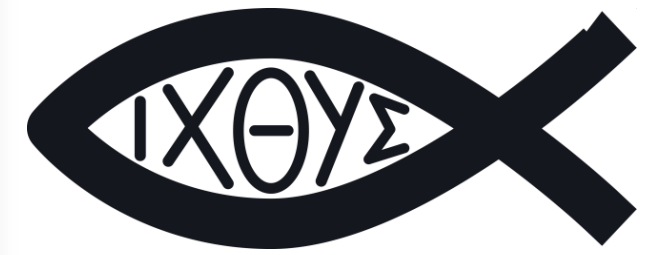


VOLUME I : SHOP BASICS, DRAWING, AND CAD

GUIDE TO SHOP AND ENGINEERING

FOR SECONDARY SCHOOL STUDENTS

By Kent Misegades
with
Michael Patrick Leahy and Anthony Gockowski



*With a Biblical
Worldview*

README
100 SHOP PROJECTS



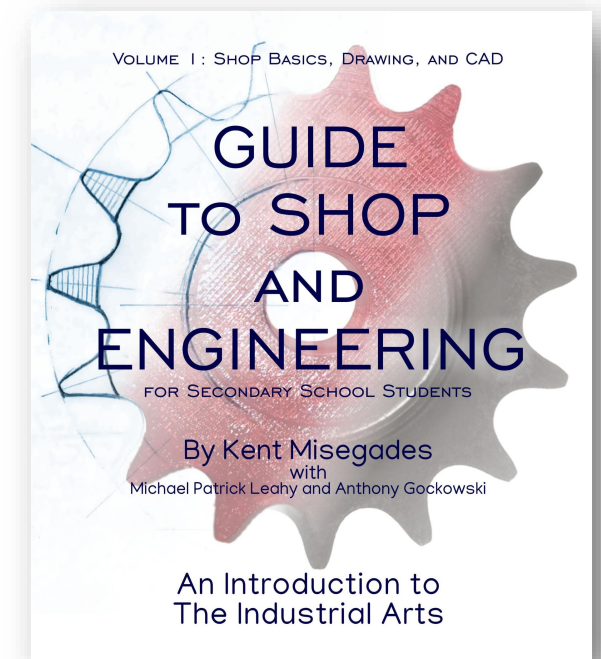
How to Use these Projects Notes

1. Prepare by **following the guidelines found** in Chapters 2-5 of **Shop & Engineering**. Work through the entire Volume I for best preparation.
2. Project information is provided **in general terms** to allow you flexibility according to needs, budget, experience and facilities.
3. See the **Project Resources** folders for plans and other guidelines.
4. Do **additional research** online and in various reference books, and then choose specifics concerning materials, dimensions, etc.
5. Use your **sketching and drawing skills** to make your own plans.
6. Make your **own decisions** and modify the project as you wish – you will learn more this way.
7. **Expect to make some mistakes** – that is how one learns. Take your time and always follow shop safety guidelines.
8. **Challenge yourself** with each project to do better and more complex things in your shop. **Reward yourself** upon completion, and others – your results might make **nice gifts for family and friends**.



Contents

- Preface: The Purpose of Education, Work and these Lessons
- Introduction: So, you want to learn to make things and fix things?
- Chapter One: Preparing for these Lessons
- Chapter Two: Set Up your Workshop
- Chapter Three: Hand Tool Identification and Usage
- Chapter Four: Power Tool Identification and Usage
- Chapter Five: Shop Safety
- Chapter Six: Units and Measurements
- Chapter Seven: Engineering Lettering
- Chapter Eight: Sketching – Straight Lines
- Chapter Nine: Sketching – Circles, Arcs, Ellipses and Curves
- Chapter Ten: Sketching – Chamfers, Fillets and Rounds
- Chapter Eleven: Multi-View Drawings
- Chapter Twelve: Pictorial Views
- Chapter Thirteen: Dimensioning and Scaling



Contents (cont'd)

Chapter Fourteen: CAD – Introduction to Computer Aided Design

Chapter Fifteen: 3D Print your CAD Designs

Chapter Sixteen: The Engineering Design Process

Chapter Seventeen: What's Next?

Glossary

Key Conversion Factors Between US Customary and Metric Units

Key Conversion Factors Between Metric and US Customary Units

Graph Paper Work Sheets, Cartesian and Isometric

Single-Stroke Gothic Lettering Template

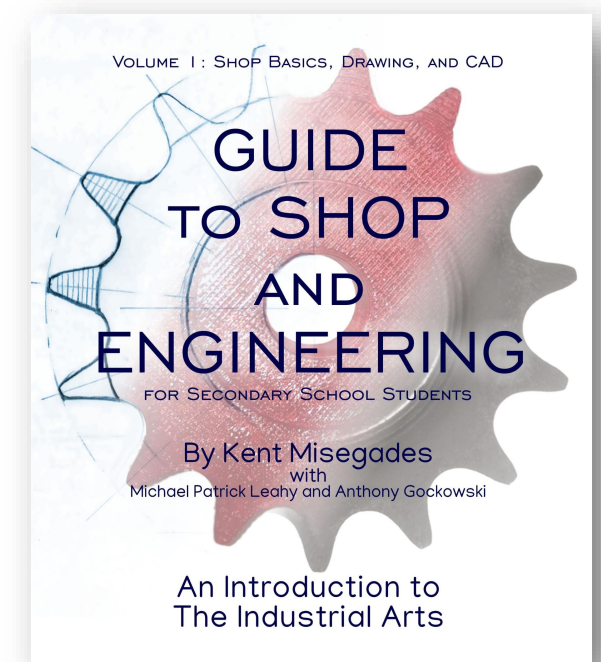
Shop Projects

Additional Reading

About the Author

Throughout the Guidebook: American Inventors

Throughout the Guidebook: Leading Schools

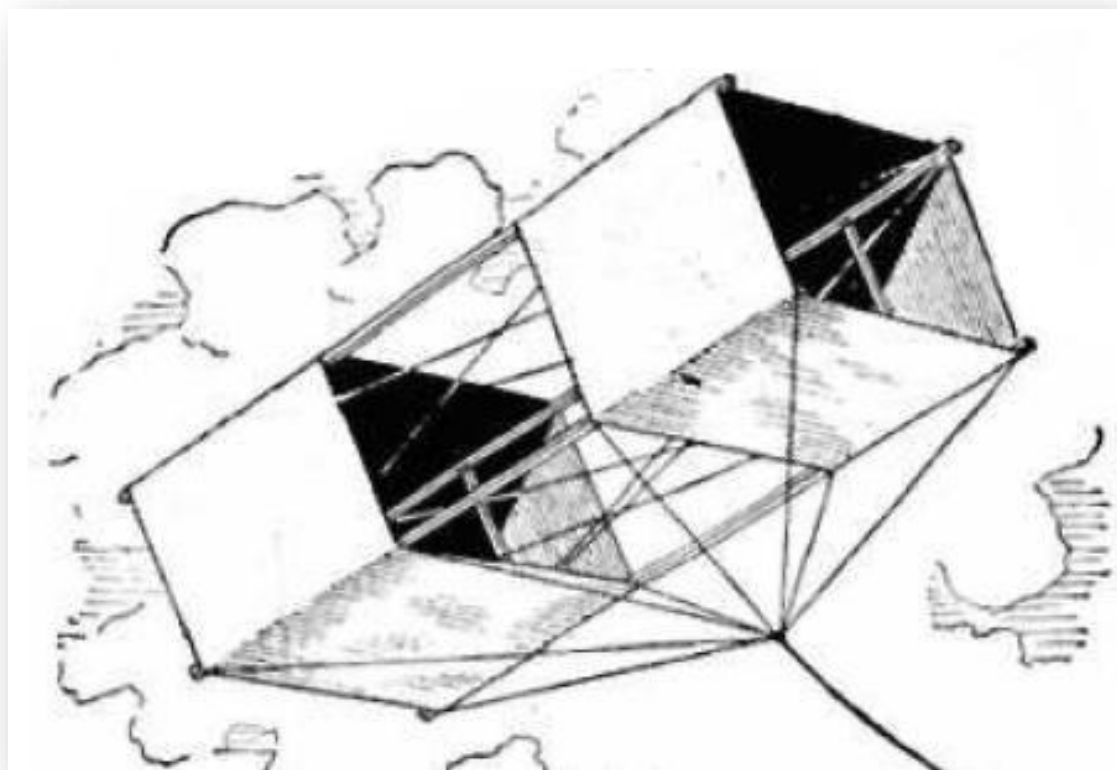


Engineering with a Biblical Worldview

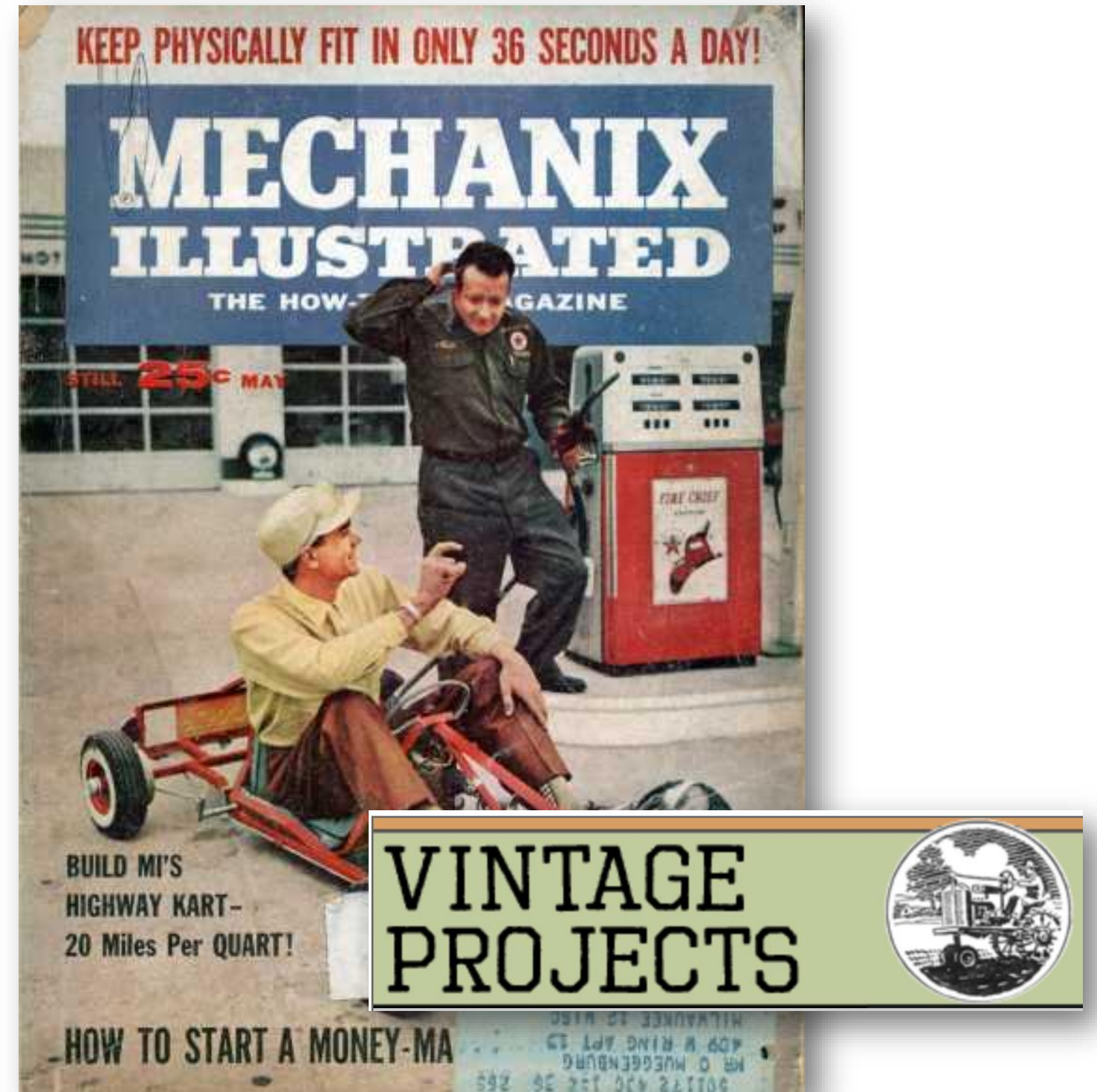
- Everything in our lives is directed by **God**. At **home** and at **work**. His **wisdom and direction** for our lives is found in the **Bible**, so *of course* engineers should always have **scripture** first and foremost in their minds!
- Our **worldview** is developed as we establish beliefs about four critical topics: (from *Biblical Worldview*, Dr. J. Mulvihill)
 1. **Creation:** How did I get here? What is my purpose?
 2. **Rebellion:** What went wrong? Why is there evil and suffering?
 3. **Salvation:** What is the solution? Where do I find hope?
 4. **Restoration:** What happens in the future? How do we transform lives and change the world for the better?
- Engineers continually **face challenges** in their quest to develop products and solutions that ultimately “**transform lives and change the world for the better**”. The Bible provides many **answers**, the reason it should be found among every engineer’s **most-used reference books**.



SHOP PROJECTS



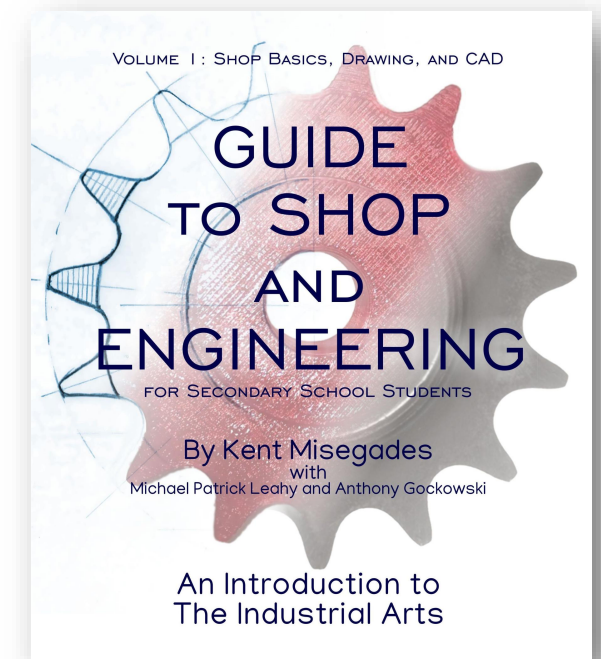
Good Sources for Fun Projects



*See especially back issues through the late 1970s, when schools still taught basic shop skills to teenagers. See also **VINTAGEPROJECTS.com***



Projects Described Here



Project 1: Shop Visits

Project 2: Set Up your Workshop

Project 3: Acquire your Personal Protection Equipment

Project 4: Make a Set of Wooden Blocks for Drawing Practice

Project 5: Make and Fly a Giant “Paper” Airplane

Project 6: Build a “Bingelis” Workbench

Project 7: Add a Shadowboard to your Bingelis Workbench

Project 8: Add a Shadow Box to Organize your Tool Sets

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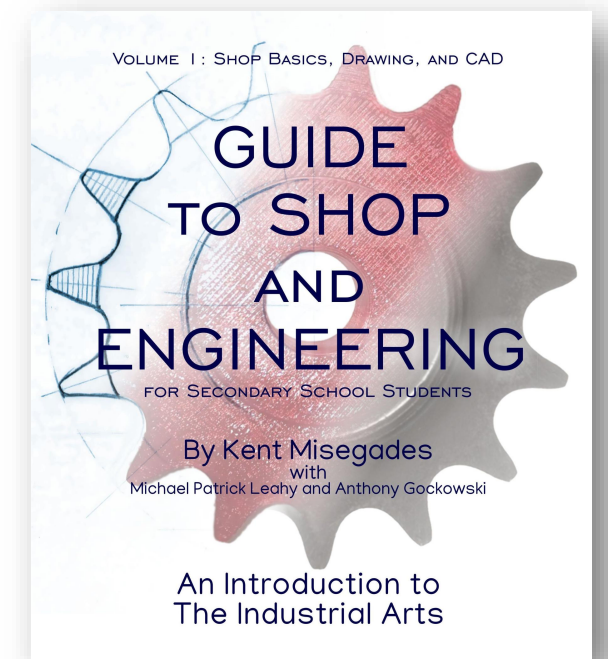
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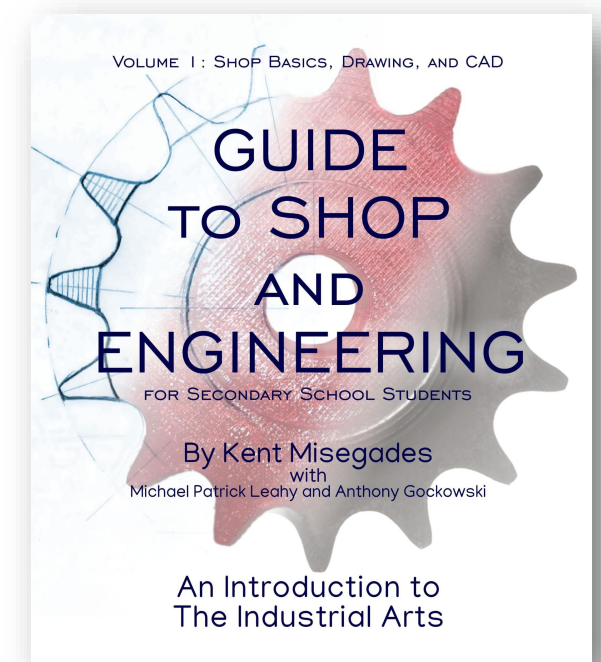
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Project 47: More Fun with a Rubber Band Gun

Project 48: Sugar-Powered Rockets

Project 49: Hot-Air Balloon from Dry Cleaning Bag

Project 50: Tennis Ball Mortar

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Project 52: Foam Board Radio-Controlled Model Airplane

Project 53: Build and Fly a U-Control Model Airplane

Project 54: Make an Indian Teepee

Project 55: Compressed Air Sand-Blaster

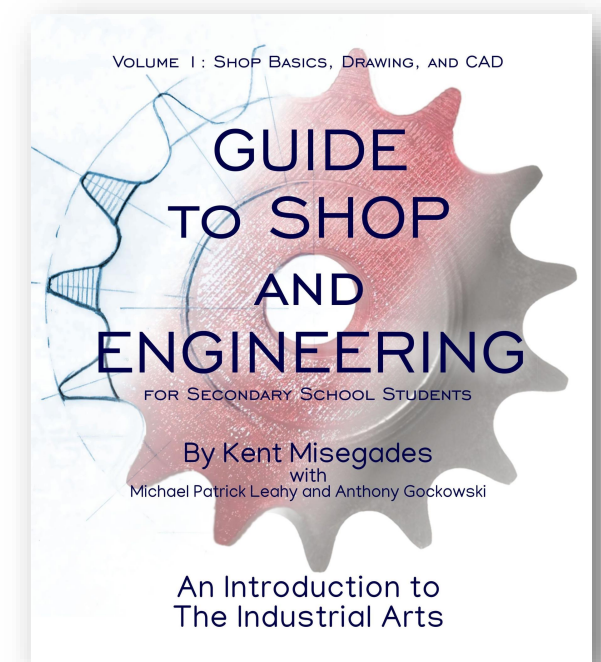
Project 56: Sheet Metal Bending Brake

Project 57: Anodize Metal

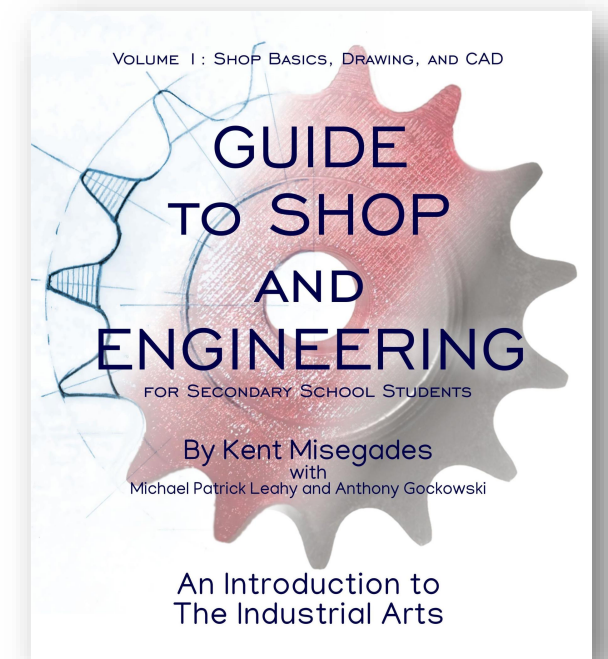
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Project 59: Vacuum-Form Sheet Plastic

Project 60: Lightbulb-Powered Shop Warming Boxes



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Project 61: Build a Teeter Totter

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Project 63: Build a Steel Guitar

Project 64: Construct an “Anyone’s Boat”

Project 65: Hot Wire Foam Cutter

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Project 83: Make a Vintage Transistor Radio

Project 84: Small Electric Motors you can Make

Project 85: Construct your own Air Hockey Table

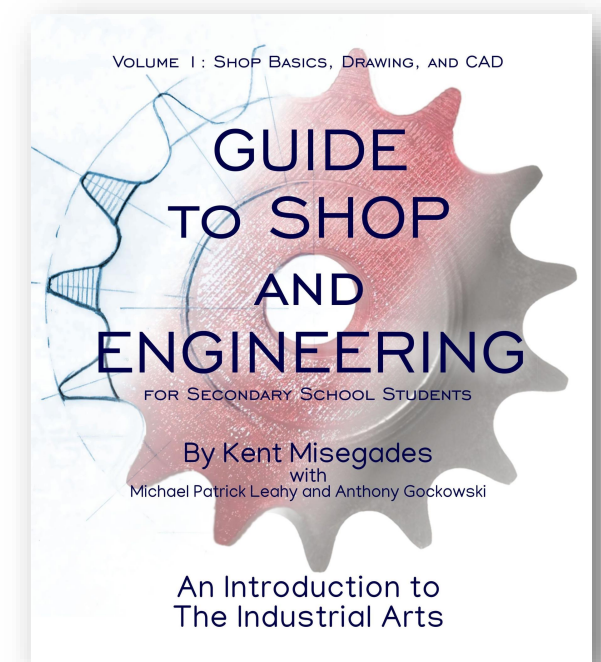
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Project 92: Build a Robot, the Old-Fashioned Way

Project 93: Make a Bubble Machine

Project 94: Send a Helium Balloon into the Stratosphere, and get it Back

Project 95: Build a Zipline Ride

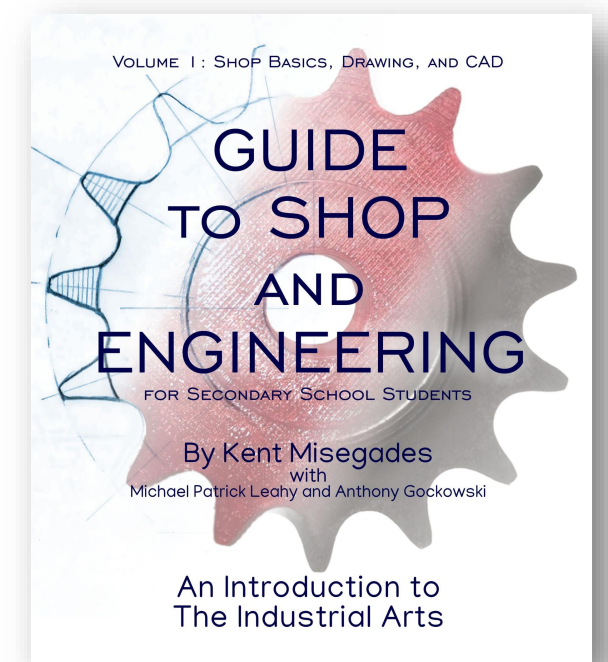
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Project 97: Baking Soda Powered Rockets

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Project 99: Home-Made Toy Parachutes

Project 100: Build your own Skatepark



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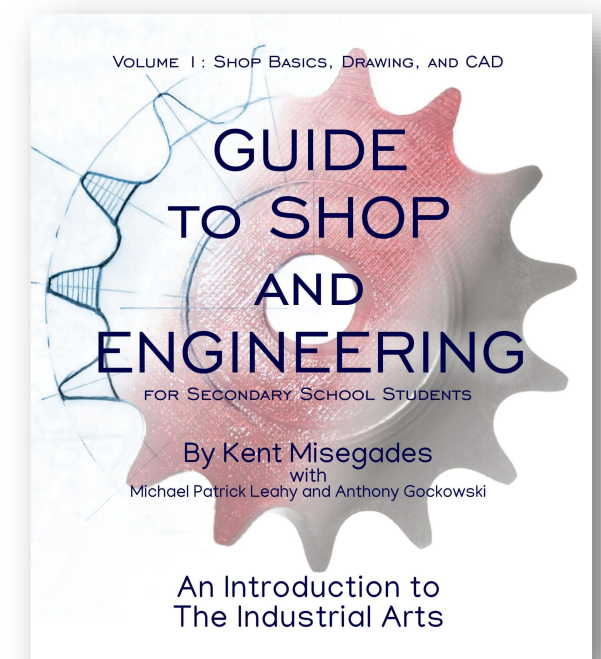
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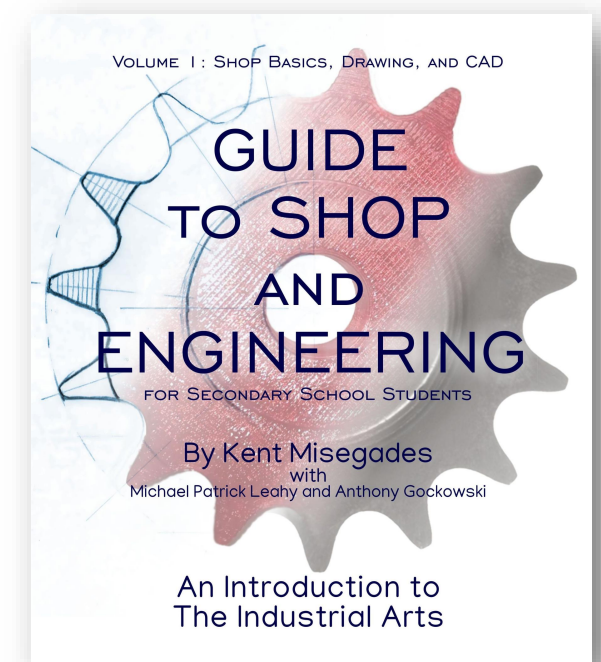
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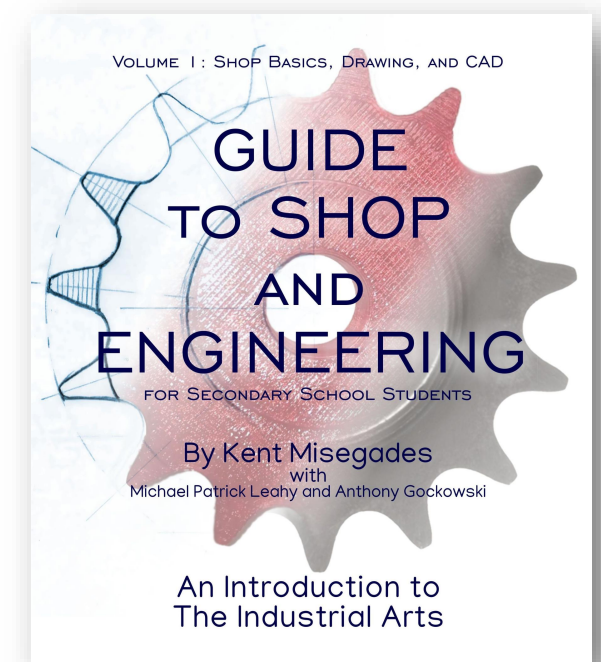
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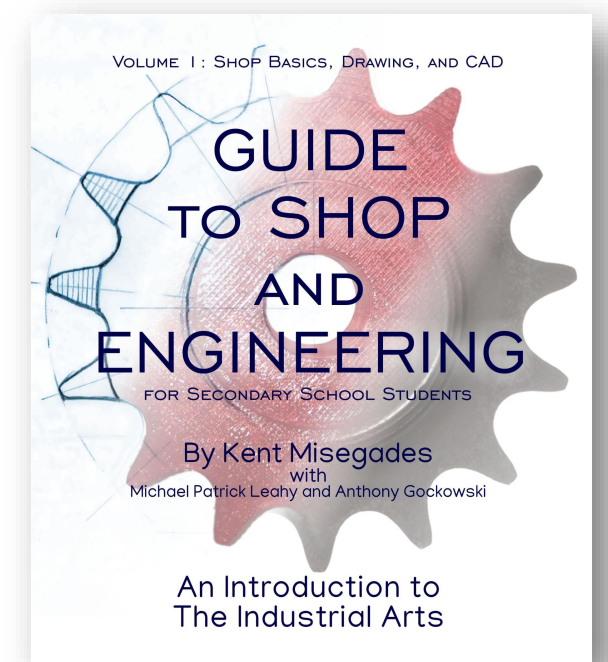
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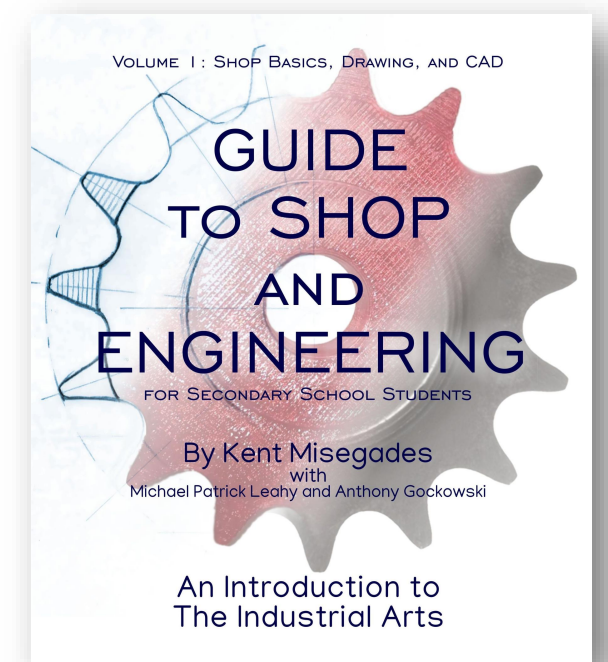
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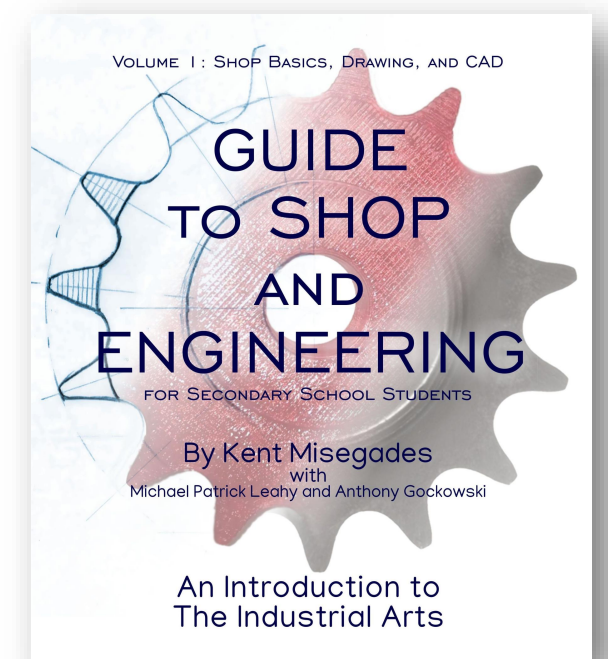
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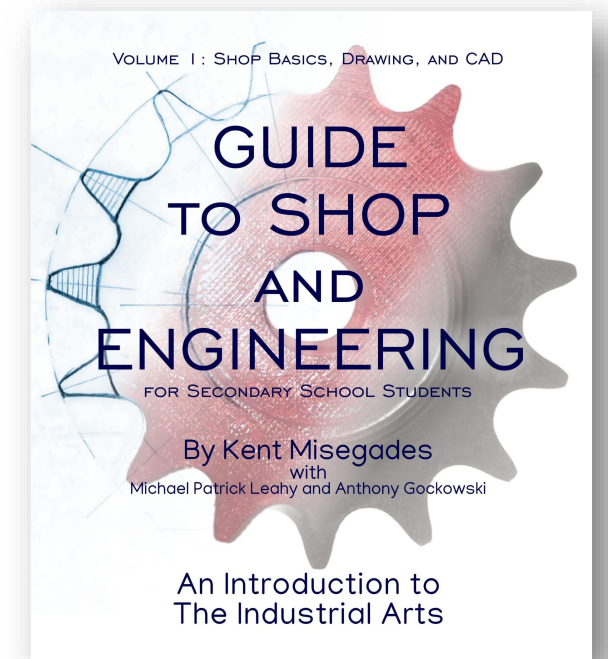
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These Lessons Inspired By

RenewaNation

Helping Children Develop a Biblical Worldview



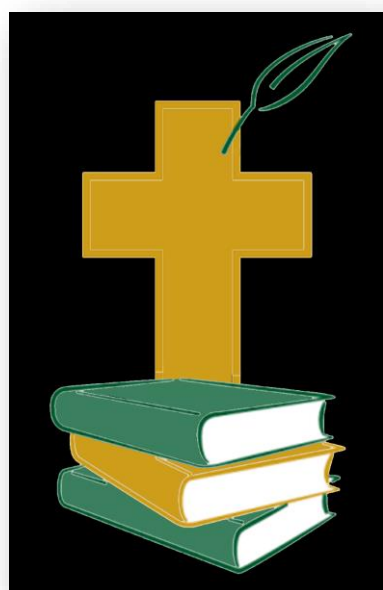
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MANDATE**



**BOB JONES
UNIVERSITY**
EST. 1927



The Author – Kent Paul Misegades



The author's 1952 Cessna 170B



Glen-L "Tuffy" built by author

- Christian, Husband, Father, Grandfather
- 40+ years engineering experience, much as manager, director and business owner
- Pilot, aircraft & boat builder since teenage years
- BSc Mechanical Engineering, Auburn University - *War Eagle!*
- MSc Applied Aerodynamics, Von Karman Institute for Fluid Dynamics
- Helped establish world-class K-12 schools, Thales Academies
- Co-founded world-class apprenticeships, NCTAP.org
- Developed and taught high school shop & engineering curricula
- Passion is flying, sailing, designing & making things - and teaching young people skills
- Founder and President of AeroSouth.net, Seven Lakes, North Carolina

