STEM CLUBS

NUMBER 1 FOR STEM

CLUB LEADER GUIDE: SUITABLE FOR AGE 11-14

How can we live smarter?

3 There's an app for that

Objective

In this activity students learn about the effects of waste on the environment. They will design an app that incentivises recycling by allowing households to log how much they are recycling each week.

HEALTH AND SAFETY:

A suitable risk assessment must be carried out by the activity leader and any significant findings recorded: if carried out in schools, guidance from CLEAPSS or SSERC must be used where appropriate.

TOPIC LINKS

Computing: app design

ESSENTIAL SKILLS SUPPORTED

Problem solving, leadership, teamwork

TIME

50 minutes

RESOURCES AND PREPARATION

- pencils
- pens
- coloured markers
- rulers
- paper (plain, lined, squared)
- design worksheets (enough for one per group)
- optional: computers with internet access for student research and examples of recyclable materials

DELIVERY

1. Start by bringing up the problem of how much waste we produce in a single home. Ask students to think of the different things that they can recycle at home and list these on the board. Make sure they consider different types of plastic rather than just plastic in general. This could be a good chance to discuss the numbered symbols on plastic containers and examine which types are recycled in your local area.
2. Discuss WHY these things need to be recycled. Make a top 3 or 5 of the things that the class feels should be prioritised to be recycled.
3. Ask if everyone has separate recycling bins at home for each of those things. Then ask if anyone ever puts recyclable rubbish in a general rubbish bin anyway. Can they explain why/why not?
4. Explain that in this activity, they will work in groups to plan and design an app that would incentivise people to become more aware of their recycling habits.
5. Assist students as they work through the student guide.
6. Ask students:
   - would your app have a positive effect on waste and recycling
   - how would you measure this effect
   - who is the best recycler in your class? How could you test out your app idea with them to find out who earned the most points in one week

TIPS

- bring in examples of waste recycling bottles and cardboard boxes
- have students think about any games they have played that use points as rewards
- research other apps to see how features similar to their ideas work
- think about user-journey - how will the user navigate through the screens. E.g. should there be back buttons on the screens or do they swipe from left to right
- keep it small-scale at first. Students might want to start out by letting people in one classroom compare scores for recycling only. Let them draw out what this would look like before they consider the complexity of an app that can be used by thousands or people
- the student guides contains three worksheets for the students to work out their app designs. It may be a good idea to prepare extra sheets for students who need to redo their work or want to add more screens

DIFFERENTIATION IDEAS

Support: students could focus on one type of recycling (e.g. plastic, batteries, or clothes) and create one information screen describing why this material need to be recycled and what will happen if it isn't. They could then design two rough drafts for screens that show how the user would be able to use their recycling app.

Challenge: students could design three or more, detailed screens that show how the user would be able to use their recycling app.

EXTENSION IDEAS

1. Let two or more groups that focused on different recycling materials to collaborate after the initial session to produce one large plan that incorporates the initial ideas of the separate groups.
2. Let students investigate how and if they can put their ideas into a more practical use.
   - can they apply their ideas (offline) to the class? For one week, students would need to log their recycling manually. The next session, scoreboards are drawn up on the board. This would happen without the use of an actual app, but it shows the picture of how this idea could work out
   - what would they need to do to actually turn their ideas into an app? (Check MIT App Inventor in the Useful links below)

USEFUL LINKS

- Excess Logic: Top 5 - Solutions to recycling
  http://excesslogic.com/electronics/top-5-solutions-to-recycling-problems/
- Studio: Paper prototyping: The 10-minute practical guide, with tips on how to design apps or web pages on paper
  www.uxpin.com/studio/blog/paper-prototyping-the-practical-beginners-guide/
- MIT App Inventor – Anyone can build apps that impact the world
  http://appinventor.mit.edu/explore/

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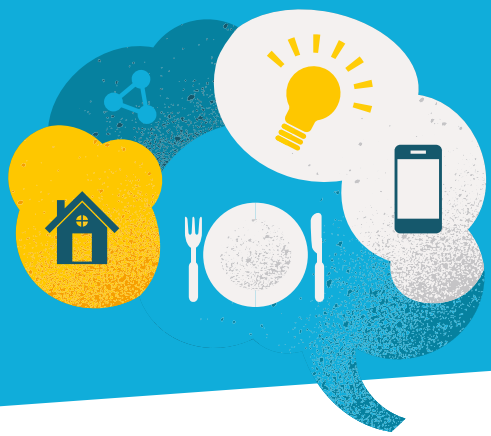

Your challenge

Recycling has become an accepted part of our daily lives. But some people still don't recycle, or when they do, they do it wrong. This can be because people don't know the right way to recycle, or because they can't be bothered. But what if you could turn recycling into a game? Could this make the difference?

YOUR TASK **Plan and design an app that allows households to score points by logging and sharing their recycling.**

WHAT YOU NEED TO DO

1. In your group, decide what recyclable material you will focus on for this activity. You may want to do some research to find out what is currently recyclable in your area, and be able to describe how and why this material should be recycled.
2. Create your information screen for the users that will download your app. In order to get people to recycle, it is important for them to know exactly why recycling that particular material is necessary. Use scientific information if you can find it and try to motivate your users. Sketch and scribble your ideas onto some paper, and work out your neat, final design on one of the design worksheets.
3. Next, decide on a system to turn recycling into a game: points need to be earned every time someone recycles. Decide how your point system works, and what this should look like. You have a lot of creative freedom, but here is some advice to help you:
   - Include one screen with a list of all the items that fall within your recycling category. The user can click on the object they recycled and indicate how many items they threw in the appropriate recycling bin (for example, 6 plastic drinks bottles - scoring lots of points in one go). Each item might have different points allocated to it. Show the amount of points each item is worth in the item list.
   - Include one screen that shows what the scoreboard could look like.
   - Include one screen where the user can see what they have recycled that day (or week, or month, or year!)
   - Include a screen where the user can save important information on a calendar. This would allow the user to make a note of when the recycling will be picked up next, so they won't forget to put the proper bins out on time.
   - Use drawings and pictures a lot! This saves the amount of text the user would see on the screen.
4. Once you have completed your mind map on all of the screens you wish to include, draw it out neatly on the worksheets attached.

FUN FACTS

1. 70% of waste is recyclable, but only 5-30% of waste actually gets recycled, (depending on location).
2. The average person generates over 2kg of trash every day and about 1.5 tonnes of solid waste per year.
3. A glass jar or bottle can travel from a recycling bin to a store shelf in as few as 30 days.
4. Graphene is the world's first 2D material (it's a lattice that's only 1 atom thick!), and was discovered by the University of Manchester, it is so interesting because it is 200 times stronger than steel, thinner than anything else, and it's the world's most conductive material. The applications of this materials are vast and could be developed to create "smart" food packaging products to cut down on waste food, or keep food fresher for longer, tablets that you could roll up like a newspaper!

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DESIGN WORKSHEET 1

Screen title:

Notes

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DESIGN WORKSHEET 2

Screen title:

Notes

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DESIGN WORKSHEET 3

Screen title:

Notes