


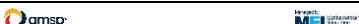























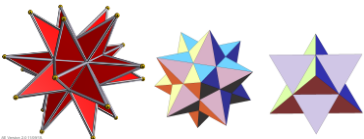


Slide 1	 <p>Advanced Mathematics Support Programme®</p>	
Slide 2	 <p>Modular origami</p> <p>2 - making the shapes</p>	
Slide 3	 <p>Origami paper</p> <ul style="list-style-type: none"> You need square paper for all origami If you have no square paper, there are two methods to make squares in this video https://bit.ly/squarefroma4 	
Slide 4	 <p>Before you start...</p> <ul style="list-style-type: none"> You will need to make several units for each of the shapes <ul style="list-style-type: none"> 6 units to make a cube <ul style="list-style-type: none"> Ideally 2 each of three colours 12 shapes to make a stellated octahedron <ul style="list-style-type: none"> Ideally 4 each of three colours 	
Slide 5	 <p>To make a cube</p> <ul style="list-style-type: none"> Take two pieces of different colours. Hold them at right angles to each other. Slide one end of one piece in to the middle flap of another piece 	<p>Students may wish to construct the cube using a different order of insertion.</p> <p>There are many different ways you can make the cube.</p> <p>If using 3 colours, it is usual to have the same colour on opposite faces, but this is not necessary. You may wish to explore with students how many different ways there are of making a cube using 3 different colours, 2 pieces of each.</p>
Slide 6	 <ul style="list-style-type: none"> Take a piece of the remaining colour. <p>You will be inserting the third piece to make a pyramid of three colours</p>   	

<p>Slide 7</p>	  <ul style="list-style-type: none"> Flip the inside flap on to the outside and tuck in 	
<p>Slide 8</p>	  <ul style="list-style-type: none"> Add the other pieces one at a time to make the cube. You can work out what goes where by putting the same colour pieces opposite each other in the cube. A bit of playing will ensure that each face has the same colour tucked in twice. You can make the cube with either unit 1 or unit 2, ending with these: 	
<p>Slide 9</p>	  <p>Making a stellated octahedron</p> <ul style="list-style-type: none"> Put one of each of the 3 colours together to make the corner of the cube, it looks like a pyramid Make 4 identical pyramids, 	
<p>Slide 10</p>	  <ul style="list-style-type: none"> Attach one pyramid to the other. Unlike the cube, you will now be attaching a different colour to the square (in the diagram a blue flap is inserted in to a grey square where there is already a white flap). 	
<p>Slide 11</p>	  <ul style="list-style-type: none"> Tuck the units in  <p>so you end up with this</p> 	
<p>Slide 12</p>	  <ul style="list-style-type: none"> Add the next 3 unit module. You should always get 3 different colours meeting at the top vertex of each pyramid. Find a vertex where two colours meet, and insert the missing colour. Then tuck in relevant flaps 	

<p>Slide 13</p>	  <ul style="list-style-type: none"> You will end with this:  <ul style="list-style-type: none"> Attach the final 3-piece the same way 	
<p>Slide 14</p>	  <p>End result!</p> <ul style="list-style-type: none"> Depending on whether you used unit 1 or unit 2, you should end with a shape like this 	
<p>Slide 15</p>	  <p>Other shapes</p> <ul style="list-style-type: none"> You can use 30 pieces to make a stellated icosahedron. You will need to do this in a team! (Or a good couple of hours). Make 30 units (10 x 3 colours work well) Start by connecting 5 x 3 pyramids in to a pentagon Rotate the shape, adding extra shapes to make sets of 5 pyramids. You should be able to arrange it so every vertex has 3 different colours. 	
<p>Slide 16</p>	  <p>Happy making!!</p> 	
<p>Slide 17</p>	  <p>Others?</p> <ul style="list-style-type: none"> There is a whole host of exciting shapes you can make with the sonobe unit (and others) If you google 'sonobe origami' lots of websites, youtube videos etc will come up. People have even made their lampshades out of them! 	
<p>Slide 18</p>	  <p>Stellated?</p> <ul style="list-style-type: none"> Below are some examples of stellated polyhedra. What makes them stellated? Do your shapes fit this description? Discuss with your neighbours. 	<p>Although these shapes are spiked, they are not truly stellated. Stellated shapes continue the edge/face at the same angle, whereas the shapes just made from origami has the 'spikes' extending at a different angle.</p> <p>You may wish to get some polyhedral models and stick cardboard on a couple of faces to see if you can see the difference.</p>