

ambic

STEM CHALLENGE



RESOURCE PACK

| Learning objective and success criteria: | Before the lesson: |
|---|---|
| <ul style="list-style-type: none"> ◆ To explore and evaluate a range of existing product <p><u>Success Criteria</u></p> <ul style="list-style-type: none"> ◆ I can use the internet to research different furniture used in school. ◆ I can identify the different types of furniture in school. ◆ I can recognise positives and negatives in different furniture. | <p>Watch the Ambic Stem Challenge video.</p> <p>Look through the powerpoint.</p> |
| Learning objective and success criteria: | Before the lesson: |
| <p>Innovative Practical Ergonomic Engineer Ingenuity</p> | <p>Ambic's competition video Powerpoint Internet access – iPads/tablets/laptops/computers Resource sheets</p> |
| Attention Grabber: | |
| <p>Share Ambic's competition video – this may already have been shown in an assembly but it might be a good idea to give the children a recap.</p> <p>Slide 4: Explain that every day people are designing new products to solve a problem or dilemma they have noticed or found.</p> <p>Slide 5: Share who Ambic are and what we do. Ambic is a company that manufactures different types of furniture for schools, as well as universities, restaurants, laboratories and residential properties. Teachers may want to discuss what some of these industries are. Many headteachers and teachers come to us needing help for a problem they have noticed in their school. Ambic measure, design, draw, programme, machine, paint, assemble and quality check everything that leaves the factory as this is all part of our engineering journey.</p> <p>Slide 6: Explain that all day every day the people who work at Ambic use science, technology, engineering and maths to complete their jobs. Did anyone notice what those 4 words spell?</p> | |
| Main Event: | |
| <p>Slide 7: Introduce some of the key words that we will be using throughout this unit. You might want to use the CCD grid to record them.</p> <p>Slide 8: Explain that a lot of the time when schools need furniture, they look at what is already available to buy, this might be online or in catalogues. Use the phrases to show the children how easy it is to see what you can buy for schools already. It is also what product designers and project managers do when asked for new and innovative furniture.</p> <p>Slide 9: In today's lesson, explain that the children are going to be completing some 'market research' which simply means finding out what has already been made. They will use the internet to research school (or commercial) furniture.</p> <p>Slide 10-13: Share some of the examples given over the next couple of slides and discuss the following, modelling what the children will be doing when completing their independent work.</p> <ul style="list-style-type: none"> ◆ What is this piece of furniture used for? ◆ Who might use it? ◆ What do you think it is made from? ◆ How could you describe the shape? How could you describe the surface? How could you describe the colour? ◆ Is it practical? ◆ Would this piece of furniture fit within our school? ◆ Do you like it? <p>Children to work in pairs or small groups to discuss their opinions and answers then share with the class.</p> | |

The Ideas:

Your class and school resources will determine how you conduct the independent part of this lesson.

Children to work either independently, in pairs or small groups.

Children will use the internet to research current school furniture on the market. Share the words or phrases or ask the children to come up with their own appropriate searches.

Children to then choose 3 (or depending on your class, the amount) pieces of furniture to complete their analysis on, using the resource sheet. An example is on **Slide 14**.

Wrapping Up:

Slide 15: Discuss with the class what they think makes a 'good' piece of furniture. It might be a good idea to define what is meant by the work good. Work back to the key vocabulary that was used within the lesson when describing the furniture.

Slide 16: Explain that during the research the children might not have actually seen a piece of furniture they would want in the school. That is why we design our own.

| | |
|--|---|
| Learning objective and success criteria: | Before the lesson: |
| <ul style="list-style-type: none"> ◆ To design a product to solve a problem within our school. <p><u>Success Criteria</u></p> <ul style="list-style-type: none"> ◆ I can identify a need or problem within the school. ◆ I can use previous market research to generate a design criteria. ◆ I can design an innovative, functional and appealing product. | <p>Think about problems to help guide children if they are struggling, you might want to guide your children to specific problem already decided.</p> |
| Learning objective and success criteria: | Before the lesson: |
| <p>Innovative Practical Ergonomic Engineer Ingenuity</p> | <p>Powerpoint Access to different areas of the school and staff, if needed. Pencils, pens, markers Paper, card, resource sheets</p> |
| Attention Grabber: | |
| <p>Slide 3: Remind the children of the previous lesson where we heard about the Ambic Stem Challenge. Ask the children what they can remember about the lesson.</p> <p>Slide 4: Show the children some of the different jobs Ambic's employees do, you might want to ask the children if their parents, carers or anyone they know does any of these jobs. The tasks that the children are doing in this lesson will be linked to these jobs.</p> | |
| Main Event: | |
| <p>Slide 5: Remind the children about the key words, you might want to revisit the CCD grid if you used it, can the children remember the meanings? These words are going to be important today because we are going to be the designers.</p> <p>Slide 6 & 7: Share the information about the competition with the children, emphasise that the furniture they will be designing must resolve a real-life problem within your school. You might want to share some of the previous entries and products Ambic creates to give the children an idea of exactly what we can do.</p> <p>Slide 8: Now is the time to look for problems around your school. Have a look around the classroom or you might even want to have a tour around the school. Can the children point out anything that they would change, improve or even need for the area? You may want the children to take part in some 'Consumer research' where they ask other members of staff and children their opinion (only if time allows).</p> <p>Slide 9: Once back together, discuss the issues or problems the children noticed. Are there some that need more urgent attention than others? Does something specific need to be made that cannot just be bought out of a catalogue or from the internet? It might be a good idea to agree on a problem you want the whole class to investigate, however you know your class and school best.</p> <p>Slide 10: Remind the children this isn't about making the craziest, wildest product they can think of, bring the children back to the key vocabulary.</p> <p>Slide 11: Remind children about shape, space and measure. Think carefully about how it is going to be made and what it will look like. Where is it going to go? Who is going to use it? It might be linked to the school mascot or theme, making it more bespoke, something that Ambic does all the time. These are important when designing the product as you don't want to make something for it not to fit in the proposed space, for example. Ensure this is clear before moving on.</p> <p>Slide 12: Once the above is agreed ask the children to work in pairs or small groups to generate a design criteria, depending on the year of your class you might want to help, support or challenge when doing this. Your criteria might be as simple as brightly coloured or more in depth like an appealing colour that matches the school theme.</p> <p>Slide 13: Work as a class to decide on the design criteria.</p> | |

The Ideas:

Depending on how your school will be submitting the designs, depends on how you want the children to work.

You may want the children to work in groups to design a product or you might have all the children submitting their own idea and then work as a class to perfect and finalise it.

We are looking for an innovative product that takes into account the environment and user or users.

Your design must include:

- ◆ A brief description of the problem you encounter in your school
- ◆ A drawing or sketch of your proposed product with annotations of:
 - ◇ Colours, patterns and textures - wood effect, gloss, metallic
 - ◇ Basic materials to be used – wood, metal, carpet.
 - ◇ Size with approximate dimensions
 - ◇ The user or users
 - ◇ Description of moving parts if any – open and close, sliding, turn.

There is a very basic example on **slide 14** of a design on the resource sheet.

Note: when drawing your product, it is up to you as a school and the resources you have, how you do this. It can be hand drawn, drawn on a computer or tablet device, a photograph of a cardboard model or even CAD. Think about your school and children when deciding.

Wrapping Up:

Slide 15: Explain that in the next lesson the children will be making prototypes of their design. Using the slide explain what a prototype is. Ask the children to have a quick think about what types of materials they could use to make their prototypes emphasise that it does not need to be made from the exact materials planned, it might be a good idea for the children to bring in anything specific they would like to use.

You might also ask the children to bring in reusable 'rubbish' from home to use.

| | |
|---|---|
| <p>Learning objective and success criteria:</p> <ul style="list-style-type: none"> ◆ To make and develop a prototype piece of furniture from my design. <p><u>Success Criteria</u></p> <ul style="list-style-type: none"> ◆ I can finalise my design for my piece of furniture. ◆ I understand the importance of health and safety when using different tools and materials. ◆ I know what a prototype is and why they are important when developing a new product. ◆ I can develop a prototype based on my design. | <p>Before the lesson:</p> <p>Look through the PowerPoint.</p> <p>Decide whether all the children are going to make a prototype of one class design or their individual design.</p> <p>If possible, scan or copy some of the children's designs to share with the class as good examples.</p> |
| <p>Learning objective and success criteria:</p> <p>Innovative Practical Ergonomic Engineer Ingenuity</p> | <p>Before the lesson:</p> <p>Powerpoint Previous lesson's designs A range of materials and tools to be used by the children to make prototypes.</p> |
| <p>Attention Grabber:</p> | |
| <p>Slide 3: Remind the children of the previous lesson where we heard about the Ambic Stem Challenge and started to design our own piece of furniture.</p> <p>Slide 4: Show the children some of the different jobs Ambic's employees do, you might want to ask the children if their parents, carers or anyone they know does any of these jobs. The tasks that the children are doing in this lesson will be linked to these jobs.</p> <p>Slide 5: Remind the children about the key words, you might want to revisit the CCD grid if you used it, can the children remember the meanings? These words are going to be important today because we are going to be the designers.</p> <p>Slide 6: Share some of the children's designs from the previous lesson, looking at them now, are there any changes or additions that can be added? Discuss with the children about editing and improving our designs. Explain that when Ambic's project managers are working with schools or even architects their first design is never the one that is made.</p> <p>Slide 7: Give the children some time to finalise their design of their piece of furniture.</p> | |
| <p>Main Event:</p> | |
| <p>Slide 8: Once the children have had a sufficient time to complete their designs bring them back together to explain today's lesson about prototypes.</p> <p>Slide 9: Prototypes – Use the slide to explain that prototypes are the first one of the product you make, like an example, they are useful to see how your idea works and it helps to see if there are any problems that you didn't think of when designing.</p> <p>Slide 10: Explain that today the children are going to be using the different materials that they have brought in or have been supplied with to make a prototype of their design.</p> <p>Slide 11: Health and Safety – It might be a good idea to show the children some health and safety rules they need to follow when completing this task – scissor use, cutting, etc.</p> <p>Slide 12: You might want to demonstrate where you would start – the main structure, maybe the larger sides. Emphasise that the children need to be focusing on the main part rather than the smaller details.</p> | |

The Ideas:

Slide 13: Children to complete their prototype either individually, in pairs or groups. This is your choice as a teacher.

Note: This lesson may span over 2 weeks or 2 lessons, depending on the need of the children, your timetable or how you are using this scheme of work.

Wrapping Up:

Slide 14: Ask the children how they found the process of making a prototype. Have they learnt anything? Do they see the importance of this step when designing a product?

Slide 15: Share that the next lesson we are going to be evaluating our design before submitting the final design for the competition.

| Learning objective and success criteria: | Before the lesson: |
|---|--|
| <ul style="list-style-type: none"> ◆ To evaluate my product against the design criteria. <p><u>Success Criteria</u></p> <ul style="list-style-type: none"> ◆ I can answer questions about my product based on the agreed design criteria. ◆ I can identify how my design achieved the design criteria ◆ I can suggest possible improvements or changes I would make to my design. | <p>Look through the Powerpoint.</p> <p>Add the previously discuss design criteria to the correct slide.</p> <p>Ensure all children have both their design and prototype.</p> |
| Learning objective and success criteria: | Before the lesson: |
| <p>Innovative Practical Ergonomic Engineer Ingenuity</p> | <p>Powerpoint Resource sheets Product designs Product Prototypes Competition entry form</p> |
| Attention Grabber: | |
| <p>Slide 3: Remind the children of the previous lessons based on the Ambic Stem Challenge. The children should have now completed their design and prototype.</p> <p>Slide 4: Today we are going to evaluate, which is a key process that our employers do when finalising a project before it goes into manufacturing and to the final client. We need to make sure that everything on the design criteria is completed to the best of our ability.</p> <p>Slide 5: Who can remember why we were designing a piece of furniture? What was the problem within our school that we were trying to solve?</p> <p>Slide 6: Can the children remember what was on the decided design criteria.</p> | |
| Main Event: | |
| <p>Slide 7: Have your decided design criteria on the PowerPoint to remind the children. Discuss what was meant by each one and how could we have achieved each aim.</p> <p>Slide 8: Explain that we are going to start with a Peer evaluation. The children will have some time to have a look at each other's designs and prototypes.</p> <p>Slide 9: Share the Peer evaluation sheet with the children. The children must evaluate the furniture against the criteria. They will write down one positive point and one area for improvement. Emphasise the children need to be working against the criteria. Ensure the design criteria is on display for the children to refer to.</p> <p>Slide 10: Bring the children back together. Discuss any feedback with the children, they might want to share any innovative or interesting designs or prototypes.</p> <p>Slide 11: Share the Self-evaluation questions with the children. Explain they are now going to evaluate their own designs against the design criteria.</p> <p>Slide 12: Have a look at the example on the powerpoint and model, with the help of the children, go through each part. You may want your children to discuss the different design criteria in pairs. They need to think about whether they have achieved it or how it could be changed to achieve it.</p> | |

The Ideas:

Slide 13: Children to work either independently, in pairs or groups. You know your class or group, to complete the evaluation of their own designs and prototypes.

Remind the children about the key vocabulary to use as they are completing the task.

Wrapping Up:

Slide 14: Feedback on the STEM challenge as a whole. Ask the children these 3 questions.

- ◆ What have you learnt?
- ◆ Why is the process you have completed important?
- ◆ What have you enjoyed?

Give the children time to think about these questions. You may want them to discuss in pairs.

Slide 15: Remind the children that this was a real-life process that they completed, we have people at Ambic that complete these steps every day and we all work together to create a product and deliver it to schools and other businesses.

The children may have more questions about the manufacturing process, we are more than happy to answer them if you would like to send them to us!

Slide 16: Ambic hopes you have enjoyed the Stem Challenge. Good Luck with your design!

My design evaluation

Aim of the project:

What went well:

Challenges I faced:

How I dealt with these challenges:

Next time I would:

My favourite part was:

Peer evaluation

Think about:

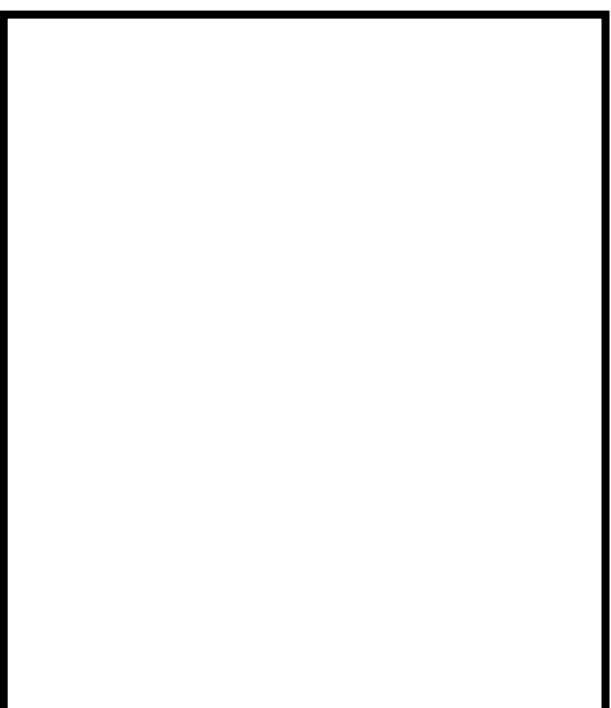
- Does the design solve the problem?
- Is the design innovative?
- Does the design and prototype achieve all the criteria?
- Will it work within our school?

| Great design, I like how you... | You might want to think about improving |
|---------------------------------|---|
| | |
| | |
| | |
| | |

| Word | Heard before | Prediction | Actual Meaning | Use in a sentence |
|------------|--------------|------------|----------------|-------------------|
| Innovative | | | | |
| Practical | | | | |
| Ergonomic | | | | |
| Engineer | | | | |
| Ingenuity | | | | |

Designer/s: _____

Problem within school: _____

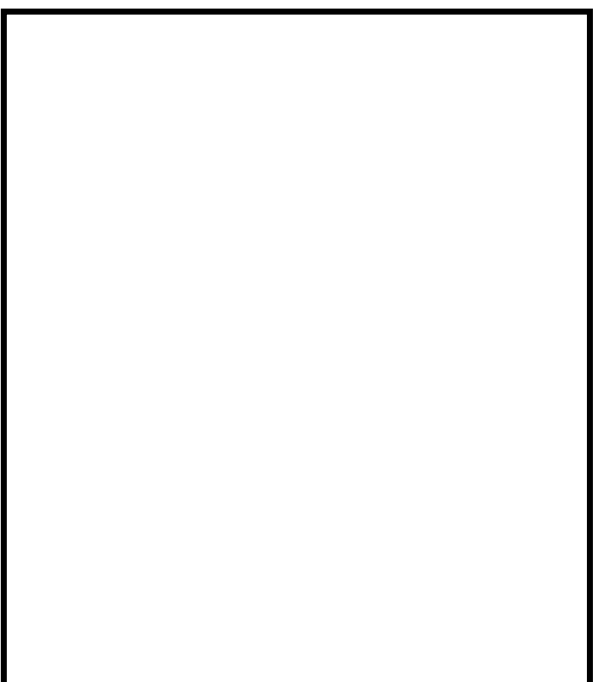


What is this piece of furniture used for?

What do you think it is made from?

How could you describe the colour?

Who might use it? How do you know?



Is it practical?

Would this fit in our school?

What is this piece of furniture used for?

How could you describe the shape?

Do you like it?
