Jersey Post

POSTBOX CHALLENGE

The challenge!

While still an essential community service, sending letters is declining by more than 20% per year as we use more email and electronic communications. With this has come a reduction in the use of postboxes, many of which are empty when we visit to collect the letters.

Our aim as an ecologically responsible company is to become 100% carbon neutral by 2030. Using non-renewable resources to visit 120+ postboxes, multiple times per day, is inconsistent with this objective. We need a way of knowing if postboxes are empty and as a technology pioneer, what better way to solve this challenge than by tapping into Jersey's young innovators?!

We need you!

We want you, along with your fellow school team members, to enter the Postbox Challenge and make use of IoT technology to monitor our postboxes. You'll also need produce a way to keep us informed, in near real time, when a postbox is used and no longer empty.

Entry requirements

1. Teams must apply through their school and must be endorsed by their school. For ease, all team members must come from the same school. Please contact the organisers if this is a problem.
2. Teams should be between three to six members and must have a school approved an adult technical mentor.
3. We will accept up to two teams per school.
4. Team members should be from key stage 4 and be in years 10 or 11.
5. Key stage 5 and sixth form students may take part in the challenge informally for their own interest, but will not be eligible to win the competition and must fund their own designs. However, participation will be recognised and is a good addition to bios and CVs.

Competition Entry

Here's how the competition will work:

1. Jersey Post will supply teams with the rules of the Postbox Challenge and a briefing (this document).
2. Before applying, should there be any questions, the team technical mentor can contact organisers via the Postbox Challenge section of Digital Jersey's Academy Online - https://digitaljersey.online/
3. To apply the Postbox Challenge you should come up with an imaginative team name and have your technical mentor complete the online application form no later than Friday 5th March. You can use the QR code below or go to the link https://bit.ly/39yiy5Y

4. Applications will be reviewed by Jersey Post and confirmed by Tuesday 9th March.
5. As a first step Jersey Post will provide an online briefing to explain the Postbox Challenge, the rules and allow teams to ask questions.
6. Please refer to the competition schedule below for more details of the key milestones of the competition.

Prizes

Each team member from the winning team will receive a £100 Amazon voucher and the runners-up will each receive a £50 Amazon voucher.

With the help of technical mentors we'll also be on the lookout for two individuals from any team, not necessarily the winner or runners up, that we believe made an outstanding contribution. This will include any teams from key stage 5. We'll award these individuals a laptop to help with their ongoing studies.

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Competition Schedule

The completion is broken into three phases based on Design, Prototyping and Production. Each phase will be followed by a review or the final judging. The schedule is as follows:

Activity	Start Date	End Date
Applications Open	11-Feb-21 Thursday	
Applications Close	05-Mar-21 Friday	
Applications Confirmed	08-Mar-21 Monday	
Online Postbox Challenge Briefing An online briefing will bring together technical mentors and students from all teams to begin the competition. This is your chance to hear about the Postbox Challenge and ask questions, but remember the answers to questions you ask will be for all teams to hear!	09-Mar-21 Tuesday	
Phase 1 – Initial Design (26% - 12 days) Teams spend time reviewing the rules and requirements. They then research potential solutions to arrive at an initial paper based design. We'll provide instructions on how to build a cardboard mock-up postbox. Designs should be distilled into a costed Bill of Materials (BOM) ready for the prototyping stage.	09-Mar-21 Tuesday	23-Mar-21 Tuesday
Initial Design Review Teams give a 10-minute presentation on their design to the technical panel, followed by a 15-minutes two-way question and answer session. This allows the panel to feedback to the team on any areas where their design may not meet the requirement or be impractical. Think 'Dragons Den' but with more help and encouragement. 'Heavy duty' documentation is not expected, but teams must prepare, market, and explain their ideas in depth to the technical panel. Following the review, funds up to £100 will be provided to buy items on the BOM via the technical mentor. It's important to fully research the cost and availability of your parts, including shipping and tax, before submitting a BOM. Contact the organisers if parts have long delivery times & need purchasing earlier.	24-Mar-21 Wednesday	
Phase 2 – Prototyping (48% - 22 days) Teams spend time making functional prototypes of their designs and testing that they work. This should include hardware, software and networking. If COVID social distancing measures permit, we'll provide access to an actual postbox to help you better understand the environment, dimensions and operating restrictions. DJX hub may be available based on COVID 19 situation.	24-Mar-21 Wednesday	10-May-21 Monday
Prototype Review Presentation Team-by-team prototype review with the technical panel. This is an opportunity to show-off your working prototype and seek help and guidance from the technical panel if required. If permitted by COVID 19 social distancing rules, we'll make a real postbox available for this.	11-May-21 Tuesday	

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Phase 3 – Production (26% - 12 days)	11-May-21	27-May-21
Incorporating feedback from the panel, teams will turn their prototypes ready for deployment in a real Postbox. This includes making prototypes ready to operate in live post boxes, finishing software and user documentation. Expectation is that the entries are nearly ready for manufacturing by Jersey Post to be deployed in all our Postboxes. **Final devices should be in cases, weatherproof, incorporate a power source and have deployable sensors.**	Tuesday	Thursday
Production Design Presentation and Judging	28-May-21	
Each team will present its finished production ready solution and documentation to the panel, including a live demonstration in a test post box.	Friday	

During the competition we will run a number of training webinars on subjects that will help you with your Postbox challenge entry. These will include, but are not limited to:

Date	Subject	Duration
Wed 10th March	Microcontrollers vs. Microcomputers	30 min
Mon 15th March	Microcontroller circuit design	60 min
Thu 18th March	IoT device networking	60 min
Fri 26th March	Low power electronic design	60 min
Wed 31st March	The Arduino IDE & basic programming for microcontrollers	60 min
Wed 5th May	3D Design & Printing Electronics Enclosures	60 min
TBC	Marketing your product	60 min

An award presentation will be held after the winners are announced. The format and date of the presentation is still to be confirmed based on prevailing COVID 19 guidance towards the end of the competition period.

Rules and Requirements

The Postbox Challenge rules are designed to ensure that entries meet the physical, safety and durability requirements of operating in a Postbox. The rules may be subject to additional technical directives throughout the competition, should clarification be required. If you are uncertain about any rule, or need additional guidance please get in touch with the organisers via the competition portal at Digital Jersey Academy Online. All entries will be judged against the rules, so please do contact us if you are uncertain.

Jersey Post expects to be able to use the designs submitted during the post box challenge for the intended purpose of monitoring post boxes. While the teams retain the intellectual property in their designs, entering the post box challenge grants Jersey Post the right to use the design submitted without recompense to the team.

Power Supply

1. The device must be powered by removable batteries, ideally AA or AAA, such that the pre-charged batteries can quickly substituted when the post box is visited.
2. The device must have a battery life of 3 or more months. Therefore, teams must consider power-saving strategies in their design.
3. The device must be able to sense low battery and inform someone emptying the postbox.
4. The device should report low battery via central website/API.
5. The device must be electrically safe, especially considering the potentially damp environment inside the post box during cold and wet winter months.

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Environment

6. The device must be durable and able to function inside a post box for a least 2 years.

7. Must be able to operate inside existing post box types.

8. No heating is provided in the post box.

9. Warning: the device must work in a damp environment. Condensation is likely within the post box.

10. The operational environment is dark.

11. Our postboxes are made of cast iron. They have a posting slot in addition to a small open aperture behind the plastic plate with collection times printed on it.

12. Maximum dimensions are 88mm x 57mm x 22mm, owing to the room available inside the smallest post boxes. There is some flexibility in layout and sub-components could be in separate locations.

13. A mounting solution is part of the challenge.

14. The solution must be secure inside the box and not dislodged by letters or the process of emptying the post box.

15. The device must be easy to fit and remove.

Monitoring

16. The device must keep track of whether the box contains any letters. An approximate count of letters is a bonus, but not required.

17. The device optionally should detect and report when the door is opened.

18. The device must report status frequently between 6am and 8pm.

19. The status of the box should be no more than 15 minutes old.

20. The device should work in failsafe way so that empty status is not falsely reported (e.g. when battery is depleted).

Reporting

21. A Central webpage should provide access to data.

22. An API to access the data would be a bonus but is not essential.

23. The webpage should be mobile friendly for the handheld computers used by our Delivery Officers.

Security

24. All data generated must be secured from unauthorised access.

25. The status of the box should be capable of being reset by a visiting Delivery Officer, with or without a smartphone.

Cost

26. The device must be easy and cost-effective to manufacture for 127 post boxes across the island.

27. The device should cost less than £75 per unit to produce – a lower cost will be judged favourably.

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