Inquiry and Analyzing

- A **design brief** (up to **3** sentences) that clearly and concisely describes the team's process.

During the process of creating the machine, we have been struggling to think of designs, we also struggled to communicate together on the first few days but later on we improved on it, we tried many different actions and ways to make our machine have a connection with the theme. Now, we successfully achieved our goal by meeting the specifications and making the machine work.

Specifications

1) Song - make the machine able to play the song
2) Creativity - develop own ideas which are unique from other people
3) Clear - demonstrates the visual stimulus clearly
4) Must have three actions - pulley, inclined plane, lever
5) Visual Stimulus - reflects the psy trance theme

- **Research** from at least **5** different sources of information, include one non-Internet

1) History - In 1942, Reuben Lucius "Rube" Goldberg exhibited a Rube Goldberg machine called "*Automatic Hitler-Kicking Machine*". Rube Goldberg was famous for designing overly complicated machines to do quite simple tasks. Goldberg didn't create any machines that he designed, but after people discovered his designed they were inspired and started to try it out . Goldberg's machines include birds, monkeys, springs, pulleys, feathers, dominos, rockets, and other various tools to create chain reactions. His machines are so extraordinary and complex that it has impacted the world. Goldberg's first Rube Goldberg machine is made in 1914.
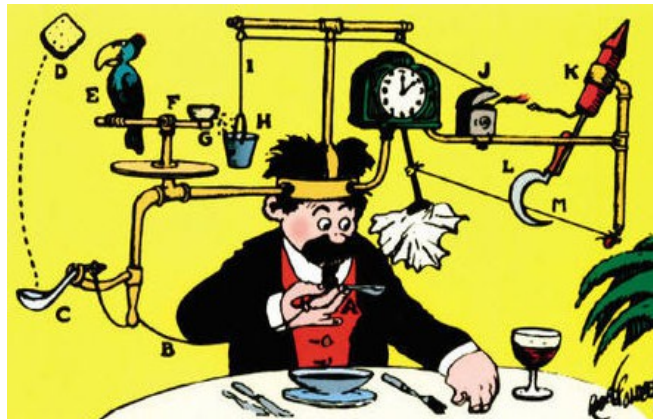
2) Examples of Rube Goldburg Machines

OK Go:

Their Rube Godberg machines are huge and it does various actions. Such as the pulley, gear, wedge, lever, and many more. Their machine is very accurate and precise because of their great timing. Their machine also connects to the song that is playing while everything is happening. I think that this can relate to our theme which is the Psy Trance.

3) How to Build
- Decide on the task of your machine (what you want it to do)
- Work backwards to plan + brainstorm all the different parts of the machine
- Pick your location/area
- Sketch and plan your machine
- Start creating your machine, step by step, little by little
- Try your machine again and again until it is perfect

- A **bibliography** in MLA format showing all sources researched.

"10 Brilliant Rube Goldberg Machines." *Cool Material*. N.p., n.d. Web. 13 Nov. 2013.

      <http://coolmaterial.com/roundup/rube-goldberg-machines/>.

"How to Build a Homemade Rube Goldberg Machine." *Wiki How*. N.p., n.d. Web. 14

      Nov. 2013.

      <http://www.wikihow.com/Build-a-Homemade-Rube-Goldberg-Machine>.

"How to Make a Rube Goldberg Machine." *Lisa Graff*. N.p., n.d. Web. 13 Nov. 2013.

      <http://www.lisagraff.com/rube-goldberg-machine.html>.

OK Go - This Too Shall Pass - Rube Goldberg Machine Version - Official. N.p., n.d.

      Web. 14 Nov. 2013. <http://www.youtube.com/watch?v=qybUFnY7Y8w>.

"Rube Goldberg Machine." *Wikipedia*. Wikimedia Foundation, n.d. Web. 13 Nov. 2013.

      <http://en.wikipedia.org/wiki/Rube_Goldberg_machine>.

Target - Fresh Machine (Rube Goldberg). N.p., n.d. Web. 14 Nov. 2013.

      <http://www.youtube.com/watch?v=6-TG6SNNL6I>.

Developing Ideas
- The range of **design ideas** (a minimum of **3**) that the team developed.

1) The first design we intended to create didn't include enough "actions". There was only the inclined plane. We planned to start with the dominos and then make it ascend to the top of the black box by putting it on top of cups of different heights. And after it reaches the top of the black box, the domino will then hit the ball placed there. The ball would hit the cups full of paint which we had put at the edge so that the paint would spill onto the canvas below. That was how we were going to express our visual stimulus of psy trance. But we discovered later that we weren't allowed to use any liquid, animal or electronics. Therefore, we needed to brainstorm more new creative ideas.

2) This picture above is our second design. This version is very similar to our final design (third one). Although the pulley and some other parts are modified in the final version. In this one, the pulley is still two cups on each side, but it didn't work out well so we changed it after. There was still no inclined plane in this second design. There's supposed to be one inclined plane used on top of the pulley (it's combined with the pulley) and another one at one side of the black box so that the marble would be able to roll down. The other difference is that there is still no image set up on the floor yet.

3) So this is our final rube goldberg machine from the top view. There, you can see the top view (although it may be too far) of our machine. The inclined plane is already constructed on top and at the side of the black box. You can also see the image made of colorful domino sets which is the second part other than the music which reflects our visual stimulus.

- Your team's **final machine design choice** with clear justification.
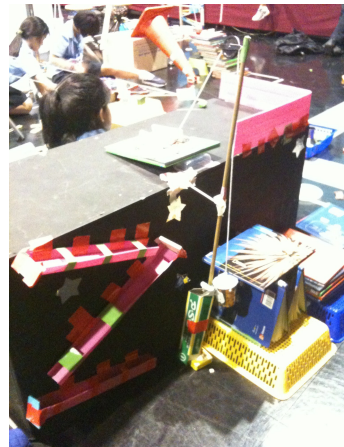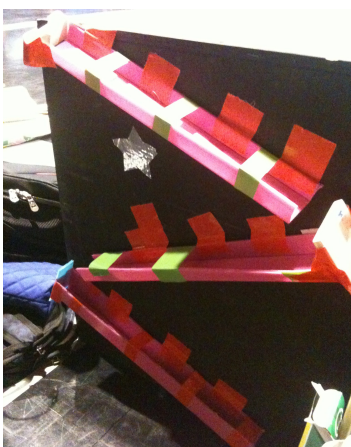
These are some snapshots of our final Rube Goldberg machine. The main "actions" shown in these pictures are the pulley and the inclined plane. The first picture is the inclined plane which is used as the track for the marble to travel down to hit the

domino set at the bottom. The second picture is our machine (though the beginning and finishing point of the machine is a little cut of). And the third picture is the pulley we made. One side is the cup, and the other is the weight used to block the marble from rolling to the dominos. Throughout the days our Rube Goldberg have improved a lot but it is still not that consistent because the machine didn't work all the way through, there were still small problems which prevented it from being able to successfully run through. We chose this design because when compared with the other designs, this is the most effective one and works out the best. It seems more creative and unique, and it also have more "actions" than the other ones.

Creating the Solution
- **Photographic evidence** of your collaboration and creativity.
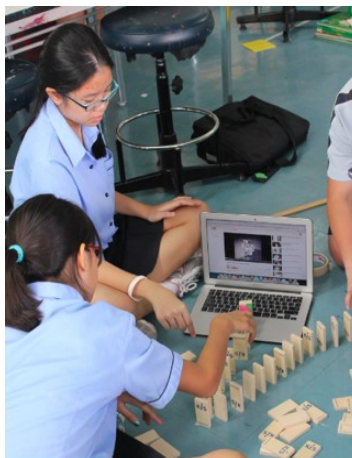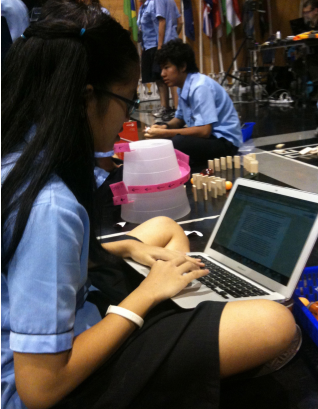
Evaluating
- A **critical evaluation** of how well your team tested their design specifications to achieve the goal.

Specifications

1) Song - make the machine able to play the song ***Pass***

2) Creativity - develop own ideas which are unique from other people ***Pass*** As a collaborative group, we were able to come up with our own original ideas for the rube goldberg machine. However, we do not know did other groups use the same concept/idea as ours. We were also able to come up of one idea which we are sure that no one else used it which is to use the dominos to create an image.

3) Clear - demonstrates the visual stimulus clearly ***Pass*** Our visual theme is psy trance which we understand as the visual characteristic of music. In the machine, we were able to make it open the music on the computer successfully and we are also working on creating an image using dominos.

4) Must have three actions - pulley, inclined plane, lever ***Failed*** We only had two actions including the pulley and inclined plane. We tried making the lever but it wasn't successful. But Mr.Park said it was okay because we already had a lot of functions and parts in the whole machine so the lever (the third action) isn't needed.

5) Visual Stimulus - r*eflects the psy trance theme* ***Pass*** We were able to reflect the theme by playing the song and also creating an image using dominos at the end.

- A description of **changes** made throughout the design cycle process.

Day 1 : We've realized that the machine doesn't have to generate just to paint. Instead it can express the characteristics by other things such as the waving flags, or the beat of the bouncing balls.

Day 2 : We have modified and changed the first design. It became more effective and efficient though it still must be improved because sometimes the domino didn't work and the pulley was also not very consistent. At first, we had two cups on each side of the pulley but it wasn't successful. So we used the idea of putting weight on one side blocking the marble and when the cup on the other side gets heavier, the weight will be pulled up and the marble will be able to pass. It was very successful this time. We've decided to not do the painting (paint cup) at the end because liquids aren't allowed in the machine. Therefore, we developed the idea of using the domino to create the picture/image itself. We've also added music into our machine by letting the dominos fall on the computer keyboard so that it would start the music.

Day 3 : We used the same model today but the pulley still didn't work. The domino didn't fall into the cups of the pulley every time so it wasn't very consistent. But fortunately, the dominos worked all the way. Another problem is that though we didn't start painting the dominos which will be used for the image yet, but we think there wouldn't be enough. Today we added another incline plane to the machine so that the marble would roll down and be able to hit the domino set at the end. Most parts of the machine worked well throughout today's consistency test but small little bits of it made it unable to work through the whole thing. We will need to find a way to make it work effectively.

Day 4 : Today we decided to change the domino image at the end of the machine. First, we planned to create the image of a colorful KIS sign to express our visual stimulus. But it wasn't successful so we changed it to just a mixture of different colors instead, more simple but still reflects our psy trance theme.

- A description of **how the machine could have been improved**.

We should make the machine more efficient and consistent because during the tests we did on Thursday for 4 times, none were successful. We need to find a way to modify and adjust our rube goldberg machine so that it would always work properly through the whole thing.