<table>
<tr><td>Unit Title: Forces in Action</td><td>KLA(s): Technologies- Design and Technologies</td><td colspan="2">Year Level (s): 3</td><td>Duration of Unit: 1x 60 minutes Lessons a week over 5 weeks</td></tr>
<tr><td colspan="5">Identify Curriculum</td></tr>
<tr><td colspan="2">Design and Technologies Knowledge and Understanding</td><td colspan="3">Design and Technologies Processes and Production Skills</td></tr>
<tr><td colspan="2">Investigate how forces and the properties of materials affect the behaviour of a product or system
• exploring through play how movement can be initiated by combining materials and using forces
• understand the characteristics and properties of materials and forces that may affect the behaviour and performance of a product or system</td><td colspan="3">Generate, develop, and communicate design ideas and decisions using appropriate technical terms and graphical representation techniques
• generating a range of design ideas for intended products, services, environments
Identifying the properties of materials needed for the designed solution</td></tr>
<tr><td colspan="3">General Capabilities</td><td colspan="2">Cross- Curriculum Priorities</td></tr>
<tr><td colspan="2">Critical and Creative Thinking
Inquiring- identifying, exploring and organising information and ideas
• Identify and clarify information and ideas
• Organise and process information
Generate ideas, possibilities and actions
• Imagine possibilities and connect ideas
• Seek solutions and put ideas into action</td><td>Information and Communication Technology
Investigating with ICT
• Define and plan information searches
• Locate, generate and access data and information</td><td colspan="2">N/A</td></tr>
<tr><td colspan="3">Literacy
Comprehending texts through listening, reading and viewing
• Listen and respond to learning area texts
• Navigate, read and view learning area texts
Word Knowledge
Understand learning area vocabulary</td><td colspan="2">Integration Opportunities
N/A</td></tr>
<tr><td colspan="3">Develop Assessment</td><td colspan="2">Make Judgments</td></tr>
<tr><td>Type of Assessment</td><td>What will be assessed</td><td>When it will be assessed</td><td>Purpose of assessment</td><td>Assessable Elements</td></tr>
<tr><td>Formative
• Observing and monitoring students
• Brief presentation of the production process of maze
• Draft planning of maze construction
Summative
• Students select design a maze that their chosen object can roll through and analyse</td><td>Knowledge and understanding of the what force is and how it works and the how changing the properties of a material can change the behaviour of the product

Identification of different products that can be used in the maze and how their different properties change the behaviour of the product</td><td>Formative
Weeks 1-5

Week 3

Week 4

Summative
Week 5</td><td>• Inform future panning and learning needs
• Inform students about how they can improve
• Draw inferences of students' level of learning and understanding of forces and properties of products
• Indicate level of achievement of students by the end of the unit</td><td>Design and Technologies Knowledge and Understanding
Design and Technologies Processes and Production Skills</td></tr>
</table>

the force needed to make the product pass through and the properties of different products				

Sequence Learning

Learning Experiences and Teaching Strategies	Differentiation/ Adjustments for Learning needs	Resources
Week1 • Create a KWHL chart (what I know, how I can find out. How I found out) and display it on a wall students can see in the classroom. Add to this wall throughout the unit at any time students have a question or response to one of these question. • Brain storm as a whole class, what force is? How it works? And what is the property of different materials? • Look at a variety of different materials and identify their properties. E.g Cricket ball is hard and does not bounce, a tennis ball can be squished and can bounce. • Discuss assessment task • Watch a Homemade Marble Run and Merrick's Homemade Marble Run select appropriate sections of videos to show students. This will give students the main idea of what they will be doing for their assessment task. Week 2 • Brainstorm how students can change the force of an object? Use physical objects such as tennis balls, marbles, basketballs and bouncy balls to show how the force can change by pushing harder or softer or increasing or decreasing an incline. • Physical demonstration of forces in action. Get students to increase and decrease inclines and use different degrees of force to push balls. Write finding in Technology journals. • On the computers get students to go to Science Games for Kids: Forces in Action. • Discuss, draw and describe what happened in Science game for kids: forces in action. Talk about how by changing the angle, weight, materials or objects the force changes • Create a class ball run using house hold materials. (Ensure the run can fit a variety of sized ball through it.) • Demonstrate using a variety of balls how the ball run works. Change the balls around and get students to draw and describe what happens when the ball is changed. How does it travel? Why does it travel like this? Get students to take notice that the property of the ball. Week 3 • Discuss reasons and needs for developing a ball run. Write down reasons for developing ball run. Relate reasons and needs back to the world around them. What might we use something like a ball run in the world around them? Water pipes, pin ball machines ect. Elaborate that if the pipe for the water was straight there would be no force for the water to move but once. Make connects with preferred futures. • Assessment Task: Develop (3) ball run plans. Look at how we can change the speed by increasing and decreasing inclines. Provide labels of the types of materials that would be used to create the ball run. Provide students with a list of materials they have accesses to build ball run e.g. paper towel cylinders, boxes, bottles ect. Explain to student the	Variety of visual and concert materials such as pictures, videos and different types of materials will be used to engage and cater for visual, auditory and kinaesthetic learners Work will be broken up into whole class, small mixed ability groups and individual working Different levels of website searches to cater for students reading and comprehension ability Different levels of difficulties in activities to cater for students ability Activities are differentiated according to the ability of levels of students- some students may draw	• Computer • Interactive Whiteboard • Technology Journals • Different types of balls • Different types of materials that can be used to make the ball run • Scissors • Sticky tape • Assessment tasks • Science Games for Kids: Forces in Action. • Merrick's Homemade Marble Run- YouTube Video • Homemade Marble Run- YouTube Video

ball run can only be as tall as themselves and only be one metre wide. Ensure students do not use any dangerous materials that could cause harm. • Complete Project Log- guided activity Week 4 • Assessment Task: Continue developing (3) ball run plans. (Activity 1) • Discuss with students the need to choose an appropriate design • Choose (3) different types of balls to pass through ball run. E.g marble, tennis ball and squishy rubber ball. Students predict how each ball will behaviour. Will they move with the same force? What makes them move differently? What are the different properties of each ball? • Construct chosen ball run design. Create a list of all the materials needed to construct ball run (Ensure materials are appropriate size for all test objects to fit through) • Complete Project Log- guided activity Week 5 • Students will record their ball runs using the IPads and take note of what happens when different types of balls are used. Why do they think this happens? What are each of the balls properties, how did the different properties change the result of the maze? • Students will write a reflection discussing things that went right with their run design, something that went wrong with the design, how they would change the design to make it work better and what they learnt from the unit experience? Why it is important to draft, test and reflect on our design? Link to the world around use (Activity 3) • Complete Project log- guided activity	and describe each stage while others might provide sequenced images and verbally tell teacher about the sequence Amount of detail and complexity of maze and product that is used to cater for different students level of ability	
Use Feedback		
Ways to monitor learning and assessment		
Formative • Observe and monitor students participation, questions and responses with in the classroom with verbal feedback • Use Questioning and discussions with individuals, small groups and whole class of students • Provide verbal and written feedback on summative assessment draft **Summative** • Provide written feedback on final assessment • Provide final grade for students assessment on a rubric • Provide students with reflections notes in the comments on rubric		

Websites:

- Science Game for Kids: Forces in Action- http://www.sciencekids.co.nz/gamesactivities/forcesinaction.html
  YouTube Videos
- Unknown. (2012). *Homemade marble run.* Retrieved 17th May 2016 from https://www.youtube.com/watch?v=KXhw-b51lcE
- MerricksMama. (2011). *Merrick's homemade marble run.* Retrieved 17th May 2016 from https://www.youtube.com/watch?v=eZ9r3-1KYs4

Year 3: Forces in Action Task

Name:_____ Due:_____

Task: Your task individually is to create a ball maze that demonstrates how force works. You will also demonstrate your understanding of how the property of different balls can change the behaviour of the ball when going through the ball run. Using your knowledge and understanding of force and the properties of objects, you will design, choose and build a ball maze that is as tall as you and (1) metre wide, out of recycled materials and materials found throughout the classroom. Once you have built the ball run you will test out (3) different types of balls going through the maze, taking note of how force is working and how the different properties of the balls change the behaviour of the ball. You will then reflect on the positives and negative of your ball run, what you could change to make it better and why it is important to draft, test and reflect on your design?

Checklist

- ☐ Complete sections of Project Timeline Log weeks 3, 4, 5
- ☐ Fill out Activity 1: Design (3) ball run plans
- ☐ Fill out Activity 2: Reasons and needs for your ball run
- ☐ Construct ball run
- ☐ Fill out Activity 3: Reflection on ball run

Important Dates: (Note: Only the Activity Sheets and overall task have due dates. Other parts of the task will be completed to teachers planning)

- Activity 1 Completed: _____

Projects Timeline Log

Fill in the Projects Timeline Log at the end of weeks 3, 4 and 5. This Project Timeline Log can be used later in week 5 to help you write your reflections.

What I did this week?	My reflections on my ball run so far…	What I need to do next week on my ball run?

Activity 1: Design (3) Ball Run Plans

1. Identify (2) reasons for creating this ball run?

- _____
- _____

In the below squares design and label your ball run.

Activity 2: Reasons and needs for your Ball Run

1. Which ball run design did you choose?

   _____

2. What is your reason for choosing this design?

   _____
   _____
   _____
   _____

3. Why do you need to create this ball run?

   _____
   _____
   _____

Activity 3: Reflection on Ball Run

1. Write (2) positive points about your Ball Run design.

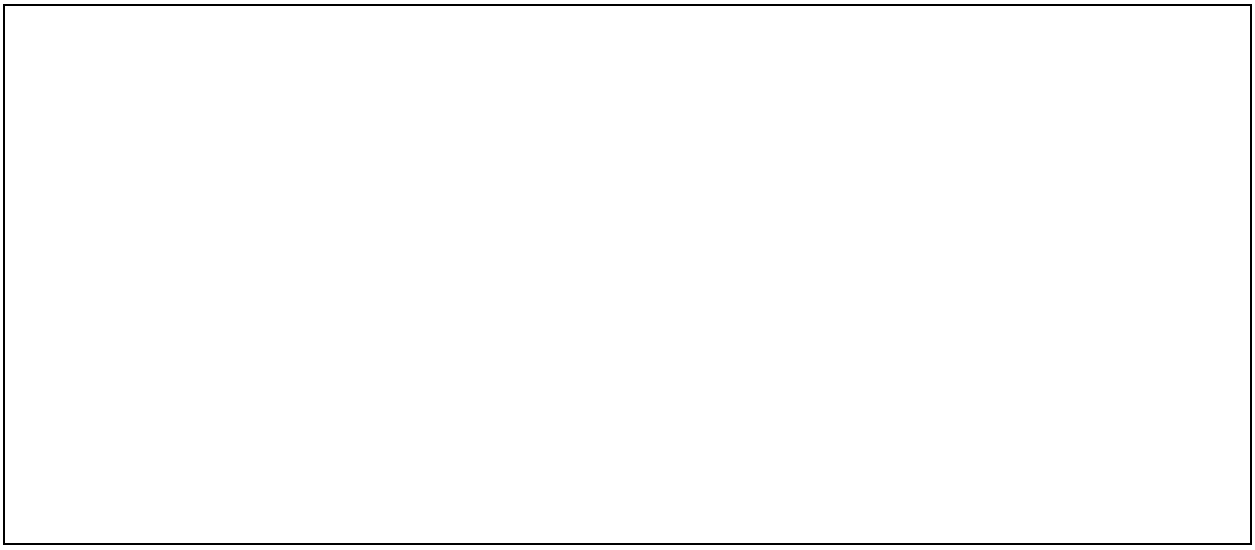
   _____
   _____
   _____
   _____

2. Write a least (1) negative about your Ball Run design.

   _____
   _____
   _____
   _____

3. How would you change the design to make it work better?

   _____
   _____
   _____



4. Why do different objects such as balls behaviour differently when going through the maze? Give an example.

   _____
   _____
   _____

5. Why is it important to drat, test and reflect on our design?

_____
_____
_____
_____

6. What jobs might draft test and reflect on their designs?

_____
_____
_____

Unit: Forces In Action Rubric

Year 3 Technologies **Term 1, 2016** **Name:**_____

Date Marked:_____

Assessable Criteria	**A**	**B**	**C**	**D**	**E**
	Excellent	**Good**	**Satisfactory**	**Developing**	**Limited**
Identifies the need for the design	Identifies and clearly explained (2) needs for the design	Identified and explained (1) need for the design	Identified and stated (1) need for the design	Identified (1) need for the design but did not state reason for design	With assistance was able to identify on need for the design
Creates a range of design ideas	Created (3) detailed and insightful design ideas	Created (3) detailed designs ideas	Created (3) appropriate design ideas	Created (2) design ideas	With assistance created a design idea
Selects appropriate design that links with the need for the design	Insightfully and accurately chooses design that links with the need for the design	Accurately chooses design that links with the need for the design	Selects appropriate design that links with the needs for the design	Selects a design	With assistance chooses a design
Identifies appropriate resources need to construct design	Consistently identifies highly appropriate resources needed to construct design	Mostly identifies appropriate resources needed to construct design	Identifies some appropriate resources needed to construct design	Sometimes identifies resources needed to construct design	With assistance identifies resources needed to construct design
Identifies why different objects behaviour differently on the maze	Identifies and makes links to different properties of objects affecting the behaviour of the product	Identifies that the property of the different objects affect the behaviour of the product	Identifies that different objects behaviour differently on the maze	Identifies that all objects act the same on the maze	Identifies with assistance that objects behaviour differently on the maze

Comment:_____

_____

_____ Mark:_____