STEPS Engineers Week

Engineers Ireland STEPS

ENGINEERS WEEK

STEPS PRIMARY SCHOOL ACTIVIY
WIND ENERGY: PINWHEEL CHALLENGE

Sponsored by

An Roinn Breisoideachais agus Ardoideachais, Taighde, Nuálaíochta agus Eolaíochta
Department of Further and Higher Education, Research, Innovation and Science

ARUP

epa Environmental Protection Agency

ESB Energy for generations

intel

TII Transport Infrastructure Ireland

Wind Energy – Pinwheel Challenge

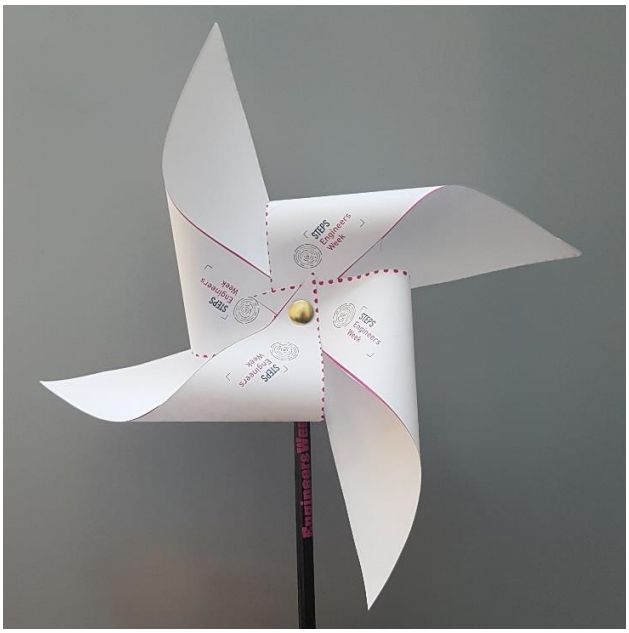
Summary

- Students make a pinwheel to mod el a wind turbine and learn about wind energy.
- Teachers can decide whether to:
  - Make the pinwheel out of repurposed paper/thin card for a more sustainable activity
  - Print the pinwheel template enclosed in this document, which may make the activity accessible for younger children

Teacher Preparation

1. Decide if you will make the pinwheel:
   a. out of repurposed paper/thin card (see page 3 for instructions)
   b. using the printable pinwheel template (see page 4 for instructions)
2. Decide if your students will work in pairs, groups or as individuals.
3. Prepare the discussion guide (see page 2).
4. Gather activity materials

- OPTIONAL: Prepare and test your own pinwheel to show the students, if needed.



Materials

Each student/pair/group will need:

- Scissors
- A longer-length pencil (with an intact eraser)
- 1 straight/push pin
- **If making from repurposed paper/light card:**
  - A way to display the pinwheel diagram (such as a projector/screen)
  - A piece of paper/light card that can be cut into a square of approximately 20cm x 20cm. This paper/light card should be of approximately the same thickness as printer paper. This ensures that it is thick enough to hold the shape of the pinwheel but is not too thick that it cannot be shaped and bent.
  - A ruler
  - A pencil
- **If printing out the pinwheel template:**
  - 1 copy of the pinwheel template (Page 4 of this document)

Did you know? Engineers Ireland declared a climate and biodiversity emergency in February 2020?

ACTIVITY INSTRUCTIONS

1. Pre-discussion and contextualisation

- Write the questions on your board
- Students can discuss answers and share with the group, or makes notes in their copy book

Engineers are key to help us move to a more sustainable society.

Discussion 1: What is Engineering?

- Ask the students if they know what engineering is.
- You can use the Discussion Tips below to help prompt the students and get the conversation going.

DISCUSSION TIPS:

- Engineers are people who want to help solve problems in the world.
- Engineers take ideas and turn them into reality, using science, math and imagination.
- Engineers are masters of problem-solving and creative design.

Discussion 2: Wind Power.

- Introduce Wind turbines to the class. Ask the students what they know about renewable energy.
- You can use the Discussion Tips below to help prompt the students and get the conversation going.

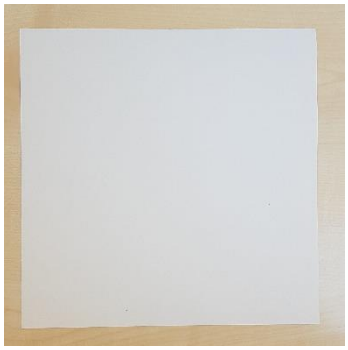
DISCUSSION TIPS: DISCUSSION TIPS:

- Wind energy has been used for centuries – it's not new – can you think of examples? E.G. Sailing boats, windmills etc.
- Wind turbines help us to rely less on fossil fuels which damage our environment. Engineers have come up with a way to use the energy from the wind to generate electricity that we can carry by cables to our fingertips
- Wind energy is currently the largest contributing resource of renewable energy in Ireland. In 2018 Wind provided 85% of Ireland's renewable electricity and 30% of our total electricity demand (via www.seai.ie).

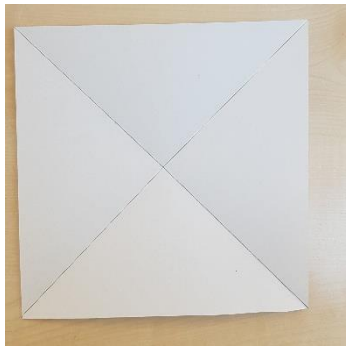
2. Making the Pinwheel

- Following the discussion guide above, you are now ready to make the pinwheel.
- Decide if you will make the pinwheel:
    a. out of repurposed paper/thin card (see page 3 for instructions)
    b. using the printable pinwheel template (see page 4 for instructions)

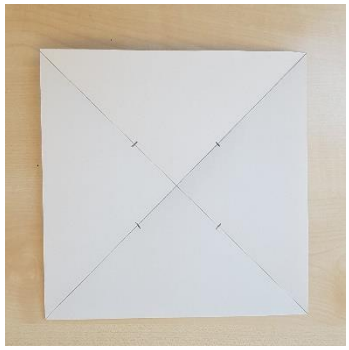
PINWHEEL INTRUCTIONS



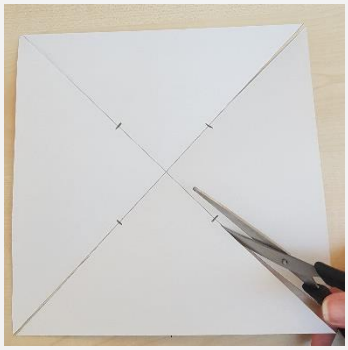
STEP 1: Begin with a square of paper



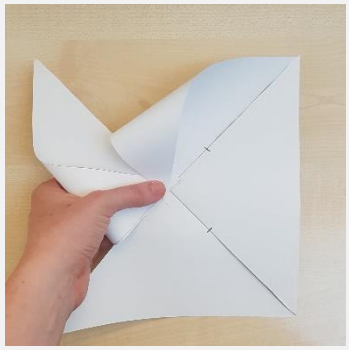
STEP 2: Fold your square, corner to corner, then unfold.



STEP 3: Make a pencil mark about 1/3 of the way from the centre



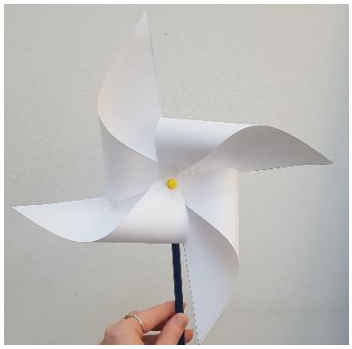
STEP 4: Cut along the folded lines. Make sure to stop at your pencil marks.



STEP 5: Bring every other point into the centre and stick a pin through all four points.

STEP 6: The head of the pin forms the hub of the pinwheel.

STEP 7: Turn your pinwheel over - make sure the pin pokes through in the exact centre.

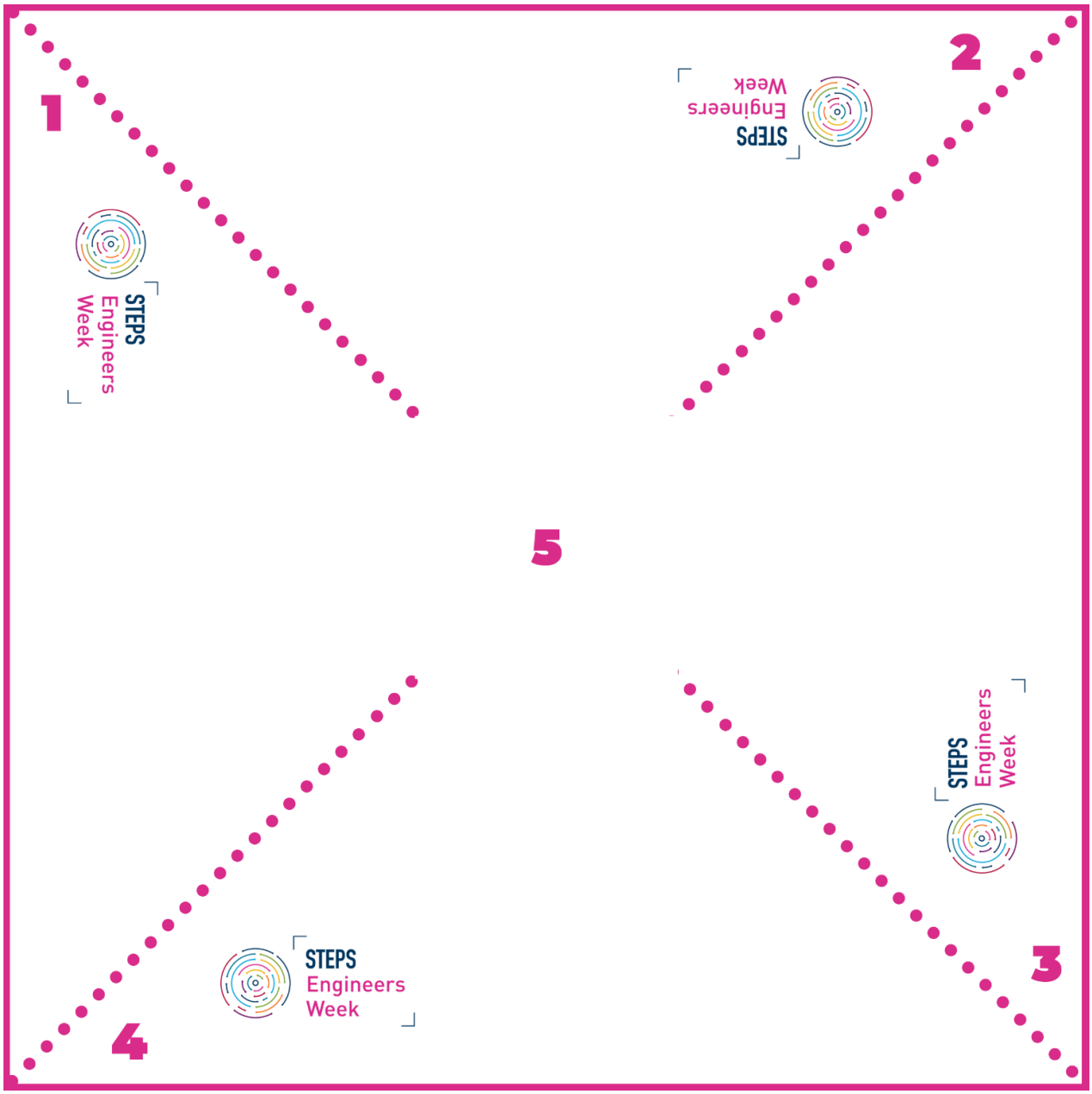


STEP 8: Turn it around. Your pinwheel is complete.

STEP 9 (Optional): Test your pinwheel by:

- Going outside on a windy day
- Blowing on it with a hair dryer

PINWHEEL CUT-OUT



Instructions

1. Cut along the solid line to make a square.
3. Cut along each of the dotted lines. Be careful to stop cutting before the dotted line stops.
4. Push the straight pin through the 1, then the 2, then the 3 and 4. TIP: Ask your teacher/guardian to show you how to do this or watch the instruction video.
5. Next, push the pin through the middle of the back of the pinwheel at number 5.
6. Push the straight pin into the eraser of a pencil.
7. Your pinwheel is complete!