

Criterion A: investigate

Introduction

Grade 9 students are about to start with the final product of their steady hand games. Each student has to choose a theme for his/her steady hand game, and point out its potential significance.

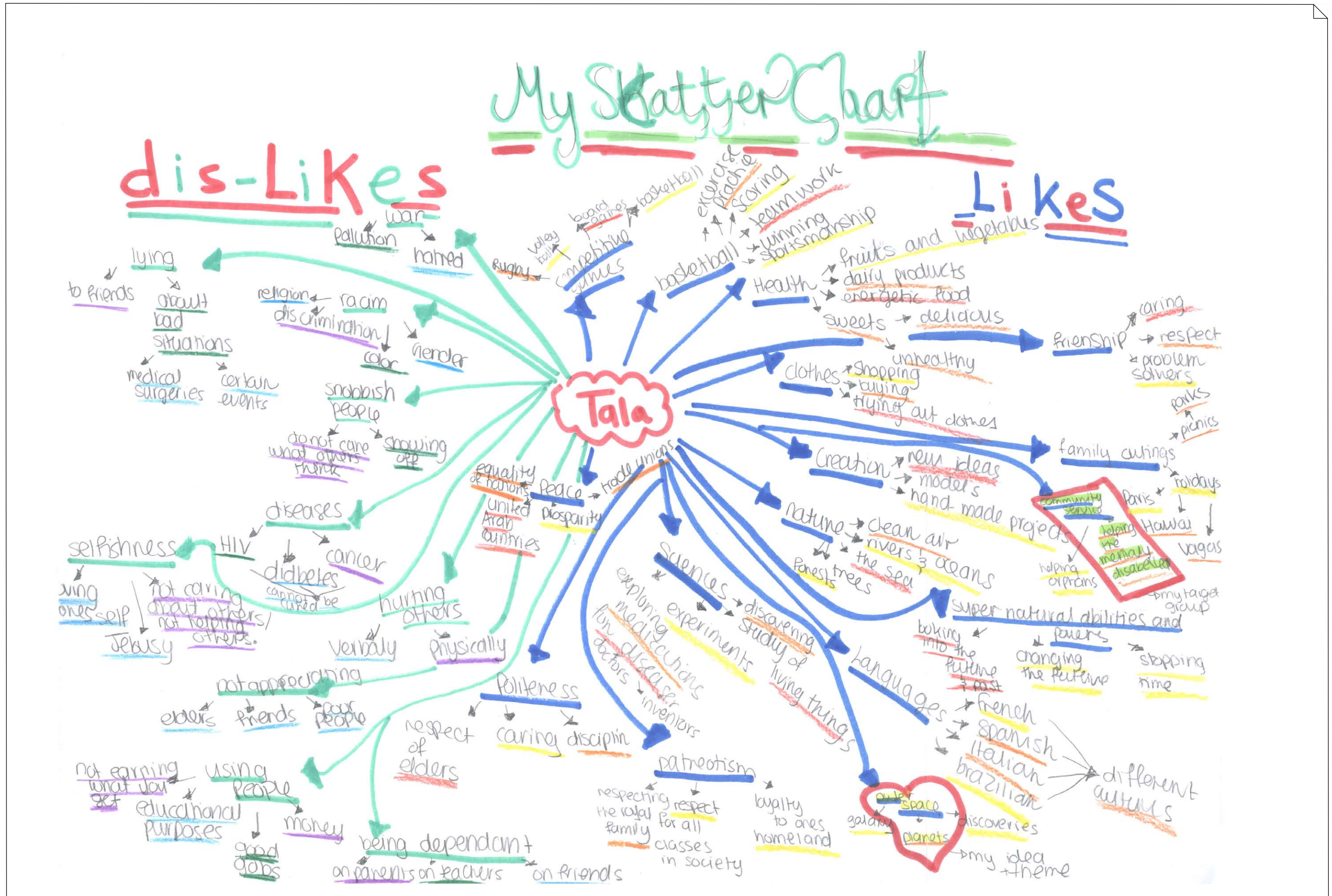
Before starting the final product we were asked to investigate, so that we would get a clearer image of what we have to do, and get introduced to: the components in the game, a history of electronics, and manufacturing techniques. We also are also learning how to come up with a unique idea, from our interests, this was done by our scatter chart, which pointed our like and dislikes, from our likes, we chose a topic, that we are interested in, and made it a theme to our project.

This investigation includes a brief idea of the history of electronics, electric components in general and in a steady hand game, brief idea of my theme and its potential significance, manufacturing techniques, case studies, and much more. All this information made us confident to start with our final product, since all we have to do is follow some steps, we learned from our investigation.

The theme I chose, is “outer space”, I did not choose this topic, just because I like to discover space. It is because; I realized that it’s hard for us to imagine how space looks like. If it is hard for us, then it’s extremely difficult for the mentally disabled in centers, this steady hand game would be an object of their entertainment, and at the same time would give them an idea of how outer space looks like. When they play with the game, they start to concentrate, and this would help their hand eye coordination, and develop their ability to learn and write.

I found my potential significance extremely interesting, for no one had ever thought of the mentally disabled having difficulties in understanding outer space, and by this game their hand eye coordination would develop, which would hopefully expand their capacitance of learning and grasping onto ideas they see.

I hope that I would be successful in this product, which will follow this investigation, which is a major part of the whole project. I also hope that you would benefit something yourselves from reading the steps to produce our steady hand game, and understand its major aim, along with the entertainment it could bring about.



Questionnaire

<u>Question</u>	<u>Yes</u>	<u>No</u>	<u>Percentage of those who answered yes</u>	<u>Comment</u>
Do you believe that a steady hand game develops hand eye coordination?	15	5	75%	Good percentage of the people I asked are aware, of the main of purpose being the steady hand game.
Can a steady hand game solve a medical issue?	13	7	65%	Although I didn't know that a steady hand game could help reduce a medical problem such as Parkinson's. 65% of the people I asked knew this fact. This shows that people are aware of the importance of this game.
Do you think that a steady hand game with a background about space would help the mentally disabled understand what space looks like?	15	5	75%	I am really pleased with this percentage, as people are really convinced of my theme and its potential significance.
Do you believe that a steady hand game could help a person focus?	17	3	85%	This is a good percentage, which shows that people are aware of the importance of a steady hand game for focusing
Do you think that if the game lacks one component it would still work?	4	16	20%	As the answer is supposed to be no. Only a small percentage answered yes, which indicated that people have a small background about electrical components in the

				game.
Do you find the game in shops by the amount it's supposed to be according to its importance?	7	13	35%	The answer should be definitely, no since when we visit shops, we do not find steady hand games purchased for sale, yet 35% percent of the people I asked think that it is, his is because probably they never asked for it in a shop, and think that its available
Have you ever played with a steady hand game	11	9	55%	The game is not very well known in our society despite its importance, therefore we should work on developing the game so that it becomes more interesting
If yes! Were you able to reach the other end without contacting the wire	9	11	82% (9/11)	A good percentage of those who played the game where able to reach the end without contacting the wire, this indicates the reason why the game is not purchased. At many times people find it too easy to play, and win.
Do you believe that each person should put in an effort to help the mentally disabled? Or is it the job of the centers and organizations?	20	---	100%	WOW! The 30 people I asked are aware that each person should put in an effort to help the mentally disabled by any method, and as a part of our society, I am going to help them by donating the steady hand game to the center, to help them understand what outer space looks like and develop their hand eye coordination

Interview
Steady hand game

1- In your opinion, should wood or acrylic be used as a box containing an electric circuit? And why?

both can be used

2- What would be easier to shape and color? Wood or acrylic?

wood acrylic is easier to change shape, yet wood is easier to change color

3- Can metal be used as a base for the steady hand game, where it contains an electrical circuit, or is it dangerous since metal is a conductor?

No, it will short out the circuit and is not efficient, and its difficult to shape

4- Are you familiar with any other material that could be used instead of wood or acrylic?

Normal plastic sheets.

5- If I decide to use a wooden base, would you recommend soft or hard woods?

for small projects soft woods are recommended, since their easier for finishing, sanding...

6- What is the most important electrical component to be well functioning in a steady hand game?

transistor, its the main automatic switch

7- Will I be able to use more than one LED in my steady hand game, or will it be too difficult?

yes, the light would be lighter, light intensity.

8- Are there any requirements for shaping the wire or the wire follower?

No it depends on your design ability and imagination, at many time it goes with the flow.

9- Any other advice you would like to give me before I start the design of my game?

Thank you.

Materials used in a steady hand game

The steady hand game is mainly made up from three different areas:

1. Box base made out of wood, acrylic, or plastic
2. Wire, and wire follower, from a metal
3. Printed circuit board with the components.(mentioned above)

The main body to hold the circuit (base) could be made out of 2 different materials, the one used would be according to what I choose, and find most appropriate, and therefore I have to study the 2 different materials that could make my box:

1- **Wood**: it has many advantage that could make it possible to use in the steady hand game, such that:

- ☑ Its easy to work with, since its glues easily, and is warm to the touch
- ☑ It gives an attractive appearance
- ☑ It is cheap and can be obtained easily
- ☑ Heat and electric insulation, which means that it is safe to use as a box base containing the electric components.

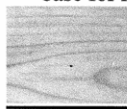
On the other hand wood:

- ☑ Needs a lot of protection against insect and fungi, since it expands and absorbs water
- ☑ It splits along the grain, and its wraps and shrinks when it dries
- ☑ Cannot be cast
- ☑ It has a limited size.

There are different types of wood in which I can use:

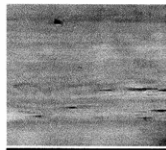
1-*Softwoods*: they come from conifer trees, they are soft, cheap and available, they also have cellular systems. Examples of softwoods are:

- ☑ Pine: it works easy, and finishes well. It resists shrinkage, and is used in modeling boxes. Since it is used in modeling boxes, then I could use it as a base for my steady hand game. It insulates and easy to work with.



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- ☑ Hemlock: its light in weight, it machines well, and is uniformly textured



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- ☑ Fir: easy to work with, and finishes well, like pine. It has low resistance for decay. It could also be used for my base, since its easy to work with

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Steady hand game: brief understanding. <http://www.design-technology.org/TheSteadyHandGame.htm>

The web page mentioned above could not be reproduced for copyright reasons. It represented however an excellent example of critical thinking where the student highlighted the relevant information and then annotated the reasons for her choices.

My interview with Mr.

Since my interview with MR.  had to do with the materials in a steady hand game, then I decided to put the interview in this section of the project.

1- In your opinion, should wood or acrylic be used as a box containing an electric circuit? And why?

Both can be used, since they both can be shaped as a box, and they are both insulators. You can also combine both to produce your box.

2- What would be easier to shape and color? Wood or acrylic?

Acrylic is easier to shape, yet wood is easier to paint and change its color.

3- Can metal be used as a base for the steady hand game, where it contains an electrical circuit, or is it dangerous since metal is a conductor?

No. It will short out the circuit, and it's not efficient for the job. Even if it was not a conductor, it's still difficult to shape, and join the parts together.

4- Are you familiar with any other material that could be used instead of wood or acrylic?

Normal plastic sheets can be used, since they make the acrylic, and have the properties you want for the box containing the electric circuit.

5- If I decide to use a wooden base, would you recommend soft or hard woods?

For small projects, softwoods are recommended, since they have an easier finishing, and are lighter. They are also easier to sand.

6- What is the most important electrical component to be well functioning in a steady hand game?

The transistor, since it's the main automatic switch, and without it, huge circuits are needed, since the transistor takes the place of many components that were used in earlier times.


7- Will I be able to use more than one LED in my steady hand game, or will it be too difficult?

Yes, but you would not have a high light intensity, and the lights would be dim.

8- Are there any requirements for shaping the wire or the wire follower?

No. It depends on your design, ability and imagination; it usually has something to do with the theme.

What I have concluded:

If I am aiming to color the base, then MR.  recommends using woods since they are easier to color. On the other hand if I want to have a complex shape for the base, then it is more appropriate to use acrylic. I am not aiming to use more than one LED, since the lights would become dimmer, and would not grab the attention of the player, when he/she comes in contact with the wire, since all his/her concentration is put into the game. I will also try to shape the wire follower as something related to my theme, to grab the attention of the player.

Case studies

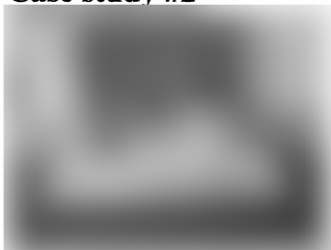
Looking at different themes and steady hand games, would really help me brainstorm ideas, and potential significances, therefore I have decided to choose some steady hand games, and evaluate them in order to get a clearer image of how would the game be successful.

Case study #1:



A student in grade 9 last year made this steady hand game, Students last year are our role models in what they have produced. Therefore I am looking at this game in order to analyze it. The theme of his/her game was drink your milk, so that you would grow and become a basketball player, which indicates being tall. The target group of this student I think were children to aware them of the importance of milk. The student was successful to make the game attention grabbing due to the use of colors, which gives a very nice effect in which the children would enjoy. The base was made out of acrylic, and the LED was placed in the middle. The wire was shaped as a basketball board, and the base as a court. In my opinion it's a very creative game, especially the almonds used for the handle, looking like basketball. I really happen to like his/her idea.

Case study #2



This steady hand game was also made by a student in grade 9 last year. The theme of this game is a city, probably New York. The wire was shaped as the structure of a building. In my opinion this student was not very creative, the colors used, are quite dull, and I cant point out hand made things in this game. I am not quite sure who is the target group of the person, as the theme does not clarify a target group, yet shows us that this student wants to elaborate our ideas of a certain city.

Case study #8



I can't point out any potential theme significance of this steady hand game, but the level of creativity is high. I like the design of the wire, and the shape of the handle, which looks neat, with the plastic base.

From the case studies, I realized that I would like to have my wire seem like part of the drawing on the base or background. I would also like to have the handle related to my theme

Requirements in a steady hand game:

- 1- Having an electronic circuit with the LED
- 2- Main wooden body made out of wood or acrylic
- 3- Having a shaped wire with a wire follower or handle, that has a crooked end
- 4- It must test the hand eye coordination skills
- 5- It should give an audible or visible alert when contact between the wire and the wire follower is made
- 6- The game must have a potential significance
- 7- It must have a set of rules

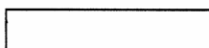
Equipment needed:

- 1- Manufacturing tools
- 2- Paper connecting blocks
- 3- Printed circuit board with all the components in the circuit
- 4- Wires
- 5- Battery clips
- 6- Wooden or acrylic base
- 7- Extra long handle
- 8- Soldering tool
- 9- Machine that makes holes in the printed circuit board
- 10- Markers

My steady hand game

My idea:

From my scatter chart, I have realized that I like to help people; I also found out that I like to discover and get to know more about outer space. I decided to combine both ideas, to produce a steady hand game that will have outer space as a theme, and would be sent to the mentally disabled, to give them an idea of how space looks like, since they find it hard to think and imagine something they do not see in front of their eyes. This game would develop their hand eye coordination whilst they are having fun, and being challenged. The name of my game is “outer space in a steady hand game”



My target group:

Mentally disabled, to have them get an idea of how outer space looks like, by playing continuously with the game, since it is hard for them to imagine such a thing.

Potential significance of game:

This game is not just a method of entertainment it has aims deep within it in which we are benefiting while we are having fun.

The potential significance of the steady hand game is:

- 1- Helps develop hand eye coordination, since when a person is playing with the steady hand game, he has to try and focus with his/her eye, to get his/her hand move in the right directions. It helps the person coordinate between his hand and an eye simultaneously, which helps in the daily lives of people where they have to copy something down.
- 2- Helps in focusing, where if a person plays the game, he would start to focus, to get his hand moving in the right direction, this could help him if he has a focus task to do further on. For example it could be used in doctors clinics, to help a doctor concentrate and focus before going into an operation, so that he could coordinate his hand and eyes simultaneously.
- 3- Reduces tension, people who are always shaking due to fright and being scared of an event coming up, could play this game, it would calm them down and stop them from shaking, since by this game they are coordinating the movement of their hands
- 4- Used for entertainment, the game could be a subject for fun, where people make up competitions to find out who has the best hand eye coordination, and get the handle to the other end without contacting the wire
- 5- Could help in solving medical problems. People with Parkinson's could use this game to reduce their hands shaking, with continuous trials, their hand shaking movements could be reduced, since they are practicing to keep their hands in coordination, and moving precisely in a certain direction

- 6- It will help small children start writing, where it makes their hands firmer.

Potential significance of theme:

My theme is about outer space, its potential significance is:

- 1- It would give the mentally disabled an idea of how outer space and the planet looks like and it would make them more aware, since they find it hard to imagine complex things.
- 2- It would help me discover new facts about outer space, and the new planets that are being discovered, as I research ideas for my background and base
- 3- Help me develop creative ideas, since there are many ideas I could use for outer space
- 4- Teach me how to arrange different shapes such as the planets in the steady hand game

Design Brief:

Design and make a steady hand game that has a circuit inside a box shaped structure, in school within 4 weeks. It should have an LED and a buzzer that will light when the wire follower is in contact with the wire. The game must have a potential significance.

Design Situation:

I work in the mentally disabled center. Patients learning here, are not able to grasp the concept of what outer space looks like, since they cannot imagine something they cannot see in front of their eyes, they also have poor hand eye coordination. The center thinks that these patients are capable of understanding a brief idea of how outer space looks like, after looking at it for numerous times. They would not look at a board or a photo. They need something that would entertain them and at the same time teach them about the planets and outer space and develop their hand eye coordination. I need a steady hand game that has a theme of outer space, which will develop their hand eye coordination, entertain them and teach them about outer space, when they play with the game for a number of times. Please test the device before sending it.

My Product Design Specifications (P.D.S)

<u>Essential</u>	<u>Desirable</u>
Printed circuit board	Audible output(buzzer or speaker)
Wire shape	Using more than one LED
Compartment for circuit	Using recycled parts
Handle-wire follower	Combining acrylic and wood to use them in the same compartment
Visible output(LED)	Wire shape related to the theme
Having a theme	Colorful and creative
Done within a specific period(creation period-3weeks)	Shaping the base(circular or rectangular) and being creative in decorating it
Not too complicated	Parts sticking out of the background or compartment
Having a potential significance	Place to put the handle
Using available materials	Using materials from nature eg.leaves
Using cheap materials	Having a background that contains different shapes.
Related to the theme	Joining materials such as wood, acrylic and metal to produce the game
Having a background related to the theme	

Conclusion

From my investigation, I have concluded, that I am mostly going to use acrylic as a base since it's easier to shape. On the other hand I might use wood only if I needed to color the base, since wood is easier to color, according to what MR. [REDACTED] had mentioned.

The importance of a steady hand game had also come to my notice, since before this investigation, I just thought of it as an entertaining game, and did not realize the deep aim within in, which is mainly hand eye coordination. I based my theme on what I like, which is exploring outer space, I related my theme to community service, were I am aiming to donate this game to the mentally disabled so that they would become more aware of outer space, with repetitive playing with the game. It would also develop their hand eye coordination, which is extremely important to develop their learning skills.

I have also learnt how to annotate the research information I have, and question the information I got, by producing evidence of my research.

By relating the investigation to more than one area of interaction, I have clearly noticed the importance of this investigation in accordance to our MYP program, and our design cycle.

My questionnaire gave me a lot of background information and has made me decide to formulate one at the end of my task to evaluate my product against the design specifications

I want to see if others can understand the theme, play the game and achieve my goal.

This can be done by a process called product testing in which my target groups test the product and give me feedback.

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