

The Tech for Global Good

Save the Species Design Challenge



BLACK RHINOS



**The Tech
for Global Good**

Introduction

The Tech for Global Good

The Tech for Global Good is an initiative that will create the next generation of innovators ready to tackle the toughest challenges facing our planet.

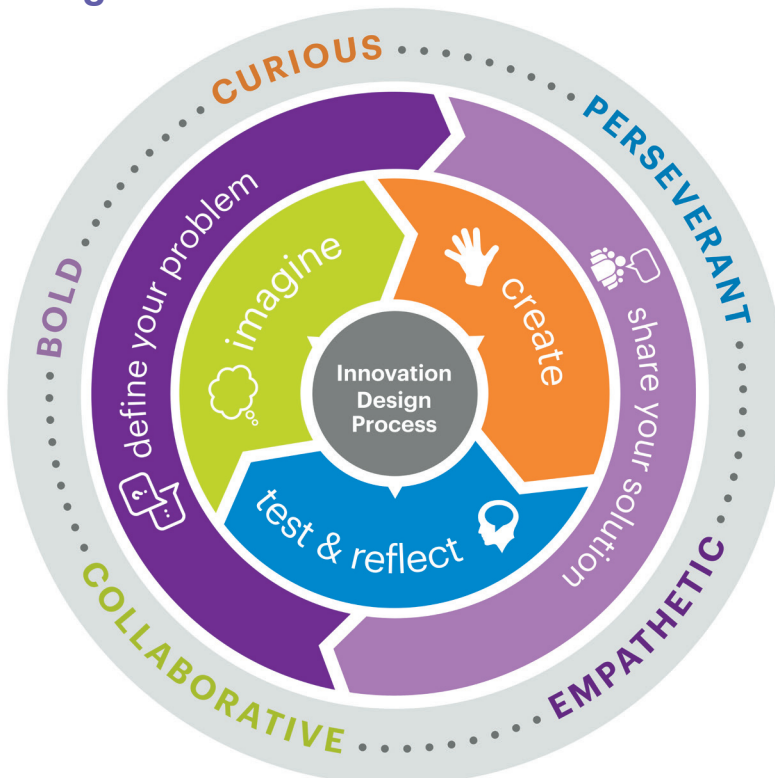
Smart Parks

Smart Parks combines conservation with innovation and technology to protect some of the world's most threatened animal populations.

Wild Me

Wild Me uses machine learning and artificial intelligence to track animal populations in the fight against species extinction.






Innovation Design Process



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Design Challenge Scenario

You and your team run an animal conservation foundation that develops innovative technology and policy plans to help save endangered and threatened animals. Four communities around the world have reached out to you for help. Your team will use your skills as communicators, researchers, collaborators and creative problem-solvers to assist one of these communities in developing plans to help create more sustainable environments for animals and humans.

-  **1. Research the problem:**
 - Understand the design challenge.
 - Read the background material.
-  **2. Brainstorm:**
 - Write each idea (in text, an image, or both) on a sticky note and put it on the board.
 - Be creative! Think of as many wild ideas as possible.
 - Develop questions and search out answers.
-  **3. Create a solution:**
 - Each member shares their sticky notes and posts them on the board.
 - Pick someone to group similar ideas.
 - Label the categories.
 - Work together to add more ideas.
 - Each team member ranks their favorite ideas (1-5).
 - As a team, choose a solution to focus on.
-  **4. Refine your solution:**
 - Get feedback from peers on your solution.
 - Edit your solution and improve how it addresses the problems your team is focusing on.
-  **5. Design a project and presentation:**
 - Get feedback on your solution from others.
 - Please show:
 - The specific problem your team is going to address.
 - Your team's solution for this problem.
 - A story of how someone is impacted by your work.

Designing a solution for the black rhino in the Moremi National Park and Game Reserve (Botswana)

Problem

You and your team run an animal conservation foundation. Community members who work with rhinos have asked your team to develop plans for helping to conserve this animal population.



Share with your team a couple things you already know about rhinos.

Your team is working directly with the Moremi (*More-em-e*) National Park and Game Reserve to innovate in black rhino conservation. As a company, your team has the ability to create policy and new technologies to help maintain and protect rhino populations in Botswana (*Bots-wan-uh*).

On the following pages, you will receive more information about the challenges of protecting critically endangered rhinoceroses. Think about these different issues to help inspire your solution. It is fine to design solutions that require collaboration with other organizations and governments, or that create new technologies or innovate with existing ones.

What will you do to create a change in Botswana that will ripple out into the world?

Background Information

Savannas are large grassy areas with few or sparsely placed trees. Botswana is primarily a desert (70%) with some savannas, and forests. Botswana is currently experiencing changes due to climate change, these changes include:

- Higher temperatures
- Longer droughts
- Changes in rainfall
- Decrease in water overall

All of these changes are leading to a decrease in savannas and an increase in desert regions. There is another pressure on the savannas: humans. Savannas are where most people farm or graze cattle. If the land isn't managed very carefully, farming and grazing can further damage the savannas.

Black Rhinos

Black rhinos are 1,700- to 3,000-pound mammals that live in savannas, and largely eat brush and other plants. Black rhinos are identified by their two horns and prehensile upper lip that helps them grab and chew on leaves and branches.

Rhinoceroses (*rahy-nos-er-us-es*) are crucial to protecting the savanna ecosystem. They prevent the overgrowth of scrub plants and small trees, plow the ground through digging, and they have a symbiotic relationship with some species of birds.

There are four subspecies of black rhinos that combined number only 5,000 in the world today. Compare that with the 65,000 black rhinos that lived in the wild in 1970. Black rhinoceroses are now considered critically endangered because of this 96% decrease in population over the last 40 years.



There are a number of challenges preventing black rhino numbers from rebounding, including:

- Predation: this happens infrequently, though sometimes baby rhinos are eaten by hyenas and lions.
- Slow reproduction rate: rhinoceros females will only breed every 2.5 to 3 years while they carry and then raise their young.
- Delicate system: many programs for breeding these rhinoceros in captivity have failed because their health is delicately balanced with their surroundings.
- Poaching: the most significant cause of the decline in black rhinos is from poaching. Poachers kill rhinos to take their horns. Currently, rhino horns on the black market fetch \$60,000 per kilogram.

Moremi Game Reserve

Located on the eastern side of the Okavango (*Oak-a-van-go*) Delta is the world's largest inland delta. This 1,900 square mile park was created in 1963 by the Batawana (*Bat-a-wan-a*) people of Ngamiland (*Game-a-land*). In 1970, the government took over the park and operations, negotiating with outside tourist groups, reintroducing animals with conservationist groups, and protecting the animals with the military. However, the Batawana people continue to manage the park and land rights. Through the efforts of all of these groups, Moremi Game Park preserves the beauty of the savanna and

brings about \$6 million in tourism profits to Botswana a year. Currently, the park is home to a wide variety of birds and mammals, including elephants, white rhinos, black rhinos, giraffe, lions, leopards, hyenas and hippos.

Botswana currently has the lowest poaching numbers of any country in Africa as they use their military to protect natural resources from poachers. It has become a place where conservationists work to breed and protect animals. This helps with the tourist industry, as people travel from all over the world to see the pristine savanna and the world's largest inland delta. However, the significant decline in the rhino population overall has raised concern over protection for the animals of Moremi Game Park.



Perspectives on the Issue



Villager in Khwai (Qu-why)

I am one of the villagers in Khwai, and my people have lived on the

Okavango Delta for as long as anyone can remember. When the Batawana people made the Moreme Game Reserve, they pushed indigenous groups like us off of the land and into villages. Over the last 40 years, we have learned to farm and herd cattle. Now there are more changes in the park and more area has been taken to house tourists. Our tribe lost parts of our way of life and fears losing more as the land is taken away from us again. Do the few tourism jobs justify the loss of our way of life and our land? What does the future hold for us, our traditions, and our children?

Technology

- Provide boats and jeeps for taking tourists to see animals.
- Demonstrate cultural practices of the people in the region that allow them live sustainably in the Okavango Delta.

Organizations

- In 2000, the Botswana government brought Community-Based Natural Resource Management (CBNRM) to Khwai to help villagers get jobs in natural resource management and tourism.
- Khwai Development Trust runs a campsite and a few local tours that earn money for the village.

Opinions

- It is seen as important to make sure the country and companies make money so they can protect the parks, but it is also important to have local involvement because the people there know the area and value the land more than anyone else.

International Approaches

- Many countries are seeking to unite indigenous people with land management jobs because they know the land and share the objective of land protection and conservation (ex., Maori Reserved Land in New Zealand).



Biologist and Geneticist

With fewer animals in their native habitats, animal scientists need to come

up with new ways to help protect animals. Rhinos are a special case as there are so few left and they are very difficult to maintain in zoos since they are so well adapted to their specific habitats. What can we do to help preserve this species?

Technology

- **Rhino DNA Index System (RhODIS®)** to help plan and breed rhinoceros to maintain genetic diversity.

Organizations

- **Rhino Conservation Botswana** is working to support rhino conservation in the Okavango Delta.

Opinions

- There are other species that are more important to protect. The rhino is very difficult to save due to the small herd numbers and sensitivity to environmental changes.

International Approaches

- Pembient makes 3D printed rhino horns to combat the need for “real” rhino horn. However, some are concerned that it is difficult to tell the difference between real and manufactured horns, and that demand for the product will be encouraged.
- Captive rhino breeding programs have been tried, but largely unsuccessful.



Soldier in the Botswana Defense Force (BDF)

I joined the BDF to serve my country.

They say our primary money maker of diamond mining is dying down and tourism is more and more important. Also, we hear that the poachers are running out of places to go and soon will come to Botswana to take the few savanna animals left. I have to protect my country and people by doing my best to keep our environment safe from those who want to steal from us. What can I do to best serve the BDF?

Technology

- Tracking skills to monitor rhinoceros from a distance and spot potential poachers.
- Weapons to protect the animals and their guards from poachers.

Organizations

- **Rhino Conservation Botswana** works with people from all over Botswana to protect the animals on the savanna.

Opinions

- Rhinos are considered one of the “Big Five” and are a huge boost in safari tourism.
- BDF has too much force to protect rhinos. They often shoot to kill and have killed fishermen and poachers indiscriminately.
- The BDF has changed their training procedures to arrest and detain possible poachers, but are also tasked with guarding the rhino with an armed patrol.

International Approaches

- DNA testing of horns taken from poachers can help authorities identify where a rhinoceros was poached from.
- Some agencies have cut the horns off of rhinos to discourage poaching. This does not seem to deter poachers and limits the rhinos’ natural defense.



From Your Reading

Below are some questions to help you process what you read

- What are some problems that affect rhino populations?

- What questions do you have based on your reading?



Brainstorm Notes

Problem

- Why is this a problem?
- What region(s) are we going to focus on?
- What other problems does it remind you of?
- Often larger problems need to be broken down into smaller pieces. What part(s) of this problem does your team want to address?



Solution

- How could you combine these ideas to create a new solution?
- What ideas do you have that are nothing like what you have researched? (Wild ideas are welcome!)
- Who will help your team solve this problem? Which organizations, governments, etc.?
- How do these ideas help solve the problem?
- What is needed to implement or enforce your solution?

Impact

Pick one of the following identities:

- Tourist
- President of Botswana
- High school student

Based on one of the above identities, think about how they will be impacted by your team's solution to this problem.

- How will this person's life change because of your solution?
- What would they think or say about your solution?
- How will this change impact someone with a similar identity that lives 2,000 miles away?



Listen and Help

| | Team Presenting | Audience |
|-------|---|----------------------------------|
| 3 min | Present their design solution. | Silently listen. Take notes. |
| 3 min | Respond to clarifying questions. | Ask clarifying questions. |
| 2 min | Silently listen. Take notes. | Provide feedback. |

Listen and Help Notes

| Feedback <i>from</i> the other team | Notes <i>for</i> the other team |
|-------------------------------------|---------------------------------|
| | |

Design a Project and Presentation!

Your conservation team will need to create a presentation to share your plan with the community, including:

- The problem your team has identified and addressed.
- Your team’s solution for this problem.
- Story of how your solution will impact one person in the community (ex., tourist, President of Botswana, high school student).

Remember your project can include any tools that are useful. Like a ...



Business plan



Advertising campaign



Demo of potential device



Slideshow



Infographic

Notes



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