30 Tips and Tricks with Generative Design in 60 Minutes

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MUK Group is official Autodesk software distributor in Ukraine, Azerbaijan, Armenia, Belarus, Georgia and Moldova.
Pace of change

Competitive threats

Supply chain volatility
WE NEED A NEW WAY
Fusion 360 flexes to your needs

Configure to your team’s size, use case and workflow

Enterprise-grade features and services when you need them
Fusion 360 intelligently powers your decision making

More high-performing, cost-effective, sustainable designs
Fusion 360 creates a dynamic network

Connects your entire product ecosystem

Collaborate seamlessly

More innovation than iteration
Fusion 360 moves your business & industry forward

- Catalyze innovation across disciplines
- Realize previously impossible outcomes
Fusion 360 is…

CONVERGENCE OF DESIGN & MANUFACTURING
Shape Optimization is not GD

F360 have Simulation possibilities

Capabilities

- Static & non-linear stresses
- Modal frequency
- Thermal & thermal stress
- Buckling & Event
- Shape Optimization
- Cloud solve simultaneously
Generative Design (GD)
Explore Multiple Manufacturable Outcomes

Benefits
- Design inspiration
- Part consolidation
- Weight reduction
- Create custom work holding
- Manufacturing costs insights

Capabilities
- Specify design requirements
- Identify constraints, materials, and manufacturing options
- Cloud solve
- Export editable files
Generative Design cases
TEXAS SHORES

EXISTING
STATE-OF-THE-ART PARTITION
Weight: 65 kg
Displacement: 158 mm
Load: 9G Forward

NEW
BIOMIC PARTITION
Weight: 35 kg (45% reduction)
Displacement: 99 mm (8% reduction)
Load: 9G Forward
A rendering of the original bionic partition (left) next to the updated design. Courtesy of Airbus.
GD is not only for 3D-printing
30 tips and advices for Generative Design
How to Access Generative Design?

Generative design allows you to simultaneously generate multiple CAD-ready options based on real-world manufacturing constraints and product performance requirements. Now is the time for everyone to learn and explore generative design.

[autodesk.com/campaigns/generative-design/free](autodesk.com/campaigns/generative-design/free)

#1 Try it!

**FUSION 360 TRIAL**

Start a 30-day free trial of Fusion 360 and begin exploring generative design with one of the samples data sets.

**PDMC SUBSCRIBER**

Product Design & Manufacturing Collection subscribers can access generative design by activating their Fusion 360 entitlement.

**FUSION 360 SUBSCRIBER**

You already have access to generative design, start exploring with one of the samples or tutorials.
How to Access Generative Design?

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#3 Learn it!

How to Access Generative Design Guide?
#4 Learn it!

How to Access Generative Design Samples? You don’t need to download something for learning and even this presentation.
# Learn it!

Understanding generative design

**Overview of generative design**
In this lesson, we explore how to define a design problem, including the functional and manufacturing requirements and generating alternative results that meet your design criteria.

- Beginner
- 0 mins 46 seconds

**Creating obstacle geometry**
In this lesson, we review the importance of obstacle geometry and how to create obstacles.

- Beginner
- 0 mins 56 seconds

**Define a design space**
In this lesson, we review how to define a design space and assign geometry types.

- Beginner
- 0 mins 34 seconds

**Setting up a design problem**
In this lesson, we set up a design problem and specify the requirements for your model. We also go through the workflow, from defining constraints and loads to generating outcomes.

- Beginner
- 7 mins 24 seconds

**Creating preserve geometry**
In this lesson, we explore how to create Preserve Geometry in Fusion 360 to drive the results of our studies.

- Beginner
- 3 mins 17 seconds

**Explore outcomes**
In this lesson, we explore multiple designs to identify the best outcomes for your specific design requirements.

- Beginner
- 4 mins 14 seconds
#6 Use it from start to end

Step by step from left to right
#7 Multiple Studies

You can create new additional Generative Studies for any target, what you need in GD.
#8 Use it

Try GD as much as you want without Cloud Credits (CC). You need CC only for creating a design from outcome.*
#9 Remove all unnecessary

Remove as much Fillets and Chamfers as possible. For information, you can edit model surfaces.
#10 Remove all unnecessary

Remove as much Fillets and Chamfers as possible
#11 Use tooltips

Don’t ignore tooltips

Use Coarse Resolution for first GD steps and use Fine Resolution for last steps of project
#10 Did you try Starting Shape?

GD is not Shape Optimization, keep it in mind. Use Starting Shape! Even preview GD didn't limited this form.
#11 Interference in GD is normal*

*Interference between Starting Shape and Preserve Geometry is OK.
#12 Use symmetry Plane

You can use symmetry plane for symmetric geometry. It’s can save time.
#13 Edit Model, again

For GD remove all unnecessary components/bodies in Edit Model tool, but not in Design Workspace. GD Edit Model workspace will save all Design Workspace elements.
Any GD project must have one or more Structural Constraint and Structural Load. Pre-Check will show it, but you can solve this issue before issue.
#15 Use multiple Load Cases

Separate Load Cases in one Generative Study are saving a lot of time.
#16 Don’t ignore Info icon (some offtop)

Don’t ignore tooltips

If information in animated prompt don’t enough than you can press Info icon in tool dialog box. You’ll redirect to Fusion 360 Product Documentation in browser.
#17 Try all Manufacturing setup

GD is not finished result. It is engineers “time saver” with generation a lot of ideas of constructions.
#18 Add or edit physical materials

Feel free to add and edit any materials for GD
#18 Add or edit physical materials

Study materials only for adding materials to GD
#18 Add or edit physical materials

The calculator icon indicates the manufacturing cost can be estimated for the material.

Manufacturing costs are estimated based on region-specific data from Americas, Europe, and Asia-Pacific. Example regions include:

- Brazil
- China
- India
- Germany
- Mexico
- United Kingdom
- USA
- Eastern Europe
- Western Europe
#19 Check, check and check

This tool is like on a road. You can go not only with Green light, but only right and safest is **Green**!
#19 Check, check and check

GD Setup Guide is one of the best Tools for preparing data and for Checking!
#20 Use preview!

It's fast and useful

Note: It is only for visualization.
#21 Generate a multiple Study

Feel free to solve Multiple Study!
#21 View outcomes from multiple Studies

Feel free to view results from Multiple Studies
#22 Explore is the main at GD
Press Explore tool to view results of active Study and Load configuration. Activation of Study is the same, like all in Browser of F360.
Use different types of view in Explore window. The best one for choosing more effective results is Scatter Plot.
#23 Explore the iterations

Add Iterations of any GD results in
#23 Explore the iterations

Open any iteration from GD
#24 Compare views

You can compare up to 4 GD results
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You can compare up to 4 GD results
#25 Label and Favorites are one more time saver

Use Labels and Favorites for mark any iterations
#25 Label and Favorites are one more time saver

Use Labels and Favorites for mark any iterations
#26 Outcome results

You can edit easier Design from Outcome compare Mesh Design from Outcome.
#26 Outcome results

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#26 Outcome results

You can edit easier Design from Outcome compare Mesh Design from Outcome.
Don’t ignore tooltips
Reminder ;)
GD outcomes is mostly are not a finish of modeling and simulation, it is good timesaver for engineers.
#30 Do not shy, ask the Community

GD outcomes is mostly are not a finish of modeling and simulation, it is good timesaver for engineers.
Summary
Any Device, Anywhere, Anytime

Cloud Connected

Device Independence

Cloud Collaboration
The future is here, and it runs on Fusion 360
Q&A