

# **Earth Hacks Prompts**

**These prompts will inspire your choice of project and solution:**

**Note that each prompt has mentors who can advise and guide you in that subject area.**

1. Stormwater Management: Infrastructure is aging across the nation, and stormwater infrastructure is no exception. Subpar systems can lead to issues with runoff, flooding, and wastewater. What strategies and technologies might be used in the USA to identify and improve poor stormwater management? What existing elements of it can be improved, and how? Are there parts that need a complete overhaul? If so, what would you replace them with while being cost-effective and eco-friendly?

Suggestions:

- i. Take advantage of the GIS database. Use it as a reference for your plan, or a platform for building your new infrastructure. There are maps displaying streamflow, irrigation, nitrogen content, precipitation, huc units and more.
  - ii. Consult the mentors! Specifically Molly Mitchell and Raha Hakimdvar! They are experts in their fields and constantly exposed to cool new projects and innovations.
2. Water Quality and Safety: Water contamination can be hard to track, and even harder to control. Propose a plan or series of plans to monitor water quality (nutrient contamination, pH, microbial presence, etc) and prevent these things from exceeding or dropping below recommended thresholds and becoming hazardous to human/environmental health. Think about nature-based solutions and green infrastructure. Can you involve the community? What sort of contributions could businesses and the government make?

NOTE: this applies to both drinking water and ecologic health. You may focus on either (or both). Remember, these prompts are not specific to any one discipline, and water quality encompasses a lot of properties. Think chemical, biological, relative safety and accessibility to humans and communities, etc!

- i. Jeff Shields and Molly Mitchell are resources!
3. Floods and Communities: Warmer global temperatures are leading to higher sea levels, more extreme weather phenomena, and more erratic water circulation patterns. These

factors coupled with increasing development and aging stormwater infrastructure are causing flooding and the related damage to be increasingly problematic to communities, especially disadvantaged ones.

Pick one city/county/municipality and design a plan for how they can mitigate and prevent flood damage (short, medium, or long term time scale). This can include legislation, community programs, new infrastructure (geo-engineering) - anything else you can think of, but keep in mind that each element must be backed up financially.

NOTE: Raha Hakimdavar can give wonderful insight into monitoring technologies. And Molly Mitchell has extensive experience in flood forecasting/control in Norfolk, VA. Use the tools available from Norfolk for inspiration and guidance. Don't reinvent the wheel.

4. Policy is a key piece of fighting the plastic crisis. What local, regional, and international policies can be put in place to solve the crisis and hold accountable those responsible, while keeping the most marginalized communities involved in mind?
  - a. Look to Raha Hakimdavar for advice!
5. Since there is already so much plastic in the Ocean, cleanup strategies and technologies must be put in place to handle it. Given the current technologies (sensing, satellites, etc), create a detailed map of one specific target area you would focus cleanup efforts. Consider ocean ecology and include a map of associated watersheds as well as what cleanup measures should be implemented where.
  - a. Jeff Shields can tell you about ocean plastics, and GeoLab is here for GIS support.
6. Make your own! If there's a subject you're passionate about, this is your chance! Water is everywhere and connects all life on earth. Anything water-related is fair game. Be creative and think big while being realistic.
  - a. Jeff Shields for ecological reference, Molly Mitchell for applications, and Raha Hakimdavar for use of technology.

## **Judging**

Submit to the Earth Hacks track to be eligible for judging.

The two highest-scoring teams will win a prize from the Cypher Treasure Chest! One notable mention will receive a prize from Kilwins.

All submissions will be eligible for the Environmental Sustainability Challenge - winners each get their choice of *two* things from the treasure chest!

## Judging Criteria

Below is the judging criteria for projects presented at Earth Hacks partner events. All projects that are submitted under the Earth Hacks category should be judged according to the following breakdown:

Criterion	Problem Definition & Analysis			Solution Design & Innovation				Idea Viability			Implementation of Solution Demonstration		
Criterion Detail	For this criterion, we only focus on the problem challenged, not on the solution created to solve this problem. How precise and relevant is the defined problem? How interesting or difficult to resolve - functionally or technically - is the problem being challenged?			Does the application approach a new problem, or look at an old problem in a new way? Is the solution completely innovative or does it rely on an existing concept/technology? Does the application impact a large number of people very broadly, or impact a smaller number of people very deeply? To what degree does the application actually solve the current problem?				Is the application technically and marketplace viable? Would people use this product? Is this solution only theoretical or does it have a realistic application for commercial purposes? (Not necessarily here and now, but eventually in the future and/or for certain markets).			Does the product function, or is the product immediately actionable? Is the path of implementation clearly discussed at different scales (end user, space in/effect on the market, regulations required or avoided)? what is the potential for long term impact of the team's project?		
Rubric Details	0-10 pts Clear definition of the problem, including constraints and why the problem as defined is important	0-10 pts The relevance of the problem as defined to the prompt the team is responding to	0-5 pts Problem complexity and difficulty to develop solutions (increased difficulty is rewarded)	0-10 pts Evidence of novelty of solution (0 if the solution already exists or is ineffectively differentiated)	0-5 pts Scope of impact	0-5 pts Depth of impact	0-5 pts Effectiveness of solution	0-10 pts Viability and usefulness	0-10 pts Realistic application in problem setting	0-5 pts Commercial Appeal	0-10 pts Preparedness of the team to implement -Or- How well does the prototype work?	0-10 pts Effectiveness of the team's demonstration of the scale of implementation and business model	0-5 pts Long term viability of the concept
Points													
Final Score & Comments	Sum of points above (0-100)												