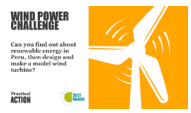
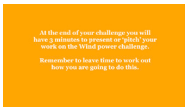
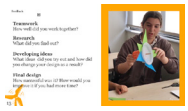
WIND POWER CHALLENGE

PowerPoint notes

1.		**Wind power challenge** Introduce the challenge. Briefly explain that their STEM challenge has been developed by an organisation called Practical Action. It is based on a real life problem.
2.		**Peru** Ask pupils to show you where Peru is on a map. Some facts about Peru are below. Ask pupils first what they already know then see if they covered alpacas, Macho Picchu and quinoa. • The Amazon rainforest covers 60% of Peru and this part of the forest is home to the highest number of bird species in the world. • Peru grows over 110 thousand tons of quinoa. It is the largest quinoa producer in the world. • Peru is famous for having an ancient civilisation called the Incas, whose empire ruled for over 100 years. They lived in the Andes Mountains where, today, the ancient Inca ruins of Machu Picchu attract half a million visitors a year. • Just under 30 million people live in Peru • Alpacas are important animals in Peru. Their fleece is used to make clothes and it is softer, stronger and warmer than sheep's wool. They are also used by families living in the mountains to move goods to markets. • The capital city of Peru is Lima which is home to more than a quarter of Peru's population. • Most people in Peru speak Spanish.
3.		**Living in Peru** An introduction to Abigail and Marco who live in Peru. There is a printed case study to show later.
4.		**The Global Goals** Introduce the Global Goals. Do this by explaining that in 2015 the United Nations (UN) identified a number of problems faced by people and communities around the world. They came up with 17 Global Goals which they agreed to work towards to help solve world poverty by 2030. These goals are also called the Sustainable Development Goals or SDGs.
5.		**17 Goals** These are the 17 goals. Ask pupils which goals might be linked to some of the problems Marco and Abigail and their families face in Peru.
6-7.		**Making a National Grid** Now pupils have identified how important energy is this activity helps them understand that whilst in most parts of the world a national grid provides electricity, sometimes people living in rural areas do not get electricity. This raises the issues of fairness and equality of access to energy.
8.		**Renewable energy** This is a good time to discover what pupils know about renewable energy. You may like to show our renewable energy poster at this point. You can request a free poster from schools@practicalaction.org.uk.
9.		**What is a Watt?** Hand out weights and carry out the starter activity as described in the Teacher's guide.

10.		**Did you know?** For older students (13–16 years) ask them to calculate e.g. how many offshore wind turbines we would need to generate 50 GW of electricity. Pupils should understand the equation in the Teacher's guide. They also need to understand that power in watts is the rate of use of energy in Joules i.e. 1 Watt is 1 Joule per second.
11.		**Your Wind power challenge**
12.		**A few ground rules** When completing the wind power challenge, students can actually calculate the power of their wind turbine (this will be very very small) using the equation $power = \frac{mgh}{t}$ Where m is the mass raised (I recommend using 5 g masses i.e. 0.005 kg), g is always 10 N kg–1 and h is the height lifted in meters (not cm!). They should measure the time in seconds using a stopwatch. Pupils aged 13–16 should also understand that the wind turbine converts kinetic energy into electrical energy and kinetic energy.
13.		**Present your challenge**
14.		**Feedback** We suggest that pupils present their model to the rest of the class reflecting on how well they worked together, problems they solved, etc. (this will be necessary if you are planning for your pupils to gain a CREST Discovery Award). Hand out the Team feedback sheet at this point Allow time for pupils to work on their presentations as well as building their model.
15.		**Harvesting the wind** Hand out the 'Harvesting the wind' case study and go back to the story of Abigail and Marco. Discuss how their lives have changed for the better since their village build a wind turbine.
16.		**Celebrating success**
17.		**CREST Awards** Taking part in the Wind power challenge is a great way for pupils to gain a CREST Award. The challenge is aligned to the Discovery Award, but can be used to gain a Superstar award or as the starting point for a Bronze, Silver or Gold Award. More details in the Teacher's guide Big Bang Fair and Competition Pupils who have taken part in a STEM challenge can enter their work into the Big Bang competition. This is a great way of pupils showcasing their work to other pupils and adults at a regional Big Bang event. If they become finalists they will be invited to attend the National Big Bang Fair which takes place in March each year. Both of these are amazing, inspiring experiences for young people. competition.thebigbangfair.co.uk
18.		**Wind power challenge** We hope you enjoyed it!