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EDST4160 Design of STEM Education

Workshop 3: 3rd Guided Project and Brief for Independent Project

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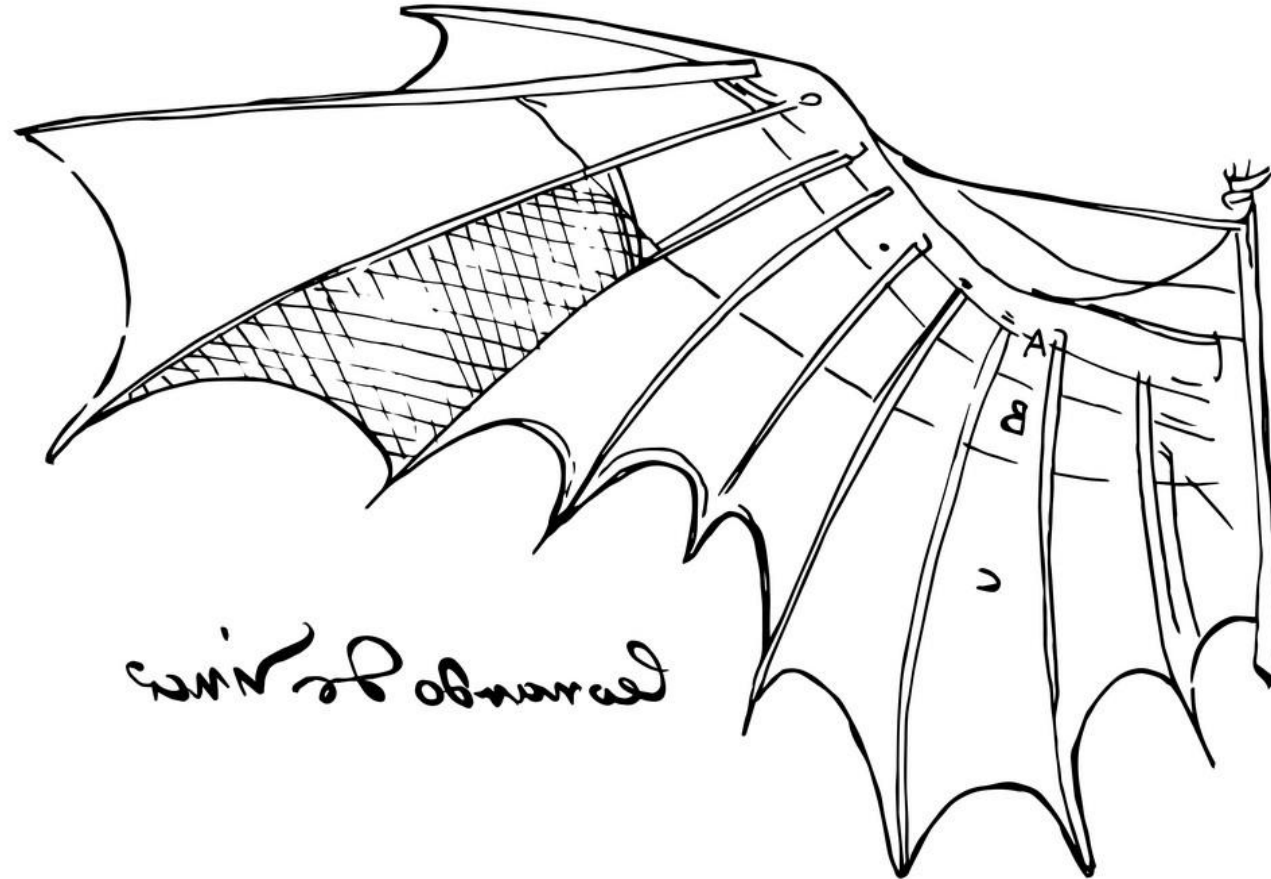
SPARK CURIOSITY

Warm-Up Activity



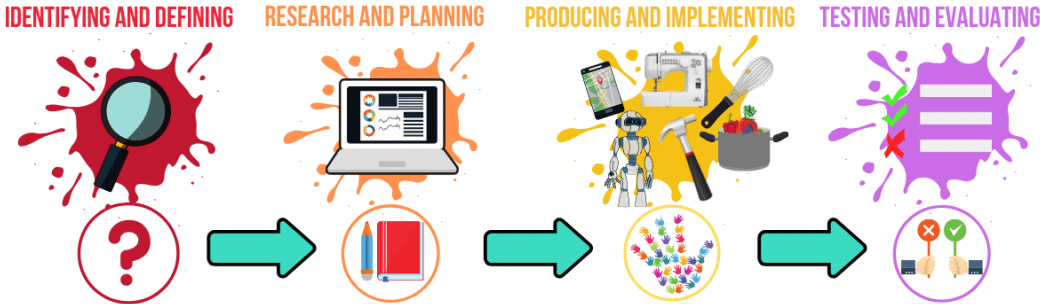
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In pairs, and in about 60 seconds, come up with as many questions about this image as you can, sensible or crazy.



D&P skills from S&T K-6 Syllabus

DESIGN AND PRODUCTION PROCESS



A 3 POSTER
DIGITAL DOWNLOAD

Identifying and Defining



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pair-share

What do we
know about
batteries?

<https://theconversation.com/curious-kids-how-do-batteries-work-123023>



Identifying and Defining



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With two other students, look at but don't touch the resources placed around the room.

Think about how you might use them to make a working battery.

5 minutes

Research and Planning.



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Do some
research and
draw your
plan.
Time to add
to
Book Creator.

15 minutes

Producing and Implementing

One person to collect materials and tools to make the battery:

- Up to 6 coins
- Piece of aluminium foil to cut out 6 disks slightly larger than the coins
- Piece of paper towel or cardboard to cut out disks about the same size as the coins
- A plastic plate to put everything on
- A couple of wires
- Maybe some tape

As you need, access water, salt and vinegar from where you find them in class.

Devices that might use electricity from the battery are placed around the room.

Take your battery to them for testing.

Don't forget to record producing and testing in Book Creator.

Independent STEM Project

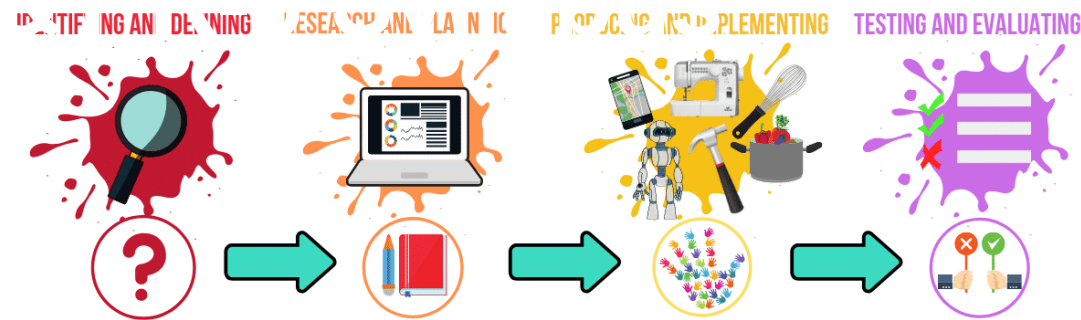


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We will:

- Unpack the theme
- Generate ideas for a D&P challenge related to the theme
- Do some research to help select and develop an idea
- Check connections to syllabuses
- Describe the challenge (context, success criteria, constraints, required resources)
- Start a plan to build a physical artefact outside of workshop hours
- Record to our e-portfolio

DESIGN AND PRODUCTION PROCESS



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D&P skills from S&T K-6 Syllabus



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Identifying and defining

Students consider the contribution of technologies to their lives and make judgements about them, and explore needs and opportunities for designing. They question and review existing products, processes and systems, explore needs or opportunities for designing, define problems to be solved, describe a sequence of steps and decisions (algorithms) needed to solve a problem and establish criteria for a successful design solution.

Identifying and Defining

THEME: HARNESSING THE WIND

- First thoughts and feelings?
- An example of building a context for the children: The Boy Who Harnessed the Wind
- From the trailer, what does the film seem to be about? How is it related to our theme?



Identifying and Defining

THEME: HARNESSING THE WIND

Building the Context –
An authentic problem



Identifying and Defining

THEME: HARNESSING THE WIND

- How many different kinds of engineering challenges involving wind come to mind? IDEATE
- How educational, innovative, practical and engaging is each idea? Which is the best for our design experience and for our interdisciplinary STEM unit? EVALUATE

Record in e-portfolio.

Researching and Planning

Researching and planning

Students identify factors that may influence and dictate the focus of the design idea, explore options and represent and refine ideas. They investigate materials, components, tools, equipment and/or processes to achieve intended design solutions. Students generate, develop and communicate design ideas and information, using appropriate technical terms and graphical representations. They develop project plans that include consideration of resources and design, modify and follow simple algorithms and steps in the development of a design solution.

Research!

THEME: HARNESSING THE WIND

- What do we know about the wind?
 - Prior knowledge

Find out more about (choose one)

TRADE WINDS	CYCLONES AND HURRICANES
WHAT MAKES THE WIND?	MEASURING WIND
WIND EROSION	AGE OF SAIL
WIND SOCK	WINDIEST PLACE

A starting point could be:

<https://www.nationalgeographic.org/encyclopedia/wind/>

Share your learning with class. Record in e-portfolio.

Research!

THEME: HARNESSING THE WIND

- What does it mean to *harness* the wind? What is a synonym of *harness*?
- Give some examples of harnessing the wind.
Research a promising engineering challenge
- What do we need to find out?
- Where are we going to find it?

Record in e-portfolio.

Research!

INTERESTING LINKS (FROM A 15 MINUTE GOOGLE SEARCH)



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<https://www.trendhunter.com/slideshow/small-scale-wind-driven-devices>

https://www.youtube.com/watch?v=JXYkjHKakGE&ab_channel=AntiquePencil

<https://sciencing.com/devices-used-harness-wind-energy-5626358.html>

<https://education.nationalgeographic.org/resource/putting-wind-work>

https://www.youtube.com/watch?v=KOd6-PFkEy8&ab_channel=ExploratoriumTeacherInstitute

https://www.youtube.com/watch?v=qiQ3Zbm1Z2c&ab_channel=PaleontologicalResearchInstitution

<https://energyfollower.com/wind/>

<https://kids.britannica.com/kids/article/wind-power/574607>

https://www.youtube.com/watch?v=NE6DKwU2df4&ab_channel=NDPgear

Plan!

THEME: HARNESSING THE WIND

- Individual or group? Composition of group. Role of members – who does what, when?
- Description of challenge and its context;
- Success criteria and constraints;
- Resource list;
- Drawing to assist construction/production;
- Invite feedback on plan from at least one other party

Don't forget to record in e-portfolio.

Plan!

THEME: HARNESSING THE WIND

Share with the teacher and class

- What are you planning?
- How are you going to work on it?
- What challenges might there be?
- Can you compete with others in your group or with another group in class?
- How will it form the basis of an interdisciplinary STEM unit of work?

Don't forget to record in e-portfolio as you progress your ideas.