

MSUS Culminating Experience



SUSTY GAMES

Whitney Love
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ASU Tempe

Abstract

As an AASHE Gold university, ASU engages its students, with varying success in adopting sustainable behaviors. The Susty Games pilot project was developed to make the adoption process both interesting and engaging for students. The project goal was to increase sustainable behaviors in ASU students' daily lifestyles by demystifying and familiarizing them with such behaviors. Familiarization occurred by getting students out and into their communities practicing eight specific behaviors that reflect ASU's Sustainability Operations focus areas: climate neutrality, zero waste, active engagement, and principled practice. The project subject was ASU students because human, incentive, and support resources are readily available and attainable to students. The main system complexities were marketing to potential participants and engaging game players throughout the duration of the game. Indicators of success were the number of new behaviors introduced to each participant by the game, and number of behaviors participants will repeat after the game.

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Introduction

Arizona faces several sustainability challenges regarding life in a desert with limited resources. Despite the challenges, Arizona residents exhibit behaviors that suggest that they are disconnected from the problems. There are several sustainable behaviors that Arizona residents could engage in, to be more sustainable and in touch with the surrounding environment, resources, and community.

Susty Games was developed to create an interactive way to engage people in new and different behaviors. This project created a game to get Tempe residents to take public transportation, compost, call their local representative, visit a local business, hike Tempe Butte ("A" Mountain), take a shower in under 5 minutes, explore local volunteer opportunities, and make a friend and exchange personal definitions of sustainability.

The project was completed for Arizona State University students on the Tempe campus. Intervention points include procedural knowledge of sustainable vs. unsustainable behaviors, unsustainable social norms, and personal and public resources. Goals included a 10% increase in new behaviors, continued sustainable behaviors, and increased understanding of sustainability and sustainable behaviors. The main desired outcome is to learn how to get people who are not interested in sustainability as a field to practice sustainable behaviors in their daily lives.

Context

Arizonians currently practice behaviors that are not ideal regarding a sustainable lifestyle. Many Arizonians drive a personal vehicle daily, shop at corporate chain stores, dispose copious amounts of waste to landfills, use unrealistic amounts of natural resources, and feel disconnected from their local politics, environment and community. Preferably, they would use alternative transportation daily, shop local, dispose of waste responsibly, preserve natural resources, participate in local politics, give back to their communities, and get in touch with the environment. Preferably, these behaviors would be social norms. They'd be behaviors that everyone knows how to do. They would not be "extra" behaviors that only "sustainability people" care about, but rather, everyday behaviors that improve our collective quality of life. Susty Games intended to get Arizonians to become familiar with sustainable behaviors and engrain those behaviors into their daily lives.

Literature Review

Various attempts at changing peoples' behavior using fun, intriguing, game-like models have been made in businesses, schools, cities, and more. According to Bohyun Kim, in *Understanding Gamification* (2015), gamification is defined as "the process of game-thinking and game mechanics to engage users and solve problems." Games can be long term and engrained into the everyday lives of users, or they can be short term single-use means to encouraging one behavior at a time. "In games, players' behavior directly impacts the outcome of the game. Although there may be delayed consequences for one's behavior (e.g., losing a chess game due to a bad move made earlier in the game), consequences for players' behavior are typically more immediate" (Morford et al. 2014).

For example, an app called "Zombies, Run" (2017) turns running into a game where the runner is depicted as the hero in a zombie apocalypse. They run various distances, making their way to checkpoints where supplies are gained in the game. In this gamification app, users already want to run, but the game improves the experience by making it fun. Making the activity fun can increase the likelihood that the user will continue the behavior of running.

Another app called EpicWin (2017) acts as a RPG (role-playing game) where players create a character and list out their real-world to-do lists. Each real-world task is assigned various amounts of points which, upon completing the tasks, contribute to their character's success in the game. "Those points can fall under any of the five categories: strength, stamina, intellect, social, and spirit". Users watch their characters gain skills and advance in levels, which helps them track their real-life progress and feel recognition for it.

Other types of gamification are for extremely short term rewards. For example, "The World's Deepest Bin" by Volkswagen, "was designed to produce sound whenever someone dropped garbage into it, as if something very heavy had been thrown into a tremendously deep valley, thereby encouraging people to use a garbage bin instead of littering". The audible simulation of the trash falling endlessly added an intriguing aspect to using the trash can. Rather than being able to push a button to hear the noise, they had to complete the action desired by the creator of the game (putting garbage in the trash can rather than littering) to hear it again.

Games have also been used to enhance learning in classroom settings. Tara Kingsley (2015) explains in her article that educational terms can be taught in the first steps of a gamification model so that participants can reflect on the terms throughout the game. Tara explains a school gamification model where "students work their way through a game earning badges and

advancing through different levels of the game. As students progressed through the quest levels, they earned awards, or badges. Badges, by design, used vocabulary to reinforce key concepts and build a deep understanding of related terms". The badges students received served as concrete tokens of recognition which could immediately be compared to those of their peers. Those tokens also reiterated the key concepts of the level to encourage additional reflection on what they had learned.

According to Kelli Larson and Erin Frisk's paper on Competencies & Practices for Transformative Action (2011), four knowledge domains should be met to spark transformative action. Those four knowledge domains are declarative, procedural, effectiveness, and social knowledge. Declarative knowledge is when the audience is simply told new information. Procedural knowledge provides the "how to" regarding exactly how people can apply the declarative knowledge. Effectiveness knowledge provides insight on the systematic impact and outcomes of the procedural knowledge. Social knowledge provides awareness of social norms, responsibilities, and expectations of how people act within social systems.

The sustainability problem addressed is that Arizonian behavior norms don't reflect sustainable living. Results from the sign-up survey showed that many participants lacked the capability to name more than 3 sustainable behaviors. The Susty Games scavenger hunt encouraged game-thinking as users deciphered clues and were prompted to "conquer" sustainable behaviors in their community. This project used the gamification approach to educate and create sustainable behavior change.

Like Zombies Run, Susty Games participants got out and participated in real life sustainable behaviors, with the support of the game's storyline of their journey through the universe and "back down to Earth". The storyline and narrative of individual levels was created to be quirky and silly to encourage students to *want* to continue playing.

As seen in Epic Win, Susty Games used the RPG aspect of creating an alternative reality, by referring to users by self-assigned gamer tags and referring to levels as different planets that players had landed on. Furthermore, the alternative reality levels translated to real-world documented behaviors. Also, a weekly scoreboard (using gamer tags) posted on www.SustyGames.com (Appendix 11) created competitive comparison between peers and recognition for outstanding players throughout gameplay.

While hosting Susty Games, I sent out quirky messages and timely level-ups to participants to provide a sense of instant gratification like the "World's Deepest Bin". When participants excelled in the game, I sent out graphic "public brag" emails congratulating them on their game

performance for all to see. To enhance the feeling of instant gratification, I dedicated myself to replying to every single photo submission (via email) with the next level's game card within 12-24 hours.

Similar to Kingsley, the reflection on key terms and concepts helped participants build a deeper understanding of the behaviors they learned. For example, after participants completed level one, by taking public transportation, the next game card provided information about how much they could lower their carbon footprint if they made public transportation part of their daily routine, while maintaining the fun quirky personality of the game.

Reflecting on the four knowledge domains, I provided effectiveness information to back up the procedural knowledge they had taught themselves by completing levels, hoping to prompt a new norm by illustrating its effectiveness in the bigger picture (Larson & Frisk, 2011). For example, in the first level participants taught themselves the procedural knowledge of taking public transportation by literally getting out and doing it, whether they had ever done so before, or not. After that, I emphasized the importance of the action they just did by providing effectiveness knowledge such as, "switching from driving to public transit can reduce your carbon emissions by more than 4,800 pounds per year" (G. Weisbrod, A. Reno, 2014). After that, I worked to create norms around these behaviors by updating the public leaderboard weekly and sending out graphic designed emails to boast the leading players and encourage the players who were lagging.

Methodology

Tools

Tools used for the project include Competencies & Practices for Transformative Action (2011), graphic design software, e-mail automation software, local organizations, google forms, google docs, and local landmarks.

The academic paper was used to identify intervention points with respect to the four knowledge domains. Intervention points determined the eight specific challenges participants would complete. The eight challenges included: taking public transportation, visiting a local business, composting, calling a local representative, taking a 5-minute shower or less, exploring local volunteer opportunities, making a friend and exchanging definitions of sustainability, and hiking Tempe Butte ("A" Mountain).

A graphic design software, Canva, was initially used to create "game cards" for each level of the game (see appendices). Game cards communicated the content of each level in a

concise, clever, playful way. Throughout the game, Canva proved to be the most valuable tool I used. I used Canva to create images for every flyer, email blast, reminder email, instruction and website graphic (See Appendices). An e-mail automation software, Boomerang was used to send timed email blasts to potential and actual game players, individual emails to participants throughout game play, and replies to every photo submission within 12-24 hours. Boomerang allowed to me to schedule mass emails and even send specific replies depending on the date and time emails were or were not received. Local resources such as Valley Metro, Local First Arizona, Recycled City, Sinema.House.gov, VolunteerMatch.org and Tempe Butte provided outlets for participants to complete their respective challenges in the game. These resources also provided information that I integrated in game cards to increase participants' understanding why each sustainable behavior is important. Google Forms were used to host and analyze the sign-up and pre-and-post survey process.

A Google Doc was used to create a document titled "Susty Secrets", that only Community Assistants (CAs) in Tooker House could see (Appendix 9). The Assistant Director of Housing, Bradley Bolin, provided the opportunity for me to present Susty Games to all the Tooker House CA's in a meeting. When I presented to CAs, the plan was to have them register their floor and then get the students on their respective floors to sign up, with Bradley's support. The CAs were then tasked with helping propel the game's momentum among their students, using the "Susty Secrets" document. "Susty Secrets" compiled the "answers" for each level (messages deciphered), tips & hints on how to help students decipher levels and complete the challenges, and helpful links and graphics to help CAs propel gameplay. Regardless of email blasts and Bradley's constant reminders, this plan completely fell through and I ended up hosting each player myself due to lack in CA support which I will later explain in my findings.

Game Overview

The game was space themed because, "We're so out of touch with the Earth; What planet are we even on?" Participants started on level one, which was Pluto. They worked their way back to Earth from Pluto by completing challenges. Each level prompted the participants to do a different sustainable behavior. Again, the eight challenges included: taking public transportation, visiting a local business, composting, calling a local representative, taking a 5-minute shower or less, exploring local volunteer opportunities, making a friend and exchanging definitions of sustainability, and hiking Tempe Butte ("A" Mountain). After participants completed all nine planetary levels they were named "Active Earthlings", and given prizes. Prizes we intended to enable participants to continue sustainable behaviors. Therefore, the

prizes included Rocketbook Everlast reusable notebooks, solar-charged battery packs, tumblers, reusable sporks, reusable grocery bags, and ASU University Sustainability Practices (USP) & Susty Games stickers (to promote sustainability).

Game play procedures:

- A. Participants registered at www.SustyGames.com.
- B. Participants received a cryptic message for Level 1 (Pluto) from sustygames@gmail.com.
- C. Participants deciphered the message to reveal their first challenge.
- D. Participants went into their community to complete their challenge and took photos as evidence of completion.
- E. Participants emailed the photo back to sustygames@gmail.com.
- F. If the evidence was sufficient, I sent participants the next message for Level 2 (Neptune).

Specific actions prompted by level:

- A. Pluto - Taking public transportation
- B. Neptune - Visiting a local business
- C. Uranus – Composting
- D. Saturn - Calling a local representative
- E. Jupiter - Taking a 5-minute shower or less
- F. Mars - Exploring local volunteer opportunities
- G. Mercury - Making a friend and exchanging definitions of sustainability
- H. Venus - Hiking Tempe Butte (“A” Mountain)

Pre-and-Post Survey

The pre-and-post surveys were intended to measure the success of the project. The pre-survey was included in the Google Form that participants completed to sign-up for the game. The pre-survey questions helped me gain an understanding of participants’ attitudes and knowledge of sustainability prior to playing Susty Games. Pre-survey questions included:

- A. What does “Sustainability” mean to you?
- B. How often to you engage with your community? (on a Likert scale)
- C. List as many “Sustainable” behaviors as you can.



- D. Imagine you're standing in the image above, this is your neighborhood and those are your neighbors. How do you feel?
- a. We should all organize a day to clean it up.
 - b. I'll start picking some of it up and see if someone joins me.
 - c. I'll pick up one piece of trash
 - d. Those kids should start cleaning up.
 - e. I don't care.

The same questions were asked again in the post-survey to compare the difference between answers before and after Susty Games. The post-survey also asked questions specific to the project goals. Additional post-survey questions included:

- A. How many of the challenges were new activities that you had never done before?
- B. How many of the activities you did in Susty Games do you think you'll repeat?
- C. How many people did you talk to about Susty Games?
- D. Did you end up volunteering at any events you found on VolunteerMatch.org?
- E. Please provide any feedback, likes/dislikes, suggestions.

Findings

The game's many pivots are reflected by the results. 83 people signed up from unexpected residential demographics. 35 of 81 people who signed up live off-campus, 46 live on-campus. However, only one person who lives on campus participated in the game after sign-up. The other 20 participants all live off-campus.

By the end of the game, 21 people played at least one level, and 8 of those people completed the entire game (winners). During gameplay, the participants completed 106 total actions. Each level prompted participants to practice one action. More specifically, 6 people Susty Games by W. Love

completed only the first 2 levels, 1 person completed only first 3 levels, 4 people completed only first 4 levels, 1 person completed only first 5 levels, 1 person completed only first 7 levels. 8 people completed all levels.

Based on the intervention points, players who completed the game self-reported an average of three new behaviors that they had never done before Susty Games. They also reported an average of five behaviors they were likely to repeat. The likelihood of those five behaviors being repeated is unknown. When asked about the level that prompted them to explore local volunteer opportunities, six of the eight winners reported that they went above and beyond by signing up or doing one of the volunteer opportunities they found. On average the winners talked to about 5-15 other people about Susty Games. Qualitative results from the post-survey indicated that participants “had a fun experience”, “loved the game” and, “would totally play again”.

When asked about their perceptions of sustainability, rather than behaviors, pre-and-post survey results showed overwhelming support for sustainable values before and after the game. For example, responses to the question about picking up trash in their neighborhood (See Pre-and-Post Survey, Question D), revealed that most respondents would either start picking up trash and see if anyone joins in or organize a day for everyone to pick it up together.

The constant of high sustainable values paired with the increase in sustainable behaviors from start to finish supports that the goal to solve the disconnect between the planet and the people living on it, was achieved. Furthermore, this suggests that the participants valued sustainability all along, but perhaps they didn't know how, or where never prompted to apply those values in their daily lives. This speaks to the impact of the game because it shows that it helped participants apply their sustainable values by turning them into sustainable behaviors.

The project approach, with numerous pivots, was validated by the results. The results support my initial goals of introducing 1 new behavior, continued action, and starting conversations about sustainability.

Discussion

The project revealed a major challenge in communicating to students on campus and getting them involved in sustainability initiatives. I was originally convinced that it would be easy to get hundreds of students signed up for my game. I scheduled the close of sign-ups for August 30th, 2017 and the close of the entire game for October 2nd (just before Fall Break), allowing students over 4 weeks to complete the game. When I initially launched the sign-up

process, I worked with the Assistant Director of Housing, Bradley Bolin and Student Engagement Coordinator, Kendon Jung to spread the word and encourage sign-ups. Bradley provided the opportunity for Kendon and I to present Changemaker and Susty Games to all the Tooker House Student Leaders (CAs) during a meeting. We planned for the 30-40 CAs to first register their respective floors, and then get the students on their floors to sign-up. I set up a separate Google Form for CAs to register their floors and a document (Susty Secrets) to provide access to exclusive information to help the students on their floor win. I also offered a pizza party to whichever floor had the most students complete the game. Two weeks after the presentation, only 4 CAs registered their floor, and only 2 students signed up.

After reflecting on the outcomes, I pushed my sign-up end date to September 10th, 2017 and I organized a tabling event during one of Tooker House's Welcoming events. While tabling, I got 60 students signed-up but wasn't satisfied with the quantity or quality of those sign-ups. After that, I sent numerous email blasts to the School of Sustainability (SOS) Graduates, Barrett Honors College, and Tooker House. I also posted open sign-up invites on Susty Games social media outlets (Facebook, Instagram, and Twitter), which were then shared by USP and various other users.

Right when sign-up momentum started to pick up, Hurricane Irma hit Miami. This wasn't originally perceived to be a threat to my project. However, my website, and sign-up link were hosted by Wix.com. Wix.com is based in Miami. When the Hurricane hit, my website went down. When I called customer support I was informed by an automated message that they had evacuated the building and did not know when or if anyone would return. Again, I pivoted, by reposting a new web link on social media and correcting all my email blasts.

By September 10th, 2017 I finally launched the game with 83 residentially diverse participants signed up including Tooker House residents, Barrett Honors college residents, ASU off-campus undergraduates, Mesa Community College (MCC) off-campus undergraduates, SOS graduate students, SOS faculty, SOS alumni, and non-student Tempe residents.

To launch the game, I sent the level one game card out to all 83 participants. The first game card included instructions, my web link, and the first cryptic message & challenge (See Appendix 7). I was really excited to finally present my product to my first pilot group. I felt confident that they'd engage immediately, without being pushed or reminded. I also thought they'd have plenty of time to complete all nine levels in the four weeks I had planned.

Two weeks later, only 5 out of 83 people completed the first level. The first 3 players to engage ended up completing the entire game within 10 days. The other two were stuck after level one... The other 78 had not participated at all. I sent numerous emails to all 83

participants congratulating the 5 players who excelled in the game and reminding everyone about weekly leaderboard updates on www.SustyGames.com (See Appendix 8).

Public boasting of the top players was intended to encourage other students to follow suit. I posted numerous updates on Twitter, Facebook, and Instagram social media accounts as well. In the third week, 5 more players started playing. I continued to send personalized emails regarding tips and hints to get to the next level, reminders on how much time was left to complete the game, specific prize information and weekly leaderboard updates.

I noticed participants were getting stuck on level two, which was originally to hike Tempe Butte (“A” Mountain). I also noticed that my last level was abnormally easy for being the final level in a game (to visit a local business). So, I swapped the second and last levels to reflect a better order of difficulty throughout gameplay. After the swap, players started advancing in levels.

By September 30th, after countless email nags and virtual nudges, 21 people completed at least one level and eight people completed the entire game. I ended up with about 25% participants’ engagement after sign-up, but this was not easy. I learned that frequent naggy emails actually do increase engagement, and getting people to follow through after signing up is very difficult. I was surprised to learn about this engagement issue because prior to the project I believed this would be the easiest part.

Despite my struggles, the project revealed a huge strength in communicating to off-campus students and alumni. The project also revealed a correlation between engagement and bottom-up encouragement. This correlation suggests that projects like Susty Games might be more attainable, approachable, and/or enticing for individuals who don’t live on campus. It is apparent that the groups who received the most top-down approach to encouraging sign-ups were the ones who participated the least. Meanwhile, those who received the most grassroots approach to signing up were the ones who engaged the most. Susty Games was intended to get Arizonians engaged in sustainable behaviors in a fun and intriguing way. The correlations between engagement and top-down vs bottom-up approach suggests that the top-down approach removes the fun and intriguing aspect of the game, whereas the bottom-up or word-of-mouth approach reinforces the same aspect.

I am confident that I reached the target demographic audience for the sustainability problem. However, I did not reach the target demographic for the original game plan (ASU on-campus students). This highlighted the disconnect between the target demographic for the game vs. the target demographic needed to solve the sustainability problem. The fact that I ended up reaching the target demographic audience needed to solve the sustainability problem (Arizonians) strengthened the project because I was able to see how various types of Arizonians

interact with this type of game. As I mentioned, off-campus Arizonians engaged the most, whereas on-campus residents engaged the least.

Perhaps on-campus residents are subjected to such a saturated environment packed with activities, clubs, and social interaction, they were less likely to engage. Whereas off-campus students have less ASU activities available to them, perhaps this is why they were more willing to interact with a sustainability initiative presented to them. Furthermore, the grassroots approach experienced by non-student Tempe residents and MCC made the game seem like more of an exclusive experience that they were “allowed” to take advantage of rather than on-campus students being nearly forced into signing up. Other possible explanations for why off-campus living was a predictor of good participation include: off-campus students are already “out in the community” where the challenges take place, and off-campus students have their unique lifestyles which are flexible to the changes prompted by Susty Games whereas on-campus students are subjected to a more rigid “campus lifestyle”.

Conclusions

The project addressed the sustainability challenge presented. The game exceeded the goals set at the beginning of the project. Next time I pilot the game I will focus more on making sure the levels get more difficult as the game goes on, hosting participants myself, and being extremely proactive in sending nags and reminders via email.

The main takeaways that I would want to pass on to future students doing projects like this include perseverance, audience, incentives, and a grassroots approach. First, your project will face failure... but it's important to be intellectually agile, and to pivot your project in a direction that works, regardless of your initial plans. You might be able to avoid some of the failure that I faced by seriously tailoring your game to the needs and desires of your audience. I'd even suggest surveying potential participants before you even craft your game. Once you know your audience you can tailor the incentives based on their real-life desires, rather than what you *think* they desire. Finally, I'd suggest giving tons of time to let the game spread by word of mouth, rather than forced marketing and rushed sign ups. My game showed that natural, grassroots sign-ups yielded higher quality participants and higher/faster-paced engagement. The two most important parts of this type of project are the game design and sign-up. The sign-ups will dictate the entire flow of gameplay. Without quality sign-ups you can't even rely on anyone playing at all. Furthermore, the game should cater to its (hopefully high quality) audience and be captivating enough to keep them interested throughout the entire game.

I also learned that games of this type are very tedious and require a lot of human attention. I'm currently developing a software to host the game at scale. The software consists of a text bot that will host the game on individual users' cell phones via SMS message. The bot will be called Susty Bot and will require little to no human oversight, so that hundreds of people could potentially play with hundreds of different start and end dates. Once the software is complete, next steps include making the game available for large audiences. The first audience I am considering is ASU staff who completed University Sustainability Practice's (USP) Seeds of Sustainability course on www.asu.edu.

Future Directions

After I have developed the Susty Bot, I will work with University Sustainability Practices to make it available to ASU staff, faculty, and students who have completed USP's Seeds of Sustainability training.

It would be interesting to use this game to develop ways to reach the more difficult communities who do not identify as "sustainability people". Future students could build off my project by creating pre-requisite games more specific to the types of people who aren't considered "sustainability people". For example, it would be an interesting project to create a series of very low level (Level One) sustainability games geared toward people who are particularly interested in areas like athletics, arts, wellness, entertainment, food, nature, computers etc. The level one games would revolve mostly around the person's specific interest, but also introduce light sustainable behaviors. After participants win the initial game geared toward their interests, they could gradually complete more games that get them all closer and closer to a cohesive "last game" where they become champions of sustainability.

Appendices and Acknowledgements

Appendix 1 Pre-Survey Demographics

Campus Resident Sign-Ups by Housing Complex					
Tooker	Vista Del Sol	Barrett	Manzi	Hassy	Total
24	4	14	2	1	45

Off Campus Sign-Ups by Affiliation			
Off Campus ASU Student	MCC Student	Non-Student Tempe Resident	Total
29	7	2	38

Appendix 2 Participation by Demographic

Completed The Entire Game			
Off Campus ASU Student	MCC	Barrett	Total
6	1	1	8

Completed At Least One Level But Didn't Complete The Game				
Off Campus ASU Student	MCC	Barrett	Tooker	Total
11	1	1	1	14

Signed Up But Didn't Participate						
Off Campus ASU Student	MCC	Barrett	Tooker	Other ASU Campus Residents	Non-Student Tempe Resident	Total
12	5	12	23	7	2	51

Appendix 3 Pre-and-post Survey Result Tables

Comparison of Pre-and-Post Test Definition of Sustainability for Players Who Completed The Entire Game		
Player	Pre-Test Personal Definition of Sustainability	Post-Test Definition of Sustainability
1	Using resources efficiently while also making sure that people and the planet are taken care of.	To me, sustainability means having the ability of all living organisms in this generation and all future generations to be able to meet their needs in a way that not only provides survival but also a good quality of life

2	Sustainability is creating a societal system that can provide future generations with the resources, structure, and flexibility to live.	Creating systems that will leave future generations with the resources that they need.
3	Meeting the needs of the present without jeopardizing the needs of the future in terms of society, the environment, and economics-- finding a balance between the three that can be continued indefinitely into the future.	All people living well for today without compromising all future generations from living well
4	Keeping all ecosystems in balance and thriving for the longest amount of time possible	acting in a way that is show consciousness of what you consume/your environment
5	The ability to use resources in such a way that prevents depletion and other negative side effects of poor planning or inefficiency.	Sustainability is a term describing efforts to maintain a clean, efficient, earth environment.
6	To me, sustainability means living in a way that is mindful of the environment, planet, and future.	To me, sustainability means living in a way that is mindful of the environment, planet, and future.
7	The ability to maintain or support an activity or process over the long term.	Sustainability to me is preserving our planet so that generations after ours of all species are able to enjoy and appreciate it as the generations before ours have.

Comparison of Pre-and-Post Test Answers for "Name As Many Sustainable Behaviors As You Can" for Players Who Completed The Entire Game	
Pre-Test Name As Many Sustainable Behaviors As You Can	Post-Test Name As Many Sustainable Behaviors As You Can

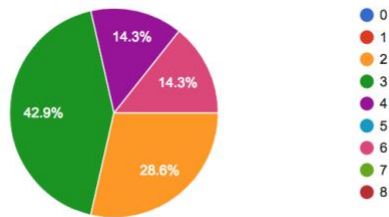
<p>Recycling, composting, eating less meat, carpooling/public transport, using less resources when possible</p>	<p>using public transportation, recycling, composting, reducing usage of non-renewable resources, re-using things as much as possible, making earth friendly food choices</p>
<p>Riding bike, participating in my democracy, eating local, being vegetarian, lowering my carbon footprint, lowering the world's carbon footprint, ensuring justice for all members of society.</p>	<p>Calling your senator, taking public transportation, using reusable materials such as a spork, bag, cup, etc., volunteering your time in the community, riding your book, lessening your GHG impact, purchasing goods that have a low GHG impact, and talking to people about sustainability.</p>
	<p>Buy local, buy organic, rainwater collection, calling legislature, participating in local government, shorter showers, water reuse for outdoor watering, volunteering in local community, taking public transit, biking, connecting with nature, reducing waste, composting, installing solar panels, turning off lights when not in use, electric cars, carpooling, getting to know your neighbors, supporting the local economy, green buildings, etc.</p>
<p>Timing showers, using public transportation, recycling, buying fresh food, carpooling, not buying things wrapped in plastic, reusing all containers, etc.</p>	<p>recycling, composting, using public transportation, carpooling, eating vegetarian, not overeating, not using straws, educating others, etc</p>
<p>Picking up trash, turning off lights, use rechargeable batteries, etc.</p>	<p>carpooling, public transportation, walking, biking, longboarding, supporting local businesses, etc.</p>
<p>Recycling, Upcycling, Carpooling/alternative</p>	

transportation, Using reusable cups/bags/etc., Composting, Using water conservatively	
Some "sustainable" behaviors include picking up trash, being socially mindful, being environmentally mindful, being an advocate for the mindset, etc.	Taking public transportation, being active, composting, sharing your opinions and using your voice, volunteering, conserving things such as water, and giving back to the local community.

Appendix 5 Post-Test Survey Response Pie Charts

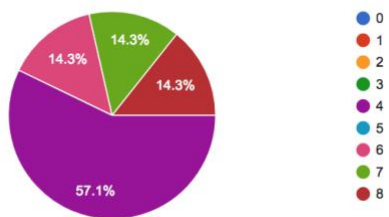
How many of the challenges were new activities that you had never done before?

7 responses



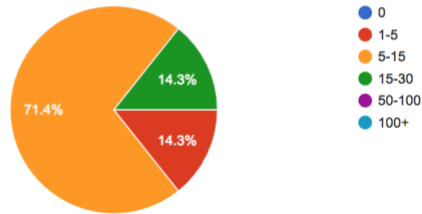
How many of the activities you did in Susty Games do you think you'll repeat?

7 responses



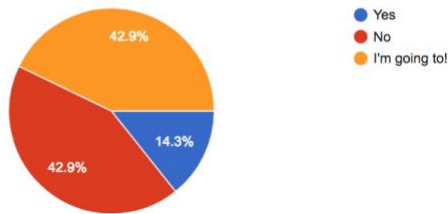
How many people did you talk to about Susty Games?

7 responses



Did you end up volunteering at any events you found on VolunteerMatch.org?

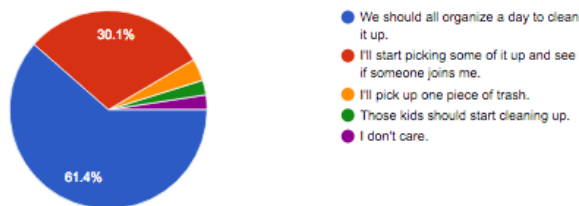
7 responses



Appendix 6 Pre-vs-Post Survey Neighborhood Answers

Imagine you're standing in the image above, this is your neighborhood, and those are your neighbors. How do you feel?

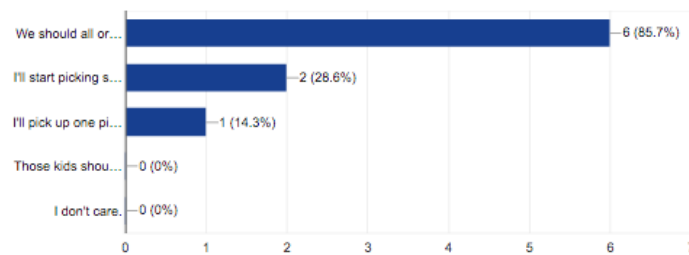
83 responses



Pre-Survey:

Imagine you're standing in the image above, this is your neighborhood, and those are your neighbors. How do you feel?

7 responses



Post-Survey:

Susty Games by W. Love

Appendix 7 Full Game Deck

**CONGRATULATIONS EARTHLING!
YOU'VE JOINED
SUSTY GAMES
...ITS FREEZING OUT HERE**

UHHH WDAH, IT LOOKS LIKE THEY'VE LOCATED US... AND NOW THAT WE KNOW WE'RE ON pLuTO, WE CAN GET HELP... bUT WE'RE A LONG WAY AWAY FROM THE EARTH. IT'S GETTING cOLD OUT tHERE and EVERYONE is GETTING pRETTY WoRrIED ABOUT US. all YOU NEED TO DO TO TRANSPORT US TO NEPTUNE IS DECIPHER T H I S MESSAGE & CoMPLETE THE CHALLENGE BEFORE WE FREEZE TO DEATH... I NEVER THOUGHT I'D MISS THE DESERT SUMMERS!

1. DECIPHER YOUR MESSAGE ***
2. COMPLETE THE CHALLENGE
3. COLLECT AND PRESENT PHOTO & PHYSICAL EVIDENCE TO SUSTYGAMES@GMAIL.COM
4. RECEIVE YOUR NEXT MESSAGE!

WE MADE IT TO NEPTUNE!

We're one step closer... but still technically 2.7 billion miles away. To put it into perspective, the average Earthling drives 13,476 miles per year... Did you know that switching from driving to public transit can reduce your carbon emissions by more than 4,800 pounds per year?! That's #Susty.

ANYWAY, WE GOTTA GET TO URANUS. ASAP!

Supporting locally owned businesses increases the likelihood that our money will flow right back into our local homes. Select a local business you might like and pay them a visit!

WWW.LOCALFIRSTAZ.COM

Click Find > Find local businesses > Enter "Tempe" > Search

This challenge does NOT require any purchases.

1. DECIPHER YOUR MESSAGE ***
2. COMPLETE THE CHALLENGE
3. COLLECT AND PRESENT PHOTO W PHYSICAL EVIDENCE TO SUSTYGAMES@GMAIL.COM
4. RECEIVE YOUR NEXT MESSAGE!

YOU MADE THE TREK TO URANUS!

You hiked almost 2 miles! Regular physical activity can reduce your risk of chronic disease, depression, and obesity; and increase your energy levels, sleep quality, strength, and self-esteem!

To maximize these benefits, it's important to pair exercise with proper nutrition... I hope you've worked up an appetite, because we need to get to Saturn!

TURN YOUR SPOIL INTO SOIL

BEFORE WE cAN GET T O SATURN WE'LL NEED TO GET SO eTHING TO EAT AND THEN DIS oSE OF THE FOOD WASTE RESP nsIBLY. WRIGLEY HALL HAS A LARGE BIN OUT oIDE THE BUILDING FOR oHIS TYPE OF WASTE!

1. DECIPHER YOUR MESSAGE ***
2. COMPLETE THE CHALLENGE
3. COLLECT & PRESENT PHOTO W PHYSICAL EVIDENCE TO SUSTYGAMES@GMAIL.COM
2. RECEIVE YOUR NEXT MESSAGE!

YOU GOT US TO SATURN!


Congrats on composting!
You not only helped make something that keeps plants healthy, you also prevented organic waste from going to a landfill! #Susty

...ALSO WE'RE SO CLOSE TO JUPITER, IF ANYBODY WAS THERE THEY COULD PRACTICALLY HEAR US.

602

You're almost half way through all 9 levels and it's time for your voice to be heard! Think of the social, economic, or environmental issues that you're most passionate about... Then Grab your phone and call AZ Rep Kyrsten Sinema (D) 2 voice yourself in the form of educating, urging, thanking, or commenting. Remember 2 be respectful & head str8 back here to 5end in your evidence!

1. DECIPHER YOUR MESSAGE ***
2. COMPLETE THE CHALLENGE
3. COLLECT AND PRESENT PHOTO W PHYSICAL EVIDENCE TO SUSTYGAMES@GMAIL.COM
4. RECEIVE YOUR NEXT MESSAGE!



WE MADE IT TO JUPITER!

PHEW, THAT WAS A TOUGH ONE. REGULARLY PARTICIPATING IN OUR POLITICAL SYSTEM CAN BE INTIMIDATING... BUT CALLS HELP STATE REPRESENTATIVES GAIN INSIGHT INTO THE VALUES OF THE POPULATIONS THEY REPRESENT - CALLS HELP THEM HELP US!

KEEP UP THE PACE. LET'S GET TO MARS!

VOLUNTEERMATCH.ORG

For the next challenge, register @ VolunteerMatch.org. After you sign in, browse volunteer opportunities in Tempe. Identify and send the coolest event you can find (personal opinion) to SustyGames@gmail.com!

1. DECIPHER YOUR MESSAGE ***
2. COMPLETE THE CHALLENGE
3. COLLECT AND PRESENT PHOTO W PHYSICAL EVIDENCE TO SUSTYGAMES@GMAIL.COM
4. RECEIVE YOUR NEXT MESSAGE!



WE GOT TO MARS!

Giving back to your community not only makes a difference in other peoples' lives, it can change yours too! Volunteering provides opportunities to develop new skills and build on existing experience and knowledge. It'll look great on your resume too!

YOU'VE BROUGHT US SO CLOSE TO EARTH, I CAN ALMOST SEE IT!



●●●/●●●/- - - /● - - - /●/● - ●

Complete the daily task in morse code in 5-minutes or less!

4.3 billion years ago, Mars had oceans full of one of the most important resources for human life - just like Earth does today. To get us back home, conserve that precious dihydrogen monoxide.

Evidence must be appropriate.

1. DECIPHER YOUR MESSAGE ***
2. COMPLETE THE CHALLENGE
3. COLLECT AND PRESENT PHOTO W PHYSICAL EVIDENCE TO SUSTYGAMES@GMAIL.COM
4. RECEIVE YOUR NEXT MESSAGE!



WHAT? We ended up on Mercury.

You annihilated that last level... but it looks like we overshot it a little bit and it IS pretty toasty here. It's a good thing you saved us some water! Did you know, as much as 5 gallons of water are saved for every 1 minute you shave off your shower time? Pun intended.

Let's jet over to Venus and then we'll have a clear path to Earth.

For this challenge, you'll need to make a new friend. Any time, any way, any where, any body! Tell them about Susty Games and ask them the question hidden in this card. Your evidence must include them and their answer.

Hint: caps

#SUSTAINABILITY

1. Decipher your message ***
2. Complete the challenge
3. Collect and present photo w physical evidence to SustyGames@gmail.com
4. Receive your next message



WE'RE ON VENUS!

Congrats! You're almost one of the most active Earthlings in the solar system. Discussing and sharing sustainability can prompt other Earthlings to become active too!

THIS IS THE LAST LEVEL BEFORE EARTH!!!

33.4283° N, 111.9359° W

This challenge requires you to locate and climb 1,496' to the coordinates above. Don't forget the photo and physical evidence! You'll really be huffing and puffing if you have to go back... MAY I suggest taking public transit to the trailhead?

1. DECIPHER YOUR MESSAGE ***
2. COMPLETE THE CHALLENGE
3. COLLECT AND PRESENT PHOTO W PHYSICAL EVIDENCE TO SUSTYGAMES@GMAIL.COM
4. RECEIVE YOUR NEXT MESSAGE!



WELCOME BACK ACTIVE EARTHLING!

You brought us back down to Earth and there are rewards to come!
Please complete the exit survey & the prize levels below will
determine what's in store! I hope you had a blast. Stay #Susty.

LINKS.ASU.EDU/SUSTY



PRIZE LEVELS

- PARTICIPATION
- SUSTY GAMER
- ACTIVE EARTHLING
- WINNER CIRCLE

1. DECIPHER YOUR MESSAGE ***
2. COMPLETE THE CHALLENGE
3. COLLECT AND PRESENT PHOTO W PHYSICAL EVIDENCE TO SUSTYGAMES@GMAIL.COM
4. RECEIVE YOUR NEXT MESSAGE!

Appendix 8 Graphic Designed Emails

SUSTY GAMES
CONGRATULATIONS!
LEVEQUETE
on being in 1ST place as an
ACTIVE EARTHLING!
View the full leaderboard
& see where YOU rank on
WWW.SUSTYGAMES.COM
(updated weekly)

SUSTY GAMES
CONGRATULATIONS!
Iwannabetheverybest
DART17
on getting 2nd and 3rd place as
ACTIVE EARTHLINGS!
View the full leaderboard
& see where YOU rank on
WWW.SUSTYGAMES.COM
(updated weekly)

SUSTY GAMES
ANNOUNCEMENT:
GAME EXTENSION!
October 31st
Susty Games has been extended until the end of the month!
YOU STILL HAVE TIME TO WIN!
See prizes below!
View the full leaderboard & see where YOU rank on
WWW.SUSTYGAMES.COM

SUSTY GAMES
CONGRATULATIONS!
TheArmedRaptor
gothimu
on getting 4th and 5th place as
ACTIVE EARTHLINGS!
View the full leaderboard
& see where YOU rank on
WWW.SUSTYGAMES.COM
(updated weekly)

SUSTY GAMES
PRIZES
9 Active Earthlings have won!
YOU still have time to get a prize!

FIRST PLACE
2 Tickets to LOST LAKE FESTIVAL,
RocketBook Everlast Smart
Notebook, Waterproof Solar Battery
Pack, Reusable ASU Bag, ASU Spork,
ASU Tumbler, Susty Games & ASU
Sustainability Stickers!!!

TOP 3
RocketBook Everlast Smart
Notebook, Waterproof Solar Battery
Pack, Reusable ASU Bag, ASU Spork,
ASU Tumbler, Susty Games & ASU
Sustainability Stickers!!!

TOP 5
Waterproof Solar Battery Pack,
Reusable ASU Bag, ASU Spork, ASU
Tumbler, Susty Games & ASU
Sustainability Stickers!!

TOP 10
ASU Spork, ASU Tumbler, Susty
Games & ASU Sustainability
Stickers!!

TOP 75
ASU Spork, Susty Games & ASU
Sustainability Stickers!

TOP 100
Susty Games & ASU Sustainability
Stickers!

**YOU COULD CATCH UP
IN ONE WEEK!**
The game has been extended until October 31st! Don't miss out on
these prizes!!! Contact SustyGames@gmail.com @SustyGames

Appendix 9 CA Instructions and Materials

STUDENT LEADER'S GUIDE TO
SUSTY GAMES

www.SustyGames.com

In a world out of whack, we've lost touch with our planet! ASU Students can help bring us back down to Earth by completing the 9 levels of Susty Games and becoming an "ACTIVE EARTHLING".

- Weekly status updates
- Event calendar
- Leaderboard

STEP 1
REGISTRATION & SIGNUP

CA's register their floor(s) @ www.sustygames.com/host-a-game
Students Sign-Up @ www.sustygames.com/start
500 student capacity

STEP 2
MYSTERY MESSAGES

Students receive and decipher mystery message emails from Sustygames@gmail.com for each level.

STEP 3
COMPLETE CHALLENGES

Once students decipher the message, they must complete the challenge! Challenges take students out into the Tempe, AZ community to learn and practice sustainable behaviors.

STEP 4
OBTAIN EVIDENCE & UNLOCK LEVELS

Students obtain photo evidence of completion with a physical object from the scene of the challenge. Students email photo evidence to SustyGames@gmail.com to unlock the next level. The next mystery message email is sent within 24 hours.

STEP 5
BECOME AN ACTIVE EARTHLING

After unlocking all 9 levels, students are deemed "Active Earthlings"! Prizes will be determined based on participation level.

STEP 6
CA ASSISTANCE

CA's have access to the Susty Secrets cheat sheet and SunDevilSync with answers, tips, hints & interesting info to supplement and help students complete each level.

STEP 7
PRIZES!!

CA's distribute prizes based on a list of prize recipients tracked and provided by SustyGames@gmail.com after students return from Fall Break 2017.

For more details, visit [@SustyGames](http://www.SustyGames.com)

CA SECRETS

Sept 10 - Oct 2

Secrets to help CA's propel participation and keep students hyped about the Susty Games!

Please only share the tips and hints below with students who are currently on their respective levels. Keep the mystery alive!

PLUTO (Getting to Neptune)

Tip to decipher: Pluto is a dwarf planet, so focus on the dwarf letters, they spell something.

The Secret Message Is: Take Public Transportation

Tip to complete: The orbit and ASU intercampus shuttles are free. Students also get discounts for public transit through ASU Parking and Transit Services. <https://cfo.asu.edu/transit>

Tip for evidence: Selfie with your bus pass!

Interesting Info:

Tempe Transit Map: <http://www.tempe.gov/home/showdocument?id=36198>

Economic Impact of Public Transportation Investment:
<https://www.apta.com/resources/reportsandpublications/Documents/Economic-Impact-Public-Transportation-Investment-APTA.pdf>

Tempe Orbit System Map: <http://www.tempe.gov/home/showdocument?id=36196>

NEPTUNE (Getting to Uranus)

Tip to decipher: Google it, literally... Or type the coordinates into the map on your phone

The Secret Message Is: Hike "A" Mountain aka Tempe Butte

Tip to complete: Bring water !!!!!

Tip for evidence: Bring a friend and enjoy the view!

Interesting Info:

ASU Online Tour of A Mountain: <https://tours.asu.edu/tempe/a-mountain>

Susty Games by W. Love

URANUS (Getting to Saturn)

Tip to decipher: Figure out what letters the “?”s are covering up, it says a word.

The Secret Message Is: “Compost”. Collect some compost and drop it in School of Sustainability’s bin (AKA Wrigley Hall)

Tip to complete: The bin is located on the 1st floor, outside, on the West side of the building, the same side as the church.

Tip for evidence: Selfie with the bin

Interesting Info:

Local Compost Hauler: <http://www.recycledcity.com/>

City of Tempe Compost Guide: <http://www.tempe.gov/city-hall/public-works/recycling-and-solid-waste/recycling/composting>

ASU Compost Bin Locations: <https://cfo.asu.edu/compost>



SATURN

Tip to decipher: The numbers hidden in the message create a phone number.

The Secret Message Is: Call Tempe’s representative Kyrsten Sinema (D) 602-956-2285 and voice your opinion on something you care about.

Tip to complete: You’ll probably talk to her staff, not her. There are scripts available online, but genuine, candid thoughts and stories are taken more seriously. They don’t expect you to talk like a politician.

Tip for evidence: Screenshot the phone call and take a picture of a script you wrote out

Interesting Info: <https://sinema.house.gov/contact-us/>

Susty Games by W. Love

<http://www.ucsusa.org/action/phone-calls.html#.WZ3YxJOGPow>

<https://www.attn.com/stories/12951/former-staffer-explains-how-call-your-representatives>

JUPITER

Tip to decipher: This one is straight forward.

The Secret Message Is: Sign-up for VolunteerMatch.org, and send sustygames@gmail.com the coolest opportunity you can find (in your opinion).

Tip to complete: It's super fast if you log in with Facebook.

Interesting Info: Not everything on VolunteerMatch.org is non-profit related. There are often opportunities to volunteer at concerts and sporting events, which usually includes free admission!

MARS

Tip to decipher: This is morse code. You can find morse code cheat sheets online

The Secret Message Is: "Shower". Take a 5 minute shower.

Tip to complete: Pic two songs that add up to 5 minutes long, listen to them in the shower to time yourself without getting your phone wet.

Tip for evidence: NO NUDITY. Screenshot a timer on your phone, screenshot the songs you listened to. Get creative but stay appropriate!

Interesting Info: <https://morsecode.scphillips.com/translator.html>

Knowing morse code becomes extremely valuable in emergency situations when communication becomes difficult.

MERCURY

Tip to decipher: There are three words in capital letters in the whole message, find them, this is the secret question. The secret message is not only in the bottom part this time, but the entire message.

The Secret Message Is: WHAT IS SUSTAINABILITY?

Tip to complete: Make friends with people in your classes, on campus, in your residential community, or even online.

Tip for Evidence: Take a selfie with them, have them write down their definition of sustainability or type it on your phone, or screenshot the conversation if it's online.

Interesting Info:

VENUS

Tip to decipher: This level is straightforward.

The Secret Message Is: Find a local business on localfirstaz.com and visit it

Tip to complete: Find something that you can take public transportation to.

Tip for Evidence: Selfie with their product or staff

Interesting Info:



ACTIVE EARTHLING

Please urge students to take the exit survey!!!

This really helps with analyzing the success of the game.

links.asu.edu/susty

PRIZE LEVELS

Participation: They signed up

Susty Gamer: They signed up and completed one level

Active Earthling: They signed up and completed all of the levels

Winner Circle: IT DEPENDS. If a lot of people end up playing and finishing the game, the floor in each building with the highest number of Active Earthlings at the end of the quarter gets a special prize (only the Active Earthlings). If there are not many people who play and complete the game, all of the Active Earthlings get a special prize.

Prize Ideas:

Pizza party, Shirts, Lunch with your dean, Water bottles, Stickers, Tickets to an event

Appendix 10 Susty Games Flyer

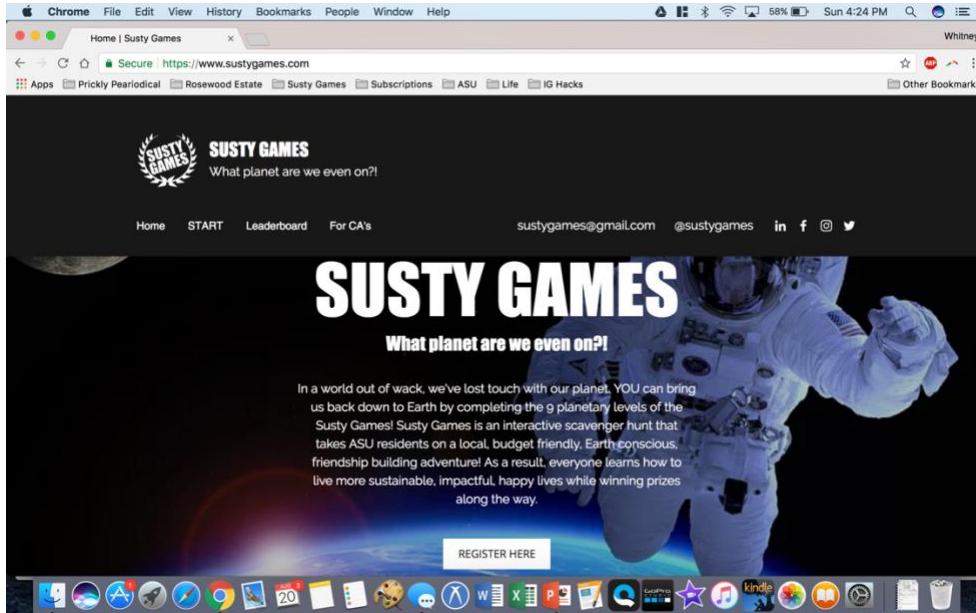
Front



Back



Appendix 11 www.SustyGames.com



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