

# The Unbalanced Glider Test Flight

Class Period: \_\_\_\_\_

Name: \_\_\_\_\_

## CER Statement CER 声明

### Claim 声明

Will your proposed changes improve the plane's ability to fly?  
你提议的更改会提高飞机的飞行能力吗?

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### Evidence 证据

What evidence so you have from your experiment would support your claim.  
你的实验有什么证据可以支持你的说法?

- List the problems that need to be resolved.  
列出需要解决的问题。
- Then list your proposed changes.  
再列出你提议的更改。

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### Reasoning 推理

Describe how your proposed changes will address all of the problems that you have indicated in the “Evidence” section of your “CER Statement”. Do not simply restate your evidence but describe how the changes will resolve each problem (i.e. state the problem, then solution, and then why you think it will work). For example: “\_\_ part of the plane is too \_\_, therefore, our group will \_\_ which will make this part of the plane stronger because \_\_”.

描述你所提议的更改将如何解决您在“CER 声明”的“证据”中指出的所有问题。请不要只是简单地重述你的证据，而是要描述这些更改将如何解决每个问题(例如，先陈述问题，然后解决方案，最后为什么你认为这样做会有效。)。例如：“飞机的\_\_部件太\_\_了，因此，我们小组将\_\_来加固飞机的该，因为\_\_”。

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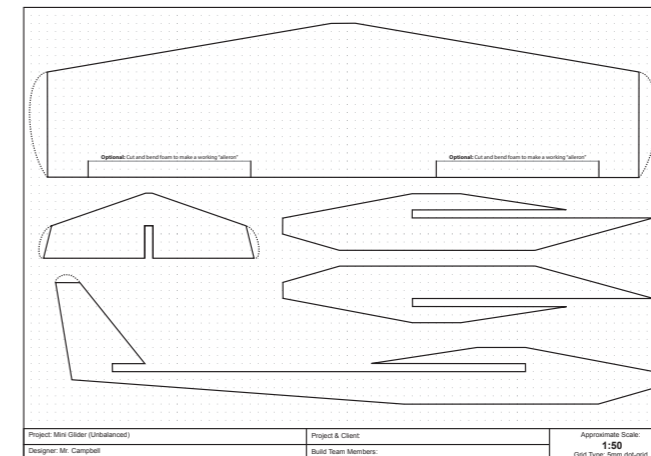
## Introduction 介绍

Simply changing the scale of an object to make a scaled model does not always work out. For instance, the density, strength, and weight of the materials that you use to build your scale model airplane will not be the same as the materials that were used to build the original airplane. This results in balance or structural issues that need to be resolved in-order for your model airplane to fly properly.

仅仅改变一个物体的比例来制作一个比例模型并不总是有效的。例如，用于建造比例模型飞机的材料的密度、强度和重量将与用于建造原始（真实）飞机的材料不同，这会导致平衡或结构问题。为了使你的模型飞机能正常飞行，你需要解决这些问题。

The airplane that you are about to build reproduces the dimensions of a real plane as closely as possible, but the model airplane will not fly properly. Your task is to build, test, and redesign the model airplane so that it will fly properly.

你将要建造的飞机会尽可能接近真实飞机的尺寸，但模型飞机可能仍不会正常飞行。所以，你的任务是建造、测试和重新设计飞机模型，使它能正常飞行。



**IMPORTANT:** Due to the materials that you will be using to build your glider, the plane will be **off-balanced**. This will result in the plane crashing and most **likely breaking the first time you fly it**. Therefore, it is very important that you are ready to make and record your observations about how the plane flies on your first test flight as you may not get a second chance to try again.

重要事项：由于你将用于建造飞机的材料的原因，飞机将失去平衡。这将导致飞机坠毁，并很可能在你第一次飞行时损坏。因此，很重要的一点是，你要做好准备，观察并记录飞机在第一次试飞中的飞行情况，因为你可能没有第二次试飞的机会。

**Initial Observations 初步观察**

1. Describe how your model airplane flew. Think about:

描述你的模型飞机是如何飞行的。思考:

a) How did the plane start its flight (i.e. did you throw the plane level to the ground, on a slight incline, or on a slight decline)?

飞机是如何开始起飞的。例如，你是从水平方向投掷起飞，还是微微向上倾斜，还是微微向下倾斜。

b) Describe how the direction of the plane (also called "flight vector") changed (i.e. did the front of the plane tilt downwards or upwards during the flight?).

描述飞机的飞行方向（也称为“飞行矢量”）是如何变化的。例如，飞行过程中，飞机的前部是向下倾斜还是向上倾斜？

c) And describe how the plane hit the ground and crashed (i.e. did the pane hit nose first or tale first?).

描述飞机是如何撞到地面并坠毁的。例如，飞机是先撞到机头还是先撞到机尾？)

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**Brain Storming 头脑风暴**

2. What part of the plane is too heavy? Do you think the front or the back of the plane is to heavy? Why do you think this?

飞机的哪个部件太重？你认为飞机的前部或后部会很重吗？你为什么这样认为？

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3. What part of the plane is not strong enough? Did any part of the plane break during your test-flight? Why do you think it broke?

飞机的哪个部件不够结实？在你试飞时飞机有哪个部件损坏了吗？你觉得它为什么坏了？

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**The Redesign 重新设计**

4. What Part of the plane needs to be redesigned so that the plane is properly balanced?

为了让飞机达到平衡，飞机的什么部件需要重新设计？

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5. How do you think you can redesign the model airplane so that it will fly better?

使飞机飞得更好，你认为你可以怎样重新设计模型飞机？

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6. Are there any parts of the plane that need to be redesigned to make them stronger so that the plane will not break so easily?

为了使飞机更坚固，不那么容易被损坏，飞机上是否有某些部件需要重新设计？

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7. How would you redesign the plane so that it will be stronger and less likely to break?

为了使飞机更坚固，不易损坏，你将如何重新设计飞机？

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8. Will your proposed changes have any negative side effects that you might need to address? (i.e. if you change part of the plane to make it stronger will your plane be thrown off balance again?)

你提出的更改是否有可能需要你解决的负面影响？例如，为了让飞机更坚固，如果你更改了飞机的某个部件，你的飞机会再次失去平衡吗？)

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