

**NAME:**

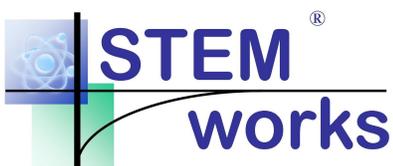
**CLASS:**

# STEMworks

# Wind Vehicles



CREST Award Booklet  
2016/17



A British Science Association programme



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## What is a CREST Award?

You are about to gain a CREST Award, the science equivalent of the Duke of Edinburgh Award. To obtain the Discovery award, you must do the following:

1. Complete this booklet
2. Participate in a workshop building a wind powered vehicle
3. Complete a self-evaluation



## Why are we doing this?

There is shortage of scientists and engineers in the UK. We want you to enjoy working like engineers, using and expanding your science and maths knowledge to design and build a wind powered car. We hope that you will then consider working for a company like Horizon Nuclear Power, who are planning to build a new power station at Oldbury.



*The old nuclear power plant at Oldbury is now closed. We still need electricity so Horizon Nuclear Power are planning to build a new one next door. Will you help build and run it?*

PŴER NIWCLEAR  
**HORIZON**  
NUCLEAR POWER

## Forces

### **A FORCE IS A PUSH OR A PULL**

There are lots of different names we give to forces, but they are all measured in newtons (N).  
Can you match the diagrams to the types of forces they show:

**Drag**

**Thrust**

**Weight**

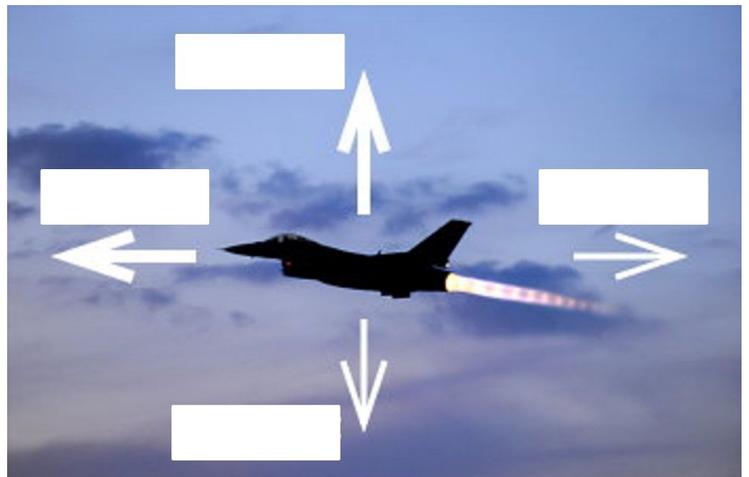
**Tension**



**MORE THAN ONE FORCE CAN ACT ON AN OBJECT.**

Can you label the arrows which show the forces acting on the plane? You may need to do some research.

**Why do you think some arrows are bigger than others?**



## Friction as a Force

**FRICION IS A FORCE THAT ACTS IN THE OPPOSITE DIRECTION TO MOVEMENT**

Sometimes friction can be useful, sometimes it can be a nuisance.



List two situations where friction is useful and two where it is a nuisance:

**Useful:**

- 1.
- 2.

**Nuisance:**

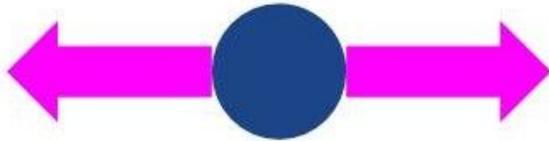
- 1.
- 2.

Look at the bike below. Draw **green arrows** to show where friction is useful and **red arrows** to shown where it is a nuisance when cycling a bike. **Are there some instances where friction is both good and bad?** Add at least 5 arrows.

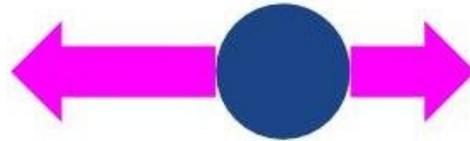


## Getting things to move

**IF AN OVERALL (NET) FORCE ACTS, AN OBJECT WILL ACCELERATE**



**Balanced**  
Will not accelerate  
If stationary, will stay still  
If moving, will continue at same speed



**Unbalanced**  
Will accelerate  
If stationary, will move  
If moving, will speed up or slow down

**W**hat have **engineers** done here to ensure that this is the fastest ship in the world?

Consider how they have made some forces very large and others very small. Annotate the image with your ideas

