**Unit / Project Overview**

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| **Curriculum Area / Skills**  KS2/3 Science.  *Key academic focus*: Renewable energy sources.  *Key scientific skills focus*: The engineering design process, testing and evaluation.  *Key literacy focus*: Writing to persuade- should we/ should we not have offshore windfarms locally?  **Learning Outcomes :**  *Lessons 1&2:*  Year 3/4: I can define the term energy. I can describe different energy types. Year 5/6: I can explain different types of renewable energy source. Challenge : I can give my opinion as to which renewable energy source is best and why  *Lessons 3:*  Year 3/4: I can define wind Energy. I can describe how a win turbine works. Year 5/6- I can describe the positives and negatives of wind energy Challenge : I can argue whether I think wind turbines are good or bad  *Lessons 4:*  All years I can explain the basic engineering design process  I can build and test a model wind turbine.  Challenge**:** I can evaluate my initial wind turbine design and make improvements to it.  *Lessons 5:*  Year 3/4: I can describe the locations of Wind Farms in the UK.  Year 5/6: I can describe the positive and negative opinions on wind farm placement in an area. Challenge:I can produce an extended piece of writing which argues for or against the building of wind turbines in an area. | | **Subject / Course:**  KS2/3 Science: Renewable Energy  **Teacher:** Steven Swales- Silverdale School  **Class/Year group**:  Mixed ability age range from Years 7-9. Working academic ability within each class varies widely from Year 3- 6 in the main. One student in the group has a working academic ability of around year 8 and will be targeted with additional challenge questions and differentiate tasks  **Number of Students**: 5/6 Per class.  **Start date:** November 2019  **Length of project** 3-4 weeks.  **Additional Info** These resources are designed to work with students who have both ASD and SEMH needs. The students are taught in small class sizes of wide academic ability in a specialist setting with high levels of 1:1 support. |
| **Driving Question:**  How can we provide renewable energy to the North East? | | |
| **How can the learning from the employer visit be applied to the project idea?**  Key idea developed from one of OSBIT key markets in offshore wind energy. The complexity of their projects has had to be differentiated down significantly to be appropriate for target pupils.  Key skills ideas of flat management structure and engineering draft process incorporated into practical lessons of project. | | |
| **Which Stakeholders could help deliver the project?**  STEM ambassadors to come and visit the school and attend a celebration event at the school/ share their experiences of renewable energies and wind turbines. This could also be supported by OSBIT.  OSBIT site visit produced a key idea and themes for the project.  Newcastle college visit to VR windfarms.  Silverdale school- internal cover provided. In-class support from colleagues. | **Foreseen Challenges / solutions?**  Pupil engagement in the comparatively complex topic (in their perception) over an extended period. Solution: 3 discreet mini topics targeting three key skill areas- underpinning knowledge, practical engineering and extended writing.  Pupil connection to topic- Launch event involving the use of VR to help make the project seem ‘tangible/real’ for pupils.  The potential perceived complexity of OSBITS work- significant differentiation of topic and activities relative to ability. | |
| **Draft activity timeline (specific delivery times / flexibility)**  Pre-activities launch event/ hook: All students to visit Newcastle college and access the VR wind turbines exhibit for a half-day visit.    Lessons 1&2: Where does our energy come from/What is Renewable Energy?  Pupils to define renewable energy and explore the UK’s energy mix. Pupils to conduct a market place activity on different renewable energy and decide which type is best for the UK.    Lessons 3: What are Wind Farms? Pupils to investigate wind power as a source of renewable energy. Pupils to conduct back to back drawings (peer teaching) of a diagram showing how a turbine works. Pupils to discuss and categorise the positive and negatives of wind energy.    Lessons 4: Wind turbine Challenge. Pupils to sue the engineering design process to design test and evaluate making basic wind turbines and record how much weight they are capable of lifting. Pupils to use Osbits flat management structure to try and take different roles in re-drafting and refining their wind turbine to make the best product.    Lessons 5&6: Should we have more offshore Wind Farms in the North East?  Pupils will use mapping to try and spatially locate the best areas to place a wind farm in the local coastline. Pupils will then discuss the advantages and disadvantages of building offshore wind power in the local area and role-play different stakeholder opinions. This will cumulate in an extended piece of writing detailing whether the more offshore wind turbines should be placed in the area. | | |
| **Products / outputs?**  Students will make an engineered wind turbine, capable of lifting basic weights in the classroom setting. These will be re-drafted and refined using the engineering design process.  Students will produce a piece of extended writing arguing for or against the use of offshore wind turbines locally. | | **How will you celebrate, showcase learning with wider stakeholders?**     Collapsed timetable sconce fair morning showing other staff, parents and key stakeholders the outcome of the learning project (hopefully to be support by OSBIT/STEM, ambassadors) |
| **How will the work be assessed? How will you measure the impact, what are the success criteria?**   * The work will be assessed against differentiated learning objectives both through summative and formative assessment throughout by the teacher. * A range of differentiated success criteria for making the extended writing will be shared with the students to inform their writing. * The impact will be assessed both academically and holistically sue to the nature of the students- are they engaged in learning (some are currently withdrawn) does this project spark an interest in careers in STEM (comparative before and after) | | **Differentiation**  A wide range of differentiated task throughout (see lessons to follow) including but not limited to:  Differentiated learning outcomes/ task that is ability appropriate within groups.  Hints and challenge cards to target individual learners.  Writing frames  Roleplay/modelling to support social roles within each group.  Differentiated success criteria based on literacy levels |