Girl Scout STEM Camp Badge-Earning Weekend Lesson Plan

by

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A thesis presented to the Honors College of Middle Tennessee State University in partial fulfillment of the requirements for graduation from the University Honors College

Fall 2019

Girl Scout STEM Camp Badge-Earning Weekend Lesson Plan

Brianna Bauman

APPROVED:

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Dedication page

This project is written for all of the young women who made their way into the STEM field regardless of the statistics, for all the little girls who love building with Legos, for all the teenage girls in the robotics club or in advanced math. This project is written for any girl who dreams of a future in STEM. Don’t let anyone tell you that you can’t do it. Pursue your dreams and make the world a better place.

Acknowledgements

To Dr. Eric Klumpe: Thank you for being my advisor. Thank you for all of your support and advice through this entire process. I truly couldn't have done it without you.

To Dr. Brian Frank: Thank you for your assistance with this project. You helped guide me through the IRB process and helped make this camp possible.

To my family: Thank you for always encouraging me to follow my dreams. I never could have made it this far without you. Mom, thank you for getting me involved in and guiding me through Girl Scouts. This project couldn't have existed without you.

To Josiah Ediger: Thank you for your continuous love and support through the process of creating this thesis project.

To Girl Scout Troops 2432 and 2728: Thank you for letting me do a trial run with you all. I hope you had fun and learned something along the way.

To Dr. June McCash: Thank you for the funding I received from the June McCash Honors Enrichment Scholarship. Your support made it possible to reserve the camp site and buy all of the necessary supplies to have a successful trial run using the lesson plan.

Abstract

This creative thesis was written in order to create a lesson plan for a Girl Scout Badge Earning STEM Weekend Camp. This thesis discusses the importance of women in STEM, how this lesson plan was created, and a reflection on a trial run camp using the lesson plan. A full lesson plan for a four-day Girl Scout camp is included in the appendix of this thesis, including instructions, pictures, supplies, and a list of the badge requirements associated with each activity.

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Introduction

Several studies have shown that there is still a gender gap in most STEM (Science, Technology, Engineering, and Math) fields (Bach, Berger); while many young women have the talents and interests that would lead them to a successful, fulfilling career in one of these fields, the numbers just aren't there. One study has pointed to lack of exposure to the creative, problem-solving side of STEM that coincides with other interests of young girls, instead focusing on the theoretical aspects which may not draw as many females in (Berger, Galvin). Another reason is lack of STEM career knowledge before college (Bach, Berger); while there are many fields in college that a woman might not have much previous experience in, it is much easier to enter an unknown career path such as nursing that isn't as predominantly male such as engineering, and recent studies have shown that while some STEM fields have improved their gender gap, physics and engineering among others are still predominantly male. Yet another aspect is social pressure; even as the WISE (Women in Science and Engineering) concept gains popularity, girls still experience pressure away from these fields: a little girl is given a doll while her brother gets building blocks, the boys are encouraged to play video games and therefore learn computer science while girls are pushed away because they would never fit in, a young woman is laughed at for asking questions in a math class and trying to understand when her male counterparts are encouraged (Choney, Planchard).

Using this information, allowing young girls to engage in creative, hands-on STEM projects will help foster interest in this area, and exposing them to potential careers may allow that interest to continue to flourish. Girl Scouts has created several badge sets that incorporate STEM topics. The badges are geared towards exposing the

girls to a variety of STEM skills and helping create an interest in further pursuing STEM. However, there are many challenges. For instance, the steps are pretty open ended, and the girls or troop leaders have to come up with activities for each step, and several badges may be interconnected, but as is, the leader must go through and plan each badge out and try to figure out what may overlap or go together. Additionally, even though several steps between scout age groups may overlap, there is not really a way to see the connections without going through each individual step of each individual badge. This makes it harder to incorporate different aged girls and many troops are multi-level troops with two or more age groups. Providing a lesson plan will make it easier for the girls to earn the badges. I have created one such lesson plan and tested it with a multilevel troop. This lesson plan makes it easier for multilevel troops because it provides a set of activities that are suitable for many age levels, so all the girls can participate, and incorporates the steps for each level's badge. This takes a lot of pressure off of the leader and gives them a way to help the girls do fun projects and learn new STEM skills in the process. Each activity has a supply list, time estimate, instructions, pictures, and a list of badge steps that it satisfies. These activities can be done all together as a camp (an itinerary for this option is provided), or done individually at meetings. Giving the girls easy access to this program that will expose them to the creative side of STEM and show them how girls can be involved with STEM may be just what they need to get started in the world of STEM.

Thesis statement

Studies have shown that several STEM fields still don't have a proportional female presence. As a woman working towards a Mechatronics Engineering degree, I have seen firsthand how the work force in STEM related careers is heavily lacking in female involvement. As studies have shown, this can be from several factors, including lack of exposure to STEM activities targeted to girls and social pressure. I have also been involved with Girl Scouts for several years and have seen the opportunities this program can provide for young girls to grow; recently, they have come out with several badges focusing on STEM activities. My project was to create a lesson plan for a multi-level Girl Scout STEM badge-earning weekend. With a leader following the steps detailed in the lesson plan, Girl Scouts who are Daisies (Kindergarten and 1st Grade), Brownies (2nd and 3rd Grade), Juniors (4th and 5th Grade), or Cadettes (6th, 7th, and 8th Grade) will be able to complete the necessary steps to earn their level's Robotics, Mechanical Engineering, Space Exploration, and Cybersecurity badges over the course of a weekend retreat. For these girls, having more exposure to STEM through the badge activities might set off a spark of interest that leads to a lifelong desire to learn more about STEM.

Methodology

Creating the Activity Book

In order to plan a retreat for the girls to earn STEM badges, I first had to compile all the badge steps. I looked through all the badge books I planned on using and made one list of all the steps. I then grouped the steps into similar groups. For example, Daisies and Cadettes both had a badge step called "Learn about programming." By grouping these steps together, one activity could cover the requirement for both age groups. After deciding which badge steps went together, I researched activities that met the requirements. After coming up with several options, I decided which activity best fit the requirements for each step. When I had my final list of activities, I proceeded to test each activity. Some of the activities, such as the egg drop, were modified after the trial; when testing, I decided that the egg drop with straws and tape was going to be too difficult and chose other supplies that worked better. Through these trials, I also got a sense of timing for each activity to estimate how long it would take at camp.

Once I had decided the activities and timing for each, I began to make the lesson plan booklet. The booklet included a full itinerary, instructions for each activity, and a list of badges completed. I began with the itinerary, including time for meals and breaks. Knowing the time estimate for each activity, I structured them so that the girls would go through a variety of different activities so as not to be monotonous, and so that they fit the timetable of camp. Once I had a set itinerary, I began writing the instructions for each activity. Each activity's instructions included a time estimate, supply list, list of badge requirements met, and the instructions themselves. I then began to format the itinerary

and instructions into a booklet, complete with cover page, table of contents, and appendix with necessary worksheets.

After finalizing the lesson plan, I organized a trial run of this camp with a troop that had a Daisy, Brownies, Cadettes, and Juniors at Camp Piedmont, a Girl Scout campsite. We made this retreat a 4-day camp, Thursday afternoon through Sunday morning, over the summer while the scouts were out of school. I bought supplies according to the supply list, ensuring everything needed was on the list. I then made sure to have an example of all smaller crafts that would be easily portable. I had each scout, parent, and volunteer sign the appropriate IRB forms when they signed the general camp permission forms. The IRB Approval form is shown in Appendix A. The scouts participated in a general STEM interest survey at the beginning of camp. We then worked our way through the lesson plan.

Overall, the lesson plan was a success. There were a few time estimates that were adjusted as the girls did the activity, but overall the first lesson plan was fairly accurate. Most of the activities were successful as well. One activity, LED origami, turned out to be more difficult than expected, so I added a note to buy LEDs with long wires, try to have the girls work in pairs, and have an adult to assist as needed. Also, for the talk portions of the lesson plan, the girls stay more focused if they are more involved; if possible, this should be set up as a question and answer session, with the instructor filling in what the girls do not know. All the other activities went smoothly, with the girls staying excited and engaged. I also had the scouts participate in the general STEM survey again at the end of the camp to try and gauge whether the retreat increased their STEM interest.

At the end of the trial camp, I went back over the lesson plan. I updated a few time estimates that changed through camp experience. I also added photos from the trial camp to go with each activity so it can be better visualized. After this, I finished final formatting for the booklet, resulting in a completed Girl Scout STEM Retreat Lesson Plan booklet. The completed lesson plan is in Appendix B.

Gathering and Analyzing Data

In order to determine whether the camp was a success, I developed a few different tools. I created two surveys as well as a list of interview questions. I wanted to use the surveys to see if there was a quantifiable increase in STEM interest for the girls who participated. I created the interview questions in order to get feedback from the volunteers who helped me run the camp.

The surveys were adapted from the survey on page 952 of Caleon and Subramaniam's study "Attitudes towards science of intellectually gifted and mainstream upper primary students in Singapore" (Caleon 952). The main content was the same. I modified the wording of some of the questions to better fit the age ranges I was working with. I also created two different versions of the survey, one using a scale of faces ranging from a big frown to a big smile for the younger girls and one using words from "Strongly Disagree" to "Strongly Agree" for the older girls. This was mainly to help make the survey easy to understand for the younger girls while still helping the older girls feel as though it is age appropriate for them. I also added a border to make it more appealing to children. Both surveys are included in Appendix C.

I created four interview questions with the intention of seeing how well the volunteers thought the event went. As all three volunteers have run several Girl Scout

badge-earning camp retreats before, they all had valuable insight on the success and repeatability of this camp. All of my questions were geared towards evaluating the success of both the lesson plan and the camp itself. These questions and the responses from the volunteers can be read in the Feedback portion of the Results section. During the interviews, to keep anonymity, I took notes of the volunteers' responses instead of recording them. This feedback helped me to improve my lesson plan.

Results

Results of Trial Run

I did a trial run of my lesson plan using a group of seven Girl Scouts of varying levels. The camp began on the afternoon of Thursday, July 18th, 2019 and concluded the morning of Sunday, July 21st, 2019. Most of the camp was hosted at Camp Piedmont in Readyville, TN. On Friday, though, we took the girls on a field trip to the Smyrna campus of the Tennessee College of Applied Technology (TCAT).

Everything we did is reflected in the Activity Book in Appendix A. After returning from the camp, I updated the Activity Book so it more accurately aligns with time estimates, and edited a few activities for clarity. I also added pictures from the trip to go along with each activity so there is a real-life example alongside the instructions.

Overall, the activities went very well. The LED Origami was more difficult than intended but that can be remedied by purchasing more suitable supplies, pairing girls up, and having the volunteers nearby to assist. Other than that, the only difficulty was the lecture-style activities. It is very hard to keep the interest of a group of children when just telling them the information. They are much more likely to stay involved when the activity is organized as a Question-Answer type situation. Even if the information is something they may know nothing about, asking questions helps get them involved and invested in the conversation. Apart from these two small modifications, all of these activities were successful based on the original plan. These tips as well as a few other small ones are listed on their corresponding activity pages in the Activity Book.

Feedback and Data

I had the scouts participate in an anonymous general STEM survey at the beginning and end of the camp to try and gauge whether the retreat increased their STEM interest. There were two variations of the survey, one had responses ranging from "Strongly Disagree" to "Strongly Agree," and the other had responses depicted by frowning to smiling faces. This allowed the younger children, who were given the version with faces, to more easily understand the responses available, while also giving the older children the worded version so they feel it is more applicable to them. The questions on both surveys were the same. The children were given this survey before we started the activities (noted as beginning), and after full completion (noted as end). However, with our small group size, the results are not as reliable as I would like them to be. For higher accuracy, this retreat would have to be repeated with more participants. The table below shows the questions and responses at the beginning of camp.

Question	Response					
	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	Average for question
I would like to be given a scientific experiment as a present			3	3	1	3.714286
I like to talk to friends about science outside of school	2	1	2	1	1	2.714286
I like joining science clubs or groups		4			3	3.285714
I like to read about science	1	1	2	2	1	3.142857
I enjoy watching science programs on TV at home	1	1	2	2	1	3.142857
I like to read books about science during school breaks	2	2	2	1		2.285714
I would like to work as a scientist	1	1	2	3		3
It is interesting earning a living in a science environment	1		2	4		3.285714
I will enjoy being a scientist			2	3	2	4
A career in science would be interesting	1			5	1	3.714286
A job related to science would be interesting			1	5	1	4
I feel that the work of a scientist is good fit for me		1	3	1	2	3.571429
Science is doing more good than harm		1	1	3	2	3.857143
I feel that science helps to make life pleasant			2	4	1	3.857143
More money should be spent on science	2		2	2	1	3
People should study science		1		4	2	4
I feel science improves our lives				4	3	4.428571
	Total Average Answer at Beginning of Camp					3.470588

Figure 1: Survey Results from Beginning of Camp

As shown in the table, the average answer was 3.47 over all questions. The next table shows the results from the same survey given at the end of camp, with the additional column depicting the change in averages from the original survey.

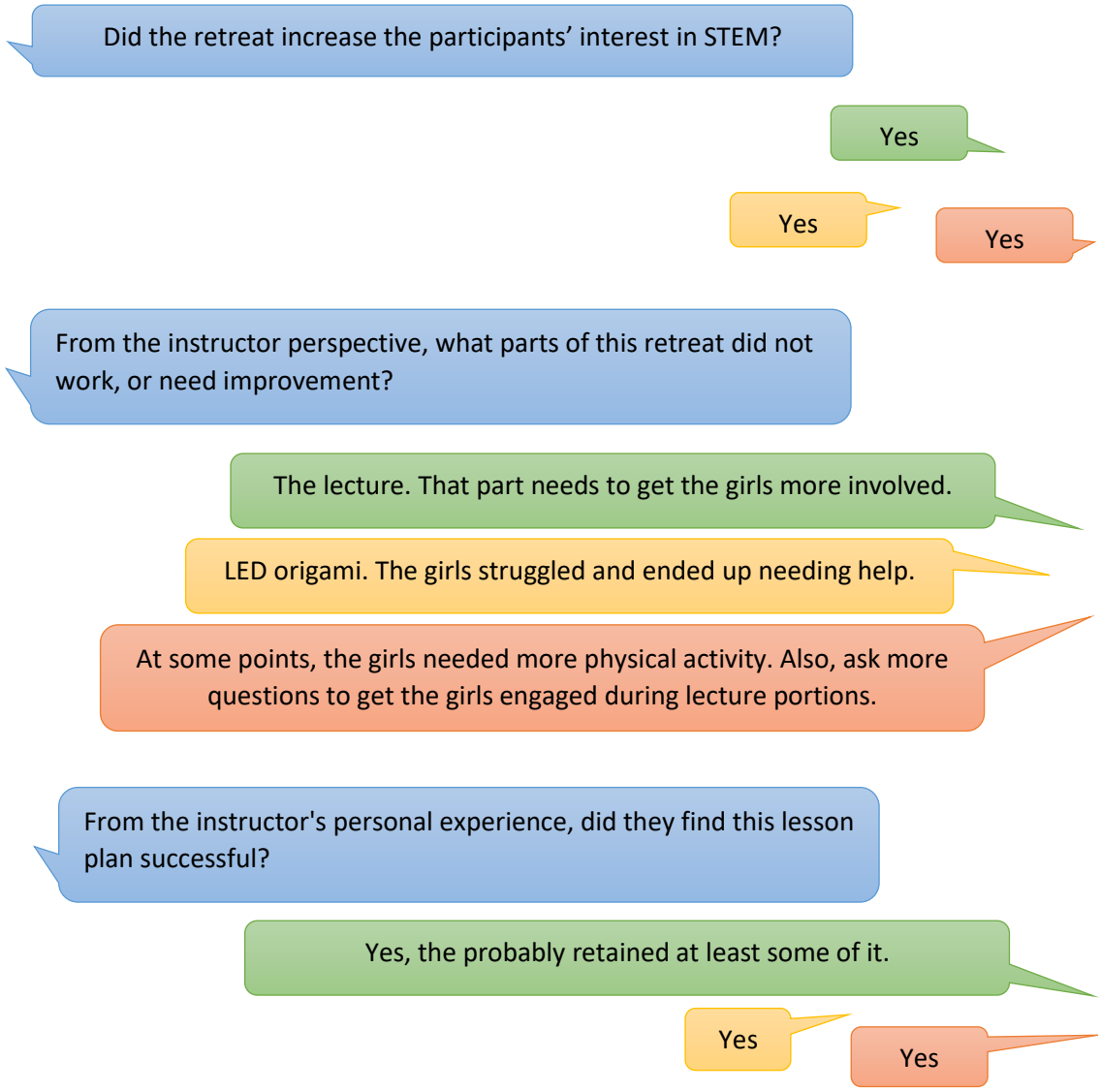
Question	Response						Comparison to Results from Beginning (End - Beginning)
	Strongly Disagree (1)	Disagree (2)	Neither agree nor disagree (3)	Agree (4)	Strongly Agree (5)	Avg for question	
I would like to be given a scientific experiment as a present		2		3	1	3.5	-0.214285714
I like to talk to friends about science outside of school		2	1	3		3.166667	0.452380952
I like joining science clubs or groups		1	1	2	2	3.833333	0.547619048
I like to read about science	1		3	1	1	3.166667	0.023809524
I enjoy watching science programs on TV at home	1	2	2	1		2.5	-0.642857143
I like to read books about science during school breaks	2		2	1	1	2.833333	0.547619048
I would like to work as a scientist		1	3	1	1	3.333333	0.333333333
It is interesting earning a living in a science environment		1	1	4		3.5	0.214285714
I will enjoy being a scientist		1	1	2	2	3.833333	-0.166666667
A career in science would be interesting		1	1	2	2	3.833333	0.119047619
A job related to science would be interesting			1	5		3.833333	-0.166666667
I feel that the work of a scientist is good fit for me		2	3		1	3	-0.571428571
Science is doing more good than harm	1	1	1	1	2	3.333333	-0.523809524
I feel that science helps to make life pleasant	1		4	1		2.833333	-1.023809524
More money should be spent on science	2		2	1	1	2.833333	-0.166666667
People should study science		1	2	2	1	3.5	-0.5
I feel science improves our lives		1	1	2	2	3.833333	-0.595238095
	Total Average Answer at End of Camp					3.333333	-0.137254902

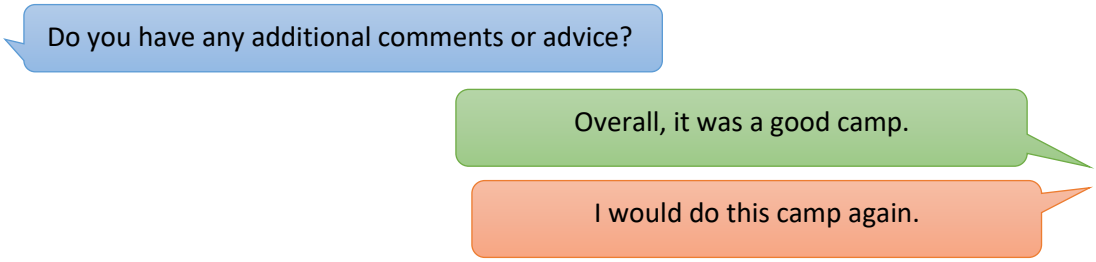
Figure 2: Survey Results from End of Camp

As you can see, the results went slightly down, with the average at the end being 3.33. However, with the small sample size of 7 girls, the results do not have the statistical power needed to show strong trends. Most of the questions only had slight variations from beginning to end in the average answer, so it cannot really be said statistically whether this camp improved the girls' interest in STEM. In order for this survey to be more accurate, it would need to be done with a larger group. Through observation, it seems like the slight decrease was mostly due to the girls being tired as it was almost time to go home, and they were not very interested in doing the survey. However, when asking the girls about their experience, they all seemed to love it, and seemed excited to

talk about it. With this in mind, it may help to go through this survey slightly before the end of the camp as opposed to as the girls were completely finished, packed up, and ready to go home.

Aside from the survey, I also conducted interviews with each volunteer at the end of camp. The volunteers will remain anonymous. Below are the questions and responses. My questions are shown in blue, volunteer #1's responses are shown in green, volunteer #2's responses are shown in yellow, and volunteer #3's responses are shown in orange.





The volunteers seemed pleased with the turnout of the camp. I implemented their suggestions when I was updating the activity book. Overall, this was a successful trial run that showed that this STEM camp plan is successful. Through this, it also seems like it would work well for other Girl Scout troops who wish to earn their STEM badges.

This camp could be easily repeated with other troops wanting to expose the girls to STEM activities. As each activity gives a supply list and detailed instructions, the camp can be scaled up for bigger groups. The activities can also be completed one (or more) at a time at meetings if a camping trip is not a viable option; all activities can be done independently. Right now, this book is meant for Daisies, Brownies, Juniors, and Cadettes, but some of the activities could be modified to include other age levels as well.

Conclusion

The main goal of this thesis project was to create a lesson plan that Girl Scout troop leaders could easily implement to introduce their scouts to a variety of STEM projects, allowing them to cultivate an interest in STEM that is not always offered to girls. Currently, women are still in the minority in the STEM fields, and part of that is due to lack of STEM activities geared towards younger girls. As most of the work usually falls on the leader to create a camp, this book made STEM activities more easily accessible to the leaders and therefore to the girls in the troops. Through this project, I was able to create a comprehensive guidebook for a four-day camp that incorporated 27 different badges ranging from Daisy level to Cadette level, using activities that are accessible and enjoyable for Girl Scouts of all ages.

The other goal I had for this thesis was to collect data through surveys and interviews to determine whether this camp actually increased the girls' interest in STEM. However, with the small sample size of the survey, the results did not prove much either way. These results could be improved in future trials by running the camp with a larger group of girls which would lead to a larger sample size, and also by giving the final survey at an earlier time to avoid fatigue interfering with results. However, through discussion with the girls and the interviews with the volunteers, all of the girls seemed to have enjoyed the camp and learned something along the way, which makes this a success in my eyes.

This thesis also helped me learn and grow as an individual. It is an amazing feeling to write an entire book dedicated to helping younger girls learn and grow, and then get to personally see the results. The activity book required more background work

than I would have expected and helped deepen my respect for teachers who write lesson plans and leaders who plan camps such as this one. This thesis also helped me gain an insight into the educational side of STEM, as I had to go through all of the activities and evaluate whether they met certain requirements so the girls could earn their badges. I've always been involved with Girl Scouts and it was very rewarding to use this as an opportunity to write something that can be used to help spark and grow interest in STEM for young girls. I hope this Activity Instruction Book will be used to show girls that they too can not only have an interest in STEM but pursue it and become a valuable member of the STEM field.

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Appendix A: IRB Approval Letter

IRB
INSTITUTIONAL REVIEW BOARD
Office of Research Compliance,
010A Sam Ingram Building,
2269 Middle Tennessee Blvd
Murfreesboro, TN 37129

MIDDLE TENNESSEE STATE UNIVERSITY

IRBN001 - EXPEDITED PROTOCOL APPROVAL NOTICE

Thursday, February 28, 2019

Principal Investigator	**Brianna Bauman** (Student)
Faculty Advisor	Brian Frank
Co-Investigators	NONE
Investigator Email(s)	blb7u@mtmail.mtsu.edu; brian.frank@mtsu.edu
Department	Mechatronics & Physics (CBAS)
Protocol Title	***Girl Scout STEM Weekend***
Protocol ID	**19-2165**

Dear Investigator(s),

The above identified research proposal has been reviewed by the MTSU Institutional Review Board (IRB) through the **EXPEDITED** mechanism under 45 CFR 46.110 and 21 CFR 56.110 within the category *(7) Research on individual or group characteristics or behavior*. A summary of the IRB action and other particulars in regard to this protocol application is tabulated below:

IRB Action	**APPROVED for ONE YEAR**		
Date of Expiration	**2/28/2020**	Date of Approval	2/28/19
Sample Size	50 (FIFTY)		
Participant Pool	Target Population 1 • Primary Classification: **Special Population - Minors (7-17 years old)** • Specific Classification: **Girl scounts** Target Population 2 • Primary Classification: **General adults - 18 or older** • Specific Classification: **NONE**		
Exceptions	1. Verbal assent is permitted when applicable. 2. Contact information including identification number is permitted.		
Restrictions	**1. Mandatory signed parental consent (age-specific) and active child assent (age-appropriate); the participants must have access to an official copy of the informed consent document signed by the PI.** **2. Data must be deidentified once processed.** **3. Identifiable data must be destroyed as described in the protocol.** **4. Any identifiable data/artifacts that include auido/video data, photographs and handwriting samples must be used only for research purpose and must be destroyed after data processing.**		
Comments	NONE		

This protocol can be continued for up to THREE years (**2/28/2022**) by obtaining a continuation approval prior to **2/28/2020**. Refer to the following schedule to plan your annual project reports and be aware that you may not receive a separate reminder to complete your continuing reviews. Failure in obtaining an approval for continuation will automatically result in cancellation of this

protocol. Moreover, the completion of this study MUST be notified to the Office of Compliance by filing a final report in order to close-out the protocol.

Post-approval Actions

The investigator(s) indicated in this notification should read and abide by all of the post-approval conditions imposed with this approval. Refer to the post-approval guidelines posted in the MTSU IRB's website. Any unanticipated harms to participants or adverse events must be reported to the Office of Compliance at (615) 494-8918 within 48 hours of the incident. Amendments to this protocol must be approved by the IRB. Inclusion of new researchers must also be approved by the Office of Compliance before they begin to work on the project.

Continuing Review (**Follow the Schedule Below:**)

Submit an annual report to request continuing review by the deadline indicated below and please be aware that **REMINDERS WILL NOT BE SENT.**

Reporting Period	Requisition Deadline	IRB Comments
First year report	1/31/2029	NOT COMPLETED
Second year report	1/31/2021	NOT COMPLETED
Final report	1/31/2022	NOT COMPLETED

Post-approval Protocol Amendments:

Only two procedural amendment requests will be entertained per year. *In addition, the researchers can request amendments during continuing review. This amendment restriction does not apply to minor changes such as language usage and addition/removal of research personnel. .*

Date	Amendment(s)	IRB Comments
NONE	NONE.	NONE

Other Post-approval Actions:

Date	IRB Action(s)	IRB Comments
NONE	NONE.	NONE

Mandatory Data Storage Requirement: All of the research-related records, which include signed consent forms, investigator information and other documents related to the study, must be retained by the PI or the faculty advisor (if the PI is a student) at the secure location mentioned in the protocol application. The data storage must be maintained for at least three (3) years after study has been closed. Subsequent to closing the protocol, the researcher may destroy the data in a manner that maintains confidentiality and anonymity.

IRB reserves the right to modify, change or cancel the terms of this letter without prior notice. Be advised that IRB also reserves the right to inspect or audit your records if needed.

Sincerely,

Institutional Review Board
Middle Tennessee State University

Quick Links:

Click here for a detailed list of the post-approval responsibilities.
More information on expedited procedures can be found here.

Appendix B: Activity Instruction Book

A Comprehensive Weekend Badge-Earning Camp Guide Created by Brianna Bauman
as a MTSU Honors College Thesis Project

Contents

Itinerary

Thursday:

Camp opens at 4 pm; drop off

4:15 pm – If-Then Programming Game	30 minutes
4:45 pm – Code robots with app - Coder MiP	40 minutes
5:25 pm – Decide what you want your robot to do	15 minutes
5:40 pm – Sketch your robot	10 minutes
5:50 pm – Build prototype with KNEX	20 minutes

Dinner at 6:10 pm - 7:40 pm

7:40 pm – Create show and tell presentation	10 minutes
7:50 pm – Do show and tell presentation	20 minutes
8:10 pm – Get in groups, give feedback	15 minutes
8:25 pm – Age on other planets	20 minutes
8:45 pm – Solar system bracelet	30 minutes

Done by 9:15 pm

Friday:

Up at 7 am, breakfast done by 8:30 am

8:30 am – TCAT - Look at a real robot, Talk about jobs with robots	20 minutes

Lunch at 12 pm - 1:30 pm

1:30 pm – Design a robot bumblebee - sketch	15 minutes
1:45 pm – Telephone game	30 minutes
2:15 pm – LED origami	30 minutes
2:45 pm – Talk about SME, show videos, show sumo robot	30 minutes
3:15 pm – Snack: Moon phase cookies-Oreos	*30 minutes*
3:45 pm – Decorate and use binoculars	45 minutes
4:30 pm – Build a KNEX Mars Rover	30 minutes
5:00 pm – Bedroom Planetarium	45 minutes

5:45 pm – Free time	45 minutes
Dinner at 6:30-8:00	
8:00 pm – Space SWAPS	60 minutes
9:00 pm – Go find a constellation	30 minutes
Done by 9:30	

Saturday:

Up at 7, breakfast done by 8:30	
8:30 am – Mechanical Engineering Station 1	90 minutes
10:00 am – Egg drop	30 minutes
10:30 am – Mechanical Engineering Station 2	90 minutes
Lunch at 12:00-1:30	
1:30 pm – Mechanical Engineering Station 3	90 minutes
3:00 pm – Physics talk	20 minutes
Snack at 3:20-3:50	
3:50 pm – Mechanical Engineering Station 4	90 minutes
5:20 pm – Mechanical Engineering Station 5	90 minutes
Dinner at 6:50-8:20	
8:20 pm – Make key to crack code	30 minutes
8:50 pm – How messages travel and are read	15 minutes
9:05 pm – Discuss online security; “ID cards”	30 minutes
9:35 pm – Talk about networks and what technology can do	15 minutes
Done by 9:50 pm	

Sunday:

Up at 7, breakfast done by 8:30	
8:30 am - Talk about viruses/malware/cyberattacks	10 minutes
8:40 am - Learn about and create a protocol	30 minutes

9:10 am - Photoshopped pictures; real vs fake messages	20 minutes
9:30 am - Digital footprints; things can't be completely deleted	15 minutes
9:45 am - 10 rules; "ID cards", safety rules "quiz"	25 minutes

10:10 am – Cleanup, then free time
Pickup at 11:30

Supply List

- #2032 Watch Batteries
- Blindfold (optional)
- Calculator
- Cardboard
- Cardboard Tubes
- Cardstock
- Coder MIP Robot(s)
- Colored tape
- Crayons/Markers/Colored Pencils
- Duct Tape
- Elastic Cord
- Electrical tape
- Empty water bottles
- Foldable Paper Binoculars (Oriental Trading)
- Glue
- Googly Eyes
- KNEX
- Large Notepad
- LEDs
- Markers
- Measuring Tape
- Napkins
- Origami Paper
- Paint
- Paint Brush
- Paper
- Paperclips
- Pencils
- Phone(s) or Tablet(s) with Coder MIP app
- Photos (In appendix)
- Pipe Cleaners
- Plastic grocery bags
- Pony Beads
- Popsicle sticks
- Projector (optional, if used make sure there is a surface to project onto)
- Pushpins
- Puzzle Pieces
- Raw eggs
- Rubber bands
- Safety Pins
- Sandwich Cookies (such as Oreos)
- Scissors
- Small swimming pool or other container
- Star Beads
- Straws
- Tacky Glue
- Tape
- Trash bags
- Wire
- Worksheets (from Appendix)

If-Then Coding Game

[Taken from *Steam Kids*, page 51]

Time: 30 minutes

Badge: Brownie Programming Robots: Steps 3-4, Junior Programming Robots: Step 3, Cadette Programming Robots: Step 4

Supplies: None

Instructions:

Pick one Programmer, line up the rest of the children as Computers and start playing this Monkey See, Monkey Do type game.

Difficulty Level 1 - If I Do This, Then You Do This

The Programmer commands the Computers to do the same thing she does and to stop when she stops.

Difficulty Level 2 – If I Do This, Then You Do That

Add the twist that the Computers should do something different that the Programmer, but still start and stop when they do. This one works the brain because they'll hear something different than they are seeing.

Difficulty Level 3 – If I Do This, Then You Do That, Else You Do Something Else

Next, add If-Then-Else statements. For example, the Programmer commands "If I raise my right arm, Then you raise your left arm, Else raise your right foot."

Difficulty Level 4 – If-Then-Else Speed Round with Eliminations

The Computers "break" and sit down when they don't follow commands correctly. The last one standing wins.

Coding MIP Robot

Time: 30 minutes

Badge: Daisy How Robots Move: Step 3, Brownie Programming Robots: Step 5, Junior Programming Robots: Steps 4-5, Cadette Programming Robots: Step 5

Supplies: Coder MIP Robot(s), Phone(s) or Tablet(s) with Coder MIP app, colored tape, scissors

1. Divide the girls into groups. Each group should have their own robot and access to the app.
2. Give each group a task, such as getting the robot through a maze taped on the floor.
3. Let the girls program the robot as a team using the app. They can also program the robot to go through an obstacle course.
4. Once both groups have programmed their robot, test the paths.

Robot Design

Badge: Daisy What Robots Do: Steps 2-3, Daisy Design a Robot: Steps 1-3, Brownie Designing Robots: Steps 3-5, Brownie Showcasing Robots: Steps 1-2, Junior Designing Robots: Steps 2-5, Junior Showcasing Robots: Steps 1-2, Cadette Designing Robots: Steps 1-5, Cadette Showcasing Robots: Steps 2-3

Decide what you want your robot to do

Time: 10 minutes

Supplies: Paper, pencils

Split into two (or more) groups. Have each group decide what they want their robot to be able to do.

Sketch your robot

Time: 10 minutes

Supplies: Large notepad, pencils

Each group gets a large notepad and pencils. They must design their robot as a group. The robot needs to be able to do whatever was decided in the previous step. This is the robot they will be building in the next step.

Build Prototype

Time: 30 minutes

Supplies: KNEX

Give each group a set of KNEX. Each group has 20 minutes to build a prototype version of their robot. As a prototype, models can represent other items that the real robot might have.

Create Show and Tell Presentations

Time: 10 minutes

Supplies: Large notepads, Markers

Each group will get a large notepad. They should use their original sketch, adding labels if needed. They should also write anything they learned.

Do Show and Tell Presentations

Time: 20 minutes

Supplies: None

Get back in one big group and let each group talk about their robot.

Get in Groups and Give Feedback

Time: 15 minutes

Supplies: None

After presentations, let each group give helpful comments and feedback about the robots. These can be questions or suggestions for improvement too.

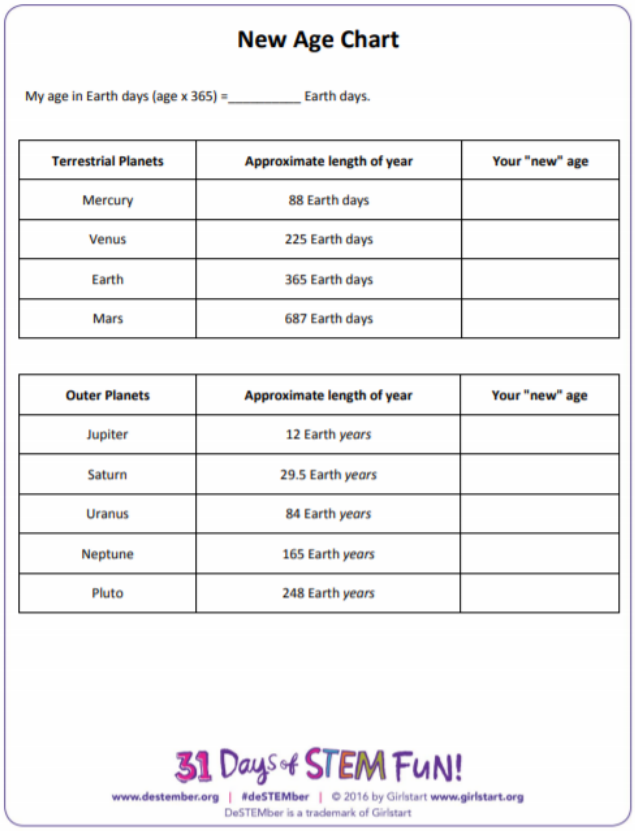
Age on Other Planets

Time: 20 minutes

Badge: Junior Space Science Investigator: Step 2

Supplies: Calculator, worksheet

Using Age on Planets worksheet[1] (in appendix), help each girl figure out their age on different planets.



New Age Chart

My age in Earth days (age x 365) =_____ Earth days.

Terrestrial Planets	Approximate length of year	Your "new" age
Mercury	88 Earth days	
Venus	225 Earth days	
Earth	365 Earth days	
Mars	687 Earth days	

Outer Planets	Approximate length of year	Your "new" age
Jupiter	12 Earth *years*	
Saturn	29.5 Earth *years*	
Uranus	84 Earth *years*	
Neptune	165 Earth *years*	
Pluto	248 Earth *years*	

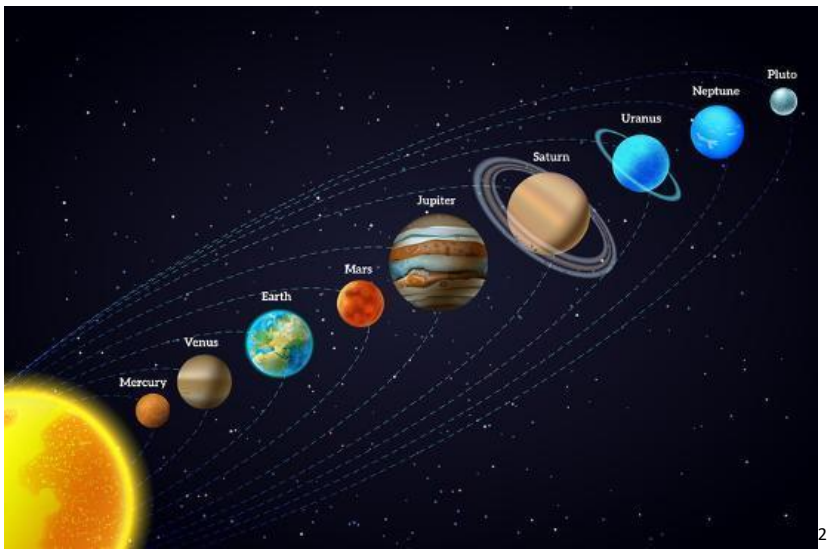
[1] GirlStart. *Age on Planets*. 2016, girlstart.org/our-programs/destember/.

Solar System Bracelet

Time: 30 minutes

Badge: Brownie Space Science Adventurer: Step 1, Junior Space Science Investigator: Step 1

Supplies: Elastic Cord, Pony Beads, Scissors



[2]

Each girl will be given a length of elastic cord. Colored beads will be used for planets and black beads for space. The above photo can be used for color reference. Assemble a bracelet beginning with a black bead, then the sun, then alternate black beads and planets.

Note: If including Pluto, discuss that Pluto is a dwarf planet.

[2] "Solar System Astronomy Banner Art Print by Macrovector." *Art.com*, www.art.com/products/p47121366439-sa-i10558927/macrovector-solar-system-astronomy-banner.htm.

TCAT

Time: 3 hours

Badge: Brownie Showcasing Robots: Step 5, Junior Showcasing Robots: Step 5, Cadette Showcasing Robots: Steps 4-5

Supplies: None

Visit scheduled at TCAT where the girls will:

- Tour campus
- See robots in action
- Play tic tac toe with a robot
- Jog a robot
- Interact with a miniature assembly line
- Interact with relay logic
- Try Forklift Simulator
- Try GTR Racing Simulator
- See results of 3D printing





Yale
Yale

Design a Robot Bumblebee

Time: 15 minutes

Badge: Daisy What Robots Do: Step 1, Brownie Designing Robots: Step 1, Junior Designing Robots: Step 1, Cadette Programming Robots: Step 1

Supplies: Paper, Pencils, Crayons/Markers/Colored Pencils

Discuss biomimicry.

Each girl will be given paper and pencil. They will need to design and sketch a robot that mimics a bumblebee.

Telephone Game

Time: 30 minutes

Badge: Junior Programming Robots: Step 2

Supplies: None

Discuss how computers need very specific instructions. If the message is inputted slightly wrong, it can cause big changes to the output. Demonstrate this by having the girls play a game of telephone.

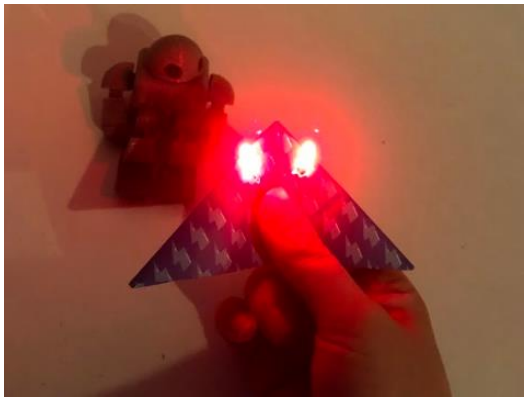
Some example sentences include:

- I broke my toy robot
- Twenty-two teens typing texts
- Two twins tie dye ten tee shirts

LED Origami

Time: 30 minutes

Badge: Daisy How Robots Move: Step 1, Brownie Programming Robots: Steps 1-2, Brownie Designing Robots: Step 2, Cadette Programming Robots: Steps 2-3



Supplies: Origami Paper, Electrical tape, LEDs, #2032 Watch Batteries, Pushpins

[Taken from *The Big Book of Makerspace Projects*, pp 45-49]

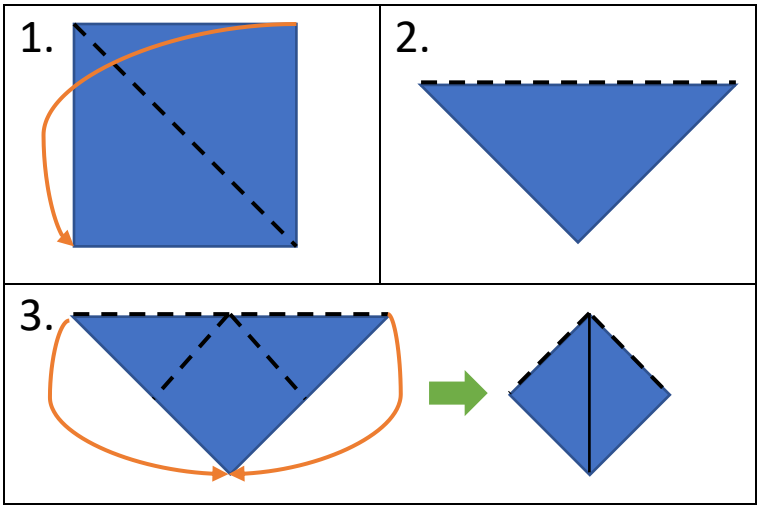
Use squares of paper.

1. Fold square in half diagonally.

2. Turn paper so fold is at the top and point is facing you.

3. Fold both top points down to meet the bottom point, which will create a diamond shape.

(Continued on next page)

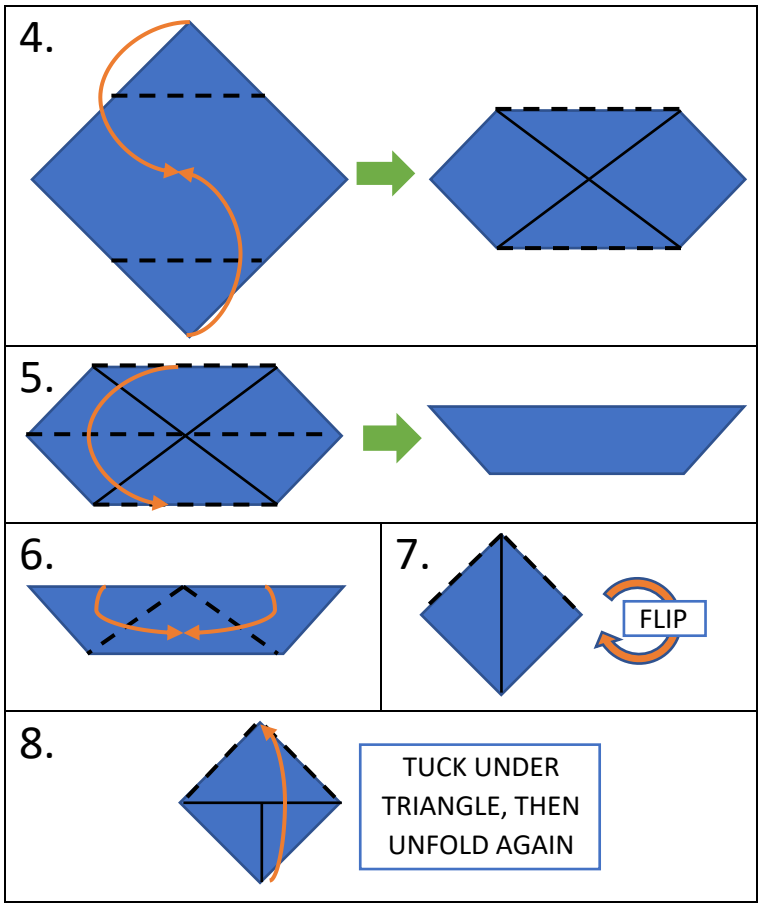


4. Unfold the last folds to get back to a triangle, still pointing back to you. Then unfold it back to a square. Take the top point and fold it down to the center, lining it up with the creases. Repeat with the bottom corner.

5. Fold the paper down across the center so the triangles are inside.

6. Turn down the corner of the long side so it lines up with the center of the bottom side. Repeat with other corner so you have a diamond.

7. Turn paper over. Squeeze it to see the pocket.



8. Tuck the overhanging triangles into the pocket.

Undo the last step to add circuitry.

Use thumbtack to poke holes for the LED wires to go through where you want your eyes. Poke the LEDs through the holes, making sure the short wires are in the middle. Twist the middle two wires together and push to one side. Twist the two outer wires and push them to the other side. This is shown in *The Big Book of Makerspace Projects* Figure 4-9 from page 48 shown on the next page.

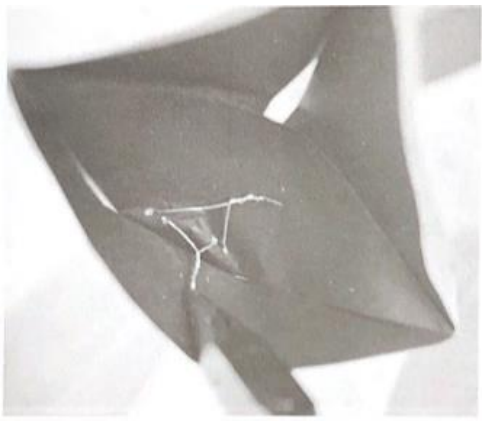


Figure 4-9 Twisting LED leads.

Place a piece of tape at the top, preventing the wires from accidentally touching. Place the battery between the sets of wires and make sure it lights up; if not, try flipping the battery. After deciding which way it goes, tape the battery on its sides to one side of the paper. This is shown in *The Big Book of Makerspace Projects* Figure 4-12 from page 49 shown below.

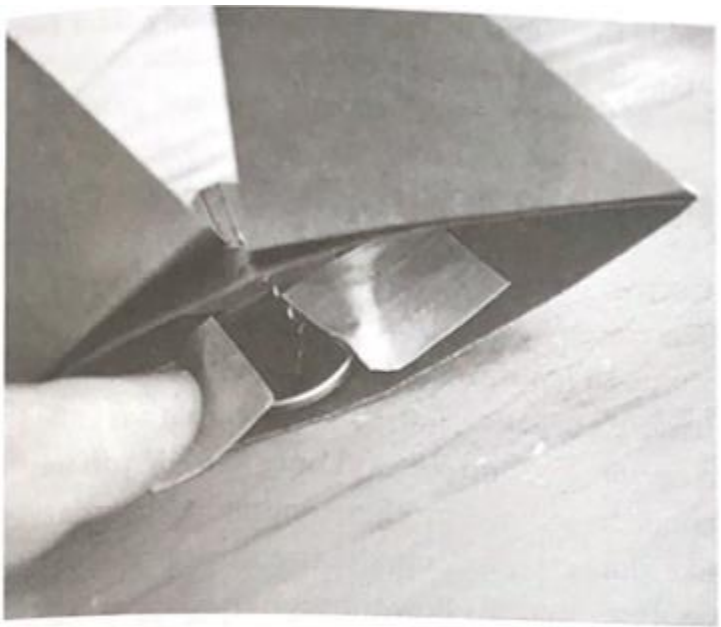


Figure 4-12 Taping battery.

The LEDs should light up when the bookmark is squeezed. To prevent it from lighting up, place it over the corner of a piece of paper.

** Hint: This works best with LEDs with long wires and the girls may require more help than with other activities. Placement of tape and wires is important. **

SME

Time: 30 minutes

Badge: Brownie Showcasing Robots: Steps 3-4, Junior Showcasing Robots: Steps 3-4, Cadette Showcasing Robots: Step 1

Supplies: Photos, Projector (optional)

These photos are from MTSU's SME chapter at the National Robotics Challenge in 2019. SME participates in this competition yearly and has many different teams that compete in different challenges. I brought the robot my team designed for the Sumo Robot Competition; the last photo shows this robot at camp with the girls. More information about SME can be found at https://www.sme.org/ and more information about the National Robotics Challenge can be found at https://www.thenrc.org/. Larger versions of the photos to print are included in the appendix to show the girls.


MTSU

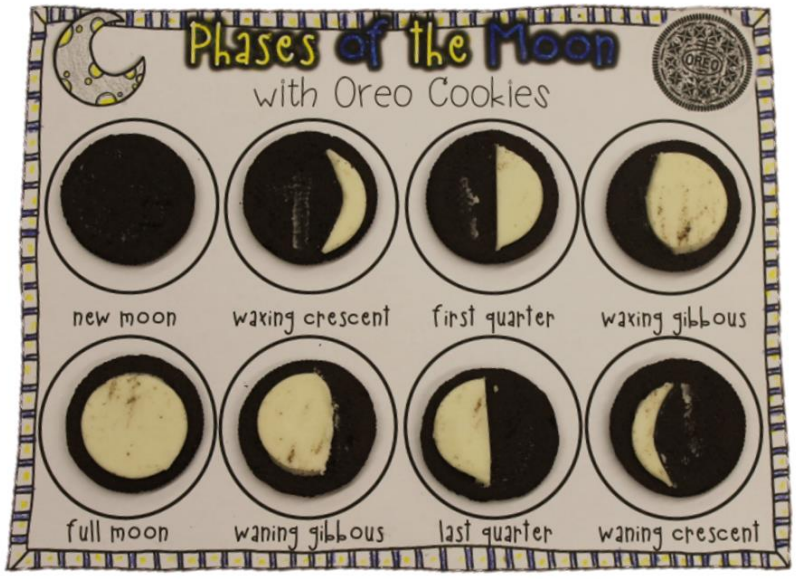
Moon Phase Cookies

Time: 30 minutes

Badge: Brownie Space Science Adventurer: Step 3

Supplies: Sandwich Cookies (such as Oreos), Napkins, Popsicle sticks, Printout

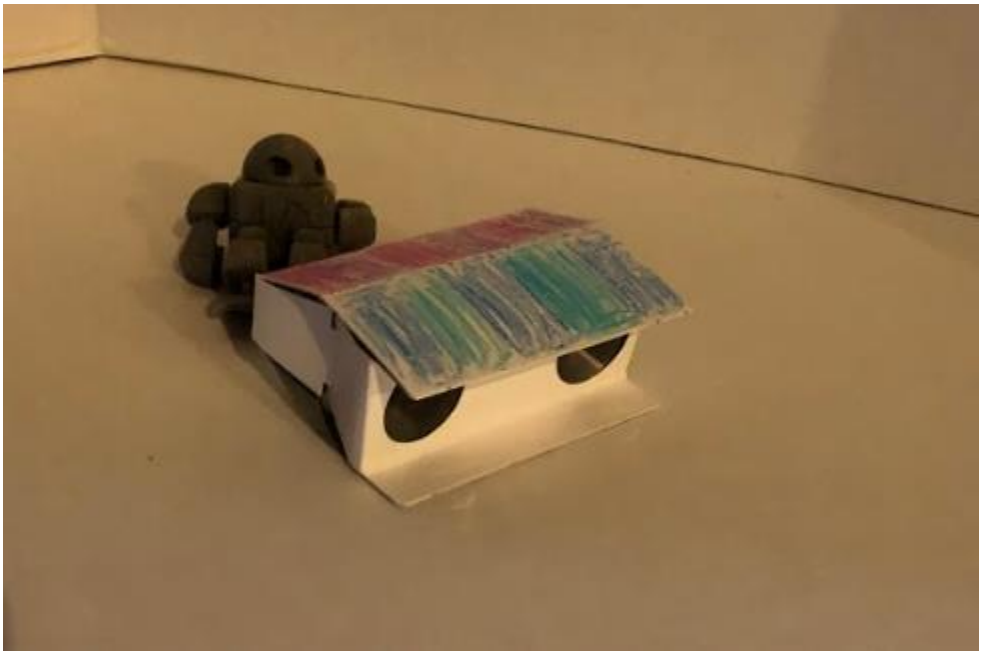
Give each girl 8 sandwich cookies, a printout, and popsicle sticks. The girls will then scrape off the crème on the cookies to create each phase of the moon in the correct circle on the worksheet.



Decorate and Use Binoculars

Time: 45 minutes

Badge: Brownie Space Science Adventurer: Step 2



Supplies: Foldable Paper Binoculars (Oriental Trading), Coloring supplies

Give each girl a pair of the binoculars. Let them decorate them as they wish. Using the binoculars, go on a scavenger hunt. An example list is shown below.

- Bird
- Water
- Tree
- Bug
- Airplane
- Butterfly
- Squirrel

Build a Mars Rover

Time: 30 minutes

Badge: Junior Space Science Investigator: Step 4

Supplies: Paper, Pencils, KNEX

Divide the girls into groups. Have each group design and sketch a Mars rover, including any equipment they think it should have, such as cameras or antennas. After they finish their sketch, the girls should build a prototype of their rover using KNEX.

Bedroom Planetarium

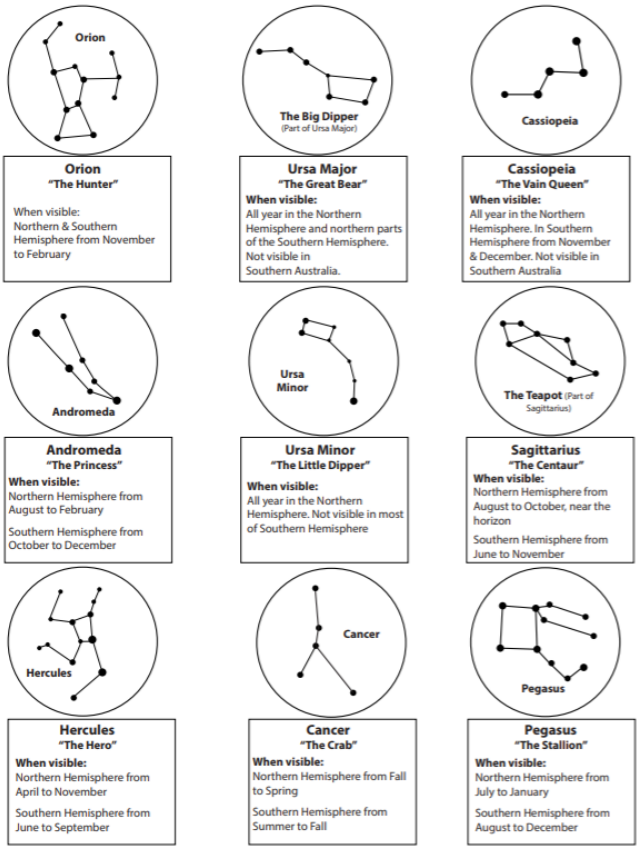
[Taken from *Steam Kids*, pages 52-53]

Time: 45 minutes

Badge: Brownie Space Science Adventurer: Step 4

Supplies: Cardboard Tubes, Worksheet, Pushpins, Duct Tape, scissors

Use the Bedroom Planetarium worksheet from the appendix. Give each girl a set of 4 cardboard toilet paper tubes and a worksheet. Have them cut each tube in half, creating two shorter tubes from each one, and cut out each circle from the worksheet. Place a constellation circle face up on the sticky side of a piece of duct tape. Use a pushpin to poke through each star in the constellation map. Place tape on end of cardboard tube. Tape information card to side. Repeat for all constellations.



Space S.W.A.P.S.

(Special Whatchamacallit Affectionately Pinned Somewhere)

Time: 60 minutes

Badge: Brownie Space Science Adventurer: Step 5, Junior Space Science Investigator: Step 5

Puzzle Piece Aliens

Supplies: Puzzle Pieces, Paint, Googly Eyes, Glue, Safety Pins, Markers, Paint Brush

For each SWAP, you will need one puzzle piece. Paint the puzzle piece a solid color. Use a second color to paint spots. Glue on googly eyes and use a marker to draw the rest of the face. Glue a safety pin onto the back.

Shooting Stars

Supplies: Star Beads, Pipe Cleaners, Safety Pins, Scissors, Tacky Glue

Put a star bead on a safety pin. Cut a few small pieces of pipe cleaner. Fold pieces in half. Add glue to the bent side and push it inside the star bead.

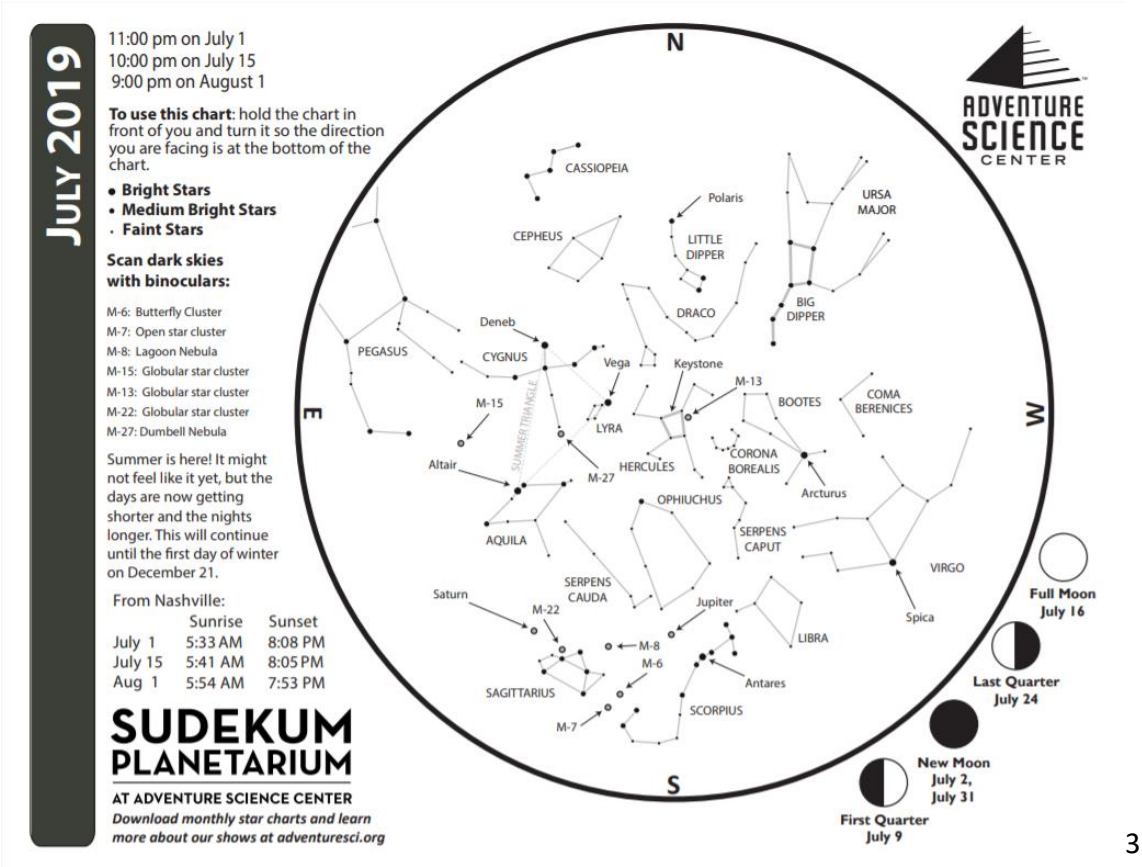
After the girls finish their S.W.A.P.S., leave them to dry. Later, have each girl trade her S.W.A.P.S. with another girl, so no one ends up with the one they made.

Find a Constellation

Time: 30 minutes

Badge: Junior Space Science Investigator: Step 3

Supplies: Worksheets



[3]

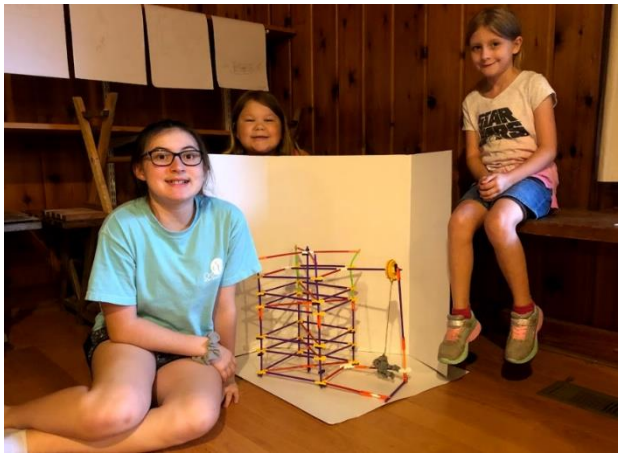
[3] "July 2019." *Star Charts*, Adventure Science Center, www.adventuresci.org/starcharts.

Mechanical Engineering Stations

Badge: Brownie Leap Bot Design Challenge: Steps 2-5, Brownie Fling Flyer Design Challenge: Steps 2-5, Brownie Race Car Design Challenge: Steps 2-5, Junior Paddle Boat Design Challenge: Steps 2-5, Junior Balloon Car Design Challenge: Steps 2-5, Junior Crane Design Challenge: Steps 2-5

Crane

Total Time: 90 minutes



Design

Time: 15 minutes

Supplies: Large notepad, pencils

Divide the girls into multiple groups. Have each group draw out a design for a KNEX crane on a large notepad.

Build

Time: 20 minutes

Supplies: KNEX

Let each group build their design with KNEX and string.

Test

Time: 20 minutes

Supplies: Objects to pick up (popsicle sticks, etc.)

Let each group try to pick something up with their crane.

Brainstorm Ways to Improve

Time: 15 minutes

Supplies: None

Have each group discuss how they could improve their design.

Analyze and Share

Time: 20 minutes

Supplies: Large notepad, pencils

Gather the groups together and have each group show their crane and talk about what they learned.

Rubber Band Paddle Boat

Total Time: 90 minutes

Design

Time: 15 minutes

Supplies: Paper, pencils

Split the girls into groups. Let each group design a rubber band paddle boat. A good idea is to cut a boat shape out of the cardboard, and then cutout a rectangular section to later attach a paddle. A rectangular piece of cardboard attached with rubber bands and tape makes a good paddle.

Build

Time: 20 minutes

Supplies: Cardboard, Scissors, tape, rubber bands, markers

Let each group use the provided supplies to build their boat.

Test

Time: 20 minutes

Supplies: Small swimming pool or other container

Use a small swimming pool to test each group's design.

Brainstorm Ways to Improve

Time: 15 minutes

Supplies: None

After testing, let each girl talk about what they could have done to improve their design.

Analyze and Share

Time: 20 minutes

Supplies: Large notepad, pencils

Get groups back together and let each group present their project. Let them talk about their design and any problems and improvements.

Fling Flyer

Total Time: 90 minutes

Design

Time: 15 minutes

Supplies: Paper, pencils

Split the girls into groups. Have each group design a rubber band-powered paper airplane.

Build

Time: 20 minutes

Supplies: Cardstock, paperclips, tape, popsicle sticks

Using the supplies provided, have each group build their designed fling flyer.

Test

Time: 20 minutes

Supplies: Tape, measuring tape

Tape a line on the floor. Starting from behind the line, see how far each fling flyer will go.

Brainstorm Ways to Improve

Time: 15 minutes

Supplies: None

After testing, let each girl talk about what they could have done to improve their design.

Analyze and Share

Time: 20 minutes

Supplies: Large notepad, pencils

Get groups back together and let each group present their project. Let them talk about their design and any problems and improvements.

Leap Bot

Total Time: 90 minutes

Design

Time: 15 minutes

Supplies: Paper, pencils

Split the girls into groups. Have each group design a spring-powered leap bot.

Build

Time: 20 minutes

Supplies: wire, cardboard, pipe cleaners, decorations

Using the supplies provided, have each group build their designed leap bot. Wire or pipe cleaners can easily be made into a spring by wrapping them around a cylindrical object.

Test

Time: 20 minutes

Supplies: None

Let each group test their leap bot to see how high it can jump.

Brainstorm Ways to Improve

Time: 15 minutes

Supplies: None

After testing, let each girl talk about what they could have done to improve their design.

Analyze and Share

Time: 20 minutes

Supplies: Large notepad, pencils

Get groups back together and let each group present their project. Let them talk about their design and any problems and improvements.

Balloon Race Car

Total Time: 90 minutes

Design

Time: 15 minutes

Supplies: Paper, pencils

Split the girls into groups. Let each group design a balloon-powered race car.

Build

Time: 20 minutes

Supplies: Balloons, Empty water bottles, tape, KNEX

Let each group build their design with the supplies provided. The top portion of a water bottle makes a good funnel for the balloon, and a part of a second balloon can be used to control how much air goes through.

Test

Time: 20 minutes

Supplies: Cardboard, glue, markers

Have the two groups work together to build a small track for their cars, and then see how far they can get.

Brainstorm Ways to Improve

Time: 15 minutes

Supplies: None

After testing, let each girl talk about what they could have done to improve their design.

Analyze and Share

Time: 20 minutes

Supplies: Large notepad, pencils

Get groups back together and let each group present their project. Let them talk about their design and any problems and improvements.

Egg Drop

Time: 30 minutes

Badge: Junior Programming Robots: Step 1

Supplies: Plastic grocery bags, straws, tape, rubber bands, raw eggs, trash bags

Divide the girls into groups. Let each group use the materials provided to build some sort of protection for the egg so that it can be dropped from a height without cracking. Give the girls 15 minutes to build their container. Take all of the projects to the drop zone. Use trash bags to cover the ground where you are dropping them. Drop all projects from the same height and see if the egg is cracked in the process. If none crack, try again from slightly higher.

Physics Talk

Time: 20 minutes

Badge: Brownie Leap Bot Design Challenge: Step 1, Brownie Fling Flyer Design Challenge: Step 1, Brownie Race Car Design Challenge: Step 1, Junior Paddle Boat Design Challenge: Step 1, Junior Balloon Car Design Challenge: Step 1, Junior Crane Design Challenge: Step 1

Supplies: None

Potential Energy is stored energy. Kinetic energy is energy of motion.

Springs store potential energy when compressed or pushed together, and they release kinetic energy when they are let go.

Force is the energy that makes things move. Thrust is a force that moves something forward. Lift is a force that pushes up on an object. Friction is what causes resistance.

Buoyancy is the force that acts on something in water.

Jet propulsion is what happens when water or air shooting out from an object makes it move in the opposite direction, like a balloon.

Simple machines include pulleys, wedges, levers, screws, and wheel and axles. Compound machines are made of multiple simple machines.

** Hint: The more interactive this is, the better this will go. **

Crack a Code

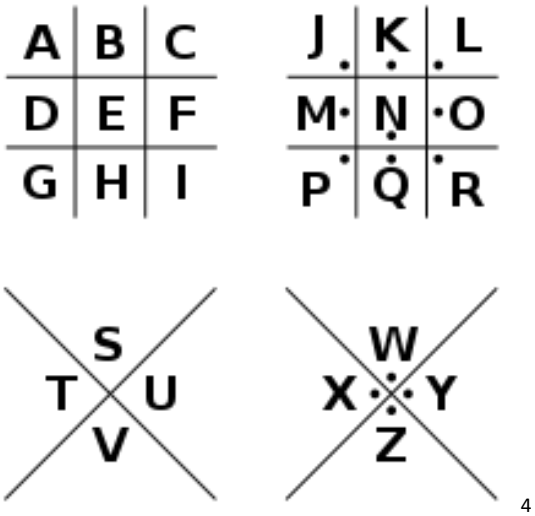
Time: 30 minutes

Badge: Brownie Cybersecurity Investigator: Step 1, Junior Cybersecurity Investigator: Step 1

Supplies: Printouts, paper, pencils

Pigpen code is show below. Each letter is represented by the piece of the shape they are in.

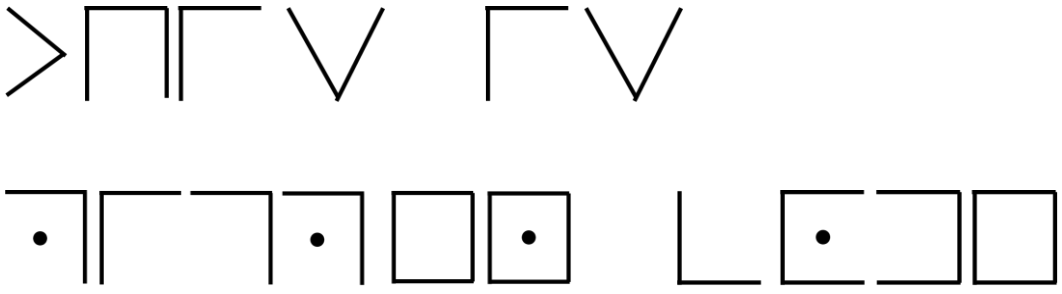
There is a handout in the appendix for the girls to use to write their names.



[4]

Example:

This is pigpen code



[4] "Pigpen Cipher." *Wikipedia*, Wikimedia Foundation, 10 May 2019, en.wikipedia.org/wiki/Pigpen_cipher.

How Online Messages Travel

Time: 15 minutes

Badge: Brownie Cybersecurity Basics: Step 5, Junior Cybersecurity Basics: Step 1

Supplies: None

Messages are sent in packets. Most pictures or messages are too big to send in one message. The message is broken down into smaller pieces and sent in many small messages called packets.

Online Security

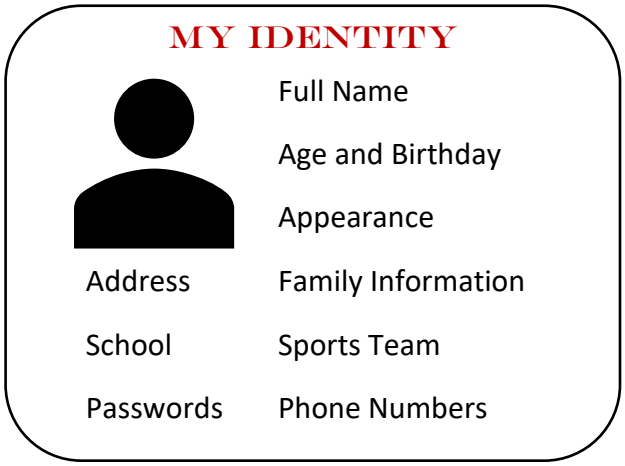
Time: 30 minutes

Badge: Brownie Cybersecurity Basics: Step 3, Brownie Cybersecurity Safeguards: Steps 1-2, Junior Cybersecurity Safeguards: Steps 1-3 and 5, Junior Cybersecurity Investigator: Steps 3-4, Cadette Netiquette: Step 4

Supplies: ID Cards Printout (IN APPENDIX)

Discuss what information is part of your identity. Talk about why it is important to keep this information private. Hand out one ID card to each girl. Tell the girls to keep any information on this card private.

Keep these things in mind when creating a username or password. When creating a password, work with a parent or guardian to try to make sure it is strong enough.



Networks and Technology

Time: 15 minutes

Badge: Brownie Cybersecurity Basics: Steps 1-2, Junior Cybersecurity Basics: Step 2

Supplies: None

Most of us use technology every day now, from phones to computers, and any device connected to the internet. This includes all kinds of things, from lights and washing machines to traffic lights and fire alarms.

Can the girls come up with any examples they use?

For computers or any electronic devices to be able to communicate, they have to be on a network. A network connects multiple devices with internet. The internet acts as a kind of bridge between devices.

Viruses, Malware, and Cyberattacks

Time: 10 minutes

Badge: Brownie Cybersecurity Investigator: Steps 4-5, Junior Cybersecurity Basics: Step 5, Junior Cybersecurity Investigator: Step 2

Supplies: None

A virus is a software program that someone made to cause harm. Once a virus is on your computer, it can cause harm by adding bad code to your computer or destroying your information. You can avoid viruses by only clicking on links and emails that you know are safe and by installing anti-virus software on your computer that will look for and get rid of viruses before they can cause damage.

Malware is a malicious (or harmful) software. It can be used to attack devices. A virus is one example of malware.

Cyberattacks are attacks by one (or more) computer on another. This can be to disrupt a connection, or even sometimes to steal information. This is especially important in big companies with lots of important information, so they have people whose job is to find new ways to prevent cyberattacks.

** Hint: The more interactive this is, the better this will go. **

Protocols

Time: 30 minutes

Badge: Daisy How Robots Move: Step 2, Junior Cybersecurity Basics: Steps 3-4

Supplies: Colored tape, blindfold (optional)

A protocol is a set of rules that says exactly how something should be done.

Lay out a path like a maze on the floor. Have the girls pair up. Have one girl come up with a set of instructions to go through the maze, and have the other girl follow the instructions (even if they aren't quite right!). For an extra challenge, have the girl who is walking through the maze wear a blindfold.

For a computer protocol, the computer won't know if the rules it is following are incorrect, it will simply follow them. One example of a computer communication protocol is called a handshake. One computer sends out a request, the other receives and understands the request, and then the request and acceptance of it are acknowledged by the sender. All of these steps must be done before messages can be sent.

Pictures and Messages: Real vs. Fake

Time: 20 minutes

Badge: Brownie Cybersecurity Investigator: Step 2, Junior Cybersecurity Investigator: Step 5

Supplies: Photos, projector (optional)

People can make pictures and emails that aren't real. Sometimes these are real but sometimes they are not. Here are some pictures in which part of the photo is real but part is edited. See if the girls can tell which parts are real and which are fake. Larger versions of the photos to print are included in the appendix to show the girls.

[5]

[5] Shovova. "Interview: Creative Dad Photoshops His Kids Into the Funniest Situations." *My Modern Met*, 3 July 2018, mymodernmet.com/john-wilhelm-funny-family-photos/.

[6]

[6] Shovova. “Photoshop Expert Visualizes a World Where Giant Animals Roam the Land.” *My Modern Met*, 24 May 2018, mymodernmet.com/giant-animals-surrealism-mani-photography/.

Digital Footprints

Time: 15 minutes

Badge: Brownie Cybersecurity Investigator: Step 3, Junior Cybersecurity Safeguards: Step 4, Cadette Netiquette: Step 1-2

Supplies: None

When you are on the internet, some information gets left behind. This is called your digital footprint. This is partly why after something is posted online it can never truly go away. These are just like real footprints; they are left behind in your path and can sometimes give some information about you. Be careful and make sure you aren't leaving any personal information behind. This is also why we need to make sure we are saying nice things; once they are said, we can't fully take them back.

Challenge: Over 2 weeks, send a kind message to someone each day.

Online Rules and Quiz

Time: 25 minutes

Badge: Brownie Cybersecurity Basics: Step 4, Brownie Cybersecurity Safeguards: Steps 3-5, Cadette Netiquette: Steps 3 and 5

Supplies: Printouts

Ten Rules:

[Taken from *Brownie Cybersecurity*]

1. **Don't talk to strangers online**
2. **Always check with an adult before going on a computer**
3. **Always have an adult with you when you're on a computer**
4. **Tell an adult if you feel scared or uncomfortable when you are on a computer**
5. **Don't share your password with anyone**
6. **Never give your private information to anyone online**
7. **Never open emails, files, or webpages without an adult's permission**
8. **Follow your parents' or school's rules for going online**
9. **Be careful about who and what you trust online**
10. **Be careful when you use your school's devices or your friend's devices**

Next, go through the quiz on the next page, which is from *Junior Cybersecurity*.

Are You CYBER SAVVY?

Take this quiz and see how cyber savvy you really are.

1. You just received an email from a rich person who wants your help. He has lots of money in another country but can't move it. He asks you to send him money. He says he will pay you back what you send him and then he will give you a bonus of extra money just for helping. What do you do?
   - a. Send a note back saying you know this is a scam.
   - b. Delete the email—tell an adult.
   - c. Forward the email to your friends.
   - d. Write back—it sounds cool!

2. You are shopping online and a window pops up saying that you have a virus. It says, "Click to resolve the issue." What do you do?
   - a. Click and follow the directions.
   - b. Close both the virus window and the shopping site window and don't return to the site.
   - c. Hit the "back" button.
   - d. Close the pop-up window.

3. How often should you back up your devices?
   - a. Once a day
   - b. Once a week
   - c. Whenever you create new files
   - d. When you think there may be a problem

4. You "meet" someone nice online. They tell you they are your age and ask what school you go to. They want to meet you in person. What do you do?
   - a. Give your name and make a time to meet.
   - b. Tell the person to stop bothering you.
   - c. Tell your parents or another trusted adult. Show them the email.
   - d. Give your name and school but don't meet.

Answers on page 23

Answer Key: 1. B; 2. B; 3. C; 4. C

Badge List

Daisy

What Robots Do

How Robots Move

Design A Robot

Brownie

Programming Robots

Designing Robots

Showcasing Robots

Space Science Adventurer

Leap Bot Design Challenge

Fling Flyer Design Challenge

Race Car Design Challenge

Cybersecurity Basics

Cybersecurity Safeguards

Cybersecurity Investigator

Junior

Programming Robots

Designing Robots

Showcasing Robots

Space Science Investigator

Paddle Boat Design Challenge

Balloon Car Design Challenge

Crane Design Challenge

Cybersecurity Basics

Cybersecurity Safeguards

Cybersecurity Investigator

Cadette

Programming Robots

Designing Robots

Showcasing Robots

Netiquette

Appendix

New Age Chart

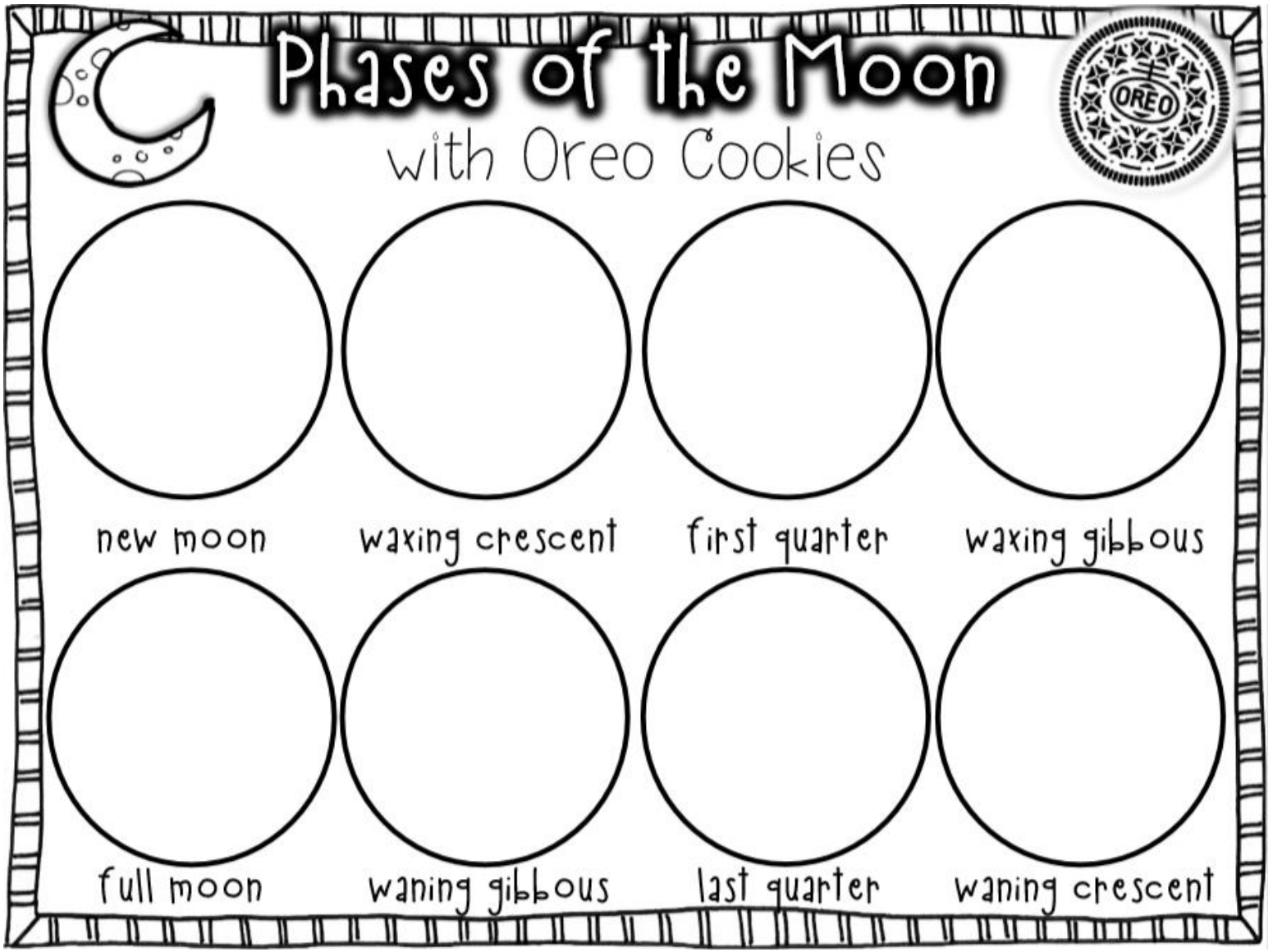
My age in Earth days (age x 365) =_____ Earth days.

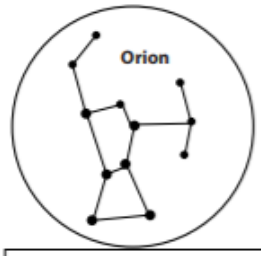
Terrestrial Planets	Approximate length of year	Your "new" age
Mercury	88 Earth days	
Venus	225 Earth days	
Earth	365 Earth days	
Mars	687 Earth days	

Outer Planets	Approximate length of year	Your "new" age
Jupiter	12 Earth *years*	
Saturn	29.5 Earth *years*	
Uranus	84 Earth *years*	
Neptune	165 Earth *years*	
Pluto	248 Earth *years*	


OPERATION
ATTENDANCE


MTSU
sme



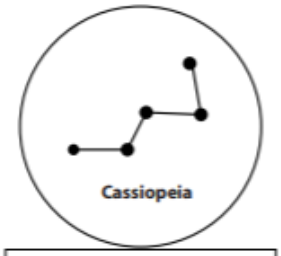


Orion
"The Hunter"

When visible:
Northern & Southern Hemisphere from November to February

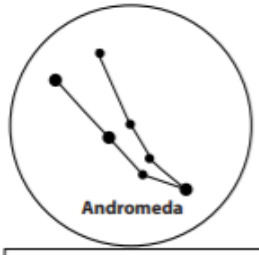
Ursa Major
"The Great Bear"

When visible:
All year in the Northern Hemisphere and northern parts of the Southern Hemisphere. Not visible in Southern Australia.



Cassiopeia
"The Vain Queen"

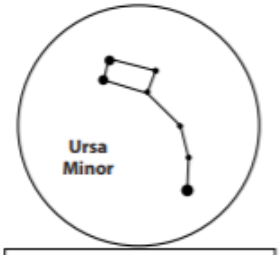
When visible:
All year in the Northern Hemisphere. In Southern Hemisphere from November & December. Not visible in Southern Australia



Andromeda
"The Princess"

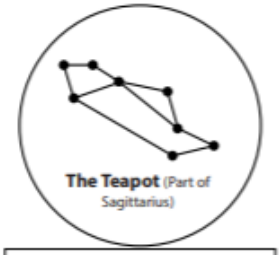
When visible:
Northern Hemisphere from August to February

Southern Hemisphere from October to December



Ursa Minor
"The Little Dipper"

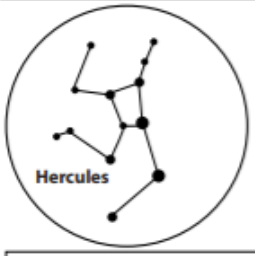
When visible:
All year in the Northern Hemisphere. Not visible in most of Southern Hemisphere



Sagittarius
"The Centaur"

When visible:
Northern Hemisphere from August to October, near the horizon

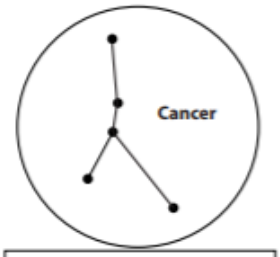
Southern Hemisphere from June to November



Hercules
"The Hero"

When visible:
Northern Hemisphere from April to November

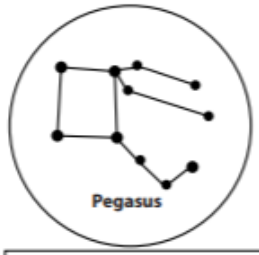
Southern Hemisphere from June to September



Cancer
"The Crab"

When visible:
Northern Hemisphere from Fall to Spring

Southern Hemisphere from Summer to Fall



Pegasus
"The Stallion"

When visible:
Northern Hemisphere from July to January

Southern Hemisphere from August to December

JULY 2019

11:00 pm on July 1
10:00 pm on July 15
9:00 pm on August 1

To use this chart: hold the chart in front of you and turn it so the direction you are facing is at the bottom of the chart.

- **Bright Stars**
- **Medium Bright Stars**
- **Faint Stars**

Scan dark skies with binoculars:

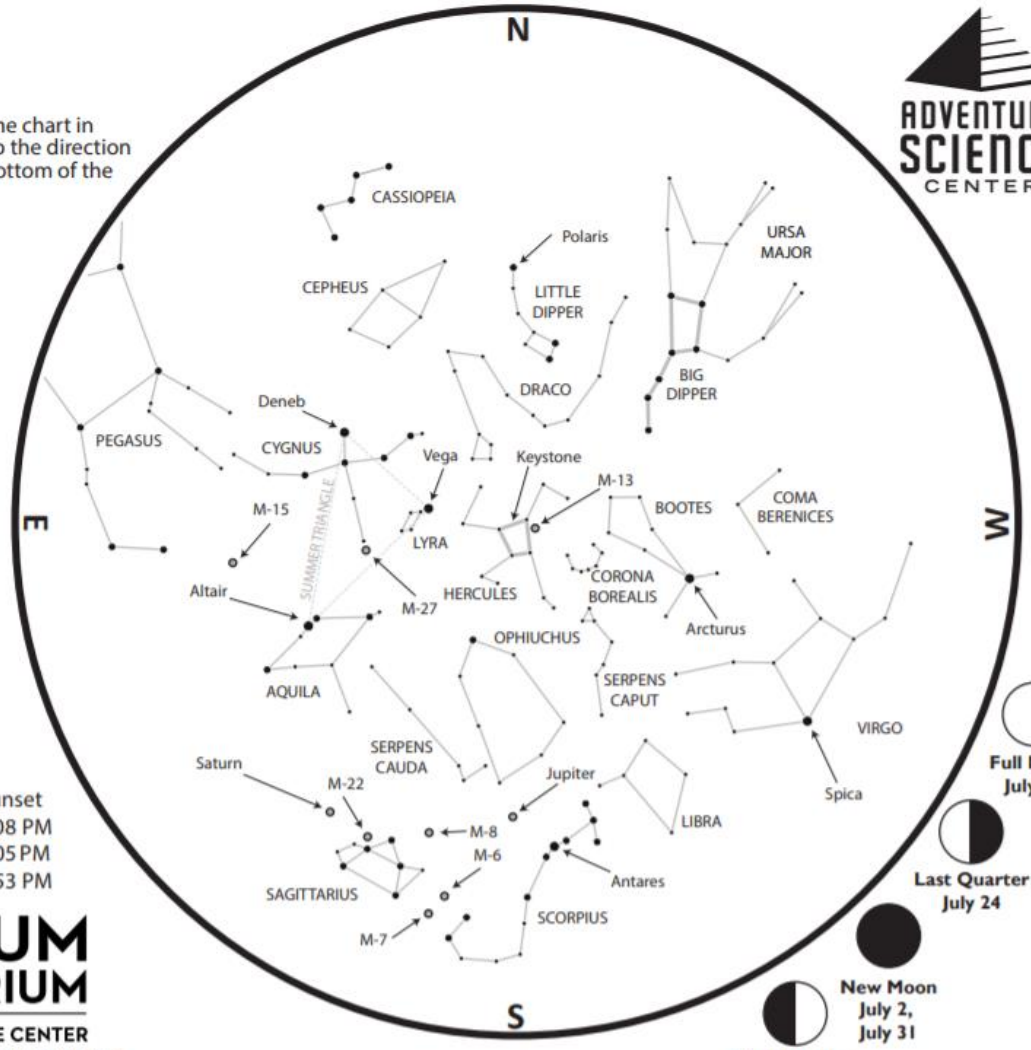
M-6: Butterfly Cluster
M-7: Open star cluster
M-8: Lagoon Nebula
M-15: Globular star cluster
M-13: Globular star cluster
M-22: Globular star cluster
M-27: Dumbell Nebula

Summer is here! It might not feel like it yet, but the days are now getting shorter and the nights longer. This will continue until the first day of winter on December 21.

From Nashville:

	Sunrise	Sunset
July 1	5:33 AM	8:08 PM
July 15	5:41 AM	8:05 PM
Aug 1	5:54 AM	7:53 PM

SUDEKUM PLANETARIUM
AT ADVENTURE SCIENCE CENTER
Download monthly star charts and learn more about our shows at adventuresci.org



ADVENTURE SCIENCE CENTER

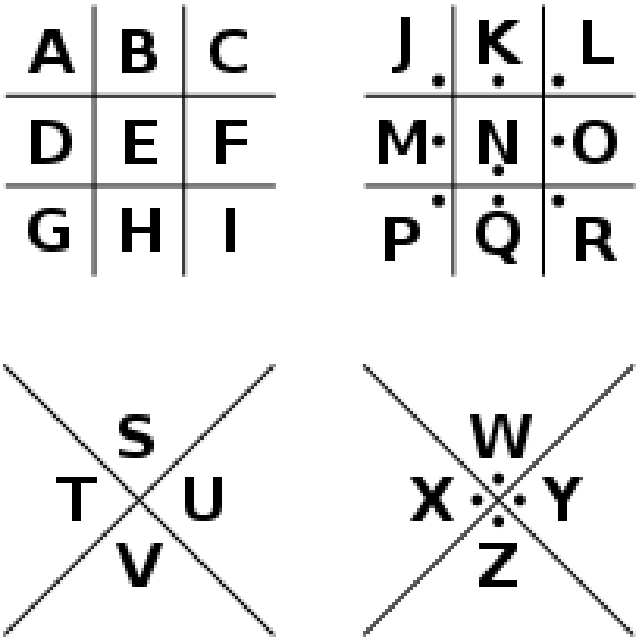
Full Moon
July 16

Last Quarter
July 24

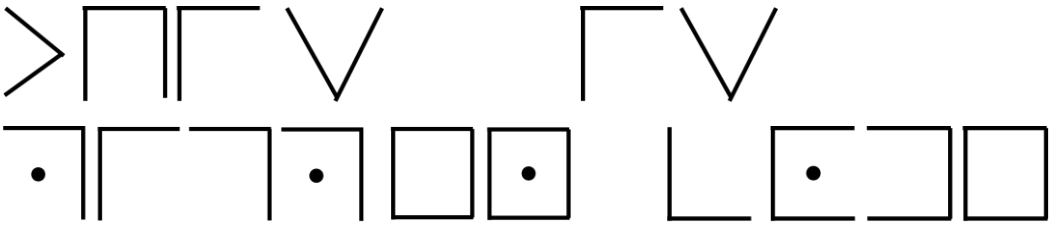
New Moon
July 2,
July 31

First Quarter
July 9

Pigpen Code



Example: This is pigpen code



Write your name below in Pigpen Code:

MY IDENTITY

Full Name
Age and Birthday
Appearance
Address
Family Information
School
Sports Team
Passwords
Phone Numbers

MY IDENTITY

Full Name
Age and Birthday
Appearance
Address
Family Information
School
Sports Team
Passwords
Phone Numbers

MY IDENTITY

Full Name
Age and Birthday
Appearance
Address
Family Information
School
Sports Team
Passwords
Phone Numbers

MY IDENTITY

Full Name
Age and Birthday
Appearance
Address
Family Information
School
Sports Team
Passwords
Phone Numbers

MY IDENTITY

Full Name
Age and Birthday
Appearance
Address
Family Information
School
Sports Team
Passwords
Phone Numbers

MY IDENTITY

Full Name
Age and Birthday
Appearance
Address
Family Information
School
Sports Team
Passwords
Phone Numbers

Ten Rules

[Taken from Brownie Cybersecurity]

1. Don't talk to strangers online
2. Always check with an adult before going on a computer
3. Always have an adult with you when you're on a computer
4. Tell an adult if you feel scared or uncomfortable when you are on a computer
5. Don't share your password with anyone
6. Never give your private information to anyone online
7. Never open emails, files, or webpages without an adult's permission
8. Follow your parents' or school's rules for going online
9. Be careful about who and what you trust online
10. Be careful when you use your school's devices or your friend's devices

Appendix C: Surveys

Science Interest Survey

					
I would like to be given a scientific experiment as a present					
I like to talk to friends about science outside of school					
I like joining science clubs or groups					
I like to read about science					
I enjoy watching science programs on TV at home					
I like to read books about science during school breaks					
I would like to work as a scientist					
It is interesting earning a living in a science environment					
I will enjoy being a scientist					
A career in science would be interesting					
A job related to science would be interesting					
I feel that the work of a scientist is good fit for me					
Science is doing more good than harm					
I feel that science helps to make life pleasant					
More money should be spent on science					
People should study science					
I feel science improves our lives					

Science Interest Survey

	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree
I would like to be given a scientific experiment as a present					
I like to talk to friends about science outside of school					
I like joining science clubs or groups					
I like to read about science					
I enjoy watching science programs on TV at home					
I like to read books about science during school breaks					
I would like to work as a scientist					
It is interesting earning a living in a science environment					
I will enjoy being a scientist					
A career in science would be interesting					
A job related to science would be interesting					
I feel that the work of a scientist is good fit for me					
Science is doing more good than harm					
I feel that science helps to make life pleasant					
More money should be spent on science					
People should study science					
I feel science improves our lives					