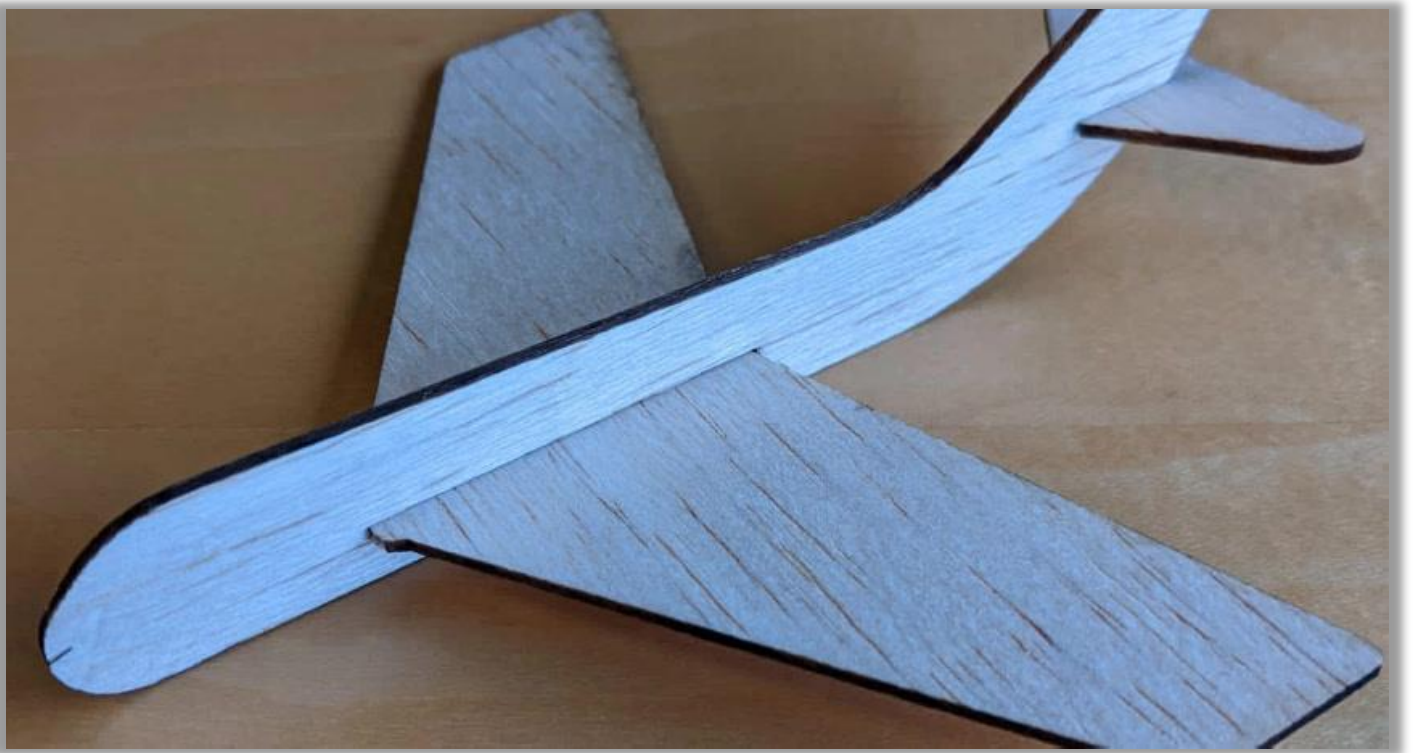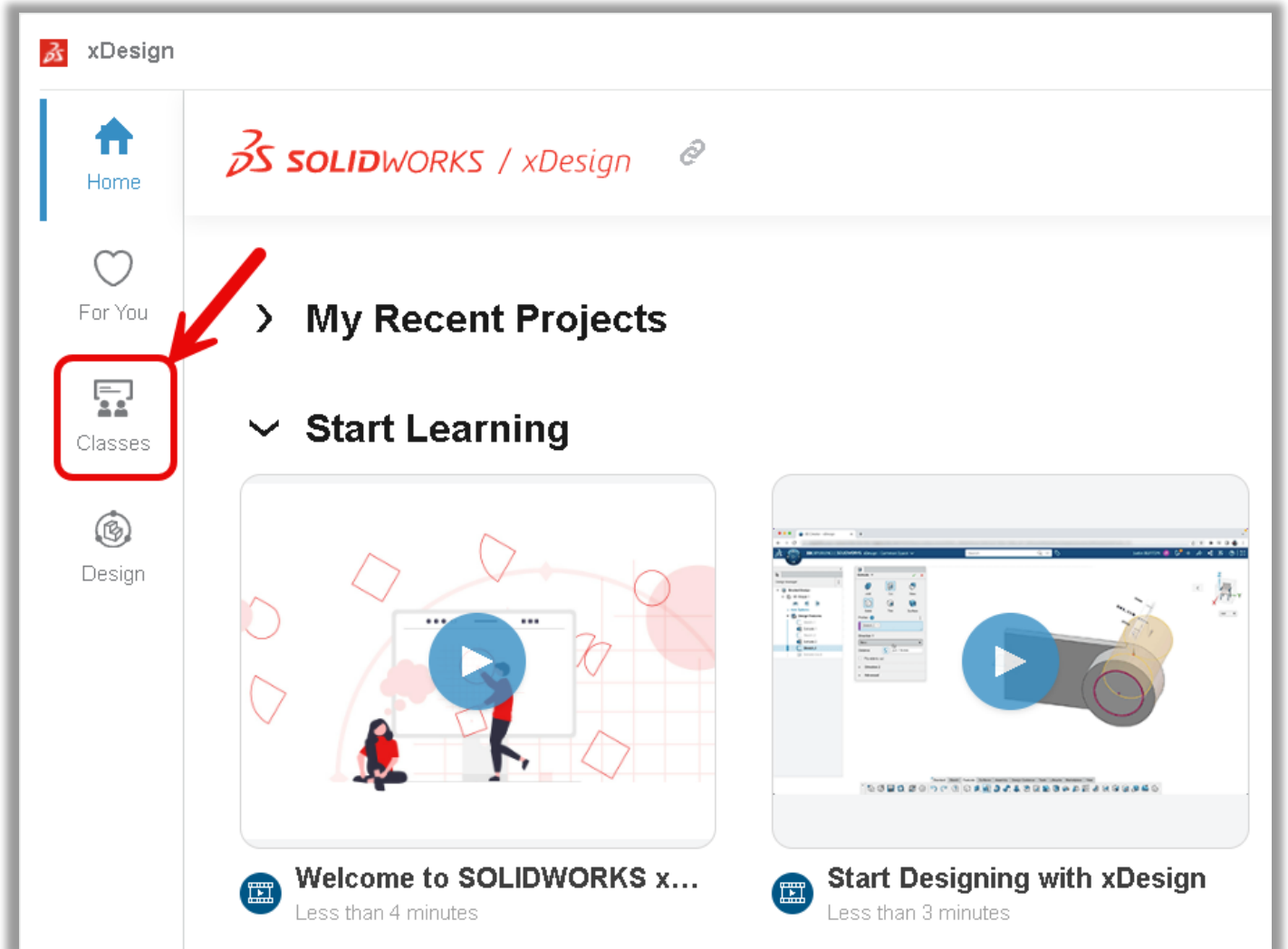**Design and fabricate your own custom glider.**
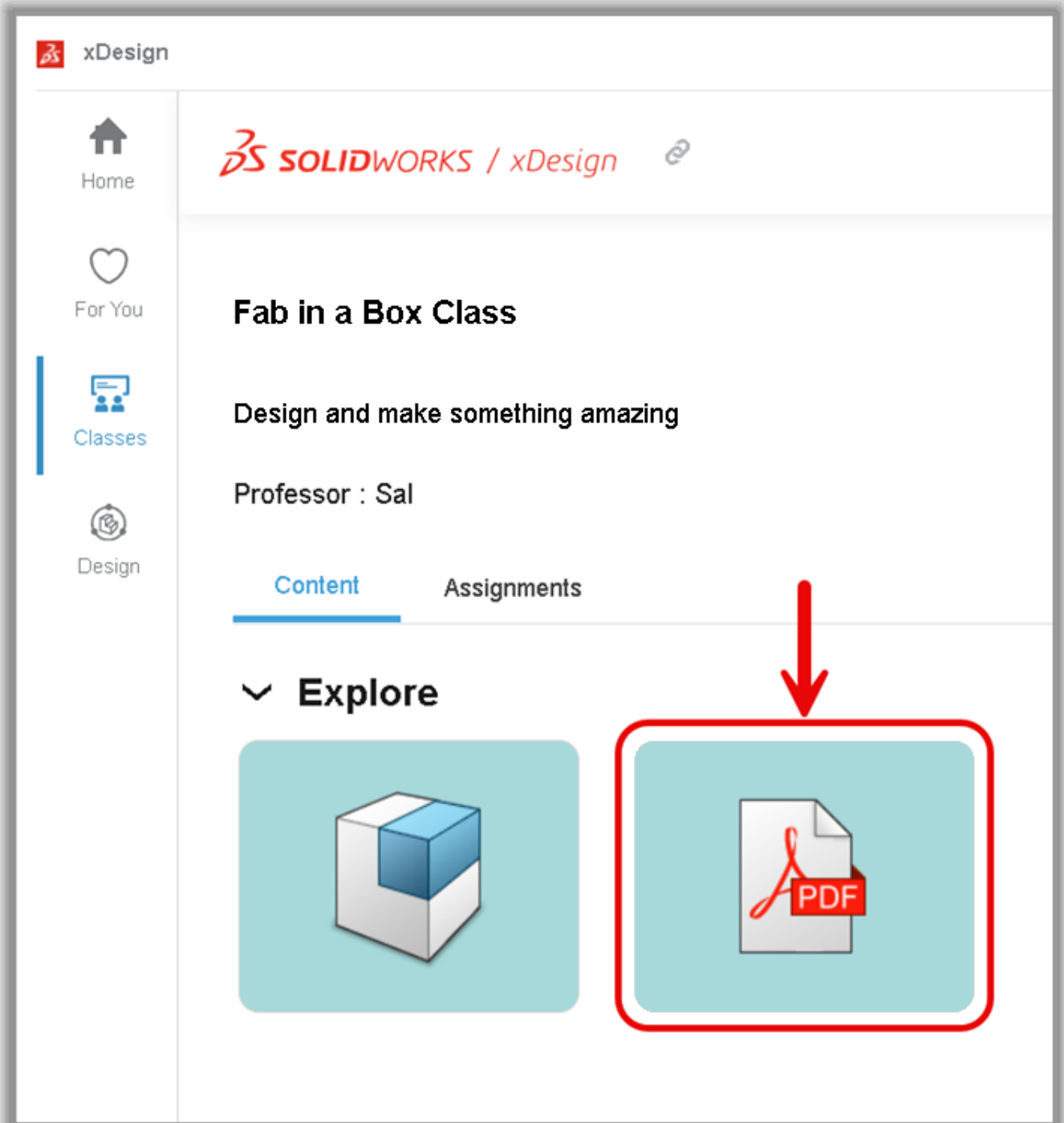
Test its flight, then improve it by adjusting the shape of its wings, tail, or body, or adding a nose weight.
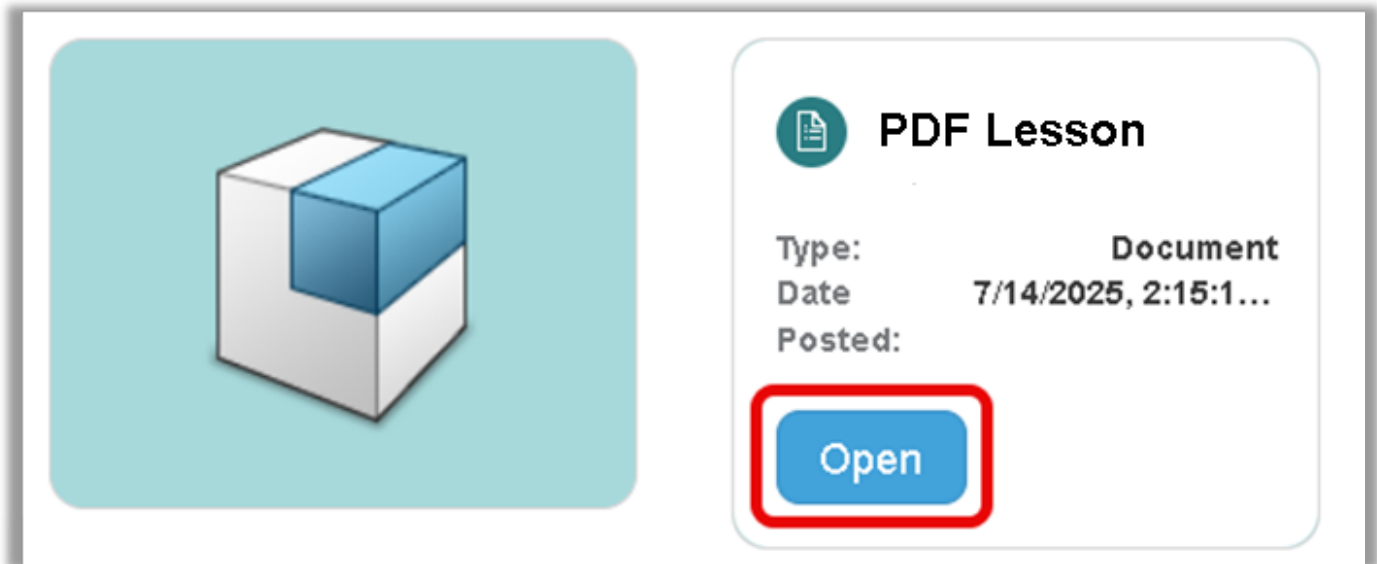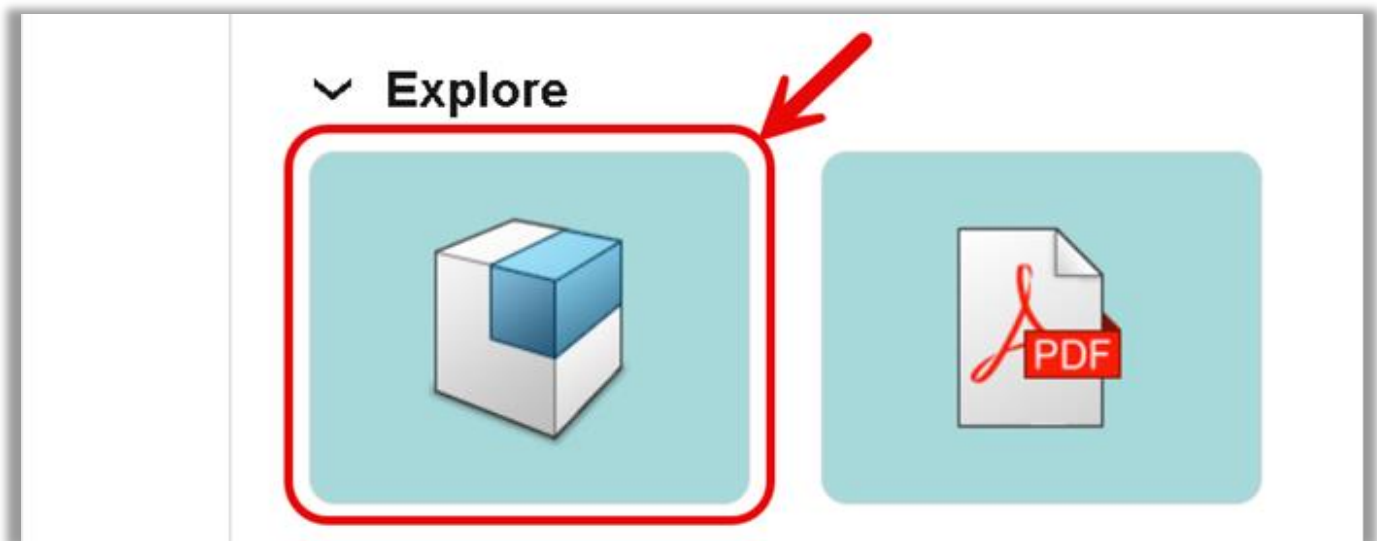
1. Click the **Classes** tab
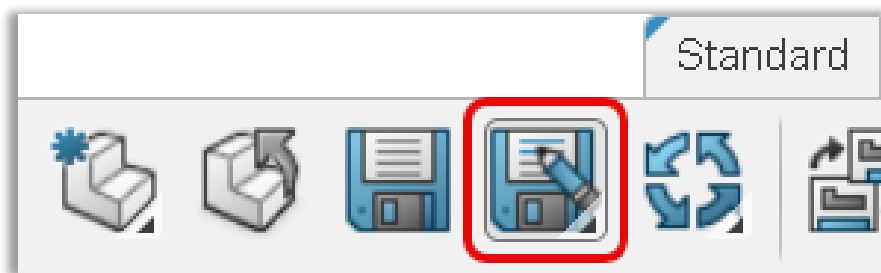
2. Hover over the PDF tile

3. Click **OPEN**

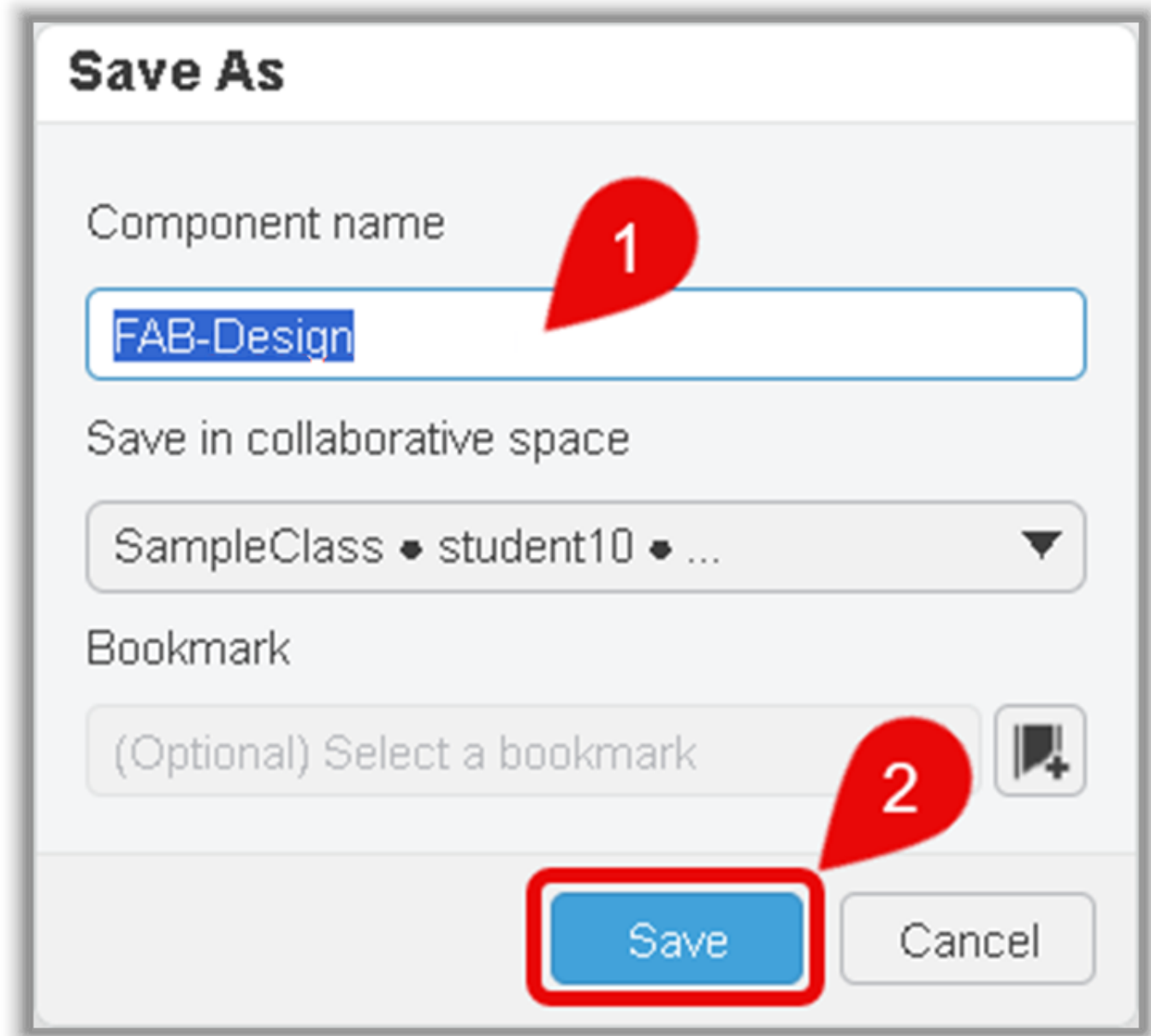4. Hover over the "**Gliders - Designing Around Templated Features**" tile

5. Click **OPEN**

6. Click **Save As** on the Standard tab of the Action Bar

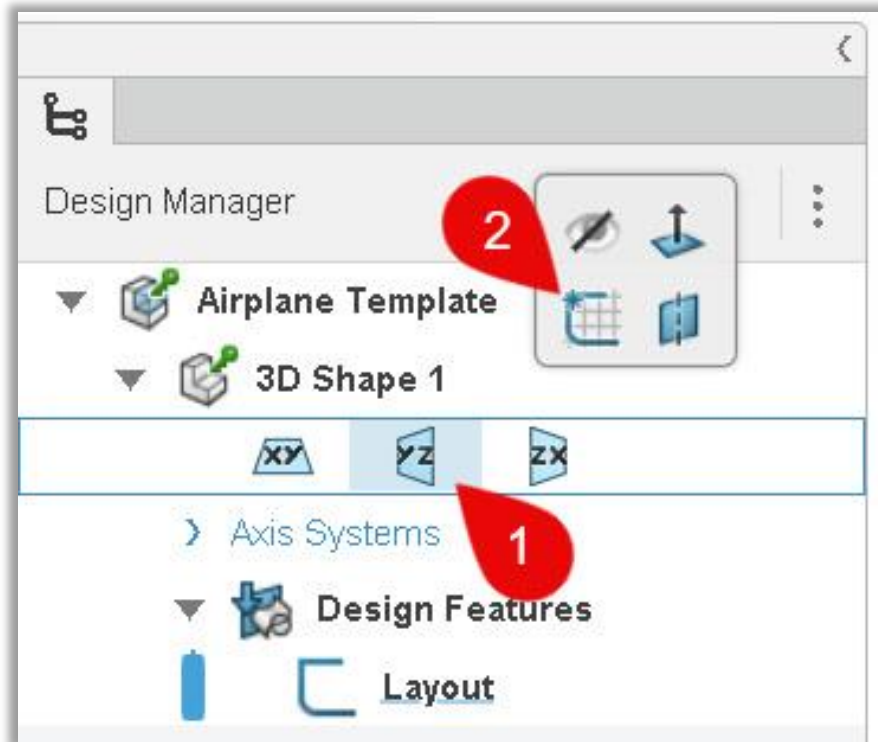7. [1] Type a name for your design, then [2] click **Save**

Save As

Component name

FAB-Design ①

Save in collaborative space

SampleClass ● student10 ● ... ▼

Bookmark

(Optional) Select a bookmark

② Save   Cancel

DESIGN YOUR AIRPLANE

8. [1] Select the **YZ** plane and then [2] click the **Create a sketch** command

9. Click the **Line** tool on the Action Bar
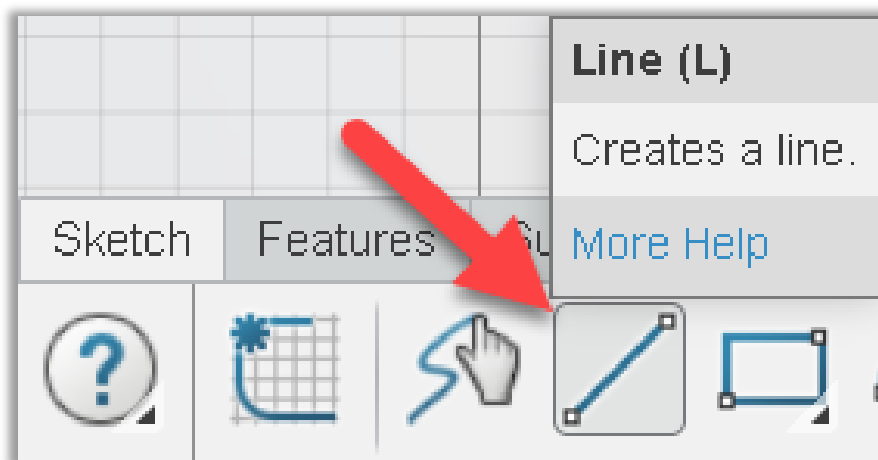
10. Click [1] to snap the first point of your line to the "Layout" sketch, and then click [2] to draw a horizontal line. Move your mouse to up and to the right, then click [3] to draw a slanted line that will become the tail of the fuselage. While staying inside the largest rectangle of the "Layout" sketch, continue clicking to draw lines in the shape of fuselage you've imagined. End your chain of lines at [1] where you started.
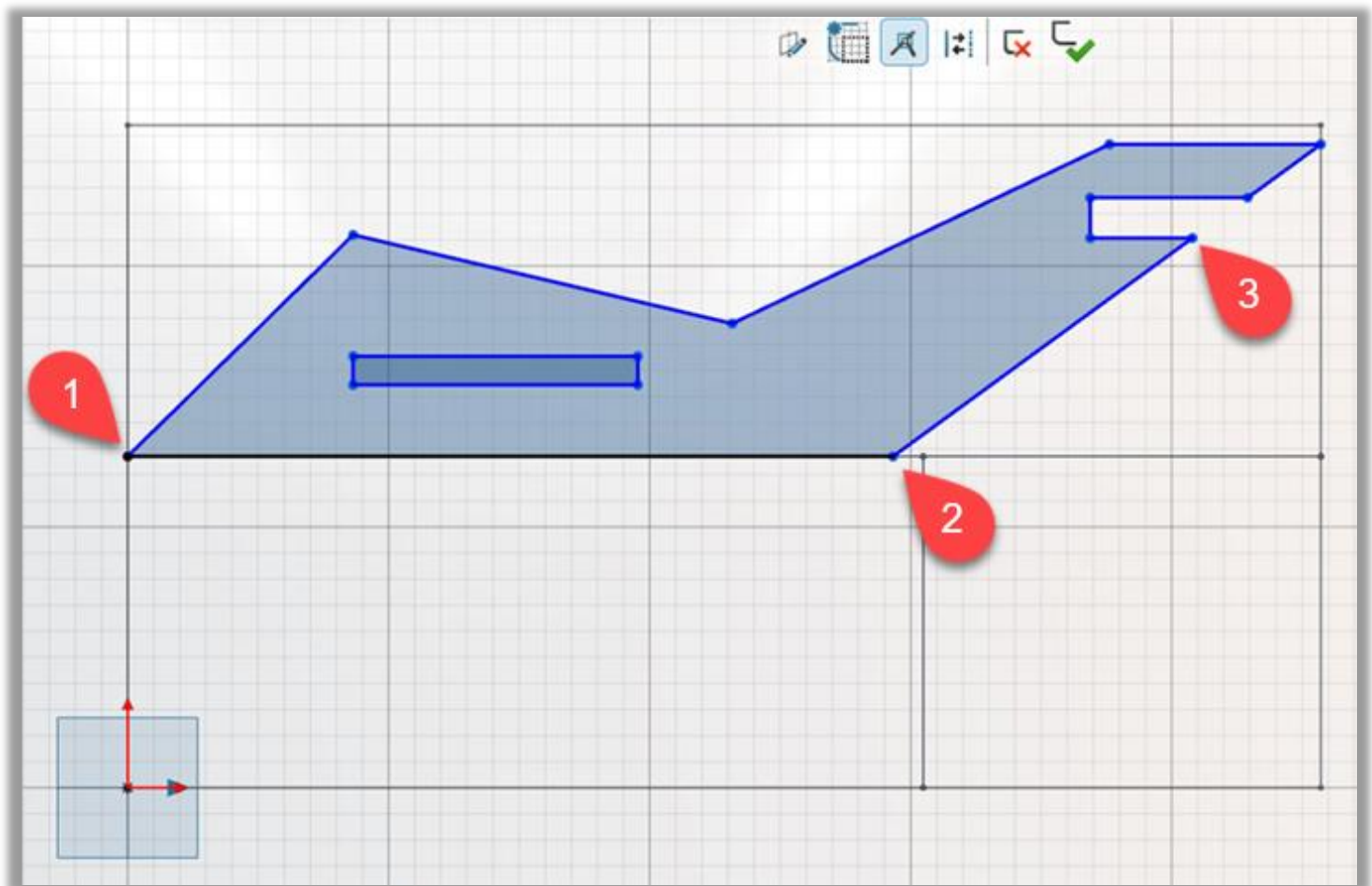
--- sample fuselage ---
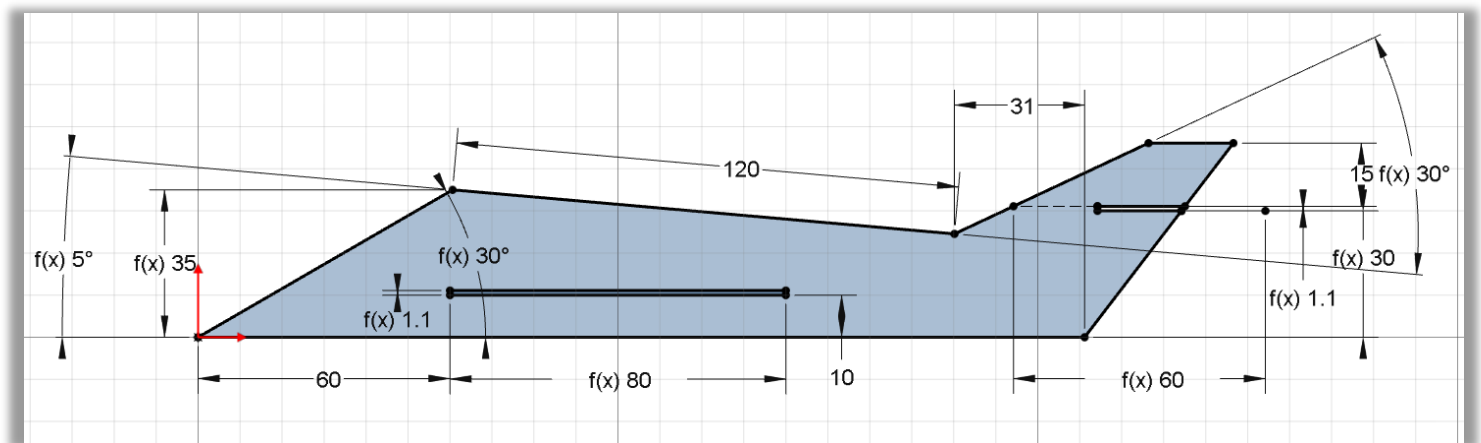
11. Use 4 lines, or the Rectangle tool on the Action Bar, to draw a rectangular opening for the wings

12. Click the **Sketch Dimension** tool on the Action Bar
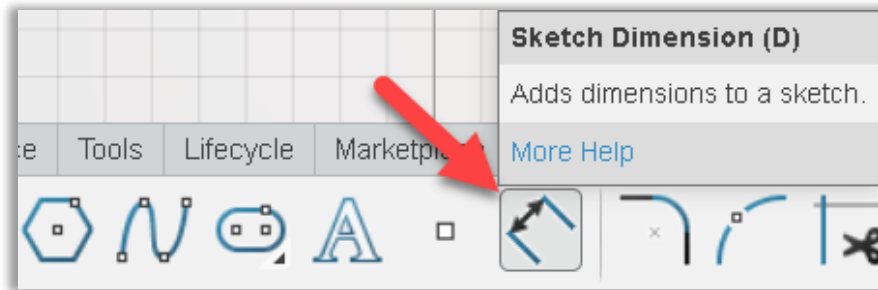

# 13. Add whatever dimensions you'd like to fully define your sketch.

--- sample dimension scheme ---

f(x) 5°   f(x) 35   f(x) 30°   120

f(x) 1.1

60   f(x) 80

31   120

15 f(x) 30°

f(x) 30

f(x) 1.1

10   f(x) 60

14. Work with your instructor to measure the thickness of the wood you'll laser cut and then enter it as the height of the wing and tail slots.
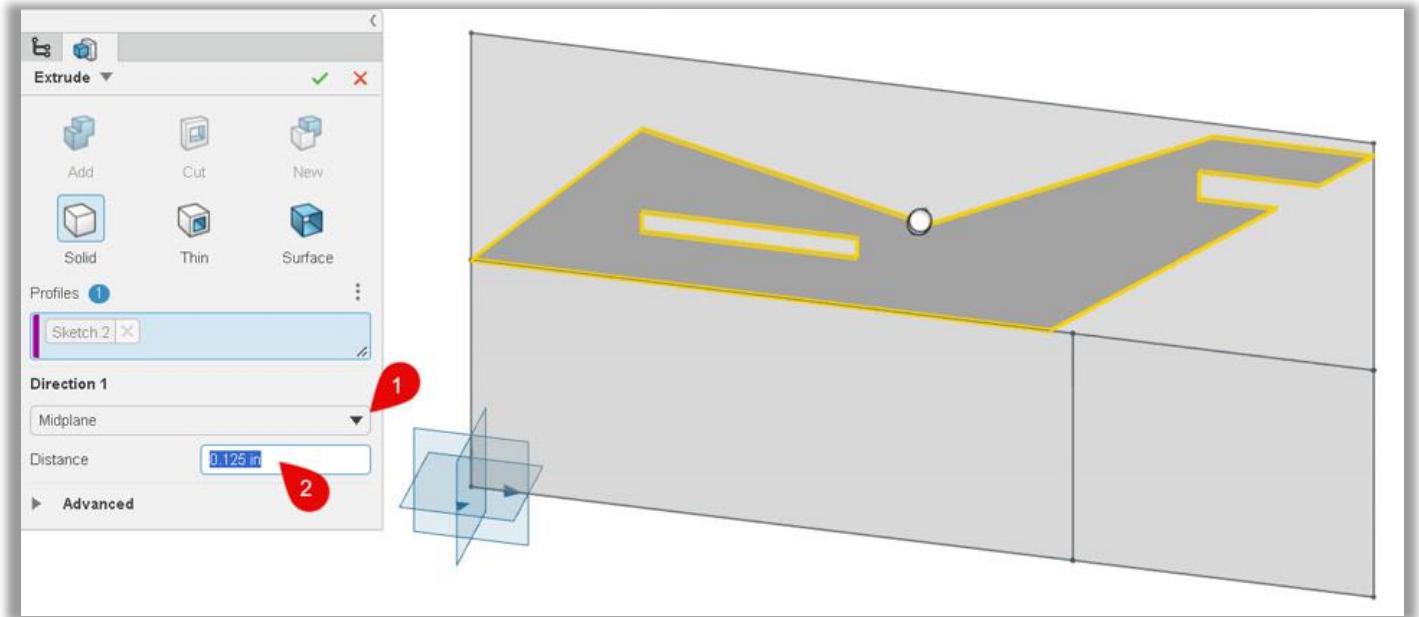
TIP: factor in a small amount of interference so the wings and stabilizer will fit snugly
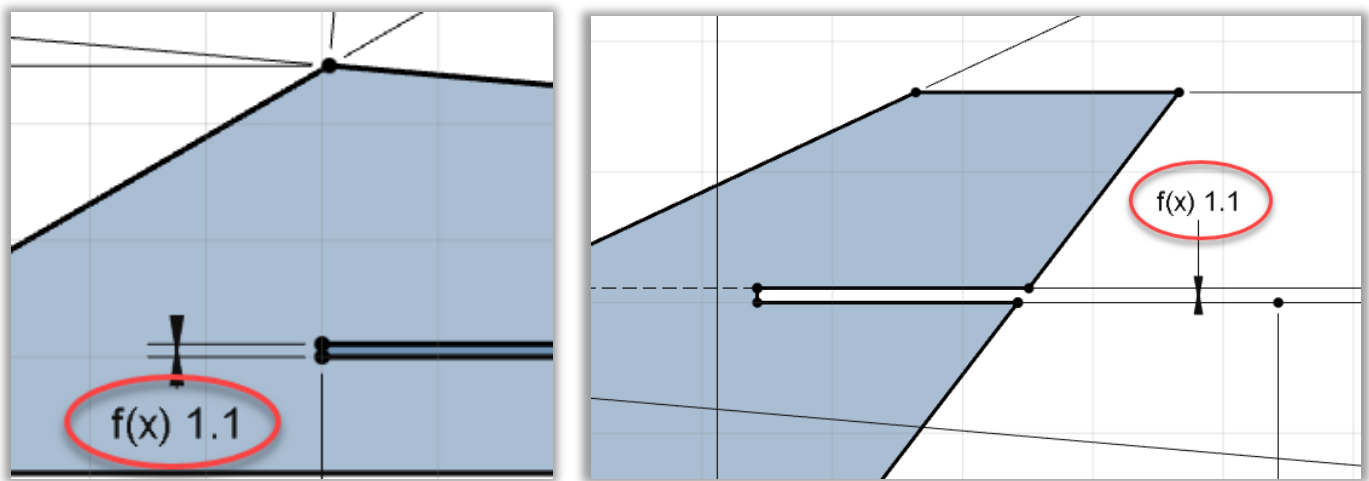
15. [1] Click the "Features" tab on the Action Bar, and then [2] click "Extrude"
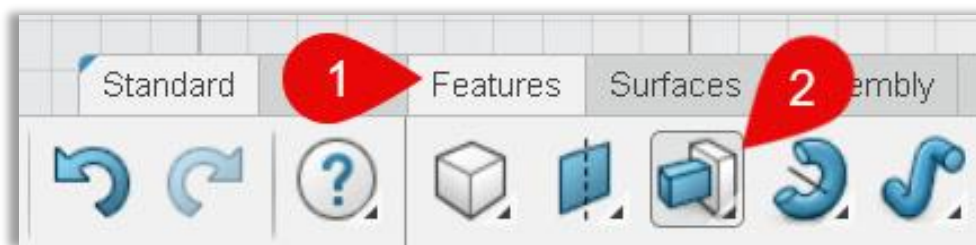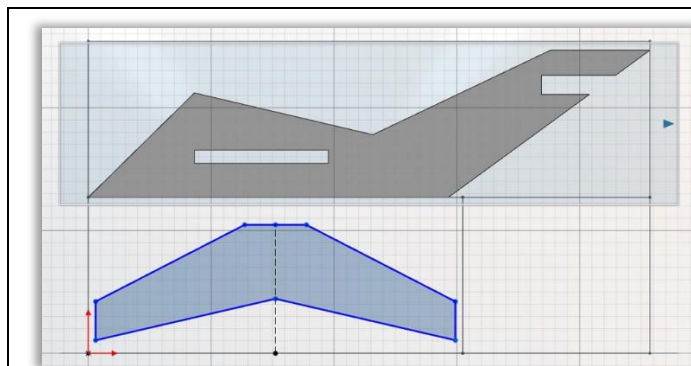
16. Set the **Direction 1** end condition to **Midplane** and the Distance to match the thickness of material you are using.
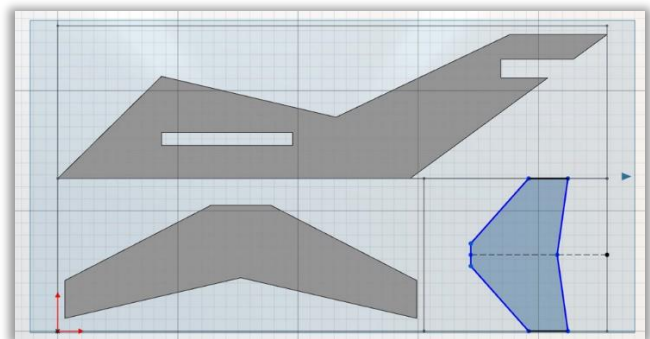

17. Repeat the above steps two times to design the wings and horizontal stabilizer. Each time...

- Start a new sketch on the **YZ** plane

- Draw and dimension the wing or stabilizer
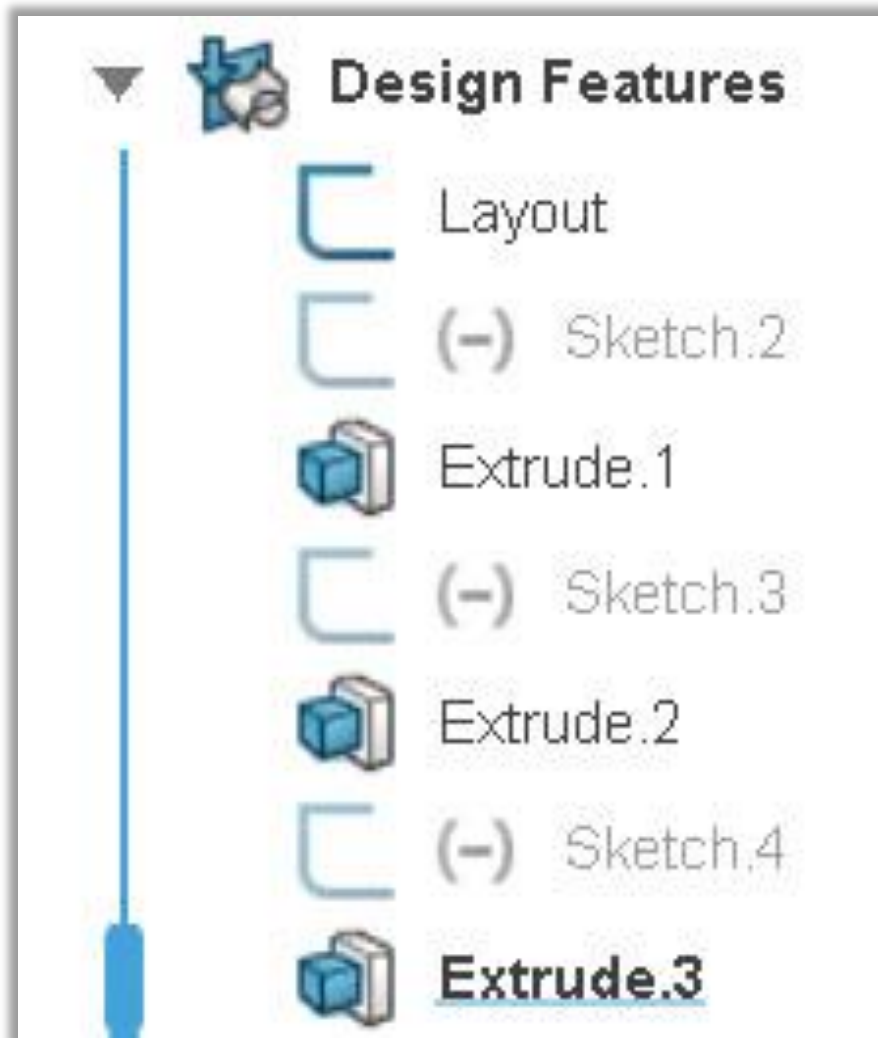
- Extrude midplane with the proper thickness

Sample Wings
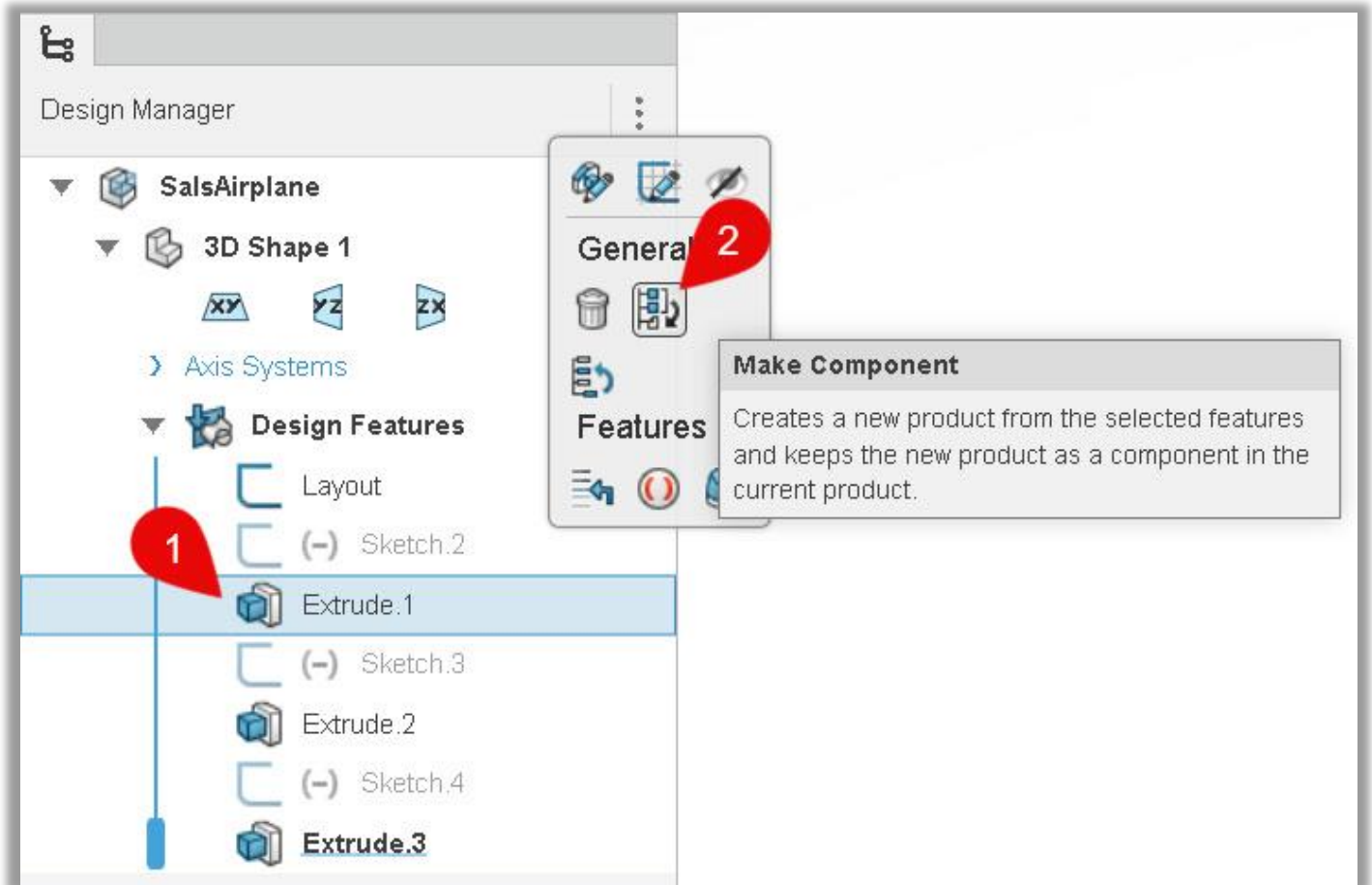
Sample Stabilizer

18. The xDesign Design Manager will now look something like this:
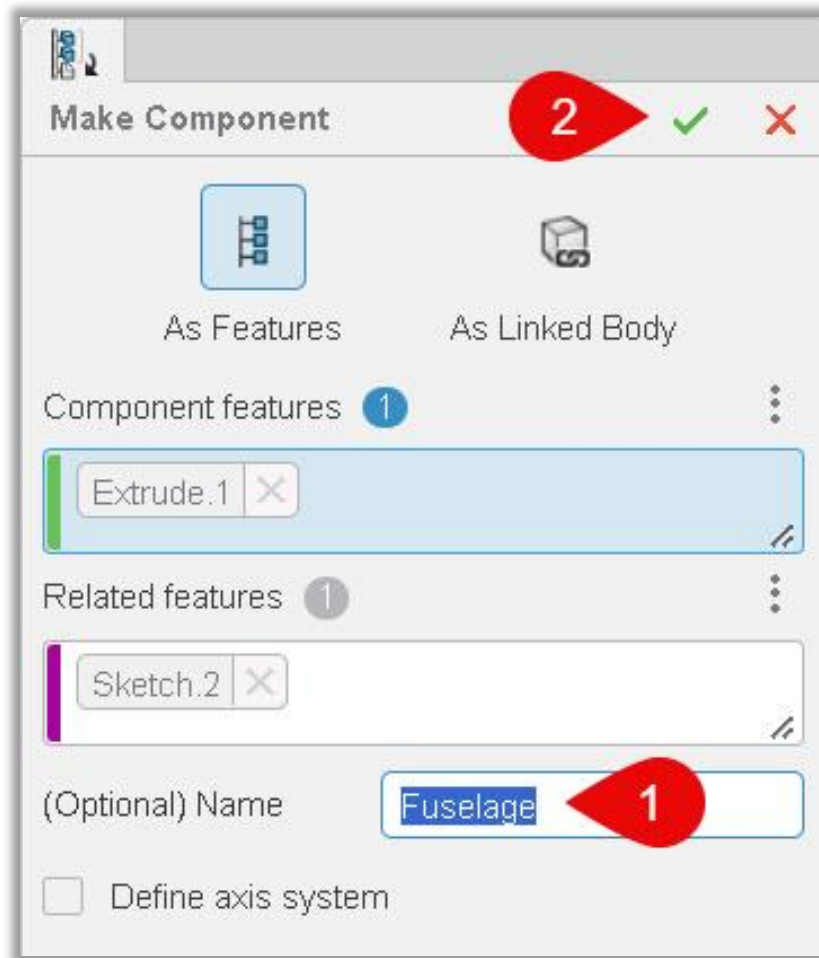
ASSEMBLE YOUR AIRPLANE

19. [1] Select the extrude feature in the Design Manager that created the fuselage and then [2] click the "Make Component" command.

20. [1] Type a unique name for your fuselage and then [2] click the green checkmark.

21. Repeat the above steps two times to transform the features for the wings and stabilizer into components. Each time...

- Select the extrude feature that created the wings or the stabilizer

- Click Make Component

- Give it a unique name and click the green checkmark

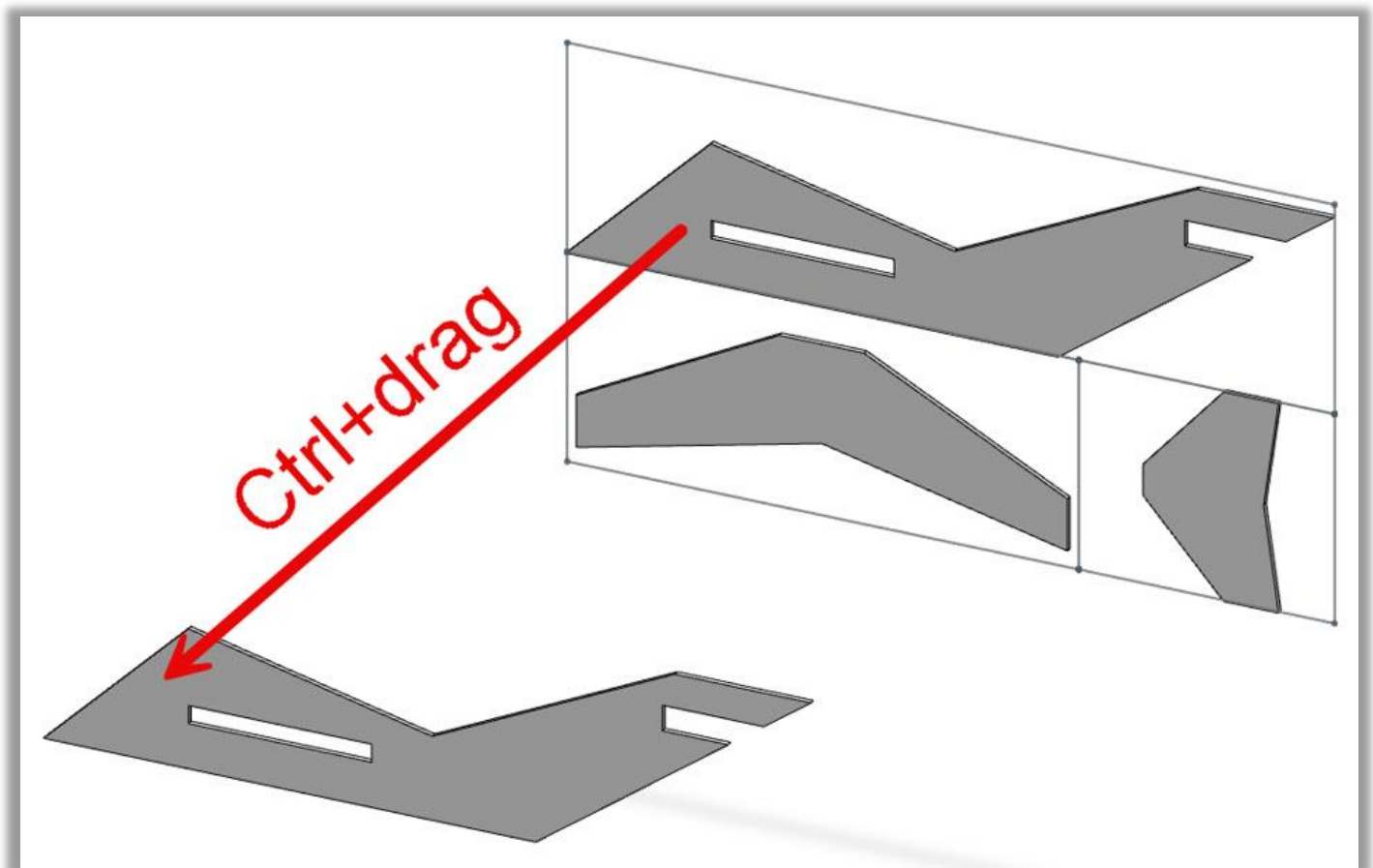22. The resulting Design Manager will look like this:
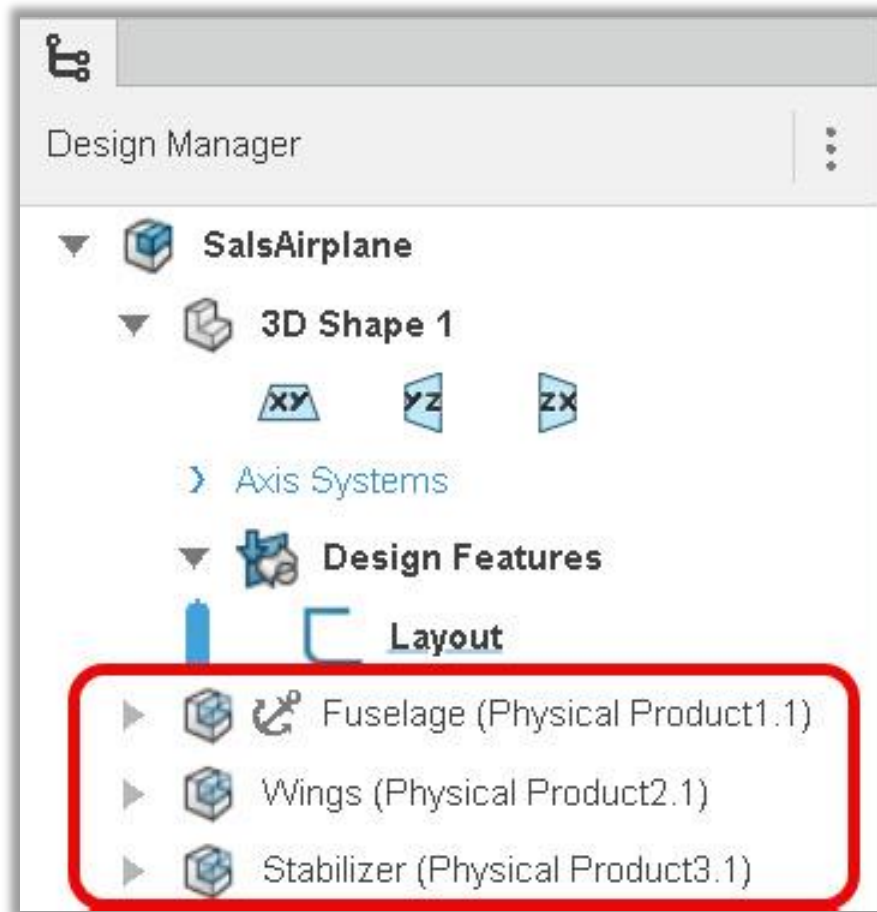
23. [1] Hold down the **Ctrl** key and select the wings and stabilizer components, then [2] select **Fix Component** from the context menu.
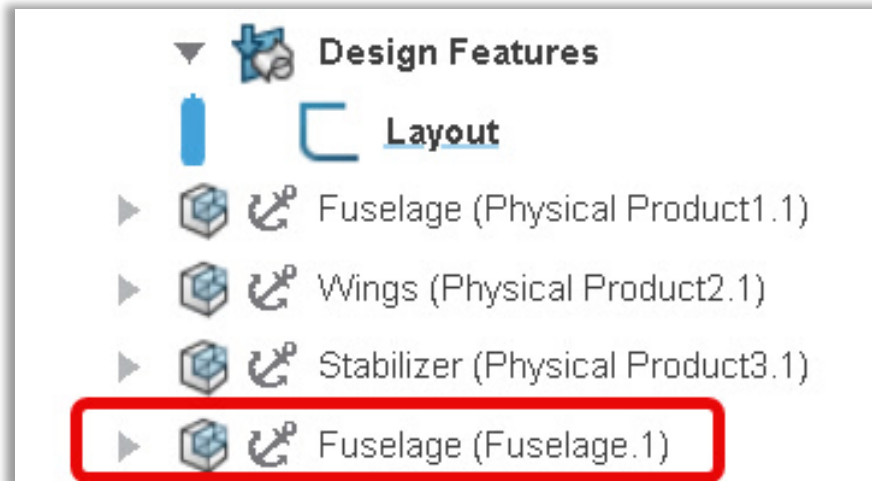
## 24. All three components will now be fixed in place.

25. Hold down the Ctrl key and drag the large face of the fuselage to create a copy of it

26. Select the newly created fuselage copy in the Design Manager and then click "Fix Component" in the context menu.


27. Hold down the **Ctrl** key and drag the large face of the wing to create a copy of it, and then hold down the Ctrl key and drag the large face of the stabilizer to create a copy of it too
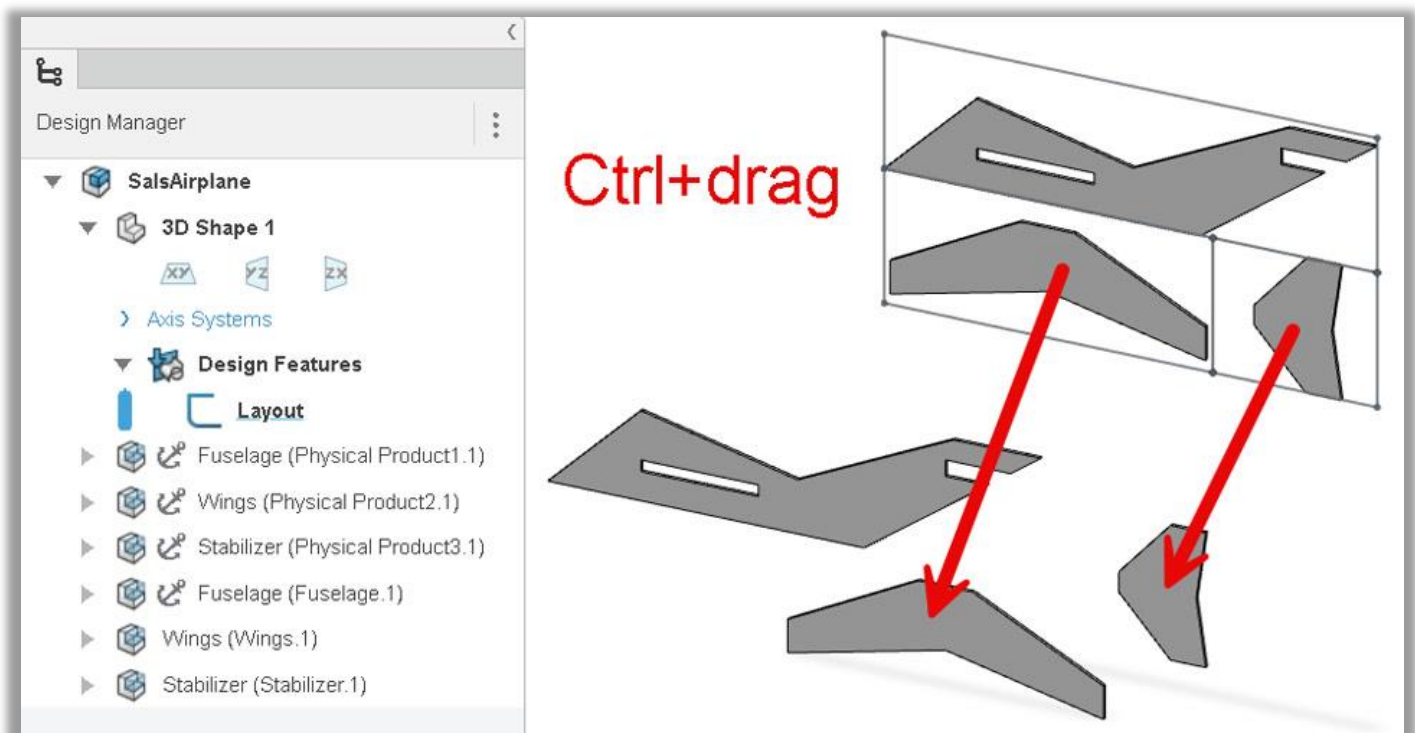
28. Reposition the wings or stabilizer by dragging them on screen. Hold down **ALT** while dragging and the component will rotate.
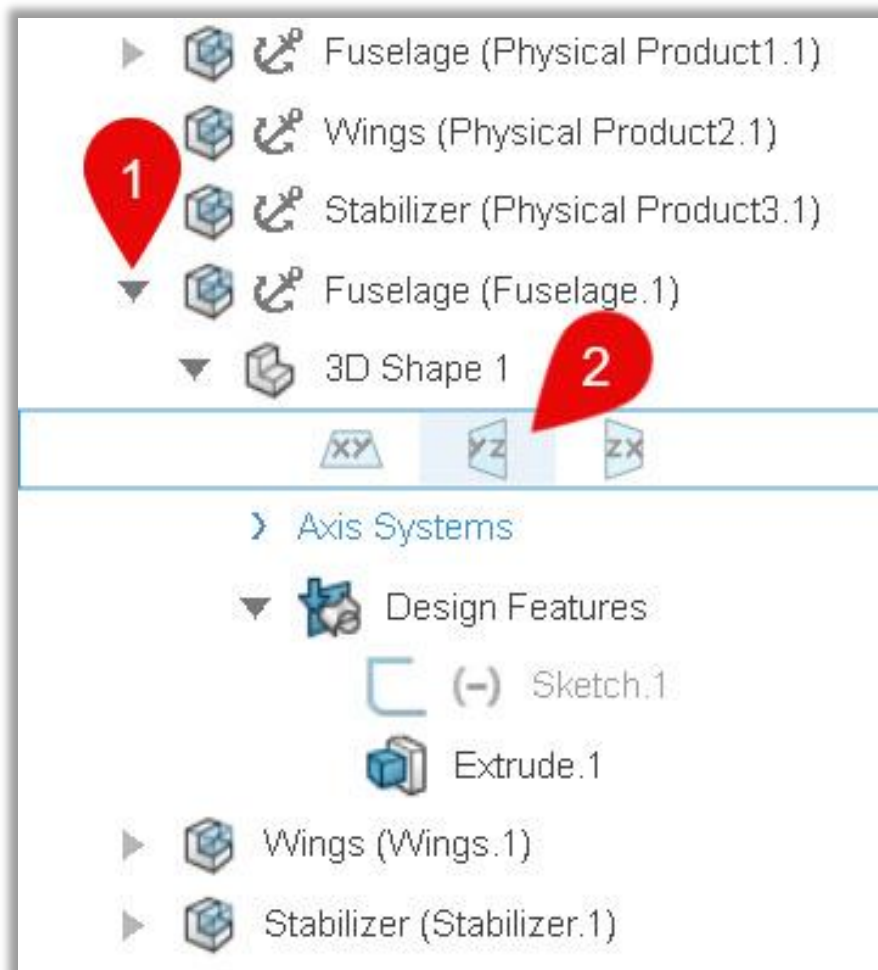

Alt+drag
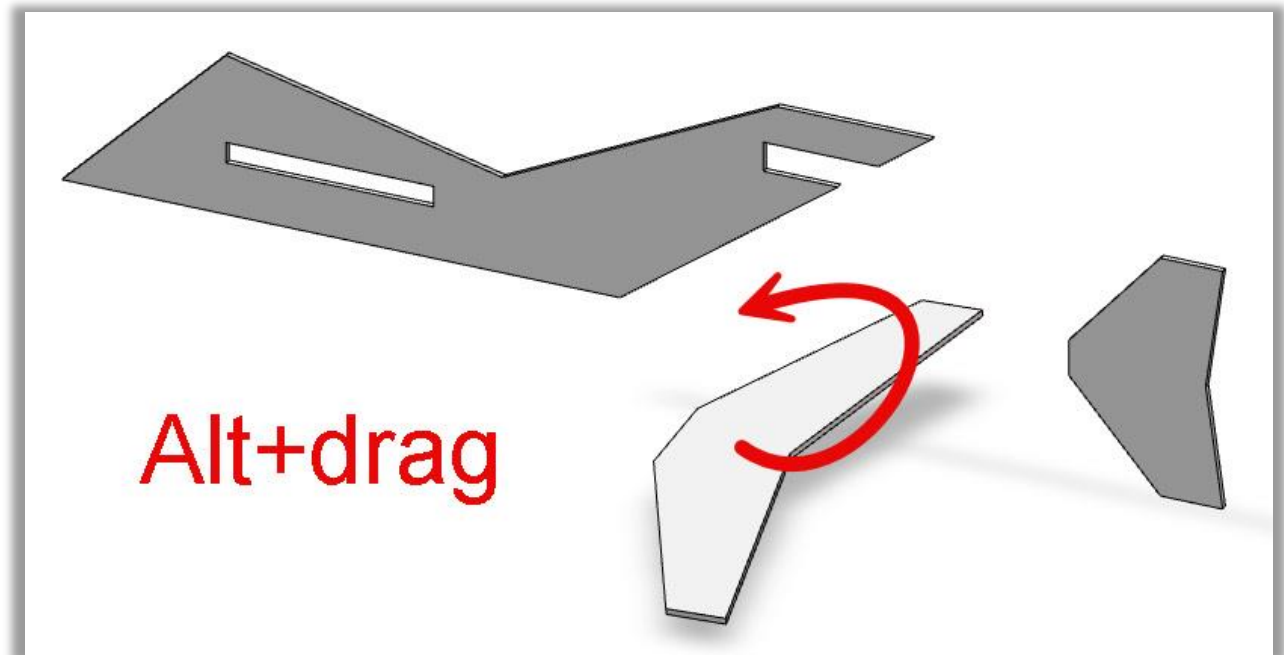
29. Select two faces to mate to one another and then click "Coincident" from the quick mate toolbar

Ctrl+Select 1,2

...then click 3
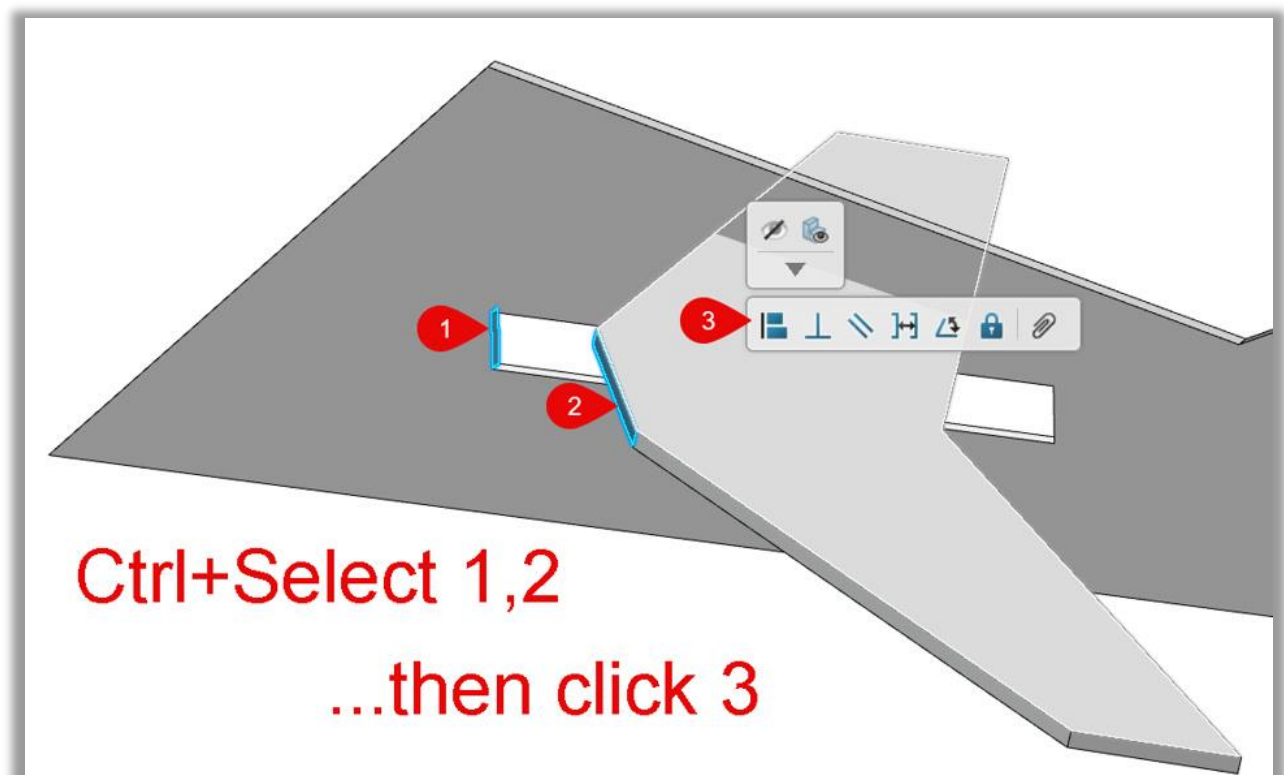
30. Repeat this process to add another coincident mate that holds the bottom of the wings to the bottom of the fuselage slot
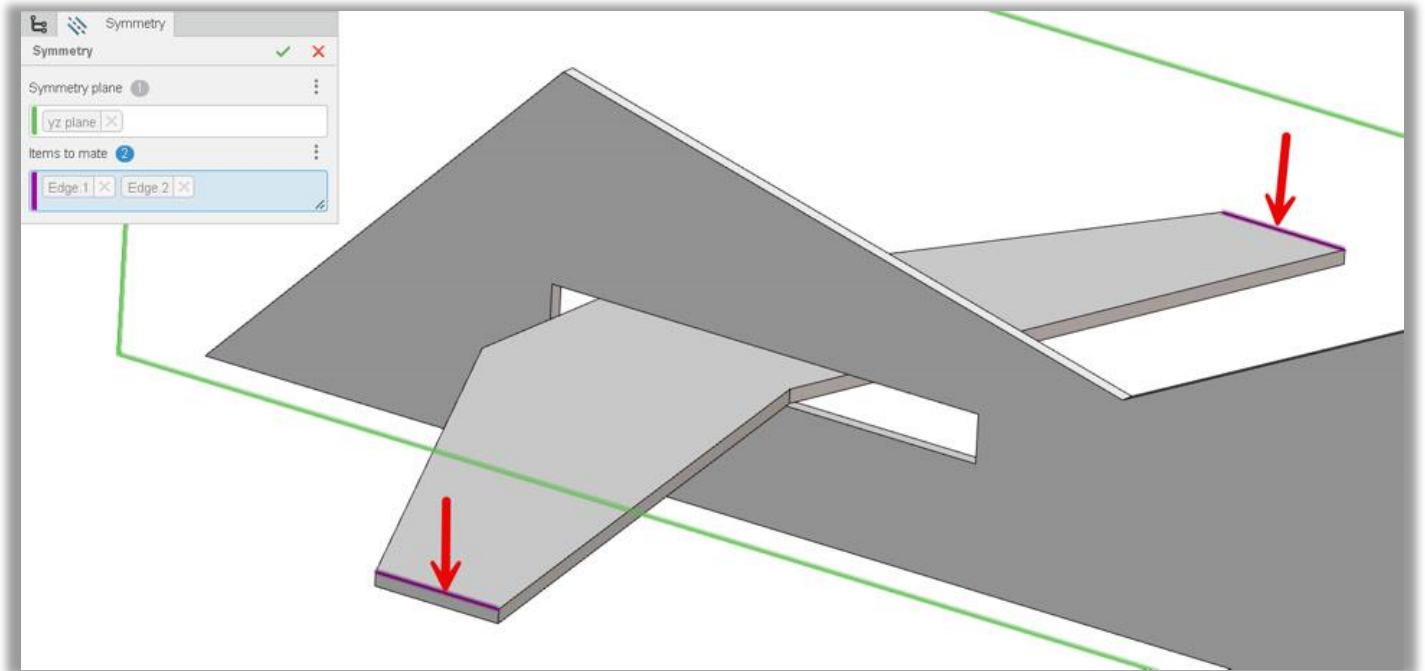
31. Expand the Fuselage component in the Design Manager and select the **YZ** plane

32. [1] Click the Assembly tab of the Action Bar and then [2] click the **Symmetry** command
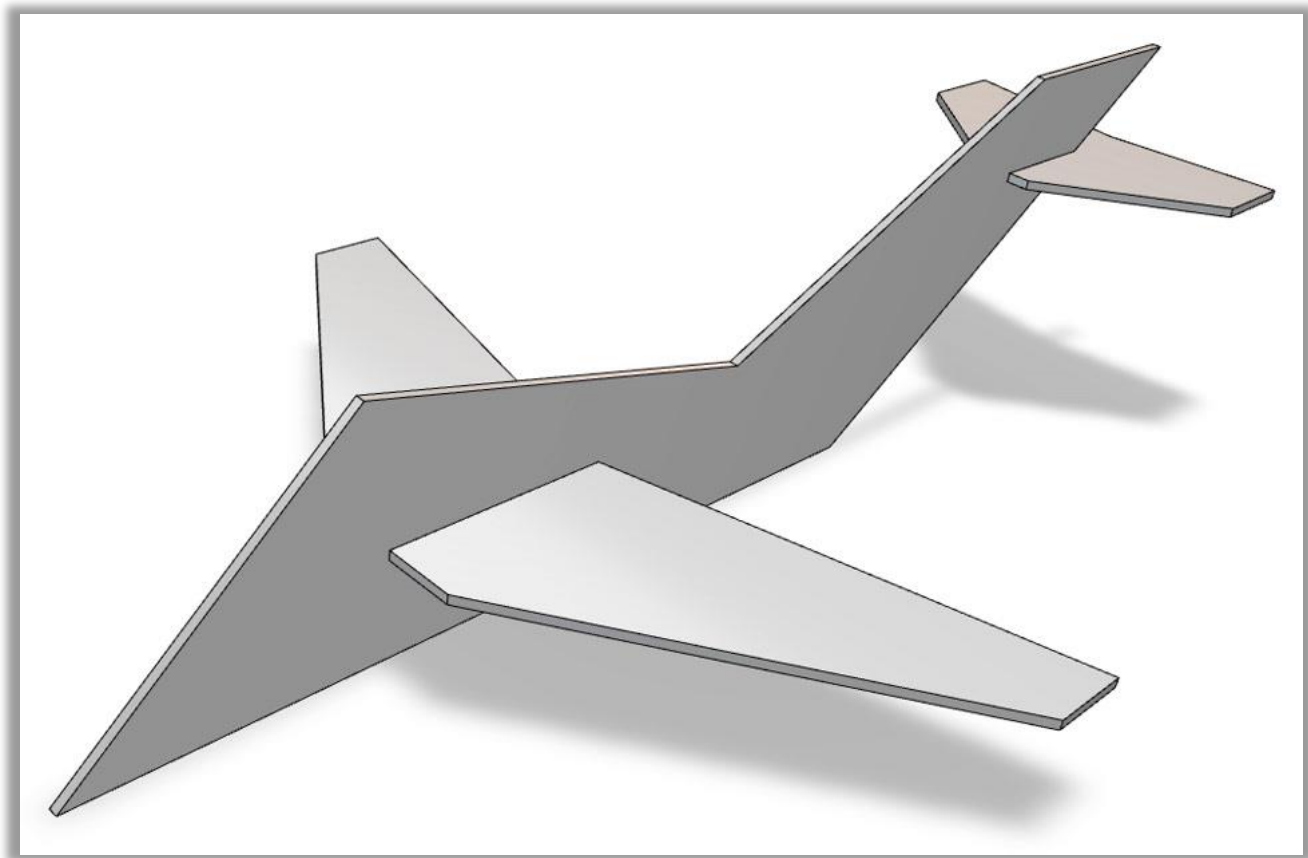

33. Select the two outermost edges of the airplane wings and then click the green checkmark.

34. Repeat this process to assemble the stabilizer.

- Add two coincident mates to position the stabilizer in the tail slot

- Add a symmetry mate to center the stabilizer

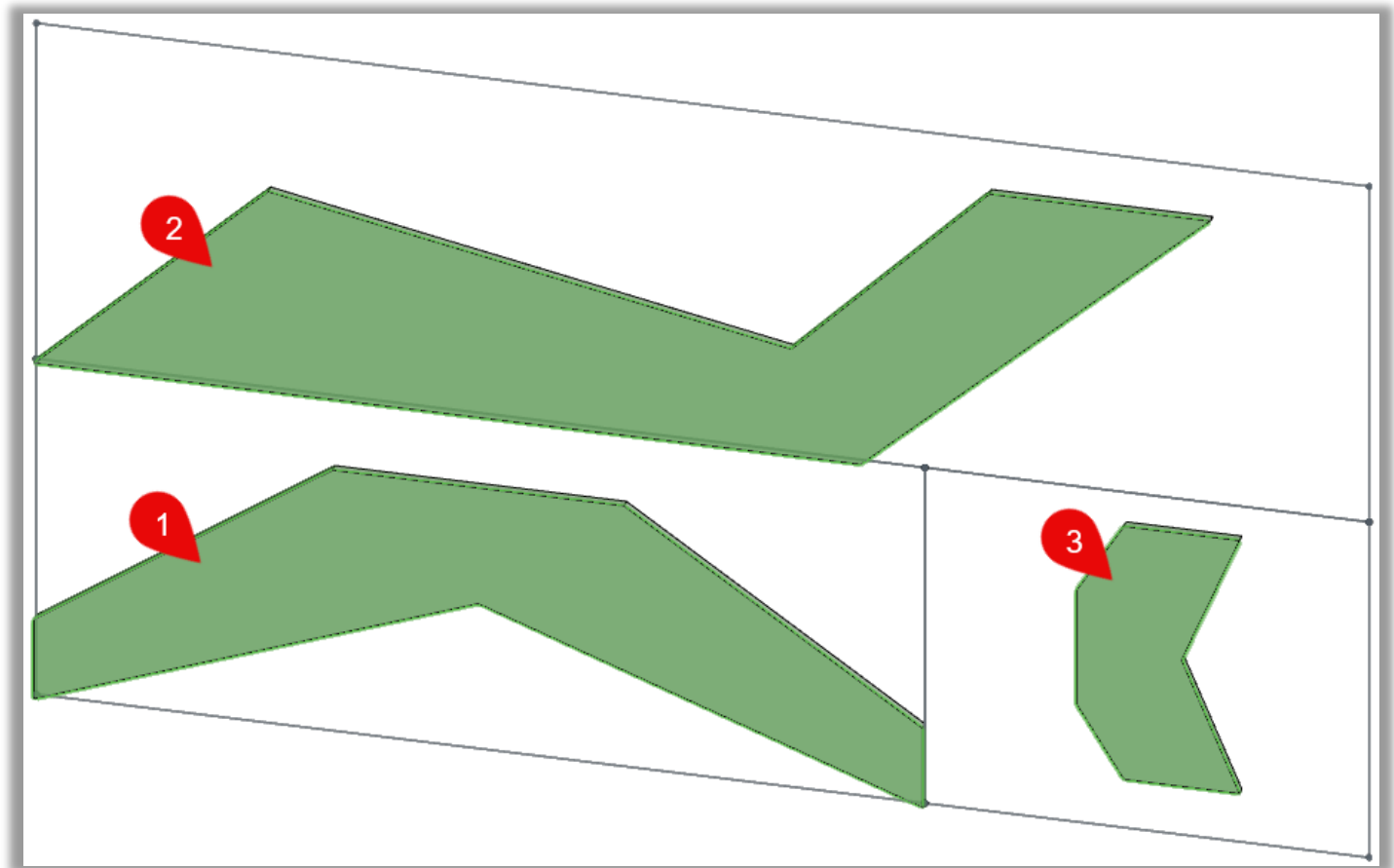## 35. Your finished plane will look something like this:
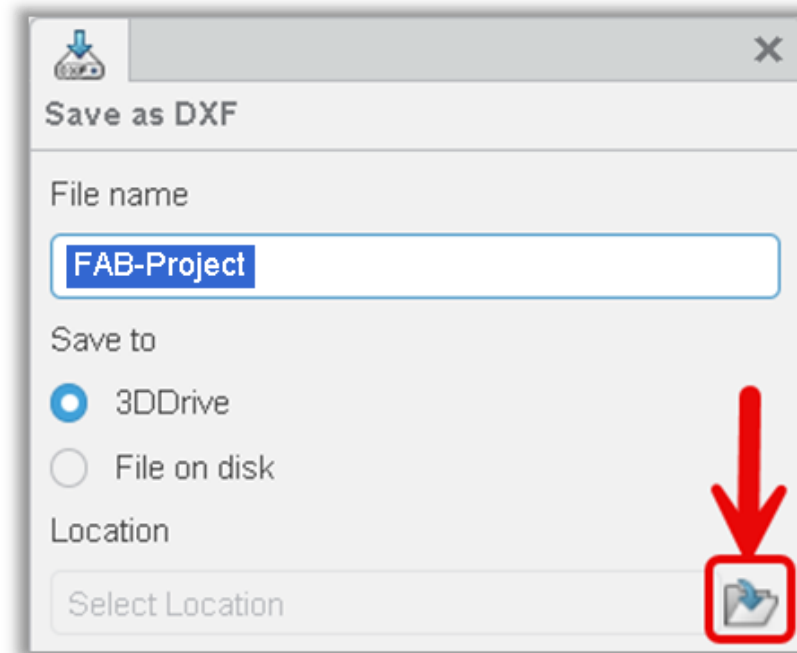
FABRICATE YOUR AIRPLANE

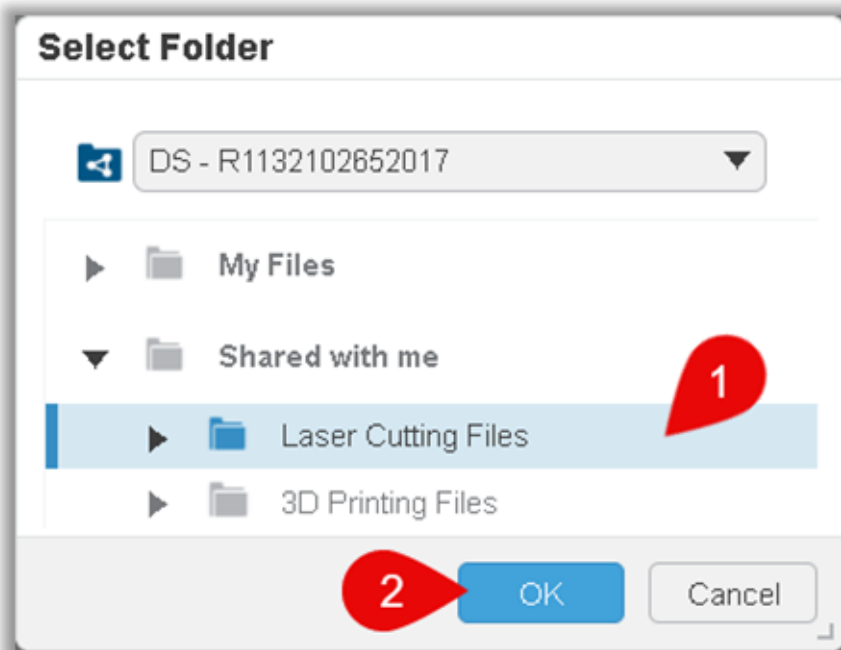36. Click the **DXF** command on the Tools tab of the Action Bar

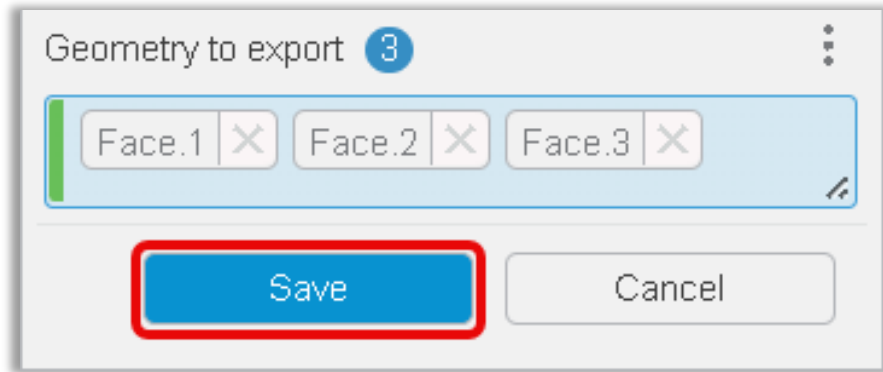37. Select the three large faces of your airplane parts

38. Click the Location folder button

39. [1] Select the folder your instructor told you to use to save your files then [2] click **OK**

40. Click the **Save** button in the Save as DXF dialog

Geometry to export ③

Face.1 ☒ Face.2 ☒ Face.3 ☒

Save   Cancel

Congratulations!

You're ready to laser cut your airplane!

See your teacher for further instruction!