

# CONTENTS

*Foreword* *xxv*

*Introduction* *xxvii*

<b>CHAPTER 1</b>	<b>Becoming Familiar with SolidWorks</b>	<b>1</b>
	Start SolidWorks . . . . .	2
	SolidWorks License Agreement . . . . .	3
	Help and Workflow Customization . . . . .	3
	Navigate the SolidWorks Interface . . . . .	5
	Graphics Area . . . . .	5
	Heads-up View Toolbar . . . . .	6
	Status Bar . . . . .	8
	Task Pane . . . . .	9
	Menu Bar . . . . .	15
	CommandManager . . . . .	16
	FeatureManager Design Tree . . . . .	16
	Toolbars . . . . .	16
	Use the CommandManager . . . . .	17
	Access the CommandManager . . . . .	18
	Float and Dock the CommandManager . . . . .	18
	Hide Text in the CommandManager . . . . .	20
	Customize the CommandManager . . . . .	21
	Use and Customize the Menus . . . . .	26
	Use Toolbars . . . . .	27
	Hide/Show Toolbars . . . . .	27
	Access the Shortcut Toolbar . . . . .	28
	Access the Context Toolbars . . . . .	31
	Use the Keyboard . . . . .	32
	Use Default Shortcuts . . . . .	32
	Add and Change Shortcut Keys . . . . .	34
	Print Keyboard Shortcuts . . . . .	36
	Use Accelerator Keys . . . . .	37
	Use the Mouse . . . . .	38
	Select with the Mouse . . . . .	39
	Use the Right Mouse Button . . . . .	42

Mouse Gestures . . . . .	44
Manipulate Views with the Mouse. . . . .	45
Are You Experienced? . . . . .	47

---

## **CHAPTER 2      Learning the Basics      49**

---

Explore the Document Structure. . . . .	50
Explore the Anatomy of a Part . . . . .	52
Graphics Area . . . . .	53
FeatureManager Design Tree. . . . .	57
PropertyManager . . . . .	70
ConfigurationManager. . . . .	70
DimXpertManager . . . . .	70
Use Assemblies . . . . .	71
FeatureManager Design Tree in Assemblies . . . . .	72
Tell a Story with Drawings . . . . .	74
Graphics Area . . . . .	74
Sheet Tabs. . . . .	76
FeatureManager Design Tree. . . . .	77
PropertyManager . . . . .	78
Are You Experienced? . . . . .	79

---

## **CHAPTER 3      Creating Your First Part      81**

---

Save the Model . . . . .	82
Set the Document Properties. . . . .	83
Create a Base Extrusion . . . . .	85
Create a Sketch. . . . .	85
Use Instant3D. . . . .	95
Add an Extruded Cut . . . . .	99
Create a Sketch on a Planar Face . . . . .	99
Fully Define the Sketch . . . . .	102
Explore Options for Creating an Extruded Cut . . . . .	104
Add Boss Extrusions . . . . .	110
Core Out the Part . . . . .	116
Define the Cutout Location. . . . .	118
Cut Out the Cavity . . . . .	119
Add Cutout for Electronics Cover . . . . .	120
Add Holes for Wiring . . . . .	123

Add Fillets and Chamfers . . . . .	132
Are You Experienced? . . . . .	147

---

## **CHAPTER 4      Creating Your First Drawing      149**

---

Create a Drawing from a Part. . . . .	150
Download and Install the Drawing Template . . . . .	151
Open the Drawing Template . . . . .	152
Add Views . . . . .	154
Add Sectioned Views . . . . .	154
Add Projected Views . . . . .	157
Add a Broken-out section. . . . .	159
Add a Detailed View . . . . .	161
Annotate the Drawing . . . . .	162
Import Annotations . . . . .	164
Move Dimensions Between Views . . . . .	167
Arrange Dimensions . . . . .	168
Reverse Directions of Dimension Arrows . . . . .	173
Hide/Show Annotations. . . . .	174
Dimension a Chamfer . . . . .	177
Use the Dimension Palette. . . . .	179
Add Reference Dimensions . . . . .	183
Add Centerlines and Center Marks . . . . .	186
Finalize the Drawing . . . . .	190
Fill in the Title Block . . . . .	190
Add Notes to the Drawing . . . . .	192
Update the Revision Table . . . . .	194
Share the Drawing . . . . .	195
Print Your Drawing . . . . .	195
Create a PDF of Your Drawing. . . . .	197
Make a Detached Drawing. . . . .	198
Are You Experienced? . . . . .	199

---

## **CHAPTER 5      Creating a Revolved Part      201**

---

Create a Sketch for a Revolved Part . . . . .	202
Draw Arcs . . . . .	206
Dimension Sketches with Centerlines . . . . .	209
Mirror a Sketch . . . . .	211

Trim Sketch Entities . . . . .	214
Revolve the Sketch . . . . .	217
Add a Threaded Boss . . . . .	219
Add a Revolve Cut . . . . .	223
Finish the Shaft . . . . .	228
If You Would Like More Practice... . . . .	232
Are You Experienced? . . . . .	232

---

## **CHAPTER 6      Creating a Subassembly      233**

---

Model a Washer . . . . .	234
Add Draft to a Part . . . . .	237
Check the Draft of a Part . . . . .	239
Add Multiple Fillets Using FilletXpert . . . . .	240
Configure a Part . . . . .	242
Model a Washer Cover . . . . .	247
Add Sketch Fillets . . . . .	248
Create a Revolved Thin Feature . . . . .	250
Create a Subassembly . . . . .	251
Select a Part Configuration . . . . .	253
Insert Components into Assembly . . . . .	254
Move Floating Components in an Assembly . . . . .	255
Add Mates in Assemblies . . . . .	255
Change the Appearance of Parts in an Assembly . . . . .	258
Change Colors Using Appearances . . . . .	258
Add Realistic Material Appearances to Models . . . . .	259
Turn on RealView . . . . .	260
If You Would Like More Practice... . . . .	262
Are You Experienced? . . . . .	262

---

## **CHAPTER 7      Creating a Simple Assembly Drawing      263**

---

Create the Drawing Views . . . . .	264
Explore the Model View PropertyManager . . . . .	266
Section the Washer Subassembly . . . . .	271
Add a Bill of Materials . . . . .	276
Explore the Bill of Materials PropertyManager . . . . .	277
Specify the Anchor Point for the Bill of Materials . . . . .	280
Add Balloons to the Drawing . . . . .	282
Explore the AutoBalloon PropertyManager . . . . .	282

Finish the Bill of Materials . . . . .	286
If You Would Like More Practice... . . . .	288
Are You Experienced? . . . . .	288

---

## **CHAPTER 8      Creating a More Complex Part Model      289**

---

Create the Base Feature of the Shade Mount . . . . .	290
Transition Between Lines and Arcs in Sketches . . . . .	291
Change a Line to a Construction Line . . . . .	294
Create a Revolved Feature for the Shade Mount . . . . .	295
Create a Swept Feature . . . . .	296
Add a Reference Plane . . . . .	297
Create a Path for Swept Feature . . . . .	299
Create a Profile Sketch for Swept Feature . . . . .	300
Create a Swept Feature from Sketches . . . . .	301
Add a Swept Cut Feature . . . . .	302
Share Sketches Among Multiple Features . . . . .	303
Model the Shade Retainer . . . . .	305
Fully Define the Sketch of Shade Retainer . . . . .	308
Complete the Shade Retainer Feature . . . . .	309
Introduce the Hole Wizard . . . . .	310
Add a Hole to the Shade Retainer . . . . .	313
Add Cosmetic Threads . . . . .	315
Mirror Features . . . . .	316
Finish the Model . . . . .	317
Model a Threaded Feature . . . . .	319
Use the Helix/Spiral PropertyManager . . . . .	320
Create a Helical Path . . . . .	322
Add Sketch of Thread . . . . .	323
Cut the Threads . . . . .	326
Are You Experienced? . . . . .	328

---

## **CHAPTER 9      Modeling Parts Within an Assembly      329**

---

Create the Shade Subassembly . . . . .	330
Insert the Washer Subassembly . . . . .	331
Mate the Washer Subassembly . . . . .	332
Insert the Second Instance of the Washer Subassembly . . . . .	334
Create an In-Context Model . . . . .	335
Extrude up to Existing Geometry . . . . .	337
Save Virtual Components Externally . . . . .	340

Finish the Shade Model . . . . .	341
Open the Part from Within an Assembly . . . . .	342
Create a Shelled Feature . . . . .	342
Add Holes to the Shade for Mounting. . . . .	343
Add Appearances to the Shade Model . . . . .	344
Edit an Appearance for a Part . . . . .	346
Finish the Shade Subassembly. . . . .	348
Define the Position of the Shade in the Assembly . . . . .	348
Add Washers for the Shade Inside . . . . .	349
Add the Shade Nut . . . . .	350
Insert a Subassembly into an Assembly . . . . .	351
Add Configurations to an Assembly . . . . .	353
Suppress a Mate . . . . .	355
Add an Angle Mate . . . . .	356
Add a Configuration to Modify the Mate. . . . .	358
Switch Between Configurations . . . . .	359
Are You Experienced? . . . . .	361

**CHAPTER 10****Making Modifications****363**

Update Components in Isolation . . . . .	364
Change Dimensions in Sketches with Instant3D. . . . .	365
Change Dimensions in Sketches Without Instant3D. . . . .	366
Prevent Loss of Data . . . . .	367
Update the Drawing Document . . . . .	368
Update the Revision Table . . . . .	369
Place Revision Symbols . . . . .	370
Update Components Within Assemblies . . . . .	372
Use In-Context Editing . . . . .	372
Detect Interference Between Components . . . . .	374
Make Modifications to the Washer Cover . . . . .	378
Make Modifications to the Washer . . . . .	379
Check for Remaining Interferences. . . . .	381
Replace Components in Assemblies. . . . .	382
If You Would Like More Practice... . . . .	386
Are You Experienced? . . . . .	386

<b>CHAPTER 11</b>	<b>Putting It All Together: Part 1</b>	<b>387</b>
	Create the Top-Level Assembly . . . . .	388
	Fully Define the Mates for the Shaft . . . . .	389
	Mate the Shaft with the Assembly . . . . .	391
	Use the Design Library . . . . .	393
	Difference Between the Design Library and the Toolbox . . . . .	393
	Add Components to the Design Library . . . . .	395
	Add Components from the Design Library into an Assembly . . . . .	399
	Use the Width Mate . . . . .	401
	Use SmartMates to Mate Components . . . . .	405
	Types of SmartMates . . . . .	405
	Mate with Peg-in-Hole SmartMate . . . . .	406
	Finish the Appearance of the Assembly . . . . .	409
	If You Would Like More Practice . . . . .	410
	Are You Experienced? . . . . .	410
<b>CHAPTER 12</b>	<b>Putting It All Together: Part 2</b>	<b>411</b>
	Understand Rigid and Flexible Subassemblies . . . . .	412
	Understand Why Flexible Subassemblies Are Helpful . . . . .	412
	Make a Subassembly Flexible . . . . .	413
	Insert a Bill of Materials in an Assembly Document . . . . .	416
	Insert a BOM in an Assembly Document . . . . .	416
	Manipulate the Bill of Materials Table . . . . .	418
	Hide and Show the Bill of Materials . . . . .	419
	Control the Display of the Assembly . . . . .	420
	Set Display States . . . . .	421
	Create a Display State . . . . .	422
	Rename a Display State . . . . .	423
	Activate a Display State . . . . .	424
	Set the Display State Mode . . . . .	424
	Understand Selection Tools for Assemblies . . . . .	425
	Use the Volume Select Tool . . . . .	425
	Select Hidden . . . . .	427
	Select Suppressed . . . . .	428
	Select Mated To . . . . .	428
	Select Internal Components . . . . .	429

Select Toolbox . . . . .	429
Do an Advanced Select . . . . .	429
Understand Assembly Visualization . . . . .	430
Create an Exploded View of the Assembly . . . . .	435
Create a New Exploded View . . . . .	435
Modify an Exploded View . . . . .	439
Add Paths to an Exploded View . . . . .	442
If You Would Like More Practice . . . . .	445
Are You Experienced? . . . . .	445

---

## **CHAPTER 13      Making the Top-Level Assembly Drawing      447**

---

Create an Exploded Assembly Drawing . . . . .	448
Add an Isometric View to a Drawing . . . . .	448
Adjust the Sheet Scale . . . . .	449
Show the Drawing View in Exploded State . . . . .	451
Create a Named View for the Drawing . . . . .	452
Link to Assembly Bill of Materials . . . . .	455
Update the Format of the BOM . . . . .	457
Fill in the BOM . . . . .	458
Add Balloons to the Assembly . . . . .	459
Reorder the Assembly Item Numbers . . . . .	461
Are You Experienced? . . . . .	463

---

## **CHAPTER 14      Sharing Your Documents with Others      465**

---

Create PDFs of Drawings . . . . .	466
Create Detached Drawings . . . . .	469
Save Drawings in eDrawings Format . . . . .	472
Export Drawings for Different Software Packages . . . . .	473
Use Pack and Go to Send Files . . . . .	474
Make Assembly Components Virtual . . . . .	478
Create a Part from an Assembly . . . . .	480
Open Files in eDrawings . . . . .	482
If You Want More Practice . . . . .	484
Are You Experienced? . . . . .	484

---

## **CHAPTER 15      Creating Your Own Templates: Part 1      485**

---

Create Part and Assembly Templates . . . . .	486
Create a New Part Template . . . . .	486

Save the New Part Template . . . . .	492
Create a New Assembly Template with Saved Standards . . . . .	493
Create a Title Block for Parts and Assemblies . . . . .	494
Insert a Title Block into a Model . . . . .	495
Edit Static Text in the Title Block . . . . .	496
Link Text to System Properties . . . . .	497
Add a New Custom Property for Linking Text . . . . .	498
Link to a New Property with a System-Generated Value . . . . .	500
Finish the Title Block Table . . . . .	501
Save the Title Block Template . . . . .	502
Create a Custom Property Tab . . . . .	503
Edit Group Boxes in the Property Tab Builder . . . . .	504
Add Controls to the Property Tab . . . . .	505
Save and Use the New Custom Properties Tab . . . . .	507
If You Would Like More Practice... . . . .	508
Are You Experienced? . . . . .	508

**CHAPTER 16****Creating Your Own Templates: Part 2****509**

Set the Sheet Size and Drafting Standards . . . . .	510
Explanation of the Sheet Sizes . . . . .	511
The Different Drafting Standards . . . . .	512
Start the Drawing Template . . . . .	513
Select a Unit System . . . . .	513
Draw Line Fonts . . . . .	514
Set the Projection Type . . . . .	516
Create the Drawing Title Block . . . . .	518
Custom Properties Defined . . . . .	518
Add a New Custom Property . . . . .	520
Manage the Drawing Title Block . . . . .	521
Edit the Sheet Format . . . . .	524
Edit Notes . . . . .	525
Edit Other Text Boxes in the Title Block . . . . .	527
Link the Drawing Revision . . . . .	530
Learn Timesaving Features for the Drawing Template . . . . .	533
Add Predefined Drawing Views . . . . .	533
Add a Revision Table . . . . .	536
Save and Share the Sheet Format and Template . . . . .	540
Save the Sheet Format . . . . .	540

Save the Draw Template . . . . .	542
Share Templates and Sheet Formats over a Network . . . . .	543
Are You Experienced? . . . . .	544

---

## **CHAPTER 17      Creating Simple, Stunning Renderings      545**

---

Use the PhotoView 360 User Interface . . . . .	546
Menus . . . . .	547
Tasks Toolbar . . . . .	548
Selection Toolbar . . . . .	550
View Toolbar . . . . .	550
Create Your First Rendering . . . . .	551
Open a Model . . . . .	552
Add Appearances to a Model . . . . .	553
Change the Scene Environment . . . . .	555
Create the Final Rendering . . . . .	556
Customize Your Rendering Even More . . . . .	558
Adjust Appearance Properties . . . . .	558
Let There Be Light . . . . .	560
Save Custom Camera Views . . . . .	560
Recall a Saved Custom Camera View . . . . .	561
Add a Custom Background . . . . .	562
Adjust the Floor Visibility . . . . .	563
Recall Previous Renderings . . . . .	564
Create Renderings with Depth of Field . . . . .	565
Adjust Ground Height . . . . .	566
Adjust the Rotation of Environment . . . . .	566
Set Camera Options . . . . .	566
Are You Experienced? . . . . .	568
<i>Glossary</i> . . . . .	569
<i>Index</i> . . . . .	585