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Design and Technology Planning

Year Group: Year 3 & Year 4	Topic: Cams – Moving Toys	Term: Spring 1 and 2 (Cycle A)

National Curriculum Links (Ref: NC 2014)
Pupils in Key Stage Two should be taught to:

Design , Research , Make , Evaluation and Technical Knowledge

- To use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups.
- To generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design
- To select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing], accurately
- select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities
- To evaluate their own product.
- To investigate and analyse a range of existing products
- To evaluate their ideas and products against their own design criteria and consider the views of others to improve their work
- To understand how key events and individuals in design and technology have helped shape the world Technical knowledge
- To apply their understanding of how to strengthen, stiffen and reinforce more complex structures.

History Link

- The Roman Empire by AD 42 and the power of its army.
- The successful invasion by Claudius and conquest, including Hadrian's Wall
- The British resistance, for example, Boudica.
- The 'Romanisation' of Britain: sites such as Caerwent and the impact of technology, culture and beliefs, including early Christianity.

Knowledge and Skills Objectives	Teaching Input	Activities with Differentiation
Lesson One **LO I understand what life was like during the Roman times.**	**Hook:** Bring chd into the ameptheatre and explant to the chd what an apethetire used to be used for. Bring some drums and musical instruments and allow chd to move how the romans would have done then. Allow chd to be immersed in this activity.	**Activity 1** Here is some background information about the Romans to help you understand this unit more. ***Task*** • Get yourself into pairs.

Resources

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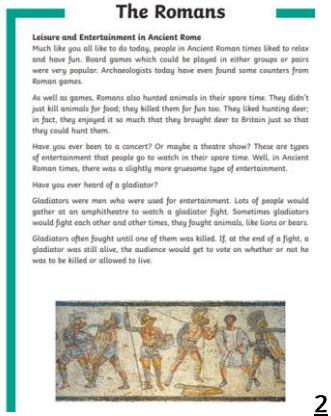
Comprehension Drums PPt Gladiator naming Making your own gladiator LKS Knowledge Organise	**<u>Starter</u>** Show the chd the worldle, phrases and words and allow them to think of what their next topic could be about. **Questions to consider** What do you notice? What is there? Where have you seen this before? What could our next topic be about and why? What do you think our next topic will be about? **<u>Main body</u>** Our next DT topic is going to be about the Romans. By the end of this unit you will make your very own moving gladiator using a cam (we will look more closely at this in the future lessons). You will also have the opportunity to design your background using features that would have been around during the roman times. As a hook today you are going to research the Romans to give you a deeper understanding of our next topic and help you to gain more ideas. ***What would you like to learn about the Romans?*** Introduce the Romans and what life was life back then. Show chd the PPt – this will include : Gladiators, entertainment, aptheteatres, collsual , weapons, food, the roads etc. Use these two websites to allow chd visual information. https://www.youtube.com/watch?v=GA-mOIjYPn4 Questions- TTYP What did they do for entertainment? What did they eat? What did the houses look like if they were poor? What did the houses look like if they would rich? What did they do as entertainment?	• Number yourselves number 1 and number 2s. • You are to read a box each. • Then play a game. Number 2s you are to begin reading and then when your teacher says 'swap' number 1s you are to take over and so on. You are to remember as much information as you can as this will help you in the activities later on in the lesson. **<u>Activity 1</u>**  **The Romans** **Leisure and Entertainment in Ancient Rome** Much like you all like to do today, people in Ancient Roman times liked to relax and have fun. Board games which could be played in either groups or pairs were very popular. Archaeologists today have even found some counters from Roman games. As well as games, Romans also hunted animals in their spare time. They didn't just kill animals for food; they killed them for fun too. They liked hunting deer; in fact, they enjoyed it so much that they brought deer to Britain just so that they could hunt them. Have you ever been to a concert? Or maybe a theatre show? These are types of entertainment that people go to watch in their spare time. Well, in Ancient Roman times, there was a slightly more gruesome type of entertainment. Have you ever heard of a gladiator? Gladiators were men who were used for entertainment. Lots of people would gather at an amphitheatre to watch a gladiator fight. Sometimes gladiators would fight each other and other times, they fought animals, like lions or bears. Gladiators often fought until one of them was killed. If, at the end of a fight, a gladiator was still alive, the audience would get to vote on whether or not he was to be killed or allowed to live. 2

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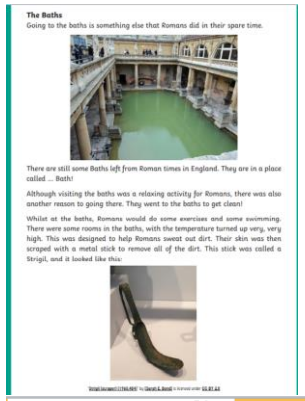
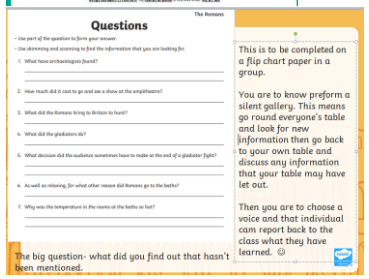
	Who were known as celebrities back then? What did the Romans believe in – way of life? How are times different then to now? What did they often give people to those who became ill? https://www.youtube.com/watch?v=c4RuWmmt8To	 **The Baths** Going to the baths is something else that Romans did in their spare time. There are still some Baths left from Roman times in England. They are in a place called ... Bath! Although visiting the baths was a relaxing activity for Romans, there was also another reason to going there. They went to the baths to get clean! Whilst at the baths, Romans would do some exercises and some swimming. There were some rooms in the baths, with the temperature turned up very, very high. This was designed to help Romans sweat out dirt. Their skin was then scraped with a metal stick to remove all of the dirt. This stick was called a Strigil, and it looked like this:  The Romans **Questions** – Use part of the question to form your answer – Use skimming and scanning to find the information that you are looking for. 1. What have archaeologists found? 2. How much did it cost to go and see a show at the ampitheatre? 3. What did the Romans bring to Britain to hunt? 4. What did the gladiators do? 5. What decision did the audience sometimes have to make at the end of a gladiator fight? 6. As well as relaxing, for what other reason did Romans go to the baths? 7. Why was the temperature in the rooms at the baths so hot? This is to be completed on a flip chart paper in a group. You are to know preform a silent gallery. This means go round everyone's table and look for new information then go back to your own table and discuss any information that your table may have let out. Then you are to choose a voice and that individual cam report back to the class what they have learned. ☺ The big question- what did you find out that hasn't been mentioned.  **The Ampitheatre** The amphitheatre is where the gladiators would fight. This is what it looked like: An amphitheatre is what we now call a theatre - somewhere we go to watch a show or a concert. It was free to go to. There could be thousands of people in the audience at an amphitheatre show. **Activity 2**

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		 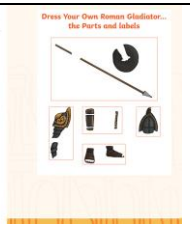  Ask the chd what do they notice? MTYT Which adjectives could we use to describe this amphitheatre- TTYP- then Popcorn ideas. https://www.youtube.com/watch?v=laGXTKsMrm0 Then show the chd a range of mages and ask the chd to draw one of them. Thinking of a backdrop for their own toy. Challenge –think of those questions and find out anything that hasn't been answered.

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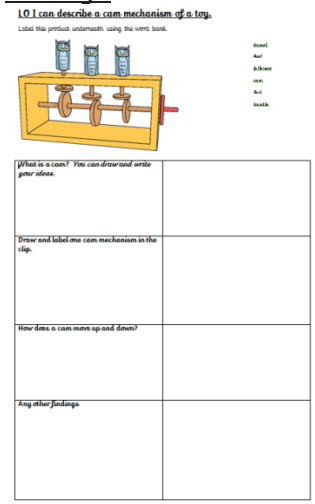
Lesson Two **LO I understand the components of a toy that requires a cam mechanism.** **Working Technically** To use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups. To generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design. Resources	**Starter- Recap** What is a gladiator? When did the Roman was times start and end? What did they eat? What did they do for entertainment? What did they look like? What did they wear? What were their weapons like? What else can you remember? **Main body** Ask the chd: What toys are in the market at the moment – what do we mean by market? What are your favourite and why? Which toys do you dislike and why? What different moving toys are there? Can you think how they work? Then introduce what a cam mechanism is and the component that are required. Introduce the language such as: component Follower Dowel Anxel Rod Rotating handle Cam	**Activity 1**  LO I can describe a cam mechanism of a toy. Label this product underneath using the word bank. What is a cam? You can draw and write your ideas. Draw and label one cam mechanism in the clip. How does a cam move up and down? Any other findings. **Activity 2**

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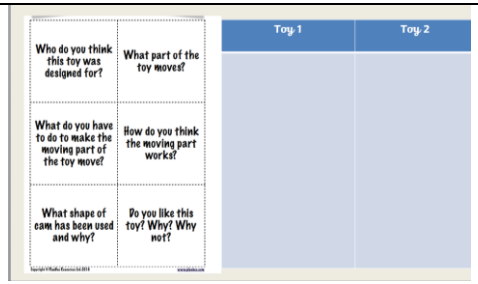
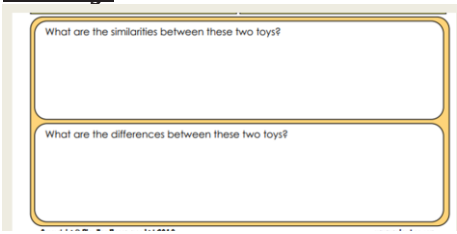
Worksheets **Paper and sketch pencils** **Toy examples** **Ipads**	Cam toy structure ***Show the chd these websites.*** https://www.youtube.com/playlist?list=PLvCYdoiwf1_DMjYFAVnlREMymcbh4JbUd https://vimeo.com/49266486 https://vimeo.com/49266486 Then show chd some examples and as class find each component and describe what they do.	 **SEND-** They can have a toy on their table between them and use that one toy as a group. They can also use that same they to answer the activity 2 questions. **Challenge** 
Lesson Three **LO I can investigate different types of cam mechanisms.** **Working Technically:**	**Starter/ Recap** **Recap** What do you remember about the Romans? What is a mechanism?	**All chd**

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To use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups

To generate, develop, model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design.

Resources

Worksheet
card
Paper
different shaped cams
base for the cams.

Why do we need mechanisms?
What do we need to make a mechanism?
How do they work?
Which toys use them?
What is a follower?
What is a cam?

Main body

Introduce the cams to the chd and how the different names. Then allow time for chd to try and remember these by showing a picture and asking them to name them.

All chd to look at the different movements from a cam. Use the two examples- circle and oval and describe what movement is happening. Then ask the chd predict what may happen with different shaped cams and why? Recap prior knowledge- What is a prediction? Why do we predict? When have created predictions before?

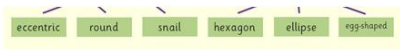
Then introduce how to make a basic cam. The chd will follow the instructions. Recap safety with resources.

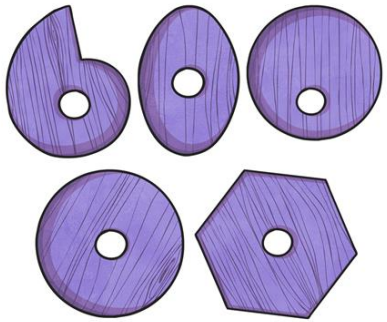
The teacher can show an example first if they want too to show how's it's done and what it can look like.

Once the have completed the video, show chd the following video. One showing another person doing the investigation and then other video showing different toys that have used different cams.

Then discuss: what went well what could have been improved, what they enjoyed, what they have learned etc?

You are to cut out the name and place each cam with its name on to a seperate piece of paper. ☺





SEND/ lowers
As a table with a large sheet.

Activity 2
Plan for the chd to follow and they will make the following.,

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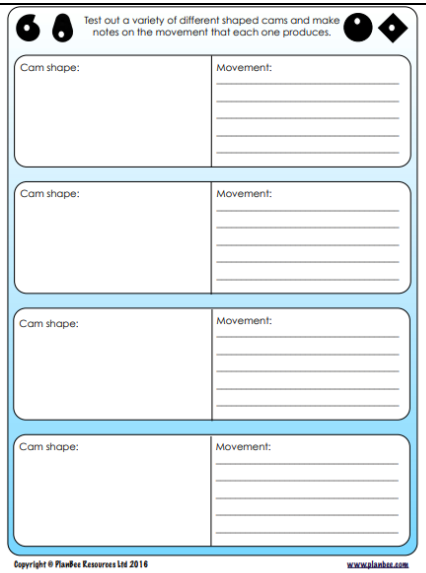
	https://www.youtube.com/watch?app=desktop&v=VEA0l21XrlQ https://www.youtube.com/watch?app=desktop&v=VEA0l21XrlQ	 Test out a variety of different shaped cams and make notes on the movement that each one produces. Cam shape: Movement: Cam shape: Movement: Cam shape: Movement: Cam shape: Movement: Copyright © PlanBee Resources Ltd 2016 www.planbee.com  Feed the other end of the dowelling into the other side hole. Don't worry if it's wonky...remember it's just a testing device! Place a larger piece of dowelling (or you could simply use a pen) and rotate the side dowelling to test the different shaped cams.

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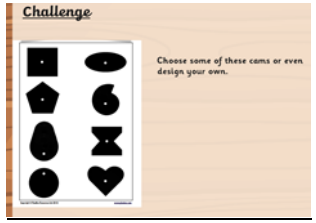
		Challenge Use different shaped cams. 
Lesson Four **LO I can create a design for my own toy that uses a cam mechanism.** **Working Technically:** I can use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups. I can generate, develop, model and communicate their ideas through discussion, annotated Sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design. Resources	**Recap** What happened during the roman times? What is a cam? Which toys require a cam to work? What are the components of a mechanism? What happens if you change the size and the shape of the cam? **Starter** If you could design something what would you like to make and why? **Main Body** Explain to the chd what a Design Criteria is also known as a Plan. The design criteria (sometimes called specifications) tells the designer (or the maker which is you) exactly what the product has to do and what to design requirements are. The design criteria are a list of all the things you need to make the product. It should contain details of the functional, aesthetic (what it looks like) and design features of the finished product. It may also include information about size, weight, materials, maintenance, cost and safety. What would happen if we didn't use one of these? What would you like your moving toy to be based upon our topic the Romans.	**All chd and SEND** Chd are to work in a group leaveideas on the board for them to dicuss.

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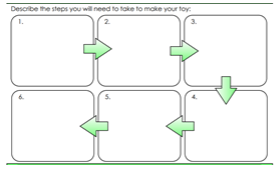
plans **template ideas**	Then recap the components that are required to make a moving toy. Then invite chd to think about what their model could look like? Show chd pictures of the roman times including videos. Then show chd of a backdrop- ensuring understand what a back drops. This will allow their ty to come to life. From this , show chd images of amphitheatre places that a gladiator/roman may fight or be. Here are some examples: https://www.youtube.com/watch?v=bAWTJO6oz-o  As they are planning these toy- leave some resources for he chd to explore with.  For the chd who may struggle go through some ideas with the class and as groups.	 

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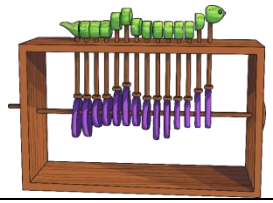
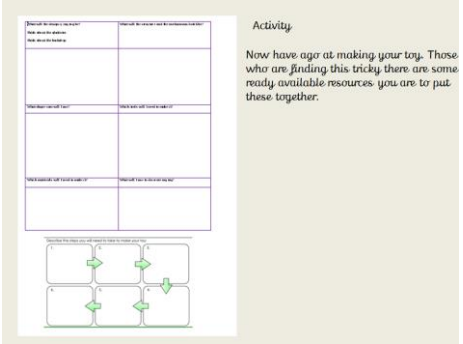
	Chd could also use template and stick the ones they prefer.	
Lesson Five and six **LO I can make my own toy using a cam mechanism.** **Working Technically** I can select from and use a wider range of tools and equipment to perform practical tasks for example, cutting, shaping, joining and finishin,, accurately I can select from and use a wider range of materials and components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities	**Starter:** What is a What is a plan What is a design criteria? Why do we use them What did your include in your design criteria? **Main Teaching:** What can we do to make sure our plan is the best it can be? – talk to our peers and discuss. You are now going to work with a partner. You will work together to evaluate your design before you start to make the mechanical system. It is important that you use the design criteria to help you evaluate your design. You need to discuss ideas about ways to proceed. How will you make sure its sturdy? How will you make sure the components work effectively What will you do if you come across any problems? How will you make sure your toy looks like your design What will happen if you want to change your mind during the making process? Then allow time for chd to use their plan to make their design. Remind chd of what one can look like. 	**All chd** Chd are to use their plan  Activity Now have ago at making your toy. Those who are finding this tricky there are some ready available resources you are to put these together. **Struggle learners** Chd will be given the recourses and will be encouraged to bit the toy together. **Challenge** Chd are to think about a packing that can be used based up the previous topic.

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Resources Resources card Paper Glue tape Boxes Card Scissors Plans PPts Already made parts for struggle leaners Challenge cards		 LO: I can make a packaging for my toy What shape will my packaging be? What will need to make it? What will the measurements be? What colour, design, graphics and font will I use what will I use to make it?
Week six **Lo I can evaluate my own work** **Working Technically** I can evaluate their ideas and products against their own design criteria and consider the views of others to improve their work **Resources** Plans Evaluation sheets self and peer Models that the chd have created	**Recap** What have you done in the previous lessons? What did you make last lessons? How did you make it? **Starter** What went well? What did you find hard? What did you enjoy? What didn't you enjoy What have you learned? **Main Teaching Body** What does the word evaluate mean? Why do we evaluate?	**SEND/ Lowers:** .

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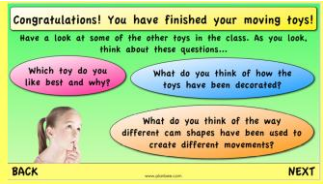
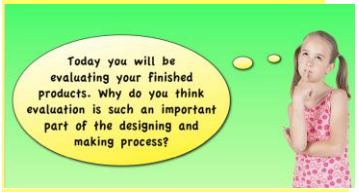
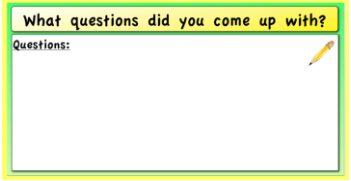
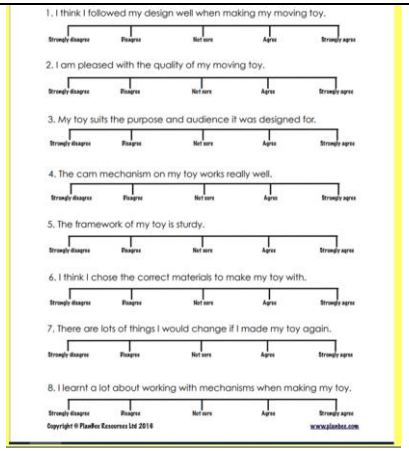
What should we do when we are evaluating?
What shouldn't we do when we are evaluating?
Why are evaluations useful and beneficial?

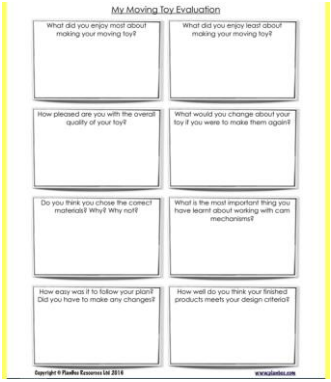








Middles/Highers:



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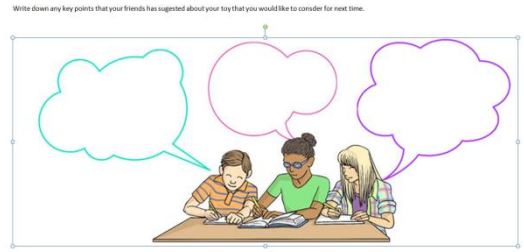
	During this lesson we are going to evaluate each others work. It is important to be able to peer assess as well as self-assess. Peers assessment is also important as it can develop your self-confidence and communication skills and we call learn a lot form other peoples as they may suggest things that we may not have thought of. **You are to think of the following questions:** What has worked well and why? What could be improved for next time and why? What do you like about it?	**Activity 2** **All chd** 

Applied Write Opportunities:
To wrote a set of instructions of how to make a toy with a cam mechanism.

Homework Opportunities
To research different cams,
To make a toy of their choice using a cam
Research different comOmemets that are required to make a toy.
Poster about being safe when using DT devices.

Enrichment Opportunities:
School trip t oa factory.

Key Vocabulary

Tier Two: model , toys, romans, amphitheatre, handle, wood, plastic, scissors, paper, card, glue, measurements, decorations, armour, sword, shield, war, up, down, movement
Tier Three: anxel, cams, dowel, follower, backdrop, gladiator, rotating, linear, mechanism, components, rotary.

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