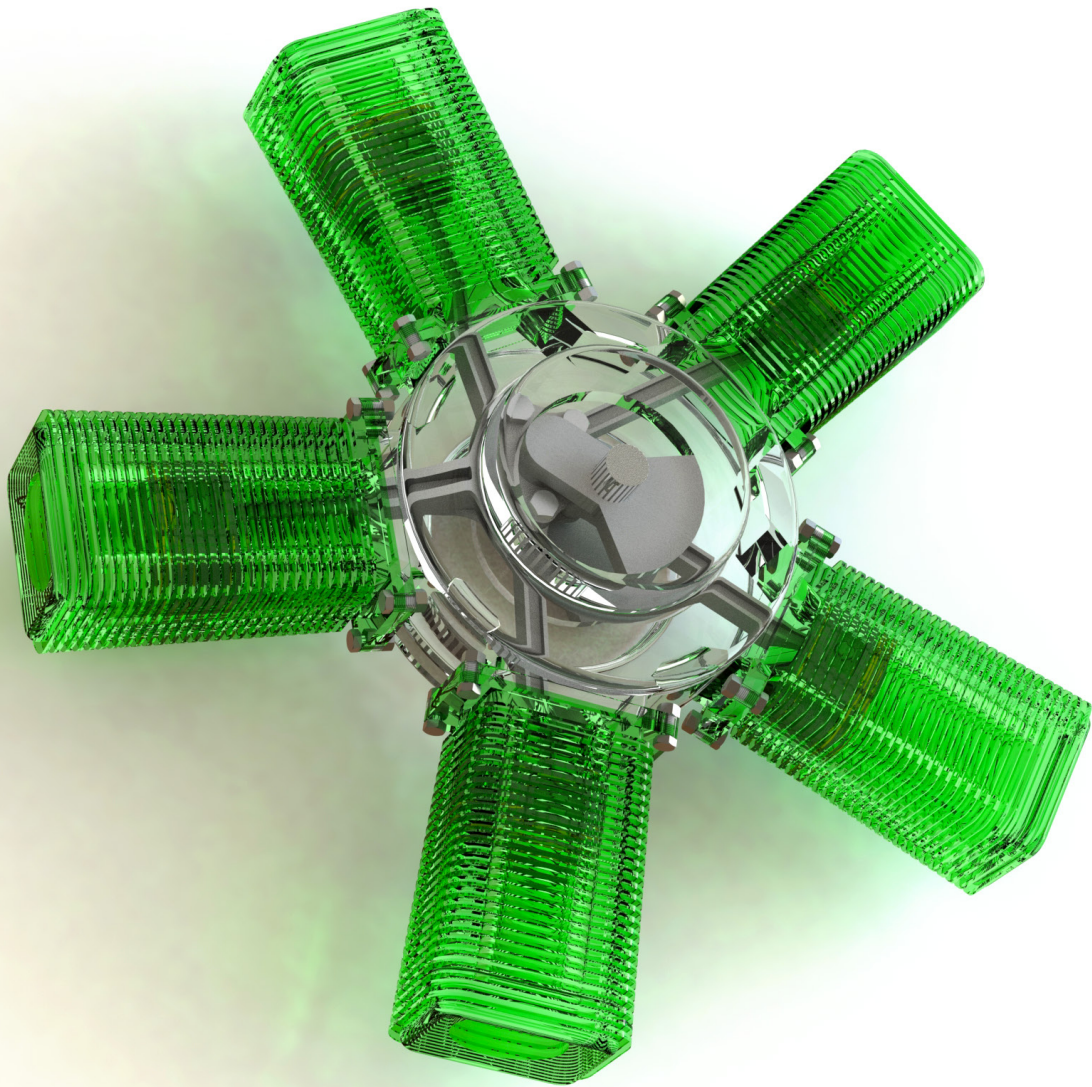


SOLIDWORKS® 2018 Tutorial

with Video Instruction

A Step-by-Step Project Based Approach
Utilizing 3D Solid Modeling



David C. Planchard, CSWP,
SOLIDWORKS Accredited Educator



Better Textbooks. Lower Prices.
www.SDCpublications.com



ACCESS CODE
UNIQUE CODE INSIDE

Visit the following websites to learn more about this book:



[amazon.com](https://www.amazon.com)

[Google books](https://books.google.com)

[BARNES & NOBLE](https://www.barnesandnoble.com)

TABLE OF CONTENTS

Introduction	I-1
About the Author	I-2
Acknowledgements	I-3
Contact the Author	I-4
Note to Instructors	I-4
Trademarks, Disclaimer, and Copyrighted Material	I-4
References	I-5
Table of Contents	I-7
What is SOLIDWORKS?	I-15
Design Intent	I-17
Overview of Chapters	I-20
About the Book	I-27
Windows Terminology in SOLIDWORKS	I-28
Chapter 1 - Overview of SOLIDWORKS and the User Interface	1-1
Chapter Objective	1-3
What is SOLIDWORKS?	1-3
Basic concepts in SOLIDWORKS	1-3
Start a SOLIDWORKS Session	1-4
<i>Tutorial: Start a SOLIDWORKS Session</i>	1-4
Welcome dialog box	1-4
Home Tab	1-5
Recent Tab	1-5
Learn Tab	1-5
Alerts Tab	1-6
SOLIDWORKS User Interface (UI) and CommandManager	1-8
Menu Bar toolbar	1-8
Menu Bar menu	1-8
Drop-down menu	1-9
Create a New Part Document	1-9
Novice Mode	1-10
Advanced Mode	1-10
Graphic Window (Default)	1-11
View Default Sketch Planes	1-12
Open a Part	1-12
Part FeatureManager	1-12
FeatureManager Rollback Bar	1-13
Heads-up View toolbar	1-13
Dynamic Annotation Views	1-15
Zoom to Fit	1-15
Zoom to Area	1-15
Window-Select	1-15
Rotate	1-15
Front View	1-16
Right View	1-16
Top View	1-16
Trimetric view	1-16

SOLIDWORKS Help	1-16
SOLIDWORKS Tutorials	1-17
SOLIDWORKS Icon Style	1-17
Additional User Interface Tools	1-17
Right-click	1-18
Consolidated toolbar	1-18
System feedback icons	1-18
Confirmation Corner	1-19
Heads-up View toolbar	1-19
CommandManager (Default Part tab)	1-22
CommandManager (Default Drawing tab)	1-23
CommandManager (Default Assembly tab)	1-24
CommandManager (Float/Fit)	1-25
Selection Enhancements	1-25
FeatureManager Design Tree	1-26
FeatureManager design tree tab	1-26
PropertyManager tab	1-26
Configuration Manager tab	1-26
DimXpertManager tab	1-26
DisplayManager tab	1-26
Fly-out FeatureManager	1-28
Task Pane	1-29
SOLIDWORKS Resources	1-29
Design Library	1-30
File Explorer	1-30
Search	1-31
View Palette	1-31
Appearances, Scenes and Decals	1-32
Custom Properties	1-32
SOLIDWORKS Forum	1-32
User Interface for Scaling High Resolution Screens	1-32
Motion Study tab	1-33
3D Views tab	1-34
Dynamic Reference Visualization	1-34
Mouse Movements	1-35
Single-Click	1-35
Double-Click	1-35
Right-Click	1-35
Scroll Wheel	1-35
Summary	1-36
Chapter 2 - Parts and Assembly Creation	2-1
Chapter Objective	2-3
Chapter Overview	2-4
Start a SOLIDWORKS Session	2-6
AXLE Part	2-10
AXLE Part-Extruded Boss/Base Feature	2-12
AXLE Part-Save	2-13
AXLE Part-Edit Appearance	2-14
AXLE Part-View Modes	2-15
SHAFT-COLLAR Part	2-18

SHAFT-COLLAR Part-Extruded Boss/Base Feature	2-18
SHAFT-COLLAR Part-Extruded Cut Feature	2-21
SHAFT-COLLAR-Modify Dimensions and Edit Color	2-23
FLATBAR Part	2-25
FLATBAR Part-Extruded Boss/Base Feature	2-25
FLATBAR Part-Extruded Cut Feature	2-28
FLATBAR Part-Linear Pattern Feature	2-30
LINKAGE Assembly	2-31
Mate Types	2-32
Standard Mates	2-32
Advanced Mates	2-33
Mechanical Mates	2-33
AirCylinder Assembly-Open and Save As option	2-34
LINKAGE Assembly-Insert FLATBAR Part	2-38
LINKAGE Assembly-Insert SHAFT-COLLAR Part	2-41
Motion Study - Basic Motion tool	2-44
LINKAGE Assembly-Basic Motion	2-44
Summary	2-47
Questions	2-48
Exercises	2-49
Chapter 3 - Front Support Assembly	3-1
Chapter Objective	3-3
Chapter Overview	3-4
Reference Planes and Orthographic Projection	3-5
HEX-STANDOFF Part	3-9
HEX-STANDOFF Part-Extruded Boss/Base Feature	3-10
HEX-STANDOFF Part-HOLE Wizard Feature	3-14
ANGLE-13HOLE Part	3-15
ANGLE-13HOLE Part-Documents Properties	3-17
ANGLE-13HOLE Part-Extruded Thin Feature	3-18
ANGLE-13HOLE Part-Extruded Cut Feature	3-20
ANGLE-13HOLE Part-Linear Pattern Feature	3-22
ANGLE-13HOLE Part-Fillet Feature	3-23
ANGLE-13HOLE Part-Second Extruded Cut and Linear Pattern	3-24
ANGLE-13HOLE Part-Third Extruded Cut Feature	3-26
TRIANGLE Part	3-31
TRIANGLE Part-Mirror, Offset and Fillet Sketch Tools	3-33
TRIANGLE Part-Extruded Boss/Base Feature	3-36
TRIANGLE Part-First Extruded Cut Feature	3-37
TRIANGLE Part-Second Extruded Cut Feature	3-39
TRIANGLE Part-Mirror Feature	3-41
TRIANGLE Part-Third Extruded Cut Feature	3-42
TRIANGLE Part-Circular Pattern Feature	3-44
SCREW Part	3-45
SCREW Part-Documents Properties	3-47
SCREW Part-Revolved Feature	3-47
SCREW Part-Extruded Cut Feature	3-51
SCREW Part-Circular Pattern Feature	3-53
SCREW Part-Fillet Feature	3-53
SCREW Part-Chamfer Feature	3-54

FRONT-SUPPORT Assembly	3-56
FRONT-SUPPORT Assembly-Insert ANGLE-13HOLE	3-56
FRONT-SUPPORT Assembly-Insert HEX-STANDOFF	3-58
FRONT-SUPPORT Assembly-Insert TRIANGLE	3-61
FRONT-SUPPORT Assembly-Insert SCREW	3-64
Chapter Summary	3-66
Questions	3-68
Exercises	3-69
Chapter 4 - Fundamentals of Drawing	4-1
Chapter Objective	4-3
Chapter Overview	4-4
Drawing Template and Sheet Format	4-5
Create a new Drawing	4-7
Drawing-Document Properties	4-9
Title Block	4-10
Create a Title Block	4-11
Company Logo	4-15
Insert a Company Logo	4-15
Save Sheet Format and Save As Drawing Template	4-17
FLATBAR Drawing	4-20
FLATBAR Drawing-Open the FLATBAR Part	4-20
Move views and Properties of the Sheet	4-24
FLATBAR Drawing-Position views	4-26
Detail Drawing	4-27
FLATBAR Drawing-Dimensions and Annotations	4-29
FLATBAR Drawing-Part Number and Document Properties	4-35
FLATBAR Drawing-Linked Note	4-37
LINKAGE Assembly Drawing-Sheet1	4-40
LINKAGE Assembly Drawing-Exploded view	4-44
LINKAGE Assembly Drawing-Animation	4-46
LINKAGE Assembly Drawing-Bill of Materials	4-47
LINKAGE Assembly Drawing-Automatic Balloons	4-49
LINKAGE Assembly Drawing-Sheet2	4-50
LINKAGE Assembly Drawing-Sheet2 Section view	4-52
LINKAGE Assembly Drawing-Sheet2 Detail view	4-52
FLATBAR Part-Design Table	4-54
FLATBAR Drawing-Sheet2	4-58
FLATBAR-SHAFTCOLLAR Assembly	4-60
Insert a Center of Mass Point	4-65
Chapter Summary	4-67
Questions	4-67
Exercises	4-69
Chapter 5 - Advanced Features	5-1
Chapter Objective	5-3
Chapter Overview	5-4
WEIGHT Part	5-6
WEIGHT Part-Lofted Feature	5-12
WEIGHT Part-Instant 3D Extruded Cut Feature	5-13
HOOK Part	5-14

HOOK Part-Swept Profile	5-20
HOOK Part-Swept Base Feature	5-20
HOOK Part-Dome Feature	5-20
HOOK Part-Thread Feature	5-21
WHEEL Part	5-24
WHEEL Part-Extruded Boss/Base Feature	5-27
WHEEL Part-Revolved Cut Feature	5-28
WHEEL Part-First Extruded Cut Feature	5-31
WHEEL Part-Second Extruded Cut Feature	5-33
WHEEL Part-Circular Pattern Feature	5-36
Modify a Part	5-39
HEX-ADAPTER Part	5-39
HEX-ADAPTER Part-Extruded Boss/Base Feature	5-42
HEX-ADAPTER Part-Extruded Cut Feature	5-42
AXLE-3000 Part	5-45
SHAFTCOLLAR-500 Part	5-46
Chapter Summary	5-49
Questions	5-50
Exercises	5-51
Chapter 6 - PNEUMATIC-TEST-MODULE and ROBOT Assembly	6-1
Chapter Objective	6-3
Chapter Overview	6-4
Assembly Techniques	6-6
PNEUMATIC-TEST-MODULE Layout	6-7
FLATBAR Sub-assembly	6-9
3HOLE-SHAFTCOLLAR Assembly	6-9
WHEEL-FLATBAR Assembly	6-16
WHEEL-FLATBAR Assembly-Insert 3HOLE-SHAFT-COLLAR	6-19
WHEEL-FLATBAR Assembly-Insert 5HOLE-SHAFT-COLLAR	6-21
WHEEL-AND-AXLE Assembly	6-25
WHEEL-AND-AXLE Assembly-Insert HEX-ADAPTER	6-28
WHEEL-AND-AXLE Assembly-Insert SHAFTCOLLAR-500	6-30
PNEUMATIC-TEST-MODULE Assembly	6-32
Modify the LINKAGE Assembly	6-33
PNEUMATIC-TEST-MODULE-Insert LINKAGE Assembly	6-42
PNEUMATIC-TEST-MODULE-Insert AIR-RESERVOIR-SUPPORT	6-44
PNEUMATIC-TEST-MODULE-Component Pattern	6-47
PNEUMATIC-TEST-MODULE-Linear Component Pattern	6-48
PNEUMATIC-TEST-MODULE-Insert FRONT-SUPPORT	6-50
PNEUMATIC-TEST-MODULE-Mirrored Component	6-53
PNEUMATIC-TEST-MODULE-MIRRORFRONT-SUPPORT	6-55
Component Properties	6-56
PNEUMATIC-TEST-MODULE-Insert WHEEL-AND-AXLE	6-56
PNEUMATIC-TEST-MODULE-Remove Rigid State	6-58
PNEUMATIC-TEST-MODULE-Review AirCylinder Configurations	6-59
Final ROBOT Assembly	6-64
Create the Robot Assembly	6-65
Insert the PNEUMATIC-TEST-MODULE Assembly	6-65
Insert the basic_integration Assembly	6-67
Chapter Summary	6-68

Questions	6-69
Exercises	6-71
Chapter 7 - CSWA Introduction and Drafting Competencies	7-1
Introduction	7-1
Objectives	7-7
Procedure to Create a Named Drawing view	7-8
Tutorial: Drawing Named Procedure 7-1	7-9
Tutorial: Drawing Named Procedure 7-2	7-9
Tutorial: Drawing Named Procedure 7-3	7-9
Tutorial: Drawing Named Procedure 7-4	7-10
Tutorial: Drawing Named Procedure 7-5	7-10
Tutorial: Drawing Named Procedure 7-6	7-11
Tutorial: Drawing Named Procedure 7-7	7-11
Tutorial: Drawing Named Procedure 7-8	7-12
Summary	7-12
Questions	7-15
Chapter 8 - CSWA Basic and Intermediate Part Creation and Modification	8-1
Objectives	8-1
Read and Understand an Engineering Document	8-2
Build a Basic Part from a Detailed Illustration	8-4
Tutorial: Volume/Center of Mass 8-1	8-4
Tutorial: Volume/Center of Mass 8-2	8-5
Tutorial: Mass-Volume 8-3	8-8
Tutorial: Mass-Volume 8-4	8-9
Tutorial: Mass-Volume 8-5	8-11
Build additional Basic Parts	8-15
Tutorial: Mass-Volume 8-6	8-15
Tutorial: Mass-Volume 8-7	8-17
Tutorial: Basic/Intermediate-Part 8-1	8-19
Tutorial: Basic/Intermediate-Part 8-2	8-22
Summary	8-25
Questions	8-26
Chapter 9 - CSWA Advanced Part Creation and Modification	9-1
Objectives	9-1
Build an Advanced Part from a Detailed Illustration	9-2
Tutorial: Advanced Part 9-1	9-2
Tutorial: Advanced Part 9-2	9-7
Calculate the Center of Mass Relative to a Created Coordinate System Location	9-10
Tutorial: Coordinate Location 9-1	9-10
Tutorial: Coordinate Location 9-2	9-12
Tutorial: Advanced Part 9-3	9-13
Tutorial: Advanced Part 9-3A	9-17
Tutorial: Advanced Part 9-3B	9-18
Tutorial: Advanced Part 9-4	9-20
Tutorial: Advanced Part 9-4A	9-26
Summary	9-27
Questions	9-28

Chapter 10 - CSWA - Assembly Creation and Modification	10-1
Objectives	10-1
Assembly Modeling	10-2
Build an Assembly from a Detailed Dimensioned Illustration	10-3
Tutorial: Assembly Modeling 10-1	10-5
Tutorial: Assembly Modeling 10-2	10-11
Tutorial: Assembly Modeling 10-3	10-16
Summary	10-21
Questions	10-22
Chapter 11 - Additive Manufacturing - 3D Printing	11-1
Chapter Objective	11-3
Additive vs. Subtractive Manufacturing	11-4
Cartesian Printer vs. Delta Printer	11-6
Create an STL file in SOLIDWORKS	11-7
Print Directly from SOLIDWORKS	11-8
Print Material	11-9
ABS - Storage	11-9
ABS - Part Accuracy	11-9
PLA - Storage	11-10
PLA - Part Accuracy	11-10
Nylon - Storage	11-10
Nylon - Part Accuracy	11-10
Build Plate	11-11
Non-Heated	11-11
Heated	11-12
Clean	11-13
Level	11-13
Temperature	11-14
Filament	11-15
Prepare the Model	11-16
Example 1: Part Orientation	11-17
Example 2: Part Orientation	11-18
3D Terminology	11-20
Stereolithography (SL or SLA)	11-20
Fused Filament Fabrication (FFF)	11-20
Fused Deposition Fabrication (FDM)	11-20
Digital Light Process (DLP)	11-20
Raft, Skirt, Brim	11-21
Support, Touching Build Plate	11-22
Slicer Engine	11-23
G-code	11-23
Infill	11-23
Infill Pattern/Shape	11-23
Shells/Parameters	11-23
Layer Height	11-24
Influence of Percent Infill	11-24
Remove the Model from the Build Plate	11-25
Know the Printer's Limitation	11-25
Tolerance for Interlocking Parts	11-25

General Printing Tips	11-26
Reduce Infill	11-26
Control Build Area Temperature	11-26
Add Pads	11-27
Unique Shape or a Large Part	11-27
Safe Zone Rule	11-27
Wall Thickness	11-27
Extruder Temperature	11-28
First Layer Not Sticking	11-28
Level Build Platform	11-29
Minimize Internal Support	11-29
Water-tight Mesh	11-29
Clearance	11-29
In General	11-30
Summary	11-31
Appendix	A-1
SOLIDWORKS Keyboard Shortcuts	A-1
Modeling - Best Practices	A-3
Helpful On-Line Information	A-5
SOLIDWORKS Document Types	A-6
CSWA Homework Answers	A-7
Glossary	G-1
Index	I-1



The Instructor’s information contains over 45 classroom presentations along with helpful hints, What’s new, sample quizzes, avi files of assemblies, projects and all initial and final SOLIDWORKS model files.

Redeem your code on the inside cover of the book. View the provided videos to enhance the user experience: Start a SOLIDWORKS session, Understand the SOLIDWORKS User Interface, Create 2D Sketches, Sketch Planes and utilize various Sketch tools, Create 3D Features and apply Design Intent, Create an Assembly and Create fundamental Drawings Part 1 & Part 2.

