

# KISLAND



# TRANSPORT VEHICLES

## DESIGN CYCLE CHALLENGE WEEK

**An interdisciplinary, cross-grade level, MYP design cycle event ...**

The KISLAND Ministry of Transportation and the Ministry of the Environment and Engineering put out a call for experts to come help build a strong and cost effective bridge to link the two islands of KISLAND. It was a huge success and as a result, KISLAND continues to develop into a strong independent nation.

In the past year KISLAND's economy and population have continued to grow. There is now a greater need to transport materials between the two islands over the bridge. The Government is once again putting out a call for engineering experts to help the country in its mission to create its own safe transport vehicles.



# DESIGN CYCLE CHALLENGE



	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
1st period	Auditorium	<b>SPEED Test</b>	<b>ACCURACY Test</b>	<b>STOPPING Test</b>	Display and Prep
2nd period	Research and Marketing	Research and Marketing	Research and Marketing -or- Design & Building	Research and Marketing -or- Design & Building	<b>STOPPING</b>
3rd period					Presentations
4th period	Design and Build	Design and Build	Research and Marketing -or- Design & Building	Research and Marketing -or- Design & Building	Presentations
5th period					<b>ACCURACY</b>
6th period	Logo Design	Research and Marketing	Research and Marketing	Final Build and <b>CLEANUP</b>	Presentations
7th period	<b>STOPPING!</b>	Design and Build	Design and Build		<b>SPEED</b>



# RESEARCH & MARKETING



## AOI FOCUS: Human Ingenuity

How and why do we create?

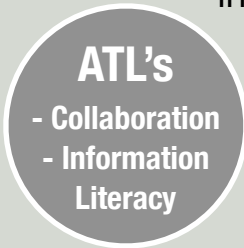
Have you ever wondered why there are different types of vehicles? Who came up with the designs and why?

Figuring out the answer to this question just may help you promote your own design!

## KISLAND Ministry of Transportation

The KISLAND Ministry of Transportation needs your help in transporting materials between the islands of KISLAND. During the RESEARCH & MARKETING portion of the project

you will research about vehicles, safety and marketing. This information will help you as you choose and create your own design, and market it.



QUESTION #1	QUESTION #2	QUESTION #3	QUESTION #4
<p><b>How have vehicles become more safe over time?</b> Include specific vehicle terminology</p>	<p><b>How have vehicles been marketed over time?</b> Include specific marketing techniques</p>	<p><b>How have vehicles helped develop countries?</b> Consider economic and social impacts of transportation</p>	<p><b>Personal inquiry:</b> Create your own question(s) about the development of transportation.</p>

# Research and Marketing Rubric

	1	2	3	4	TOTAL
<b>A</b> <b>KNOWLEDGE</b>	The group provided an <b>insufficient</b> explanation of their vehicle's social and economic impact. Use of vehicle terminology was <b>absent</b> .	The group provided a <b>basic</b> explanation of their vehicle's social and economic impact. Use of vehicle terminology was <b>limited</b> or inaccurate.	The group provided an <b>adequate</b> explanation of their vehicle's social and economic impact but could have been (much) more detailed. Use of vehicle terminology was <b>sufficient</b> and accurate.	The group provided a <b>detailed and thorough</b> explanation of their vehicle's social and economic impact. The group used a <b>wide range</b> of vehicle terminology accurately.	
<b>B</b> <b>PRESENTATION SKILLS</b>	Presentation <b>does not support</b> the marketing of the vehicle.	Presentation <b>attempts to support</b> the marketing of the vehicle, but more time was spent on special effects than content.	Presentation <b>supports</b> the marketing of the vehicle.	<b>High quality</b> presentation that <b>clearly supports</b> and enhances the marketing of the vehicle.	
<b>C</b> <b>PERSUASION TECHNIQUES</b>	The group <b>did not attempt to use</b> persuasion techniques and emotive language.	The group <b>attempted to use</b> persuasion techniques and <b>some</b> emotive language.	The group used <b>adequate</b> persuasion techniques and emotive language.	The group used <b>highly effective</b> persuasion techniques and emotive language.	
<b>D</b> <b>RESEARCH SKILLS</b>	The students have <b>no evidence</b> of choosing relevant information and resources.	The students have chosen and used a <b>limited amount</b> of <b>relevant</b> information and resources, from a <b>limited number</b> of appropriate sources.	The students have chosen and used a <b>good</b> amount of relevant information and resources, from a <b>fairly extensive number</b> of appropriate sources.	The research contains <b>excellent</b> , relevant information and resources from a <b>wide variety</b> of appropriate web, print, and interview sources.	
<b>E</b> <b>COMMUNITY SPIRIT</b>	The group experienced <b>many problems</b> working together.	<b>Not all</b> members of the group contributed fairly. Not everyone had fun.	<b>Each member</b> of the group had a balanced contribution.	The group showed <b>excellent collaboration</b> skills with all members contributing and having fun!	
<b>TOTAL:</b>					

# Getting Started . . .



## TEAM NAME

What are you going to call your vehicle?

## To Think About . . .

*When collaboratively researching it's important to make sure you record all your information, and everyone knows what they're supposed to do.*

Who will do what in your group?  
Assign roles to each group member.

## TEAM LOGO

Sketch some logo ideas for your vehicle.

## ROLES

# Question #1



**How have vehicles become more safe over time?**

- Include specific vehicle terminology

**What do you want/need to know???**

**Research**

**REFERENCES**

## Question #2

Research  
& Marketing

**How have vehicles been marketed over time?**

- Include specific marketing techniques

**What do you  
want/need to  
know???**

**Research**

**REFERENCES**

# Question #3



## How have vehicles helped develop countries?

- Consider economic and social impacts of transportation

What do you want/need to know???

Research

REFERENCES



## Question #4

Research  
& Marketing

### Personal inquiry:

- Create your own question(s) about the development of

What do you  
want/need to  
know???

Research

REFERENCES

# Option A: One-minute video.

\*\*\*Electronic Presentations to Mr. Brian by Thursday Period 5

**Audience:**

**Materials and Locations:**

**Other Notes:**

# ... Storyboarding



**Scene 1:** \_\_\_\_\_

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**Scene 2:** \_\_\_\_\_

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**Scene 3:** \_\_\_\_\_

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**Scene 4:** \_\_\_\_\_

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**Scene 5:** \_\_\_\_\_

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**Scene 6:** \_\_\_\_\_

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## Option B: One-minute skit.

## ... Scripting

### Setting

Where does your skit take place?

Audience:

Materials:

### Characters

Who is in your skit?

### Dialogue

# DESIGN AND BUILD



## *AOI FOCUS: Health and Social*

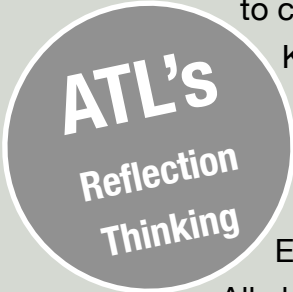
How can I look after myself and others?

How can the SAFE design of a vehicle help look after others?

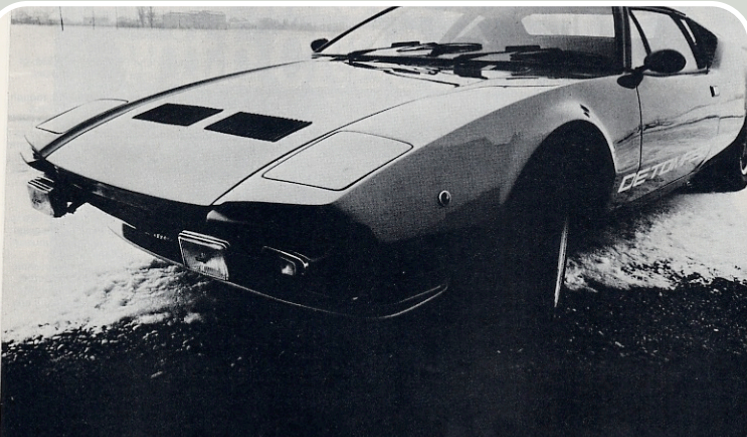
In what ways have vehicles been made more safe?

The KISLAND Guiding Environmental & Engineering Experts of KISLAND (GEEEEK's) will help guide you as you implement the Design Cycle to create a safe vehicle for the KISLAND Ministry of Transportation. All vehicles in KISLAND must meet the criteria set forth by the Ministry of the Environment and Engineering.

All elements of the Design Cycle are critical as you seek to come up with the best possible design for your vehicle, particularly good Reflection skills!



QUESTION A	QUESTION B	QUESTION C	QUESTION D
What design elements will help the <b>SPEED</b> of your vehicle?	What design elements will help the <b>ACCURACY</b> of your vehicle?	What design elements will help the <b>STOPPING/SAFETY</b> of your vehicle?	How will you attempt to balance the 3 design elements in your final design?



# THE VEHICLE

## EARNING POINTS

<b>SPEED</b> (time)	1st 200, 2nd 195, 3rd 190, etc...
<b>ACCURACY</b> (10m)	20 pts x meters in boundary (max 200pts)
<b>SAFETY</b> (3m)	>10cm = 200pts, >50cm = 100pts, >100cm = 50pts, >200cm = 25pts
<b>Tests</b>	2 mid-week tests (half pts each)

Your final standing in the Vehicle Building competition will be based on your vehicle's overall RATING. Your SPEED, ACCURACY, and SAFETY (STOPPING) will earn you points, but those points can be increased by your GEEEK REFLECTION rating!

This year you will be given a lot of choice in how your team customizes your KISland transport vehicle. HOWEVER, your team still needs to follow the rules regarding the build of your transport vehicle.

**ATL's**  
- Following  
Instructions!

## THE RULES

1. Your KISland vehicle must be able to transport an egg 10 meters in a straight line, and be able to start and stop within 3 meters.
2. Your egg must be positioned in front of your vehicle, nothing may extend farther out in front of the egg.
3. You may use any or all of the parts provided. Remember to conserve your materials in case a part breaks or you need to change your design. You may trade and share with other groups, but you will not receive extra if you make poor trades.
4. Your vehicle may have any number of wheels, according to your teams design ideas.
5. Your vehicle needs to have a "fully onboard" stopping mechanism, you may not attach or tape anything to the floor to help your vehicle stop.
6. You may test your vehicle with an egg substitute.



# THE POINTS

SPEED	
PLACE	POINTS
1	200
2	195
3	190
4	185
5	180
6	175
7	170
8	165
9	160
10	155
11	150
12	145
13	140
14	135
15	130
16	125
17	120
18	115
19	110
20	105
21	100
22	95
23	90
24	85
25	80
26	75
27	70
28	65
29	60
30	55
31	50
32	45
33	40
34	35
35	30
36	25
37	20
38	15
39	10
40	5

ACCURACY	
STAYS IN BOUNDARY FOR...	POINTS
10 meters	200
9 meters	180
8 meters	160
7 meters	140
6 meters	120
5 meters	100
4 meters	80
3 meters	60
2 meters	40
1 meter	20

SAFETY	
STOPPING DISTANCE	POINTS
> 10 cm from the wall	200
> 50 cm from the wall	100
> 1 meter from the wall	50
> 2 meters from the wall	25

REFLECTION	MARK	SCORE
<ul style="list-style-type: none"> <li>• <b>Clearly</b> discusses a PLAN to achieve.</li> <li>• <b>Clearly</b> discusses WEAKNESSES and how to improve design.</li> </ul>	7	200
<ul style="list-style-type: none"> <li>• <b>Clearly</b> discusses a PLAN to achieve.</li> <li>• <b>Discusses</b> WEAKNESSES and how to improve design.</li> </ul>	6	150
<ul style="list-style-type: none"> <li>• <b>Discusses</b> a PLAN to achieve.</li> <li>• <b>Discusses</b> WEAKNESSES and how to improve design.</li> </ul>	5	100
<ul style="list-style-type: none"> <li>• <b>Discusses</b> a PLAN to achieve.</li> <li>• <b>Discusses</b> WEAKNESSES and how to improve design.</li> </ul>	4	75
<ul style="list-style-type: none"> <li>• PLAN to achieve is <b>unrealistic</b>.</li> <li>• <b>Mentions</b> WEAKNESSES, or improvement to design, is <b>unrealistic</b>.</li> </ul>	3	50
<ul style="list-style-type: none"> <li>• PLAN to achieve is <b>unrealistic</b>.</li> <li>• <b>NO</b> WEAKNESSES discussed.</li> </ul>	2	25
<ul style="list-style-type: none"> <li>• <b>NO</b> PLAN to achieve, or</li> <li>• <b>NO</b> WEAKNESSES discussed.</li> </ul>	1	0

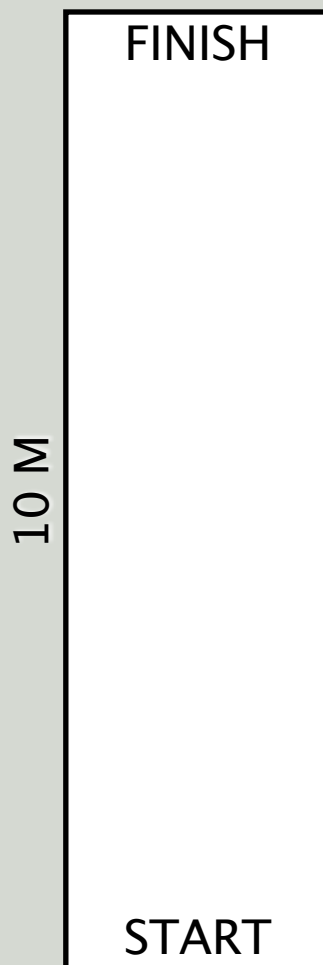
## SPEED

PLACE	POINTS
1	200
2	195
3	190
4	185
5	180
6	175
7	170
8	165
9	160
10	155
11	150
12	145
13	140
14	135
15	130
16	125
17	120
18	115
19	110
20	105
21	100
22	95
23	90
24	85
25	80
26	75
27	70
28	65
29	60
30	55
31	50
32	45
33	40
34	35
35	30
36	25
37	20
38	15
39	10
40	5

# THE POINTS: SPEED TEST

A 10 meter long speed track will be constructed. You will race the track and your time will be recorded. Your place, and points, will be determined based on fastest-to-slowest times.

On Tuesday morning we will hold a “fun” speed test. This will be run like the final race, but will be just for practice. 4 cars will race at one time, with the winner of each race advances until we have a winner. There are NO points awarded on Tuesday morning, the main purpose of the speed test is to test your initial KISland vehicle design and see what changes you need in order to improve the performance of your KISland vehicle.



# THE

# POINTS:

# ACCURACY TEST

Your KISland vehicle begins at the start line. The goal is to travel the entire 10 meters within the testing lane. As soon as any part of your KISland vehicle crosses over the sidelines your KISland vehicle is “out”. The meter number of the box where your KISland vehicle crossed is used to determine your score.

For the Wednesday morning accuracy test each meter box is worth 10 points. For example if your KISland vehicle goes “out” at meter box 4 your score is  $4 \times 10 = 40$  points. For the Friday Finale accuracy test each meter box is worth 20 points. For example if your KISland vehicle goes “out” at meter box 4 your score is  $4 \times 20 = 80$  points.

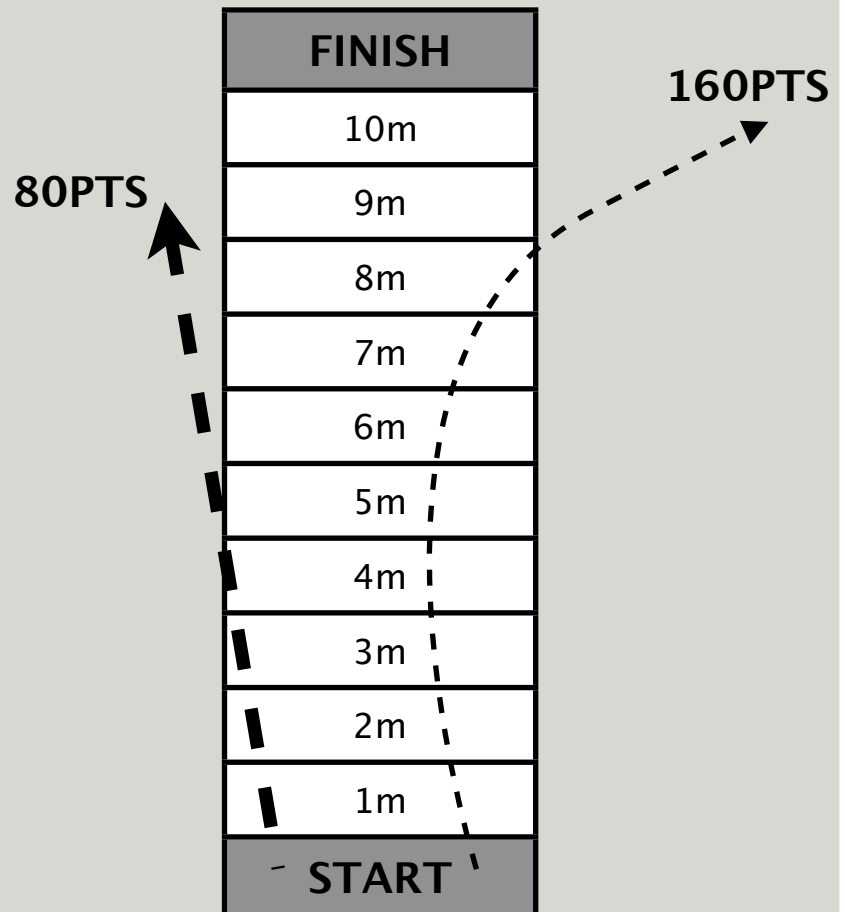
Each KISland vehicle will be given two attempts at the accuracy test track and the best distance we be used to determine your score.

## ACCURACY TEST

STAYS IN BOUNDARY FOR...	POINTS
10 meters	100
9 meters	90
8 meters	80
7 meters	70
6 meters	60
5 meters	50
4 meters	40
3 meters	30
2 meters	20
1 meter	10

## ACCURACY FINALE

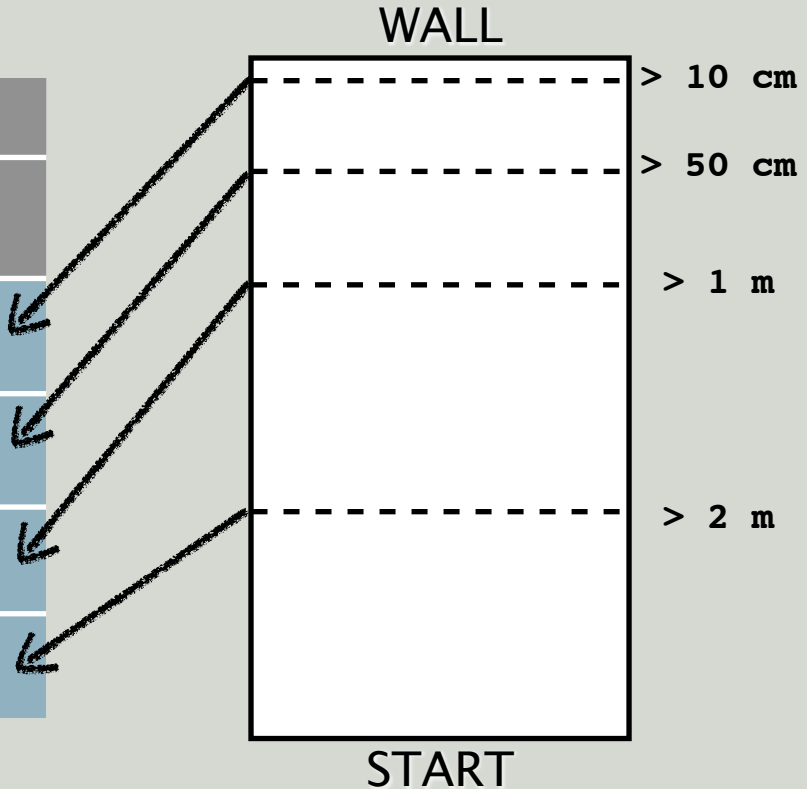
STAYS IN BOUNDARY FOR...	POINTS
10 meters	200
9 meters	180
8 meters	160
7 meters	140
6 meters	120
5 meters	100
4 meters	80
3 meters	60
2 meters	40
1 meter	20



# THE POINTS: SAFETY TEST

A 3 meter long test track will be constructed with a wall at the end. You must try and stop your vehicle as close to the wall as possible. Your score is based on how close you stop before hitting the wall. Hitting the wall is a safety failure and results in a score of 0 points.

SAFETY	
STOPPING DISTANCE	POINTS
> 10 cm from the wall	200
> 50 cm from the wall	100
> 1 meter from the wall	50
> 2 meters from the wall	25



REFLECTION	MARK	SCORE
<ul style="list-style-type: none"> <li>• <b>Clearly</b> discusses a PLAN to achieve.</li> <li>• <b>Clearly</b> discusses WEAKNESSES and how to improve design.</li> </ul>	7	200
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<ul style="list-style-type: none"> <li>• <b>Discusses</b> a PLAN to achieve.</li> <li>• <b>Discusses</b> WEAKNESSES and how to improve design.</li> </ul>	4	75
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# REFLECTION: THE POINTS:



With custom and additional parts remember to take only what you need and promptly return extra parts so other teams may use them.

**NO MODEL CAR PARTS ALLOWED – but you may use other things available at KIS as parts, but ask Mr Brian or Mr Park first!!!**

**Team Materials** ...each team will receive a basket of the same parts, including:

- ★ 40 x 40cm Future Board – use as much or as little as you need (hint remember to conserve your future board so you will have extra to change your design plans)
- ★ 1.5L plastic bottle
- ★ 2 electric DC motors
- ★ 2 AAA battery holders
- ★ 4 AAA batteries (you may bring your own but remember to RECYCLE all batteries)
- ★ 30cm of electrical wire (plan before you cut!!!)
- ★ 1/2 electrical tape roll (shared between 2 groups)
- ★ 1/2 cloth tape roll (shared between 2 groups)
- ★ 1 super glue (only one per team so take care to store properly between use)

**Custom Parts** ...in each room will be a collection of custom parts for you to use:

- ★ set of four wheels – you choose the color!
- ★ custom motor covers
- ★ on/off switches in different styles, which works with your stopping design?
- ★ Axles – different lengths and styles

**Additional Parts** ...in each room will be a collection of other parts to help your team with its design, including:

- ★ cloth string or fishing-line string
- ★ popsicle sticks
- ★ paper clips
- ★ old CDs
- ★ clear tape
- ★ rubber bands
- ★ misc nuts & bolts
- ★ ... and more!

**Tools** ...in each room will be tools that your team can use. Remember to work safely.

- ★ cutters
- ★ wire strippers
- ★ hot glue gun station
- ★ hard mats
- ★ egg substitute testers



### **Question A**

**What design elements will help the SPEED of your vehicle?**

### **Question B**

**What design elements will help the ACCURACY of your vehicle?**

### **Question C**

**What design elements will help the STOPPING/SAFETY of you vehicle?**

### **Question D**

**How will you attempt to balance the 3 design elements in your final design?**

## ... Sketch your design

### To Think About ...

*What design elements will help the  
SPEED of your vehicle?*

What are the different parts of your design?

How will you make each part?

How will you attach the parts together?

Design  
Cycle  
1

### REFLECTION

## ... Sketch your design

### To Think About ...

*What design elements will help the ACCURACY of your vehicle?*

What is keeping your car from going straight?

Design  
Cycle  
2

### REFLECTION

## ... Sketch your design

### To Think About ...

*What design elements will help the SAFETY of your vehicle?*

What is keeping your car from stopping effectively?

How can you improve on the accuracy of the stopping distance?

Design  
Cycle  
3

### REFLECTION

## ... Sketch your design

### To Think About ...

*How will you attempt to balance  
the 3 design elements in your final design?*

What area needs the most improvement?

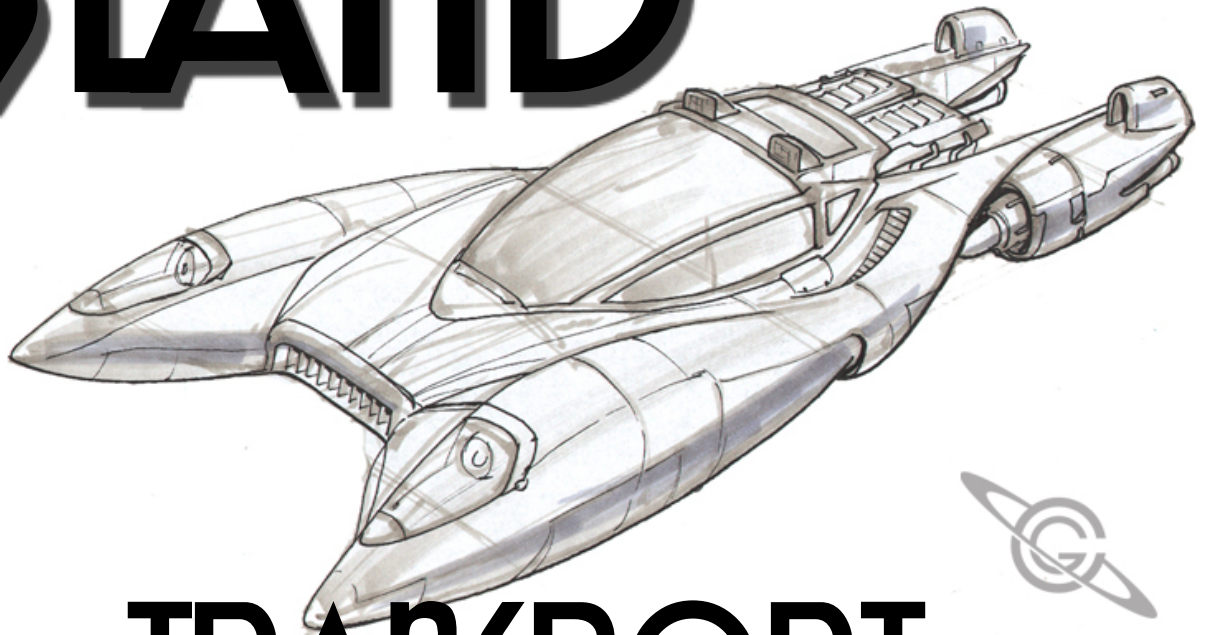
What improvements will earn you the most points?

**Design  
Cycle  
4**

### REFLECTION



# KISLAND



## TRANSPORT VEHICLES

### DESIGN CYCLE CHALLENGE WEEK

An interdisciplinary, cross-grade level, MYP design cycle event . . .

#### **KIS INTERNATIONAL SCHOOL**

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