

MYP TECHNOLOGY YEAR 2.

iRobot [Information] [Systems]

Significant Concept:

Robots are changing the world!

Unit question:

What can robots really do for us? (HI)

Context:

The advances in robot technology in recent years have been incredible. Breakthroughs in nanotechnology, advances with computing power and clever engineering have given us many robotic inventions that were once only possible in Science Fiction. What does the future hold?

Task:

Your task is to design and make working robots that can complete a series of challenges that are set for you. You will be using the Lego Mindstorms NXT robot kits to complete these challenges. You will be working in teams to build the robots but you each must produce a design folio. Your design folio will be completed electronically on your wiki.

Information:

- Communication of information using appropriate I.T. to produce web-based Design Folio.
- Communication of ideas through the design process.
- Inquiry through research

Systems:

- Input-process-output system of control
- Robotic systems
- Programming software

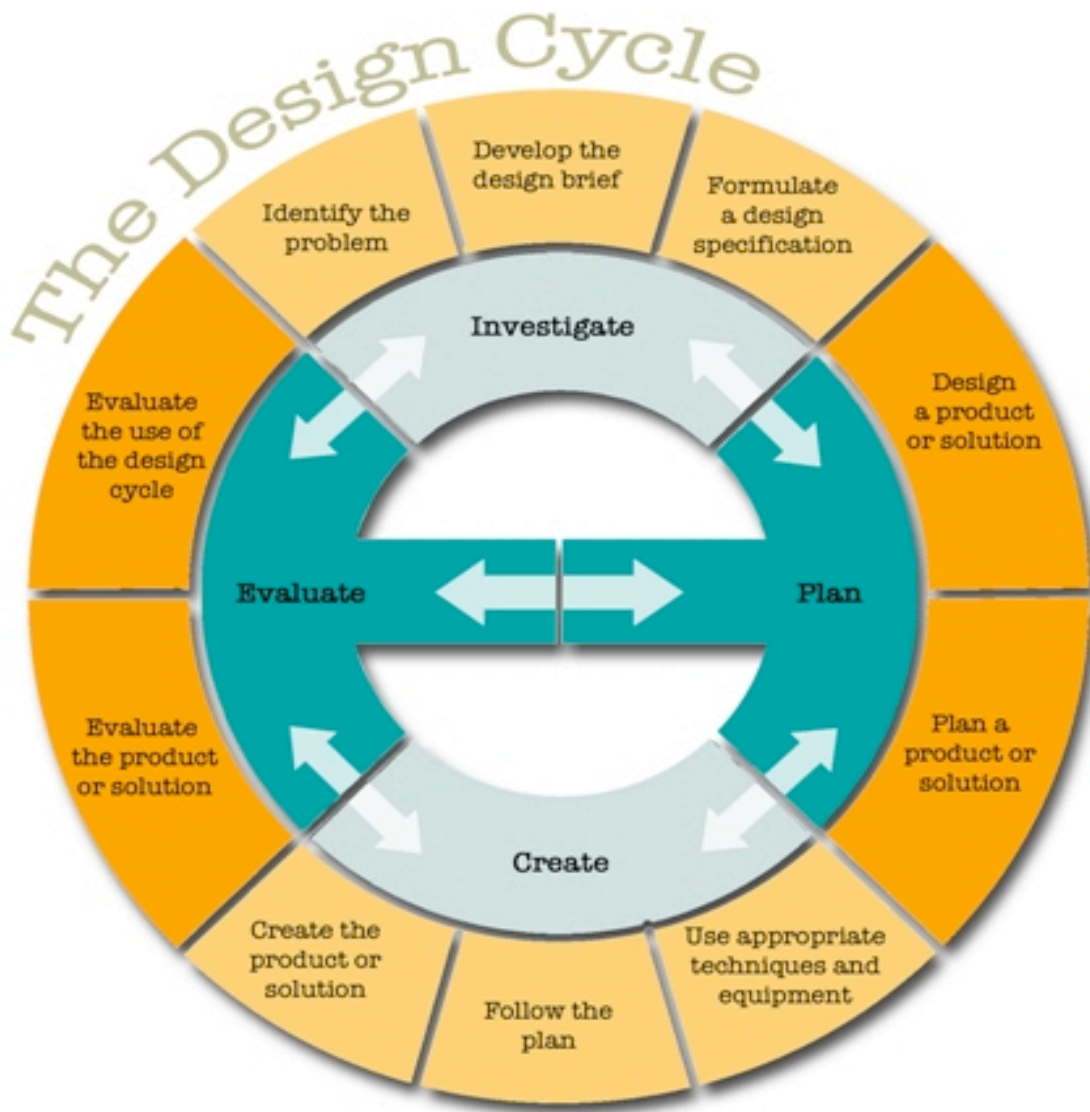
Areas of Interaction:	Student learning Expectations (SLE's)
ATL	<i>Collaboration:</i> How can I best collaborate <i>Thinking:</i> What tools can I use to solve complex problems?
HI	How have robots changed the way we live?

OBJECTIVES	ASSESSMENT
<ol style="list-style-type: none"> 1. Use the Design Cycle. 2. Undertake meaningful and relevant research. 3. Understand the input-process-output system of control 4. Understand the impact of robots on society & predict future implications. 5. Apply research. 6. Gain experience working with robotic systems and equipment. 7. Manage time & resources. 8. Critically evaluate own work. 	<ol style="list-style-type: none"> 1. Create an e-Design Folio following the Design Cycle. 2. Demonstrate an understanding of nanotechnology 3. Programming using Lego software and flow charts 4. Critical essay about robotics and nanotechnology. 5. Provide several possible solutions and justify final choice. 6. Create solution (working robot) to appropriate standard. 7. Plan the programming and making of various robots. 8. Test & evaluate solution. Evaluate design in terms of AOI.

You will follow the Design Cycle to complete this task. I have created a checklist for you to follow for each stage of the Design Cycle complete with due dates. I will assess each section independently and then the whole Design Folio will be submitted for final assessment.

Please refer to my wiki for help. www.myp-tech.wikispaces.com

Your first task is to make your own notes against the Check List and Assessment Criteria.



Check List: iRobot Challenge

Investigate: [Due: 15th Oct]

Identify the Problem. (Research)

- ☐ Rewrite the task in your own words.
- ☐ Write an explanation of Nanotechnology.
- ☐ Critically discuss what the impact of robotics has been on society. Use at least 2 examples.
- ☐ What will the future hold? How will nanotechnology/robotics be used in the future?
- ☐ Conduct a detailed Product Analysis or other Lego Minstorms robot

Develop A Design Brief

- ☐ Write a Design Brief explaining **what** you will design, **what** are the tasks that you need to complete and what may be a real world application.

Formulate a Design Specification

- ☐ Write a **detailed** Design Specification (a check-list for your robot designs)

Investigate- Tips for Success

www.myp-tech.wikispaces.com

Design: [Due 30th Oct]

Design a product or Solution

- ☐ Create a detailed **Mind Map** to identify the possibilities for your robot design
- ☐ Come up with **2** designs for you robot(s) and annotate thoroughly.
- ☐ Evaluate **each** design against the Design Specification.
- ☐ Justify your chosen design.

Design- Tips for Success

Plan: [Due 7th Nov]

Plan a Product or Solution

- ☐ Write a time management plan for the entire project.
- ☐ Write a Component List (Major components)
- ☐ Write a **detailed** Production Plan for the construction of your robot.
- ☐ Evaluate your plan (during the Create phase) and explain any changes.

Plan- Tips for Success

<p>Create: [Due 28th Nov]</p> <p>Create the Product or Solution</p> <p><input type="checkbox"/> Build a robot(s) to the best of your ability.</p> <p>Use Appropriate Techniques and Equipment</p> <p><input type="checkbox"/> Keep a detailed Process Journal each lesson. (Photos & video)</p> <p><input type="checkbox"/> Test and re-test your robot. Explain improvements.</p> <p>Follow the Plan</p> <p><input type="checkbox"/> Follow your production plan and explain any changes</p>	<p>Create- Tips for Success</p>
<p>Evaluate: [Due 4th Dec]</p> <p>Evaluate your Product or Solution</p> <p><input type="checkbox"/> Design a tests for your prototype</p> <p><input type="checkbox"/> Evaluate your completed project against the Design Specification.</p> <p><input type="checkbox"/> Suggest improvements to your final product</p> <p>Evaluate your Use of the Design Cycle.</p> <p><input type="checkbox"/> Evaluate your use of the Design Cycle.</p> <p><input type="checkbox"/> Evaluate the AOI and demonstrate a clear understanding of the 'Big Picture'</p> <p><input type="checkbox"/> Evaluate your personal engagement in the project. (effort and attitude.)</p>	<p>Evaluate- Tips for Success</p>
<p>Notes</p>	

Assessment Rubric: iRobot Challenge

	LEVEL 5 - 6	LEVEL 3 - 4	LEVEL 1 - 2
INVESTIGATE	<p>I have clearly re-written the Design Brief and have written highly relevant guiding questions.</p> <p>I have a complete Product Analysis with relevant annotation and then evaluated research against the specification.</p> <p>I have written a detailed Design Specification with clear and relevant points that demonstrate an excellent understanding of the task.</p> <p>I have written an excellent and thoughtful explanation of the impact nanotechnology and robotics on society.</p> <p>I have written an highly insightful and thought provoking essay about the possible future of robotics.</p>	<p>I have clearly re-written the Design Brief and have written relevant guiding questions.</p> <p>I have a complete and detailed Product Analysis with relevant reflection.</p> <p>I have written a Design Specification with clear and relevant points that demonstrate a good understanding of the task.</p> <p>I have conducted thorough research into the impact of nanotechnology and robotics on society.</p> <p>I have written an insightful essay about the possible future of robotics.</p>	<p>I have written a Design brief and have written a guiding question.</p> <p>I have attempted some product analysis.</p> <p>I have written a Design Specification</p> <p>I have made an attempt at explaining the impact of robots.</p> <p>I have conducted some research</p>
DESIGN	<p>I completed designs of excellent quality, clearly explained that included the robot itself and the programming.</p> <p>I justified the chosen design and critically evaluated against the design specification.</p> <p>I created a detailed mind map of excellent quality.</p>	<p>I completed designs of good quality, clearly explained that included the robot itself and the programming.</p> <p>I evaluated my designs against the design specification and justified my chosen design.</p> <p>I created a mind map of good quality.</p>	<p>I completed a design with some attempt to justify against the specification.</p> <p>My design is of poor quality</p> <p>I created a mind map.</p>
PLAN	<p>I produced production plan containing a number of detailed, logical steps with that described job allocation, time management, components and testing that could be followed by others.</p> <p>I critically evaluated and justified any modifications to my plan & design.</p>	<p>I produced a production plan containing a number of logical steps that include resources and time.</p> <p>I made some attempt to evaluate the plan.</p>	<p>I produced a time management tool.</p> <p>My production plan lacks detailed and could not be followed by others.</p>
CREATE	<p>I followed my plan, justified and changes and created a robot of excellent quality that met the challenge easily.</p> <p>I confidently used the software & equipment with a high level of skill.</p> <p>I kept a very detailed Process Journal using a variety of media (photos, video) to explain my progress. (Including testing)</p>	<p>I followed my plan and created a working robot of good quality. It passed the challenge, but with difficulty.</p> <p>I used the software & equipment with satisfactory skill.</p> <p>I took photographs/video to highlight steps & testing in my Process Journal.</p>	<p>I considered my plan and created a robot. It failed the challenge.</p> <p>I followed the teacher's instructions.</p> <p>I wrote an infrequent Process Journal.</p>

EVALUATE	<p>I gauged the success of robot and evaluated objectively based on the results of relevant testing. (Challenge)</p> <p>I made clearly explained the relevance of this task to society as a whole. (Big picture).</p> <p>I produced a detailed evaluation at each stage of design cycle, suggesting improvements.</p> <p>I insightfully evaluated the AOI and clearly demonstrated an understanding of its relevance.</p>	<p>I evaluated my robot and own performance, suggesting what could be improved.</p> <p>I made clearly explained the relevance of this task to society (big picture).</p> <p>I evaluated my efforts at each stage of the Design Cycle.</p> <p>I evaluated the AOI.</p>	<p>I evaluated my robot or my own performance.</p> <p>I made some attempt to explain the relevance of this task to the broader community.</p>
ATTITUDE	<p>My conduct in a workshop environment is exemplary.</p> <p>I have worked with a consistently positive attitude</p> <p>I can highlight many Learner profile attributes I have exhibited</p> <p>My overall effort and work ethic has been excellent.</p>	<p>I always conduct myself in a responsible manner in the workshop</p> <p>I have worked with a generally positive attitude</p> <p>I can highlight several Learner Profile attributes I have exhibited</p> <p>My overall effort and work ethic has been good.</p>	<p>I mostly conduct myself in a responsible manner in the workshop</p> <p>I have worked with a reasonably positive attitude</p> <p>I can highlight some Learner profile attributes I have exhibited</p> <p>I could improve my overall effort and work ethic.</p>