

Design Problem:

KIS Students are known for thinking outside of the box. After all, the name of our school stands for Knowledge, Inspiration, and Spirit. It's not always about knowing the facts, but also about putting that extra enthusiastic spirit into our work. KIS students are smart, but they're also motivated and truly inventive. As this week is dedicated to the design cycle, it gives us a chance to show the IB world that KIS has the most creative and collaborative students in Thailand!

Design Brief:

In order for us as KIS students to show the IB world that we ARE the most creative and collaborative students in Thailand, we decided to create and design a Rube Goldberg machine to perform three simple tasks throughout the design. To exercise our minds to our full potential, we have set minimum requirements for our machine to have at least 2 potential energy sources and perform at least 3 actions to perform a simple task.

Works Cited

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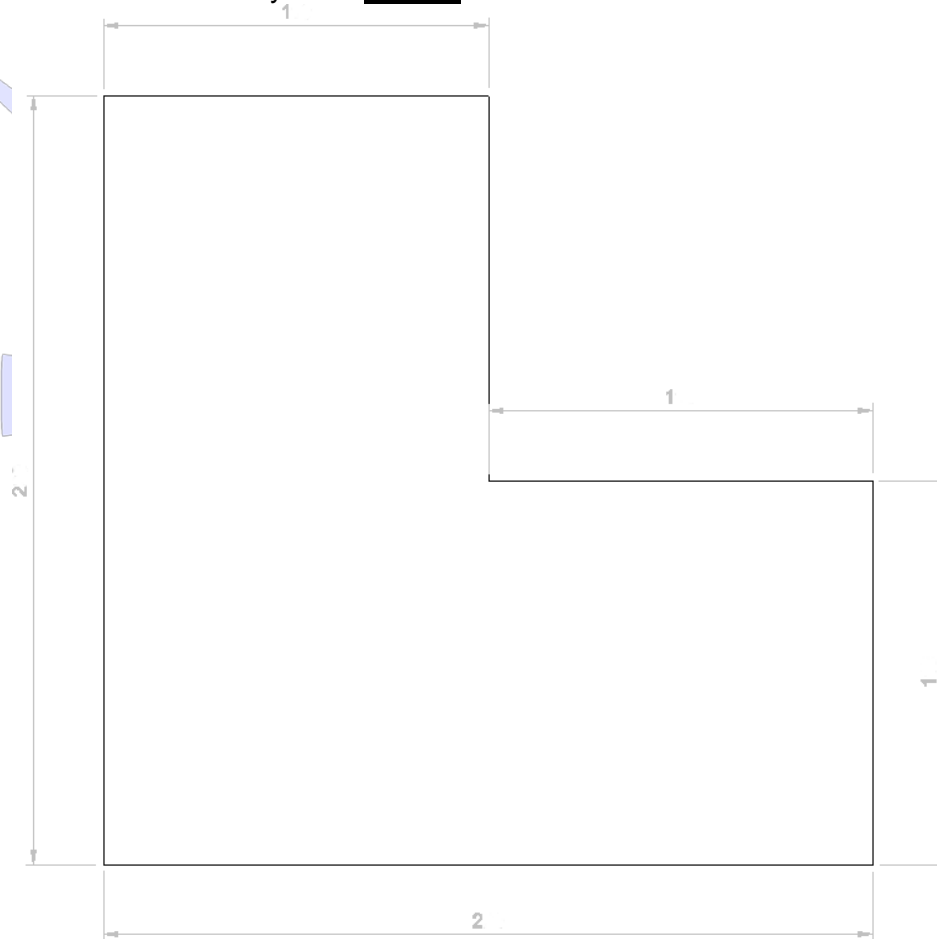
Specification for Rube Goldberg Machine: From your investigation, produce a detailed bullet pointed list of the specifics of *your group's* design. Remember to **justify and explain each point.**

<p>Function – (What will it do?) “Our design will ...”</p>	<ul style="list-style-type: none"> • Our design will perform at least 3 tasks and will begin and end with dominoes. <p>Our design performed around 3 tasks also having 3 different special features supporting it.</p> <ul style="list-style-type: none"> • Our design will have at least 2 potential energy sources good enough to continue the flow of other machines. <p>Our design 2 potential energy sources which splits into 2 different directions continuing the flow and attracting quite a bit of attention in the end.</p>
<p>Aesthetics –What <u>exactly</u> will your group's final design look like?</p>	<ul style="list-style-type: none"> • Our final design will be a complex machine with several simple and compound machines working together. <p>Our design wasn't as complex as we specified it would be, however there were some simple machines working together.</p> <ul style="list-style-type: none"> • The aesthetics of our final design will be based off the space we were given. In this case, our Rube Goldberg machine will be in a form of an “L” shape. <p>We didn't manage to entirely use the space given to us for our design, however we did use most of it when our design went 2 separate ways.</p>
<p>Extra features – What <i>realistic</i> special features would your design have?</p>	<ul style="list-style-type: none"> • Our design will have some special features (such as the confetti) to trigger a powerful potential energy source. <p>We substituted the confetti with a balloon as it is less costly and balloons wouldn't create much of a mess.</p> <ul style="list-style-type: none"> • Since we are required to have at least 2 potential energy sources and we were assigned an “L” shape, this would mean our design can move in multiple directions. So one of our special features would be the machine producing multiple potential energy sources in order to cover all the space given to us. <p>As stated before, we have 2 potential energy sources which eventually went into 2 separate directions.</p>
<p>Testing- How will you know if your design is successful</p>	<ul style="list-style-type: none"> • We will test our designs and extra features by using the measurements and dimensions of our given space, and test the physics of simple machines based on the measurements. <p>We tested our design on Thursday and fixed certain issues due to the amount of force used based on measurements.</p> <ul style="list-style-type: none"> • We can also test certain parts of the design such as the special features. This way we can improve/fix anything wrong we come across.

Specification continued:

- Our design could be about 2m in length and 2m in width, therefore making it a square shape.
- We were given an “L” shape so we wouldn’t have exactly 2x2 meters worth of space. However we can work around that.

Measurements of layout in meters:



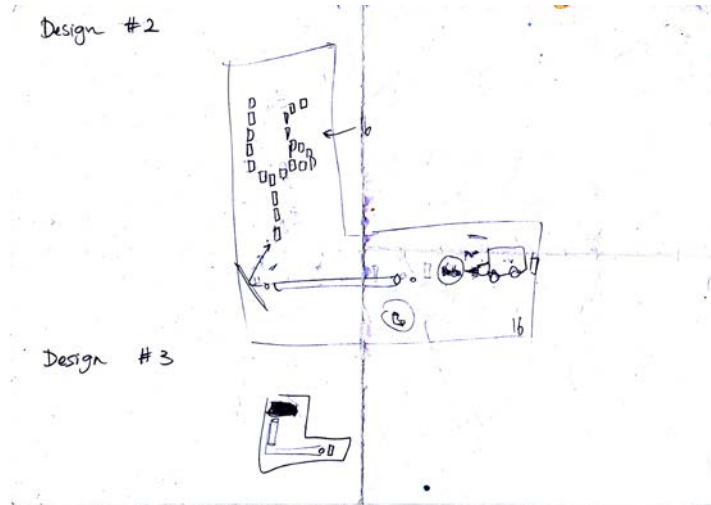
Dimensions

What sizes should it be

bad
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You have now completed the investigation stage

Design ideas: On the next few pages draw a range of different ideas for your Rube Goldberg Machine. Annotate each design by describing it. Clearly evaluate each idea and explain how you could improve it. (You can draw on paper and then either scan or photograph your drawings, then insert them here.).



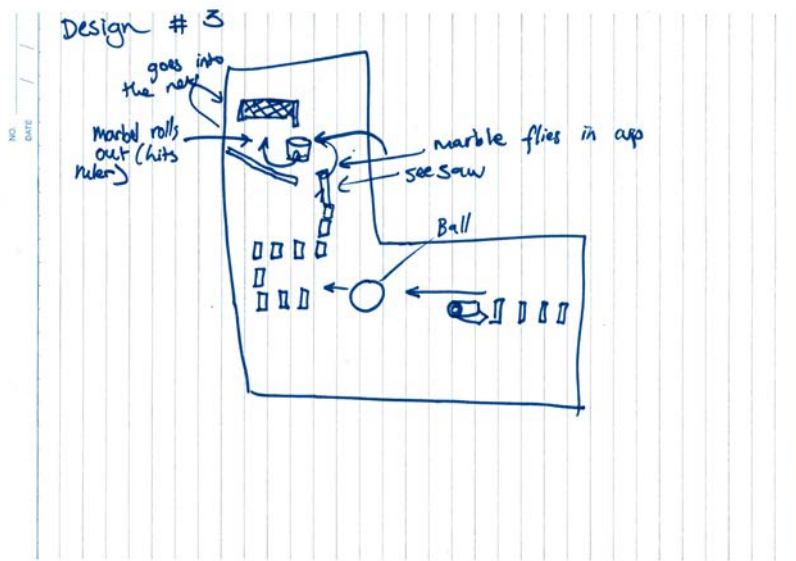
Good: What I like about this design is that it is simple to build and easy to set up. Its special feature is that it starts off with a truck popping the balloon with a needle stuck onto it. This special feature pops the balloon at the start of the design which makes it different from any other machines and is also another reason why I like it. Therefore, this special feature attracts a lot of attention at the start, capturing the audience's views throughout the run of our machine.

Bad: What I don't quite like about this design is it doesn't start with a domino which is required in our set specifications. Therefore, the group before us has to think of a way to use enough potential energy to start off our design. This wouldn't be possible as every group was specifically told to start and to end with a domino.

Improvements: What we can improve on this design as a group is that we can start off our design with the dominoes, and then use the truck to attract attention somewhere throughout the design. I also think we can add a few more features to this design making it more complex to perform more tasks.

Evaluation: Overall I think this is a good start to the main idea of what we would design. However, if our product were to perform more tasks, we can take the special feature of this design and add on more features using more potential energy sources.

Design ideas continued:



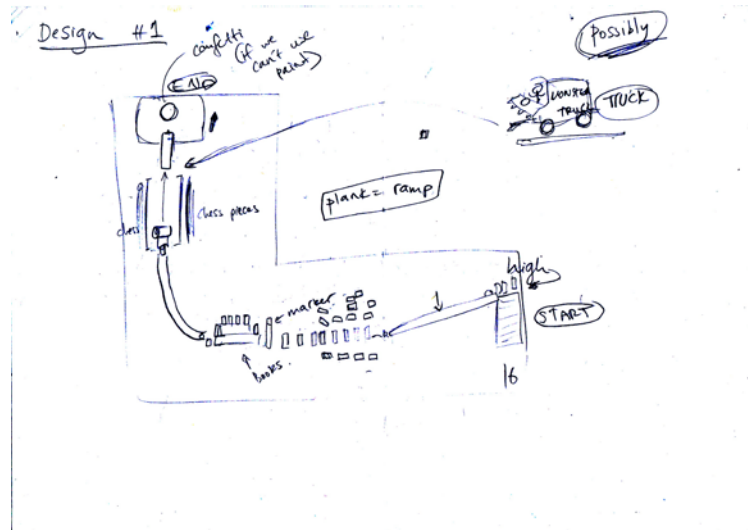
Good: What I like about this design is that there are more simple machines used in it. Such as the see-saw, which also consists of a lever and is a simple machine. What I also like about this design are the physics used in this design, as there will need to be certain measurements for the see-saw to elevate the marble into the cup.

Bad: What I don't quite like about this design is that there isn't really anything related to the picture it was supposed to be based off of. There was some paint splatter in the picture, and this design doesn't really quite have anything related to "splashing paint".

Improvements: What I think this design can improve on is, it needs something to trigger such as "splashing paint". A Rube Goldberg machine is supposed to be a design to help do a simple task. The objective has nothing related to the picture, so I don't think we will consider using this in our creation stage. However, we can use some of the ideas related to physics and merge them in our creation.

Evaluation: Overall I think this design can be quite successful as a Rube Goldberg machine, but it doesn't reveal the picture we were supposed to incorporate in it. Otherwise, I think parts of this design can be used as ideas during our creation.

Final Design: On this page draw out your final design. Justify your design and explain why you feel this is your best design. (Scan or photograph the drawing you did and insert it below)



Good: What I like about this design is that it is more complex than the previous 2 designs. Also this design relates to the picture our team was assigned because in the end, the machine will trigger either the confetti or a balloon. Therefore, this can represent the paint splatter on the image we were assigned.

Bad: This design does not show how our machine would continue triggering the next design. Basically, without dominoes ending our design, there wouldn't be enough potential energy to trigger the next Rube Goldberg machine. The confetti or balloon might attract attention however it doesn't trigger anything which is why we will have to make slight modifications during our creation stage.

Improvements: After the confetti or balloon is triggered, we can improve by adding another potential energy source to trigger the next Rube Goldberg machine. Also we can improve by describing what we're going to do a bit further in this drawing, by annotating what each feature would do.

Evaluation: Overall, I think this design is quite successful in terms of attracting attention and performing multiple tasks. However, I would still improve on it by adding or separating the machine to flow in 2 or more different directions to substitute the discontinuing flow of potential energy from the confetti.

I chose this design because....

It is the most fascinating for our audience and us. It is also annotated and explains what we need to do, as well as explains each special feature and what they are supposed to do.

Evaluation: Describe 2 problems you had while making your design. How did you solve these problems?

1.

- Problem – Difficulty connecting our design to the next group's machine
- Solved by – Splitting the design in 2, therefore having 2 potential energy sources and moving in 2 separate directions.

2.

- Problem – Difficulty popping the balloon to attract attention
- Solved by – We stuck the pins on the car with more tape, therefore making it sturdier.

Test your design: Test your design in as many ways as possible and record your results. Explain how you tested your design (These tests should be outlined in your original specification)

We have tested our machine consisting of a few simple machines. The machine successfully divided into 2 causing 2 separate potential energy sources. We didn't manage to cover up the amount of space we were given to build our machine, however it is still successful in terms of continuing with the flow of the other designs. Also the special features have been slightly modified towards the end as certain resources couldn't be provided.

What did your group find out about your design after you tested it?

We found out that our design had certain problems with angles and physics. Certain dominoes or marbles couldn't be knocked over or pushed because we didn't have enough energy at the start. In the end, we did a few slight measurements and tests to figure out exactly how much force we need to start the machine.

Product Evaluation: Think about your final Rube Goldberg machine model, and answer the questions below.

What do you like -Why? **I like the fact that our design has met most of our specifications due to the fact that we followed most of it during the creation stage. I especially like the fact that we used the specific measurements we found during the investigation stage.**

What do you dislike -Why? **What I dislike about this design is it's a bit too simple. Most of the features used in this design are quite commonly seen all around.**

How would you improve your design? **I would improve our group's design by adding more simple machines and a few compound machines. Therefore there would be more tasks it can perform.**

Best feature – Why **I think the best feature of this design is the specially designed inclined plane, because it slows down our machine meeting both our specifics and the requirements of the design.**

Evaluate your performance in each stage of the Design cycle: Explain your strengths and weaknesses at each stage of the Design Cycle and outline what you can do to improve at each stage.

Investigate: **Our strengths during the investigation stage were that we were able to brainstorm many ideas and have a main idea of what we were going to design. Although we had many ideas and seen many examples of Rube Goldberg machines online, our weaknesses were our lack of creativity skills. We could improve by coming out with our creative and realistic ideas that we can actually perform.**

Design: **Our strengths were that we were able to outline, annotate, and explain our ideas and how our final design would look like. However our weaknesses were that we were unable to provide more information on how we would construct our design if we were to use them as blueprints. We can improve by explaining and annotating each design more thoroughly.**

Create: **Our strengths in this stage were basically our collaboration. Most of our creativity skills weren't so great, however with combined effort, we were able to come out with an outstanding design most of us wouldn't expect of. However, what we lacked was creativity skills, so we were only able to come out with basic designs which every other group had. Improvements can be made if we had put in a bit more effort, but again we were also limited to a certain amount of time.**

Refer to the bolded text in pages 3-4 for evaluation against design specifications.

ATL's (Approaches Towards Learning): Name 2ATL's you used well during this project, and explain how you used them. ATLS are skills like Problem solving skills, researching, Use of ICT, Reflection, Working in Teams, etc.

1. Working in Teams

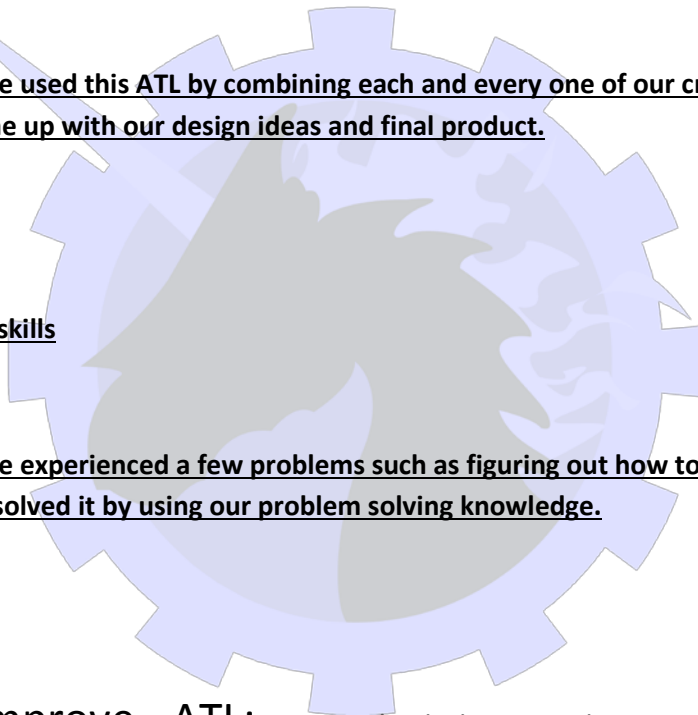
How you used it: We used this ATL by combining each and every one of our creativity skills to come out with our design. We also collaborated with our skills and experiences to come up with our design ideas and final product.

2. Problem solving skills

How you used it: We experienced a few problems such as figuring out how to start our design with a domino and immediately triggering the rest of the machine at a high level, and we solved it by using our problem solving knowledge.

Targets to improve - ATL: List 2 ATL's which you need to improve. How will you make sure you improve them on your next project?

1. Researching. How will you improve this ATL? I will improve this ATL by doing more researching especially in the investigation stage for Anthropometrics and Ergonomics so that I can find more measurements to help me create a more exact size of future designs.



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Targets to improve - Project: Outline 2 areas that you need to improve on for your next DCC project, and how you think you will achieve this:


1. Investigation skills. I will achieve this by asking friends and using more sources for information and in the future, I will double check to see if I missed out on anything or if I think I need to add more work to it.

2. Not rushing through my designing. I will spend more time drawing the design instead of rushing it through so that I can get a clearer design and spend time coloring and shading the design idea.

Project Grade: Now that you have thoroughly evaluated your final design, what grade would you give it out of 6? Why?

I would give my final design a **5/8** because

I don't think my design was a great design, since my investigation and most of my design ideas were being rushed. If I want to have a great final design, I will not rush anything through, and complete each and every step properly.



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