation of 24 satellites which are used for navigation and precise geodetic position measurements.

Satellite Laser Ranging (SLR) determines round-trip time of light from ground-based lasers at widely separated points on the earth to mirrors on satellites.

Very Long Baseline Interferometry ([VLBI](http://lupus.gsfc.nasa.gov/plots/maps/jpg/World_Wide_Adjusts.jpg)) uses the difference in time at widely separated places of received quasar-emitted radio signals and can also be used to obtain plate movement.

**DNA V205.05(4 Questions)**

DNA-Deoxyribonucleic acid Large molecule called a polymer (molecule with many units)

Nucleotides Units or monomers of DNA Made of 5-carbon sugar called deoxyribose

Deoxyribose contain a phosphate group and one of four nitrogen bases

Four nitrogen bases A for adenine G for guanine C for cytosine T for thymine

 Purine Bases Adenine and guanine -The larger of the 2 types of bases have a double ring structure

Pyrimidine Bases Cytosine and Thymine- Have a single ring structure

Deoxyribose sugar- 3 oxygen and 5 carbon atoms which make up the DNA “backbone”The hydroxyl groups’ carbons link to phosphates to form this “backbone”

Double Helix- DNA is composed of twisting strands of nucleotides. Each strand is a helix or spiral staircase

2 strands are bound together to create a double helix

DNA Fingerprinting- Method of identification that compares fragments of DNA

Constructing a Fingerprint- Obtaining a DNA sample from body tissue or fluid, and then cutting the sample into pieces using enzymes. Arranging these pieces using gel electrophoresis.

Gel Electrophoresis- Refers to the forced movement of molecules by electricity Separates macromolecules (large molecules) on the basis of size, electric charge, and other physical properties.

Electrophoresis describes the moving of the charged DNA *Electro*: energy of electricity *Phoros*: to carry across

 Steps in Gel Electrophoresis

1. Holes created in gel to hold DNA solution
2. DNA solutions loaded into holes
3. Gel is “excited” by electricity and small molecules move through the gel
4. Photograph is taken to save the results of the fingerprint
5. 2 matching fingerprints indicate they are probably from identical sources

Uses in DNA Fingerprinting- Discovery of genetic causes of diseases, mapping the human genome (2003), Forensic science, Paternity testing

**Simple Machines V205.6 (4 Questions)**

Simple Machines- They allow us to apply effort at one place to do work at another point and/or to change the direction of a force.

Inclined plane -- a sloping surface, such as a ramp. *Ex:* staircase, ramp, and bottom of a bath tub

Wedge -- two inclined planes joined back to back. *Ex:* Axe, Zipper, Knife

Screw -- an inclined plane wrapped around a shaft or cylinder. *Ex:* Bolt, Spiral staircase, wood screw, Corkscrew, screws on light bulbs

Wheel and axle -- a wheel and axle has a larger wheel (or wheels) connected by a smaller cylinder (axle) and is fastened to the wheel so that they turn together. Ex: Door knob, Wagon, Toy car, Bicycle gears, Screw driver

Pulley -- a wheel that usually has a groove around the outside edge. Ex: Flag pole, Crane, Elevators, Window blinds

Lever -- a straight rod or board that pivots on a point known as a fulcrum. Door on hinges, Seesaw, Hammer Bottle opener

**V206.01: Summarize different types of portfolios (4 questions)**

A portfolio is designed to showcase a student’s work that meets a prescribed set of standards and is deemed by the student to be his/her own work.

Electronic portfolio- This electronic information takes up very little physical space and is easily accessed. Can be easily saved on a CD-ROM or Flash Drive and edited.

Because electronic portfolios can be made available to wider audiences on the Internet, feedback can come not only from peers and teachers, but also via email from parents and the community.

Traditional portfolios should contain a wide variety of examples of your work. There is usually a concentration of a particular style or technique or medium.

As with traditional portfolios, viewers of electronic portfolios are encouraged to share their impressions and suggestions regarding student work.