Teacher: CORE CAD

Course: CAD

Year: 2012-13

Month: All Months

Intro to Computer Aided Design

	Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
September	What is "CAD"?

How do you create basic 3D models? | History of engineering drawings.

Explanation of what CAD programs do and how and why they are used.

Examples of companies that use CAD software. Examples of everyday objects that were designed in pro/Engineer.

Explanation of what extrusions are and examples of objects that are extruded

Overview of the Pro/Engineer environment

Introduction | Open Pro/Engineer

Set Working Directory

Navigate with in the Pro/E environment (rotate drawings, zoom in and out).

Create a simple sketch in "sketcher".

Use the extrude tool to make simple 3D shapes.

Use the extrude tool to add and subtract material from a model.

Determine whether or not | Discussion of how everyday objects are created. 9/1/2012 Create a basic 3D object 9/1/2012 Create a child's block with a different image on each side. 9/9/2012 Shapes Worksheet 9/18/2012 Shape Quiz - Use pro/E to recreate the a series of 3D object 10/2/2012 Camera Model 9/26/2012 | Discussion of the history behind Pro/Engineer and related programs. Demonstration of how to navigate within the Pro/E environment. Discussion of extrusions and demonstration of how to extrude with Pro/Engineer Using sketcher to create "legal" sketches Orientating in sketcher (using sketch references) Building extrusuions off existing extrusions (adding and subtracting) | ability to create extrusions

ability to create basic 3D shapes/models | A.3-Students will use creative, analytical, and critical thinking skills. A.5-Students will be creative producers in at least one area of the visual and performing arts. A.6-Students will demonstrate competency in technology. IT.03.19- Demonstrate how specialized technology tools can be used for problemsolving, decision-making, and creativity (e.g., simulation software, environmental probes, computer-aided design, geographic information systems, dynamic |

	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
	to the extrude tool. Intro to "sketcher" (drawing tools, legal sketches) Choosing a work plane and references Building extrudes off of each other (adding and subtracting) to create more complex shapes.	something is a "legal sketch". Edit object definitions to make changes to existing parts. Sketch references Building extrudes off of each other				geometric software, graphing calculators, art and music composition software). M.G.G.16-Geometry ~ Geometry ~ Demonstrate the ability to visualize solid objects and recognize their projections and cross sections. (10.G.10) STE.17.01.03-Demonstrate the use of drafting techniques with paper and pencil or computer-aided design (CAD) systems when available. STE.17.01.05-Interpret plans, diagrams, and working drawings in the construction of a prototype.

October

Reading Engineering Drawings

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How do you create an accurate 3D model from an	Introduction to orthographic projections (3-view	Convert 3D objects to orthographics Convert	Worksheets - converting 3D objects to orthographic	Introduction and explanation of 3-view drawings and	ability to interpret an orthographic drawing	A.3-Students will use creative, analytical, and critical thinking

| engineering drawing (blueprints)? | drawings) Converting a 3D object to a 3-view drawing Recognizing which surfaces of a 3D object correspond to which lines and areas in a 3-view drawing. Creating 3D drawings from orthographic projections. Creating 3D objects in Pro/E from 3-view drawings Reading dimensions on 3-view drawings Dimensioning drawings in Pro/E | orthographic drawings to 3D objects Dimension drawings Create accurate scale models in pro/E read an orthographic drawing to determine the shape and size of said drawing. Use basic math to determine the length of a line when you know the length of the other lines. | projections 10/9/2012 Worksheets - Create 3D objects in pro/E from an orthographic drawing 10/11/2012 Worksheets - create accurate scale models based on dimensioned orthographic projections 10/15/2012 | what they're used for. How to draw a 3D object as an orthographic projection. Creating 3D objects from orthographic projections Dimensioning drawings in Pro/Engineer Creating accurate 3D objects from dimensioned orthographic projections. | | skills. A.5-Students will be creative producers in at least one area of the visual and performing arts. A.6-Students will demonstrate competency in technology. IT.03.19-Demonstrate how specialized technology tools can be used for problemsolving, decision-making, and creativity (e.g., simulation software, environmental probes, computer-aided design, geographic information systems, dynamic geometric software, graphing calculators, art and music composition software). STE.17.01.02-Demonstrate knowledge of pictorial and multi-view drawings (e.g., orthographic |

| | | | | | | | projection, isometric, oblique, perspective) using proper techniques. STE.17.01.03- Demonstrate the use of drafting techniques with paper and pencil or computer-aided design (CAD) systems when available. STE.17.01.04- Apply scale and proportion to drawings, e.g., $1/4\text{Â}^2 = 1'0"$. STE.17.01.05- Interpret plans, diagrams, and working drawings in the construction of a prototype. |

November

Accurate and Realistic Model Making

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How can you create the most realistic/lifelike model possible?	The Revolve Tool Explanation of shortcuts and time saving tools and tips. intro to the mirror tool	revolve tool mirror tool pattern tool applying materials to a model applying decals and	Work Sheet - the revolve tool 11/1/2012 Worksheet - using the pattern tool 11/5/2012 Vehicle Model 11/7/2012 Basic	Introduction and explanation of the revolve tool Introduction and explanation of time saving tools - pattern and mirror	ability to use the revolve tool ability to render their models	A.3-Students will use creative, analytical, and critical thinking skills. A.5-Students will be creative producers in at least one area of the visual and performing arts.

		explanation and intro to the pattern tool explanation of how rendering works and discussion of what you can do with it. intro to basic object rendering (specifying materials, decals, textures, etc) intro to environmental rendering intro to lighting a model	textures to a model creating environments to showcase a model lighting models	Rendering Exercises 11/18/2012 Advanced Rendering Exercises 11/20/2012 Render the Vehicle 11/26/2012	Intro to basic rendering, adding materials, decals and textures. Intro to more advanced rendering techniques - adding environments and lighting		A.6-Students will demonstrate competency in technology. IT.03.17-Import graphics, photos, and other media into report or presentation, citing sources appropriately. IT.03.19-Demonstrate how specialized technology tools can be used for problemsolving, decision-making, and creativity (e.g., simulation software, environmental probes, computer-aided design, geographic information systems, dynamic geometric software, graphing calculators, art and music composition software). M.G.G.15-Geometry ~ Geometry ~ Draw the results, and interpret

							transformations on figures in the coordinate plane, e.g., translations, reflections, rotations, scale factors, and the results of successive transformations. Apply transformations to the solution of problems. (10.G.9) M.G.G.16- Geometry ~ Geometry ~ Demonstrate the ability to visualize solid objects and recognize their projections and cross sections. (10.G.10)

December

Creating Advanced Geometries

Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
How do you create more advanced models?	intro to more advanced model making techniques Understanding cross sections Introduction to blending two or more cross sectional surfaces to create a solid	blends freeform surfaces sweeps assemblies	Environment 12/5/2012 Advanced Geometry Practice 12/3/2012 Assembly Worksheet 12/17/2012 Sweep and Blend Exercises (chapter 8) 12/13/2012	Intro to advanced modeling tools Intro to Assemblies	ability to create an blend ability to create a sweep	A.3-Students will use creative, analytical, and critical thinking skills. A.5-Students will be creative producers in at least one area of the visual and performing arts. A.6-Students will

		object					demonstrate competency in technology. IT.01.60-Select the appropriate technology tool for a task. IT.03.19- Demonstrate how specialized technology tools can be used for problemsolving, decision- making, and creativity (e.g., simulation software, environmental probes, computer-aided design, geographic information systems, dynamic geometric software, graphing calculators, art and music composition software). M.09-10.G.10- Geometry ~ Demonstrate the ability to visualize solid objects and recognize their projections and cross sections.
J a	Articulated (Moving) Models						

nuary	Essential Questions	Content	Skills	Assessments	Lessons	Learning Benchmarks	Standards
	How do you use animation to show movement of a 3D model?	Advanced Assemblies Basic Animation Techniques (key frames) Timelines	assemblies key frame animation	Animated Model 1/3/2013	Intro to advanced Assembly techniques Intro to key frame animation and timelines	ability to create simple 3D animations ability to assemble multiple parts files into one model	A.3-Students will use creative, analytical, and critical thinking skills. A.5-Students will be creative producers in at least one area of the visual and performing arts. A.6-Students will demonstrate competency in technology. IT.01.60-Select the appropriate technology tool for a task. IT.03.15-Present information, ideas, and results of work using any of a variety of communications technologies (e.g., multimedia presentations, Web pages, videotapes, desktop-published documents). IT.03.19-Demonstrate how specialized technology tools can be

						used for problemsolving, decision-making, and creativity (e.g., simulation software, environmental probes, computer-aided design, geographic information systems, dynamic geometric software, graphing calculators, art and music composition software). M.09-10.G.10-Geometry ~ Demonstrate the ability to visualize solid objects and recognize their projections and cross sections.