Oficina “MATEGAMI: a matemática do origami”

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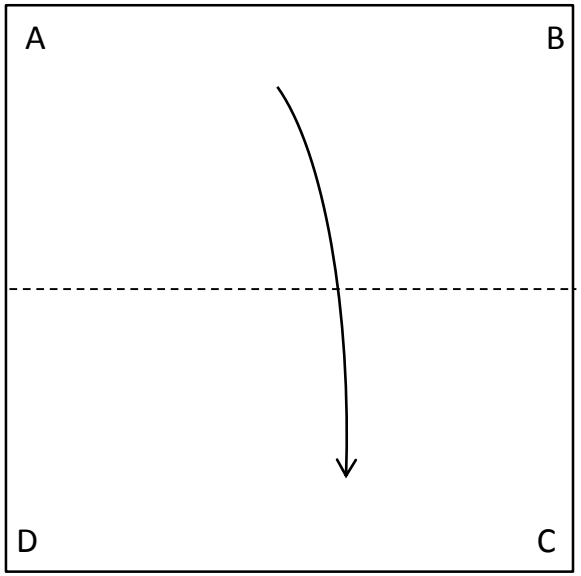
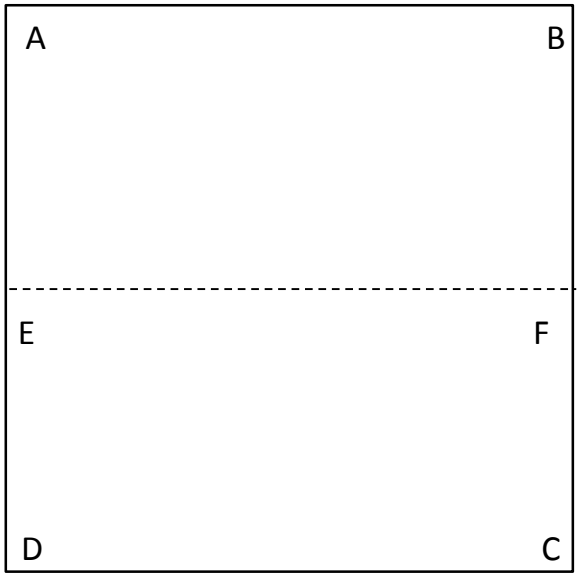
INSTITUTO FEDERAL
RIO GRANDE DO SUL

Construção dos poliedros de Platão
Cubo - Módulo

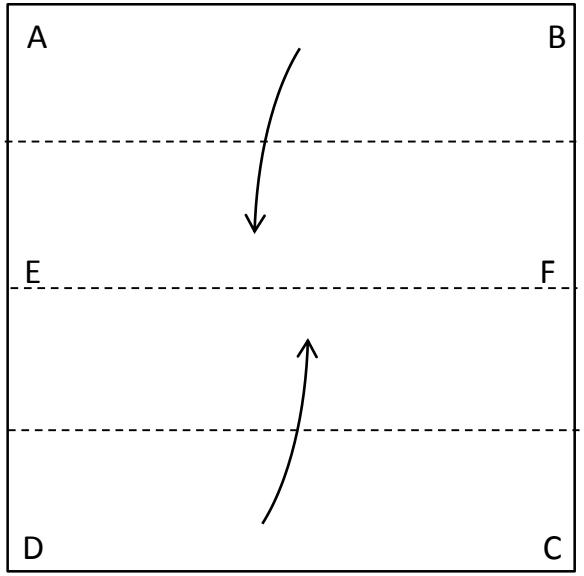
1) Seja uma folha quadrada ABCD. Dobre-a ao meio, fazendo coincidir os lados AB e CD. Marque o ponto E, intersecção entre a dobra e o lado AD e o ponto F, intersecção entre a dobra e o lado BC.

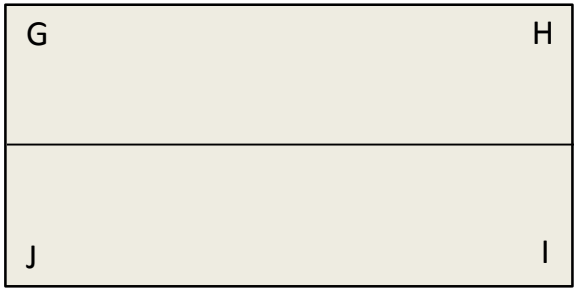




Construção dos poliedros de Platão
Cubo - Módulo

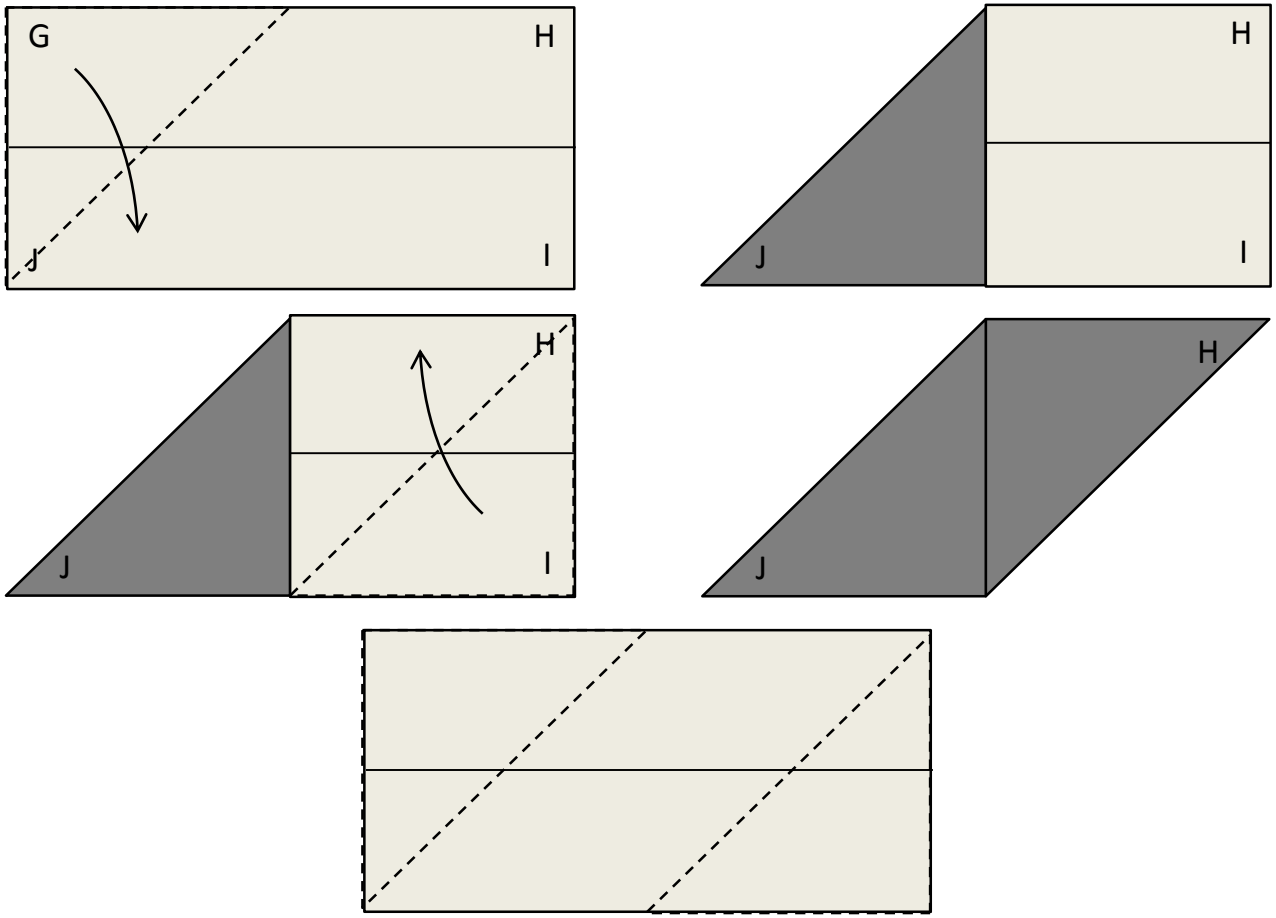
2) Faça uma dobra unindo os lados AB e EF, e outra unindo os lados CD e EF. Nomeie o retângulo obtido como GHIJ.





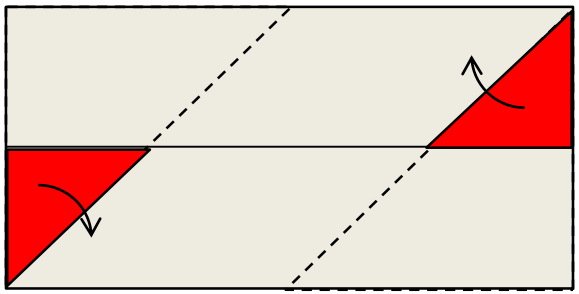
Construção dos poliedros de Platão
Cubo - Módulo

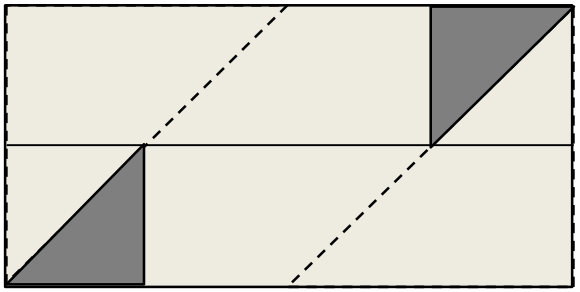
3) Leve o vértice G ao lado IJ e o vértice I até GH. Formamos um paralelogramo. Desdobre.

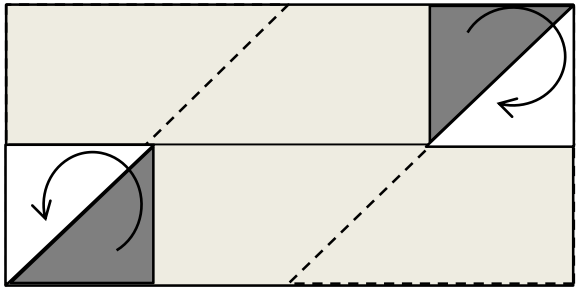


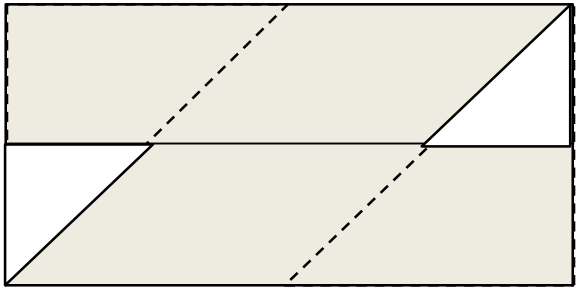
Construção dos poliedros de Platão
Cubo - Módulo

4) Dobre os dois triângulos retângulo destacados em vermelho, colocando-os para dentro.



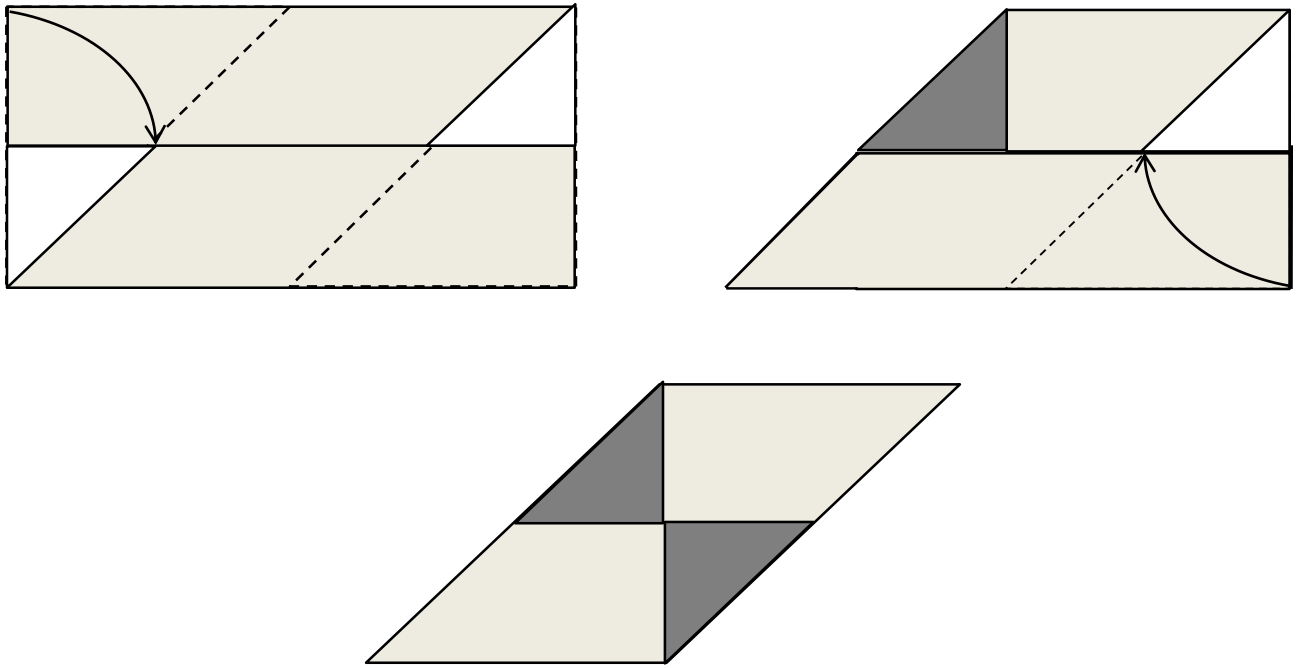






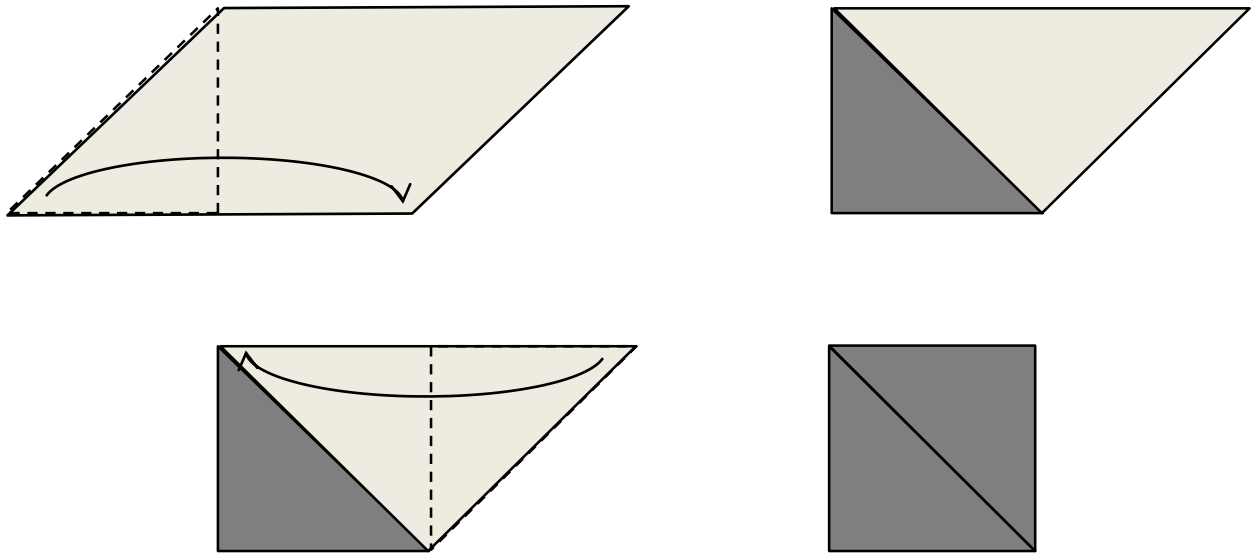
Construção dos poliedros de Platão
Cubo - Módulo

5) Proceda conforme o passo 3, mas de forma a colocar o vértice superior esquerdo dentro da parte inferior da peça e o vértice inferior direito dentro da parte superior da peça.



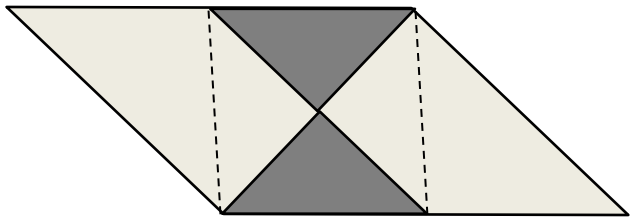
Construção dos poliedros de Platão
Cubo - Módulo

6) Vire a peça. Faça uma dobra de modo que os dois vértices da base do paralelogramo coincidam. Faça o mesmo com os vértices superiores.

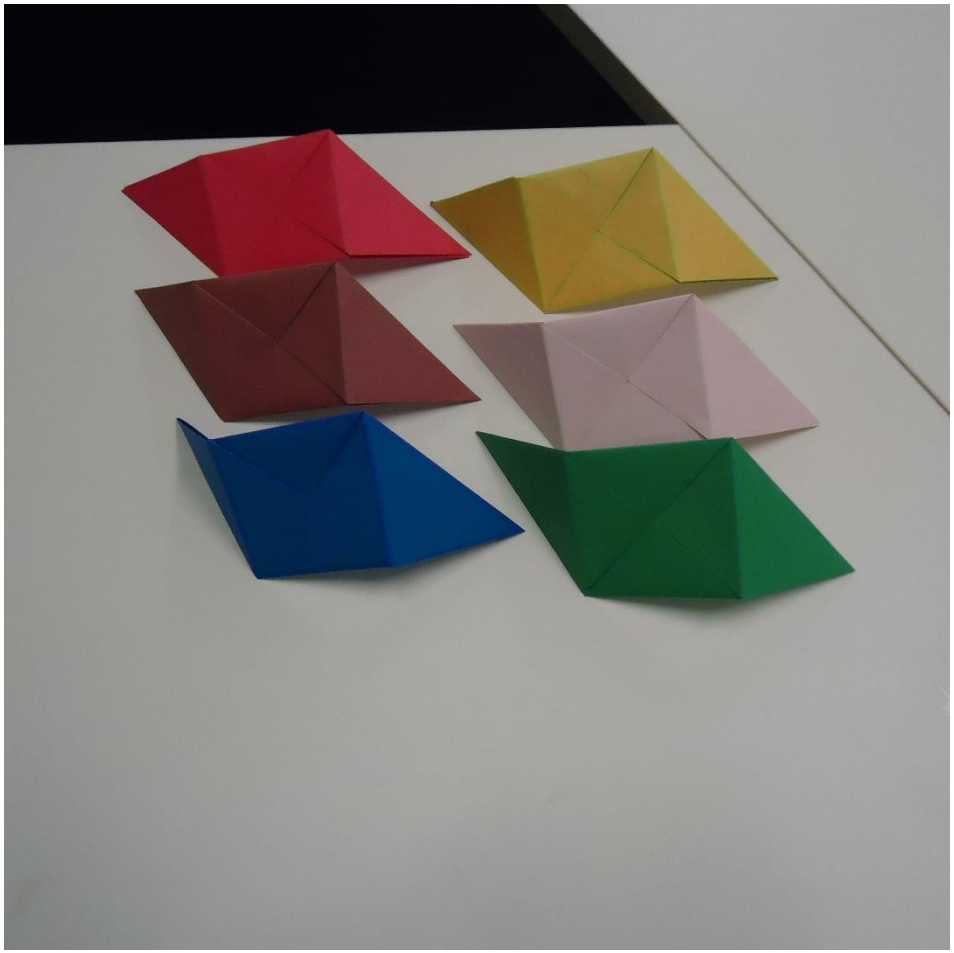


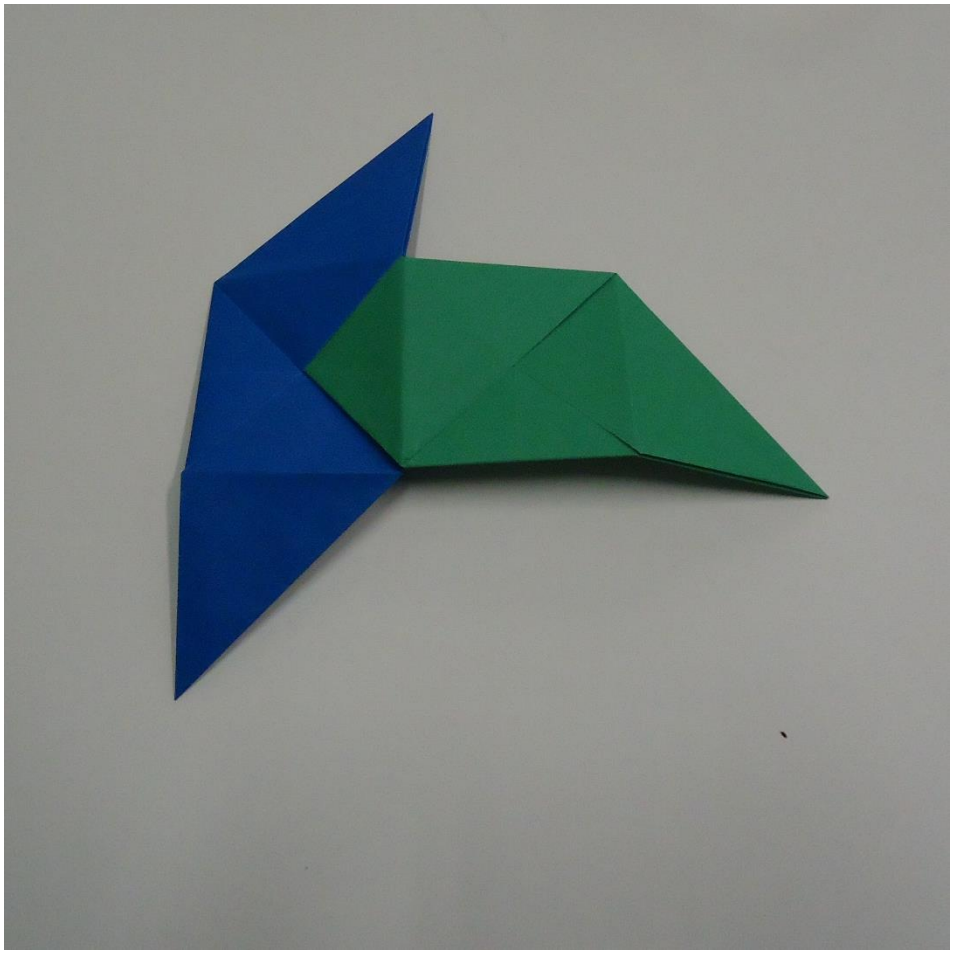
Construção dos poliedros de Platão
Cubo - Módulo

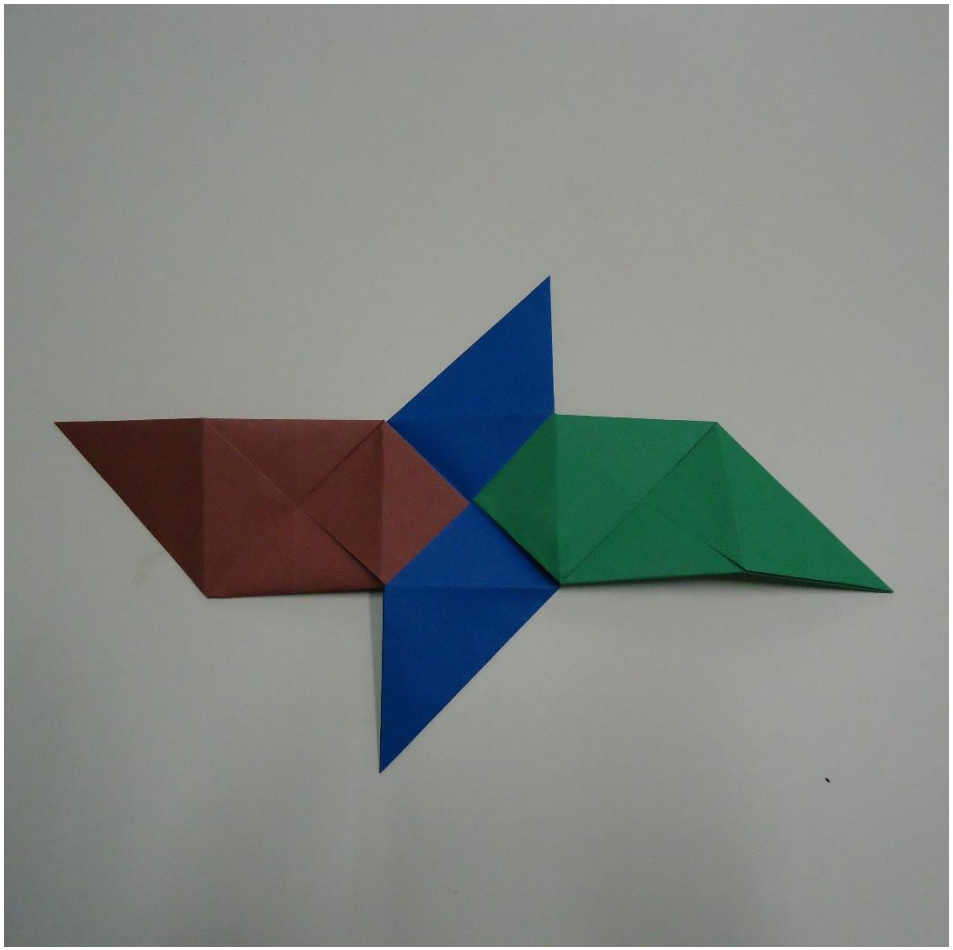
7) Desfaça o último passo e vire a peça.

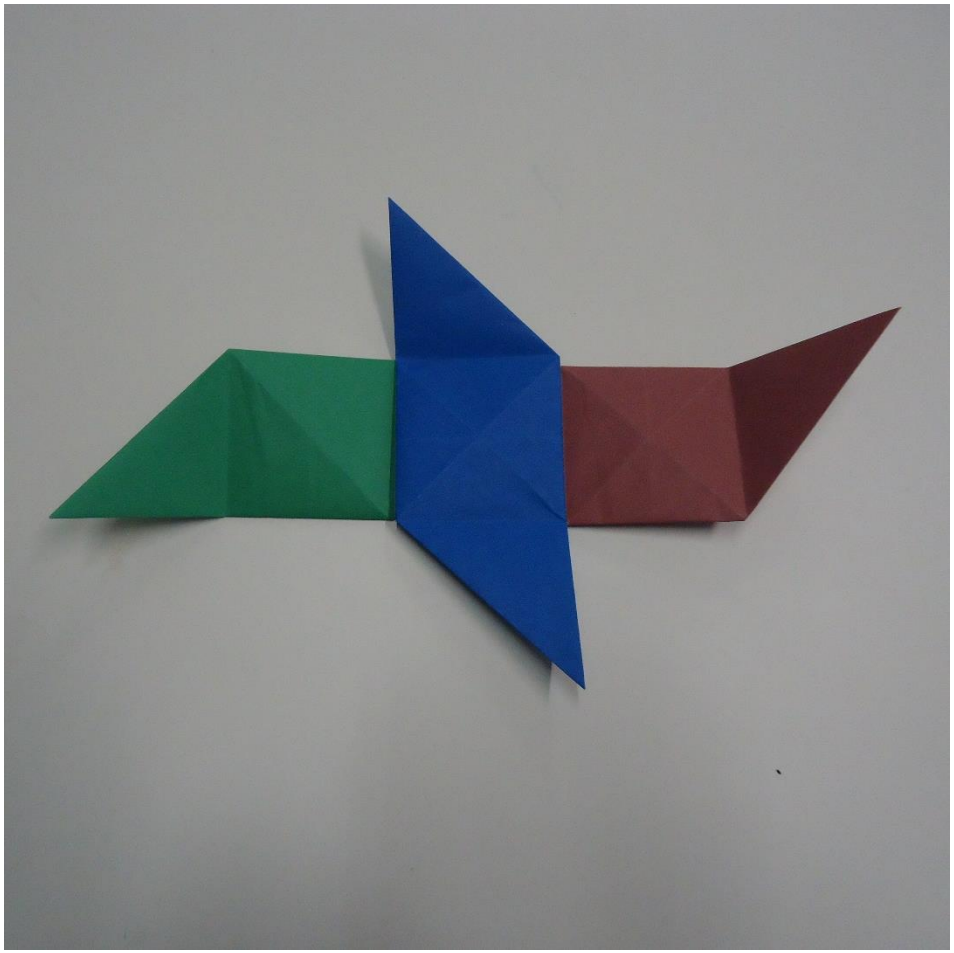


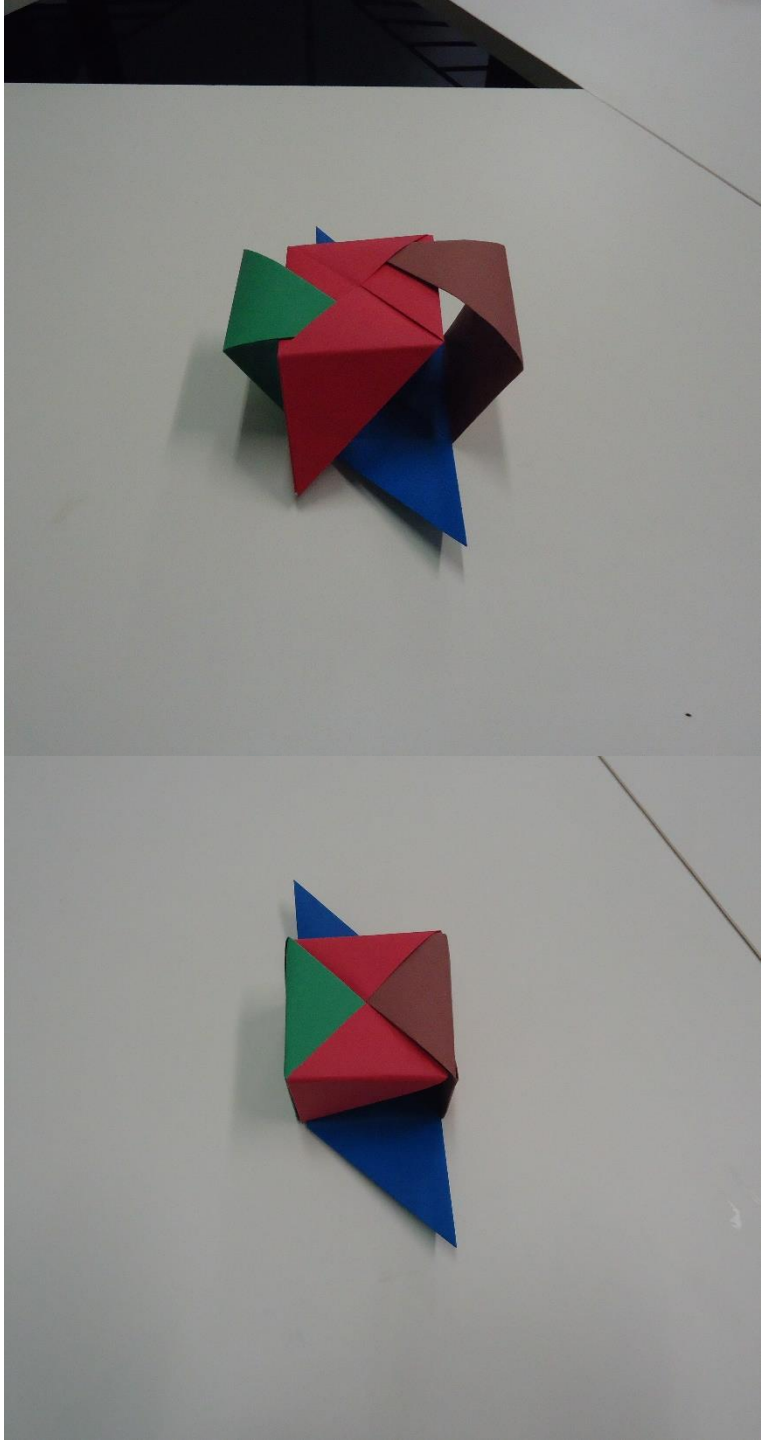
Para a construção de um cubo, utilizaremos seis destes módulos.

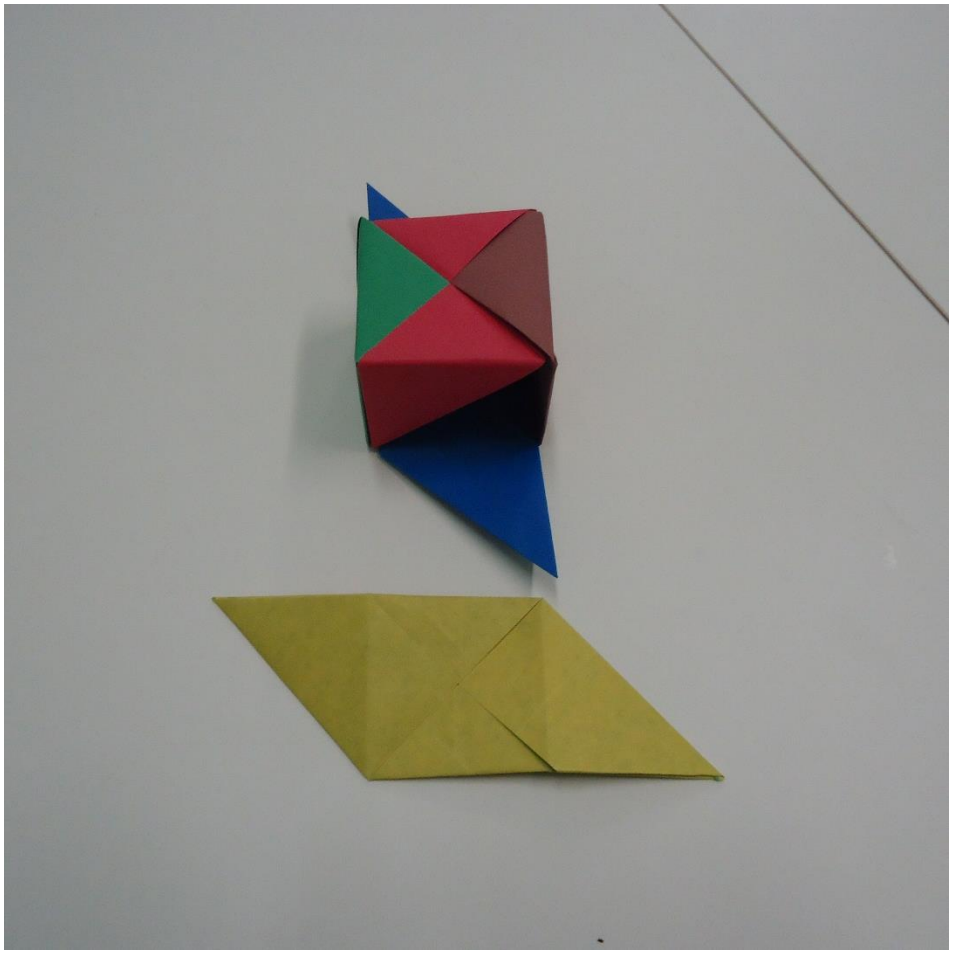


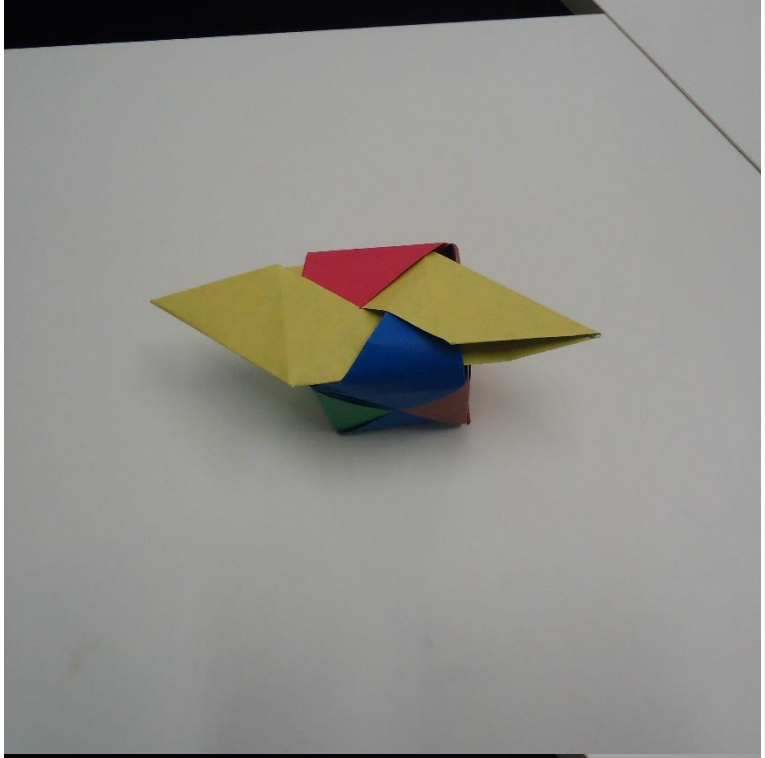


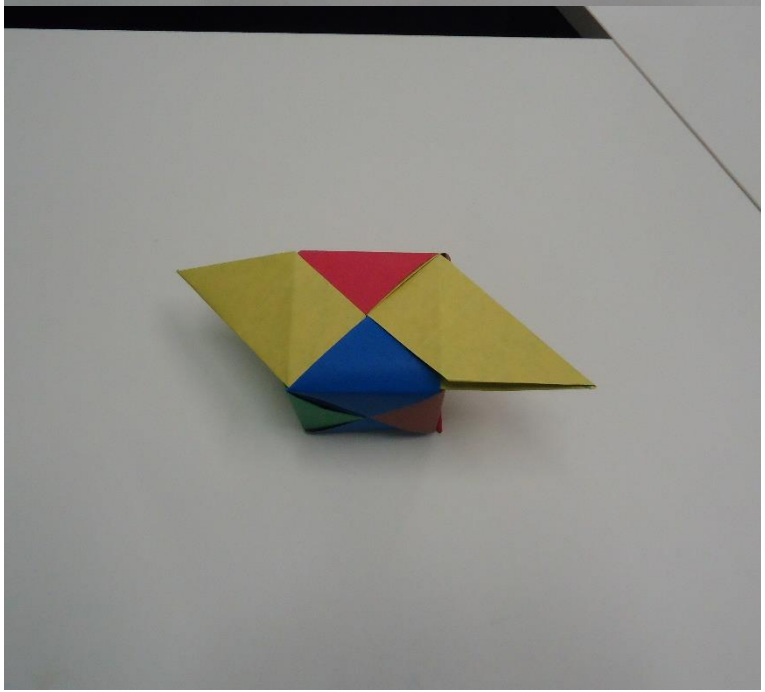


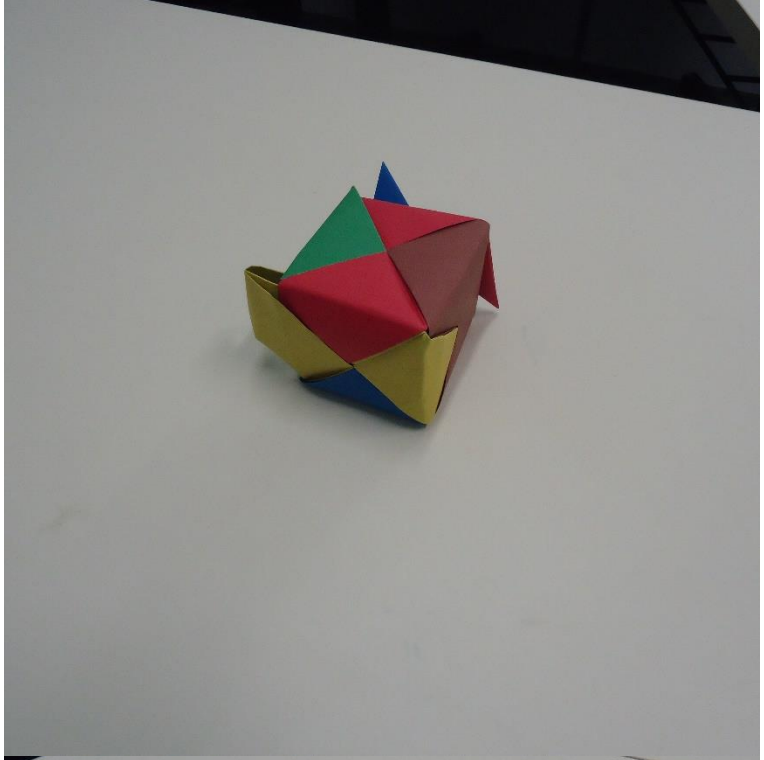


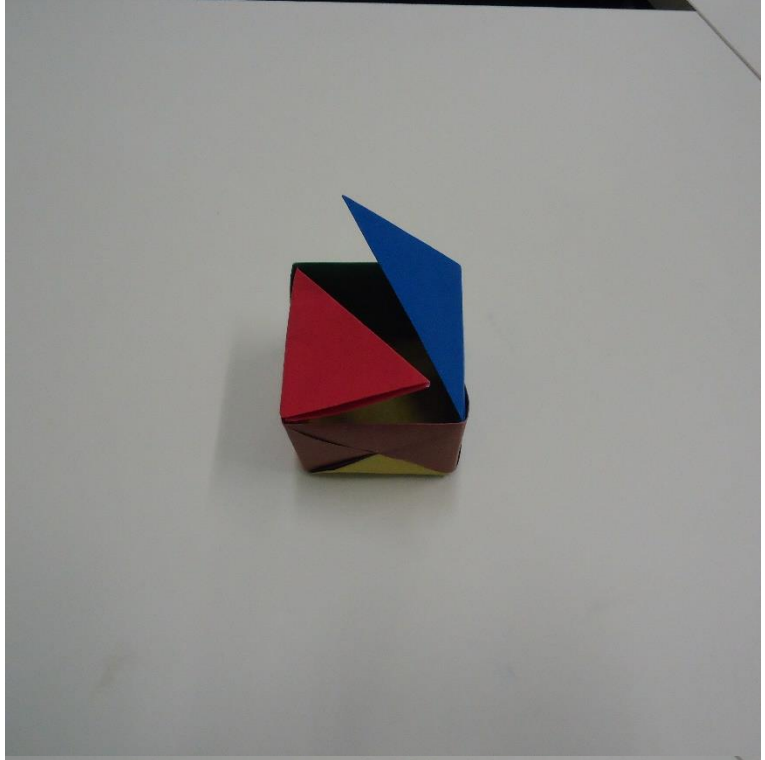


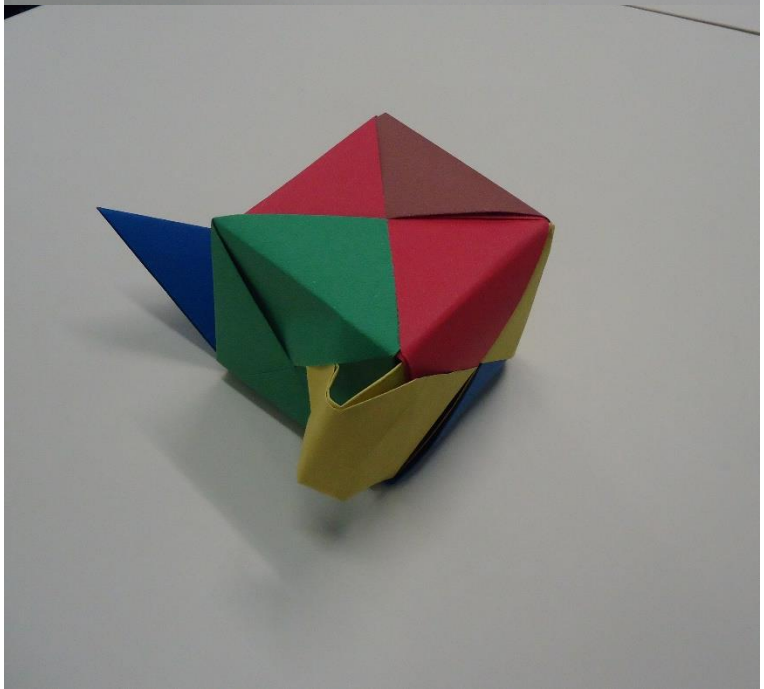


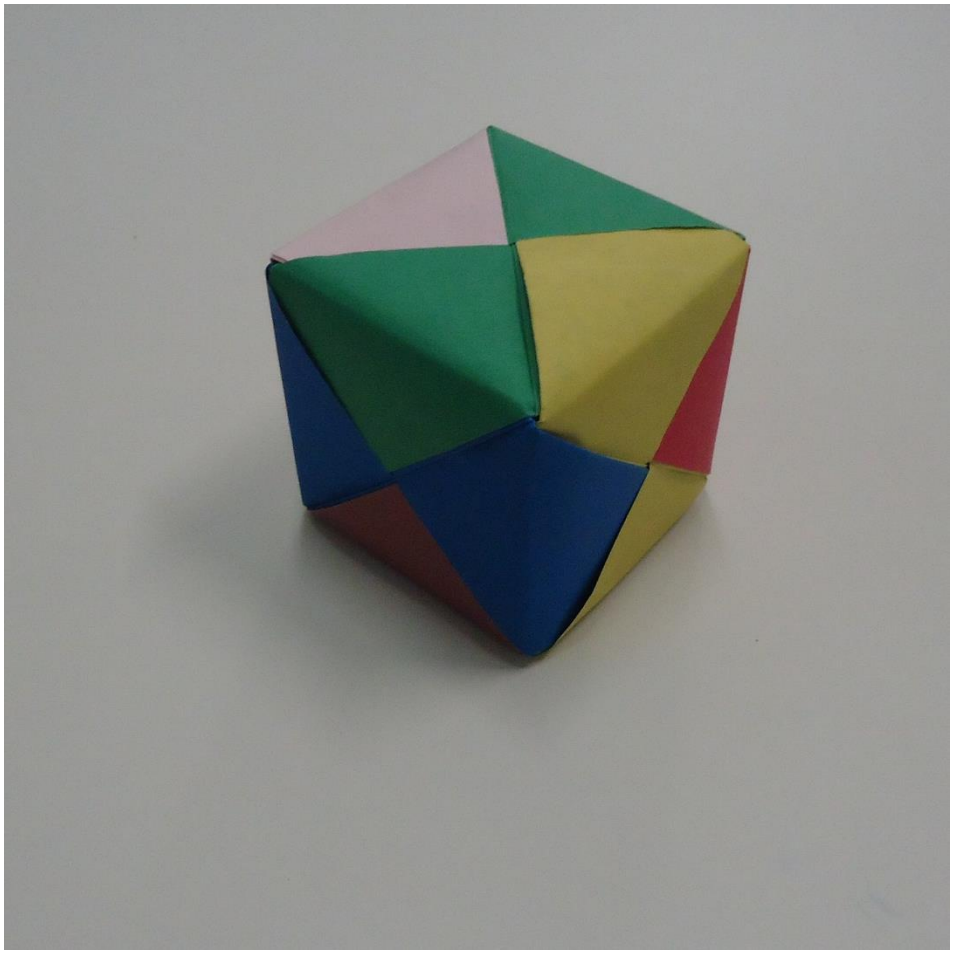






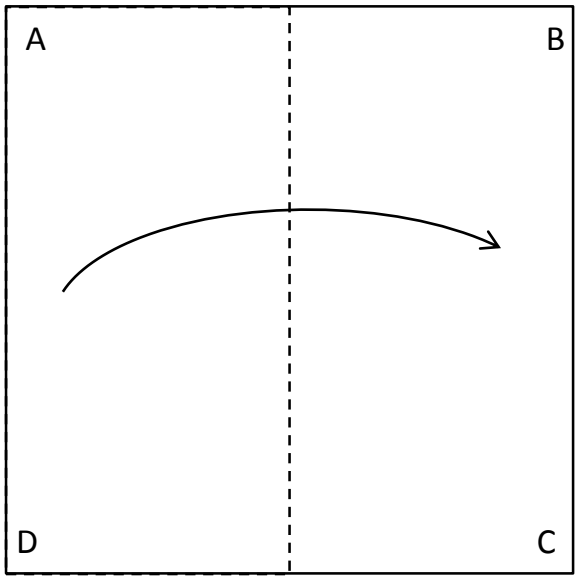


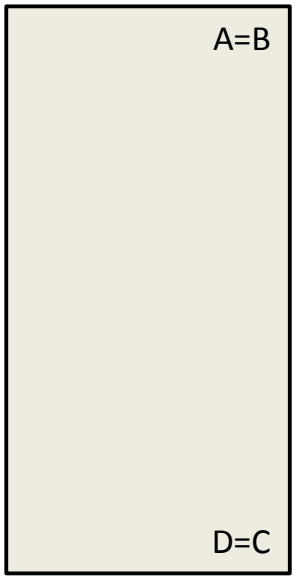




Construção dos poliedros de Platão
Tetraedro, Octaedro e Icosaedro – Módulo triangular

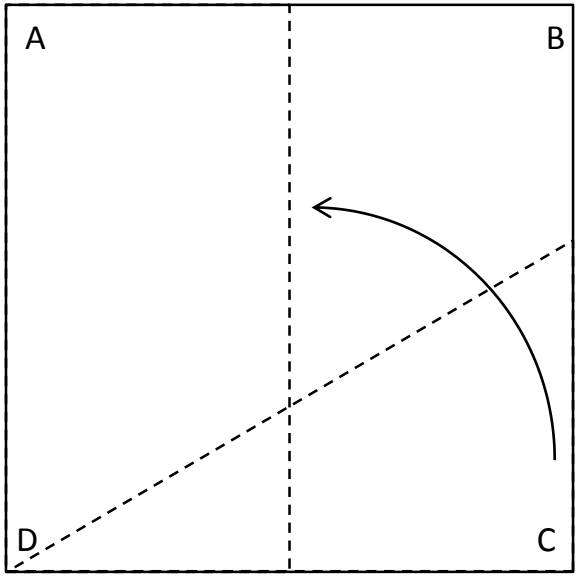
1) Seja uma folha quadrada ABCD. Dobre-a ao meio, fazendo coincidir os lados AD e BC. Desdobre. Obtém-se a mediatriz dos segmentos $\overline{AB}$ e $\overline{CD}$.

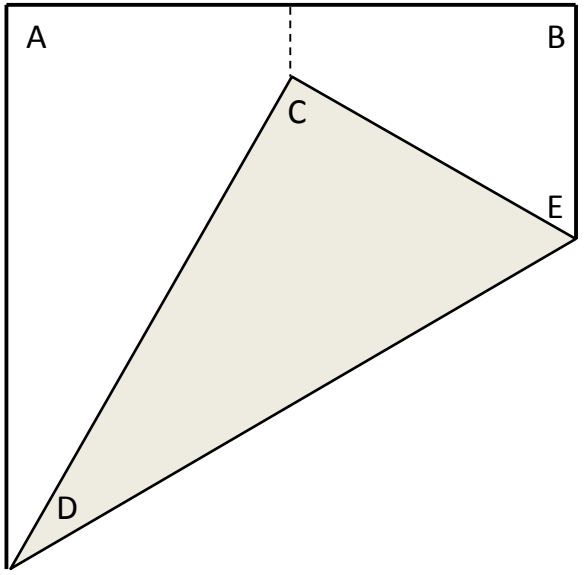




Construção dos poliedros de Platão
Tetraedro, Octaedro e Icosaedro – Módulo triangular

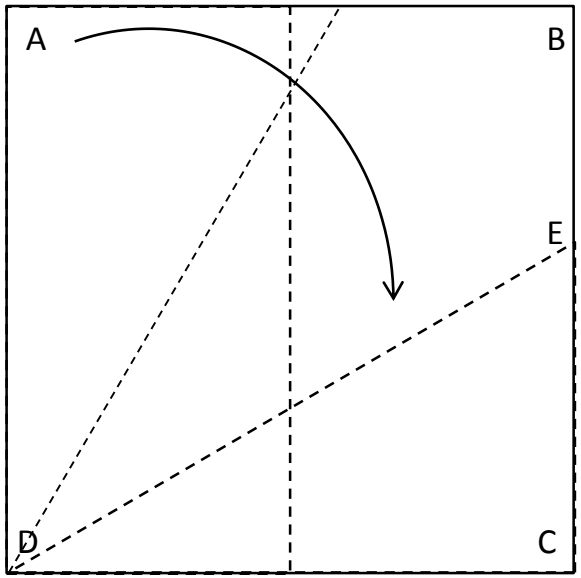
2) Leve o vértice C à dobra obtida anteriormente. Marque o ponto “E”, intersecção entre a dobra e o lado BC.

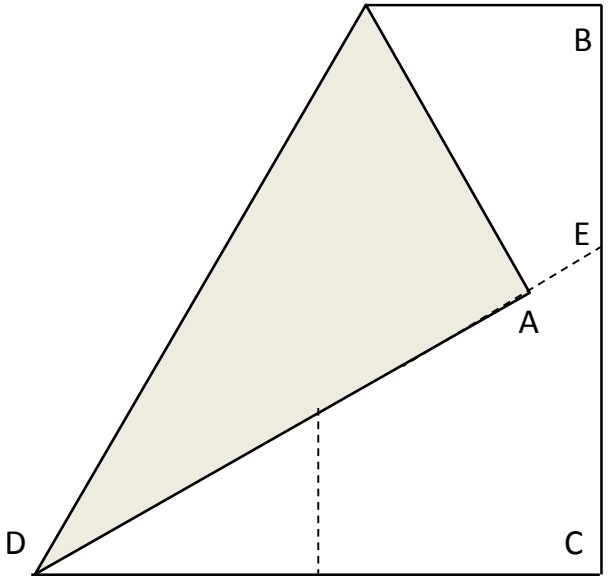




Construção dos poliedros de Platão
Tetraedro, Octaedro e Icosaedro – Módulo triangular

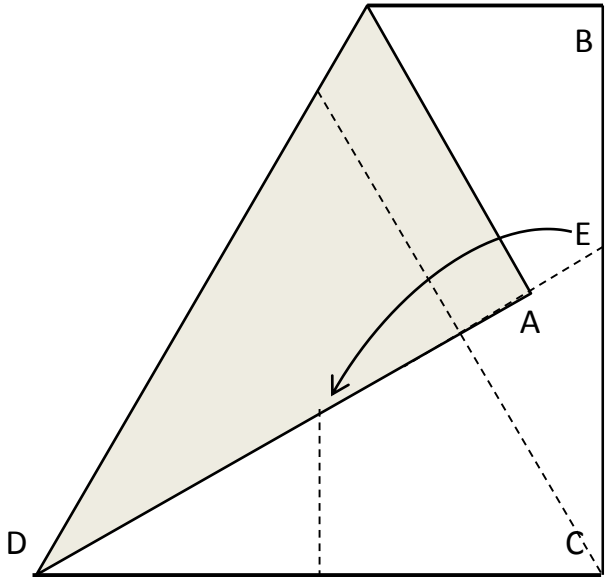
3) Encontre, através de dobradura, a bissetriz do ângulo $A\widehat{D}E$.

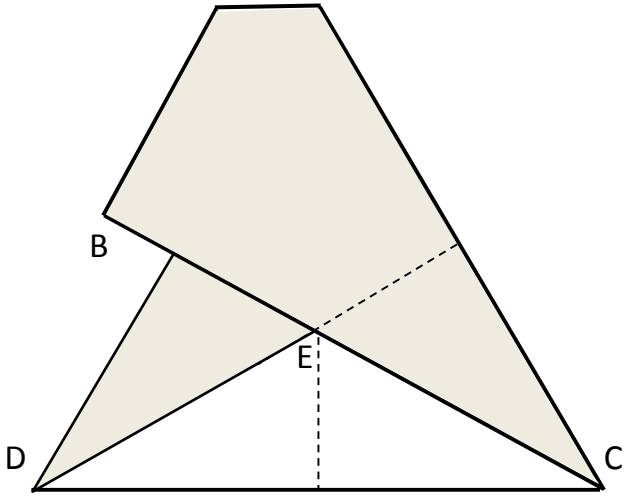




Construção dos poliedros de Platão
Tetraedro, Octaedro e Icosaedro – Módulo triangular

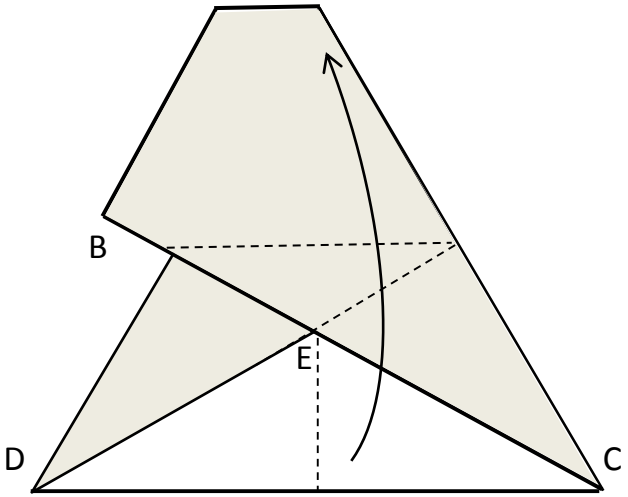
4) Faça uma dobra levando o ponto E até a primeira dobra.





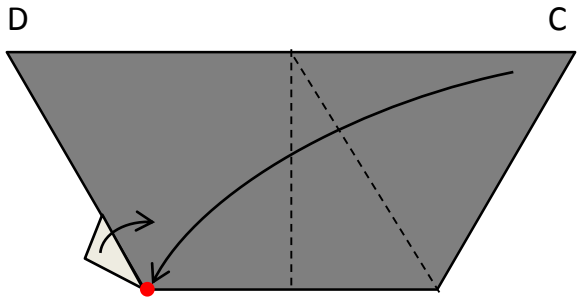
Construção dos poliedros de Platão
Tetraedro, Octaedro e Icosaedro – Módulo triangular

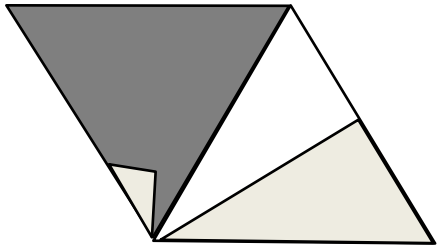
4) Dobre conforme a figura.



Construção dos poliedros de Platão
Tetraedro, Octaedro e Icosaedro – Módulo triangular

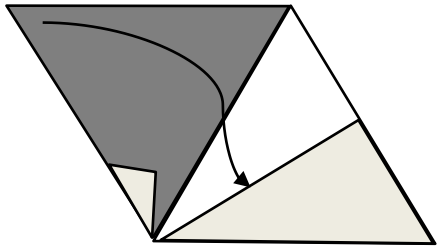
5) Leve o vértice C ao ponto indicado. Dobre a aba do canto esquerdo.

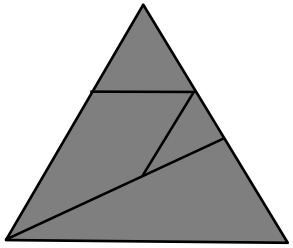




Construção dos poliedros de Platão
Tetraedro, Octaedro e Icosaedro – Módulo triangular

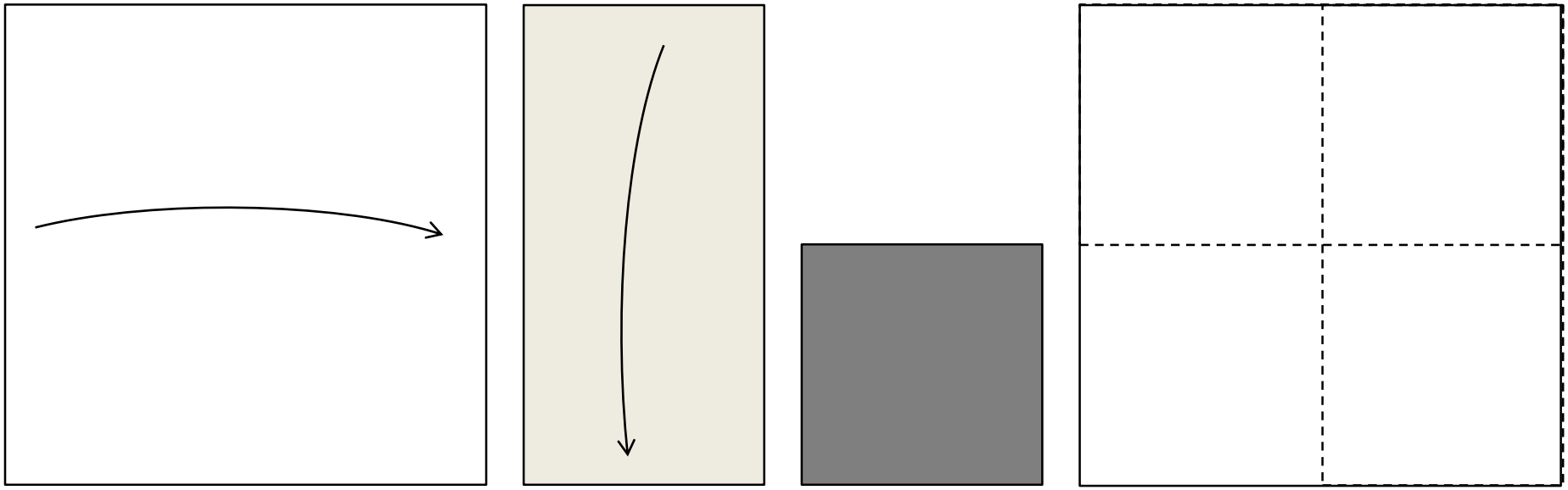
6) Dobre conforme a figura.





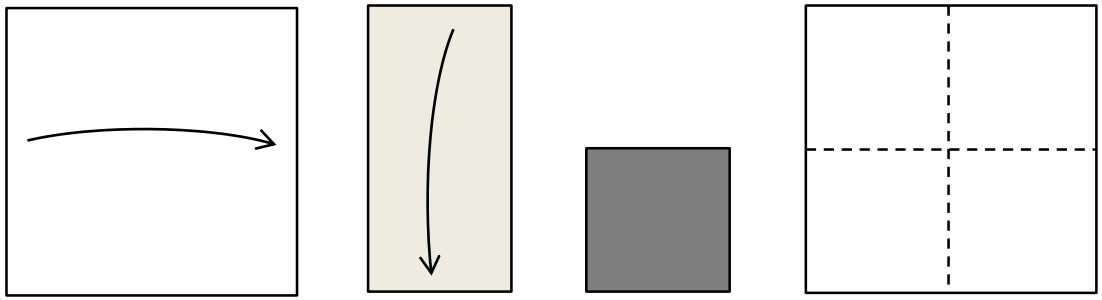
Construção dos poliedros de Platão
Tetraedro, Octaedro e Icosaedro – Módulo de encaixe

1) Vamos partir de um quadrado de mesmo tamanho do usado no módulo anterior. Divida-o em quatro partes iguais.

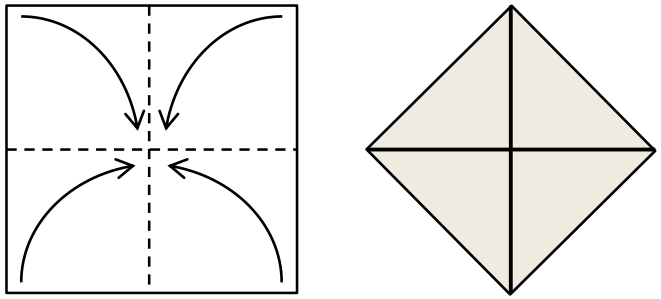


Construção dos poliedros de Platão
Tetraedro, Octaedro e Icosaedro – Módulo de encaixe

2) Recorte e pegue uma destas partes. Proceda conforme o passo 1 com este quadrado.

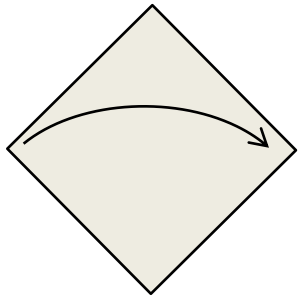


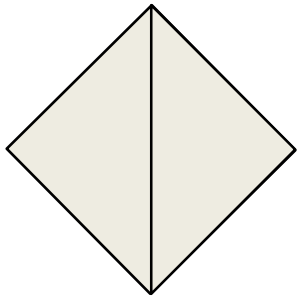
3) Leve os quatro vértices do quadrado ao centro (intersecção entre as dobras feitas).



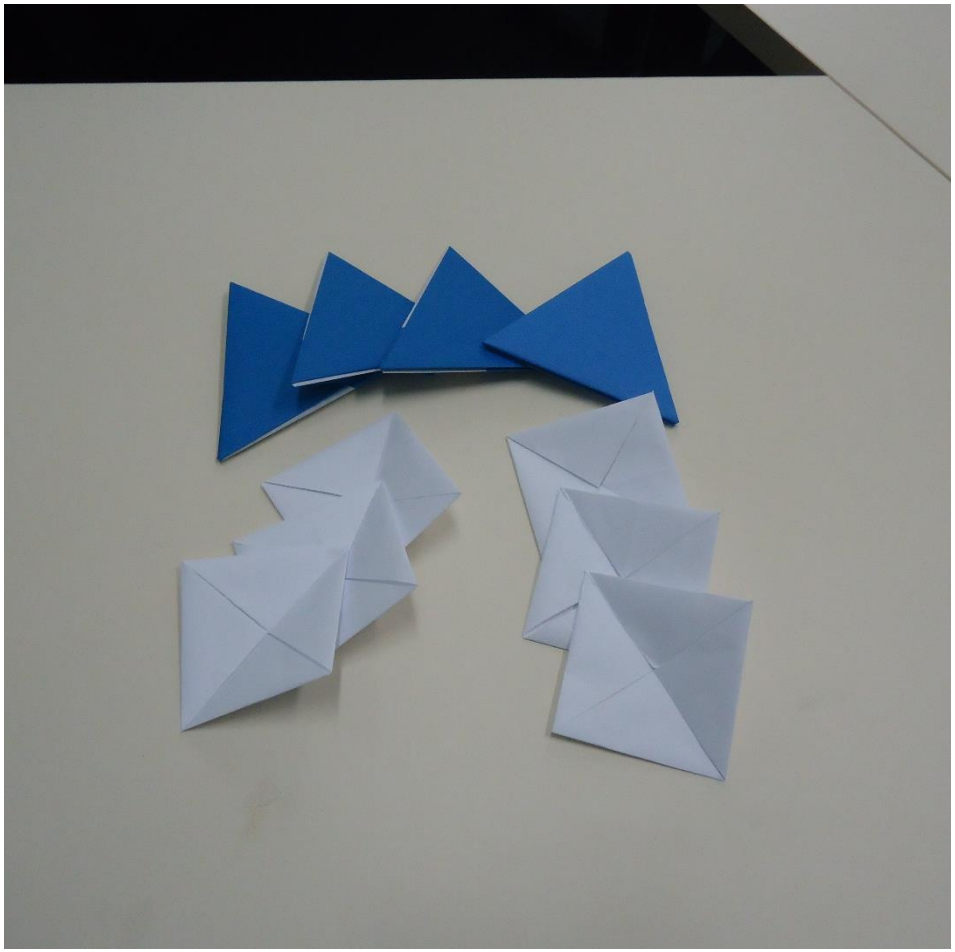
Construção dos poliedros de Platão
Tetraedro, Octaedro e Icosaedro – Módulo de encaixe

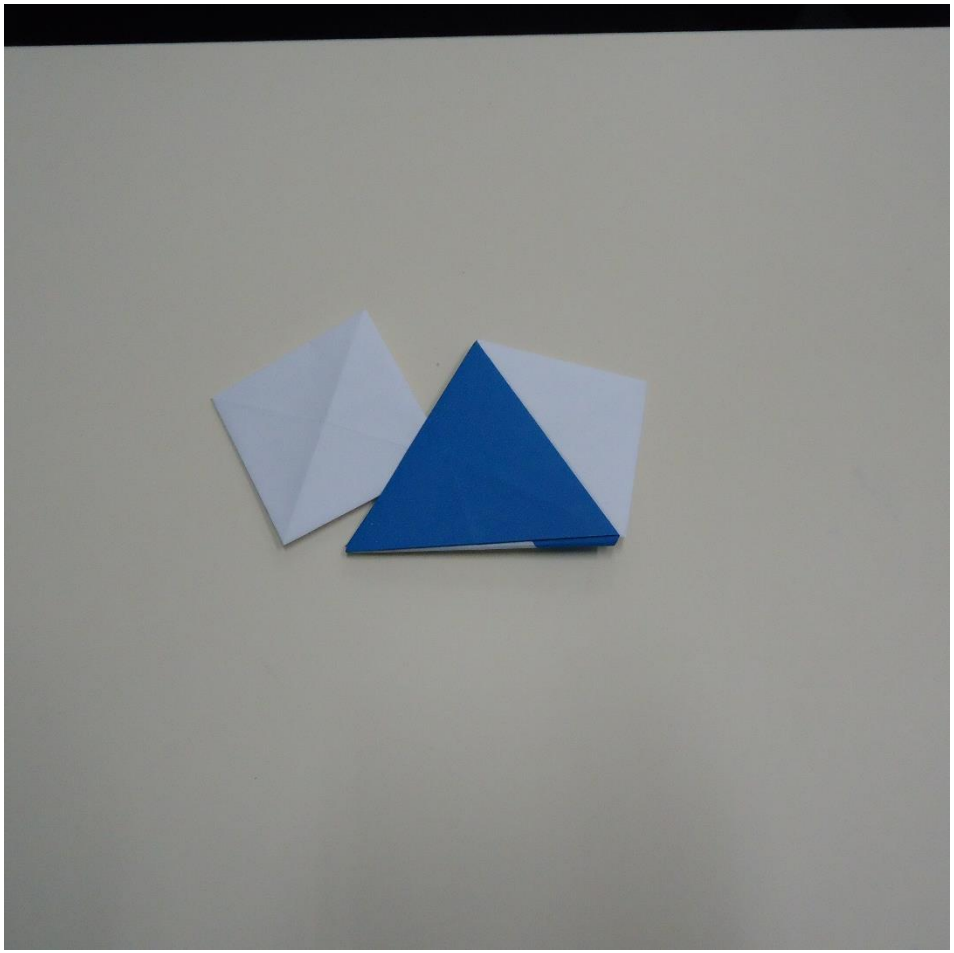
4) Vire e dobre ao meio.

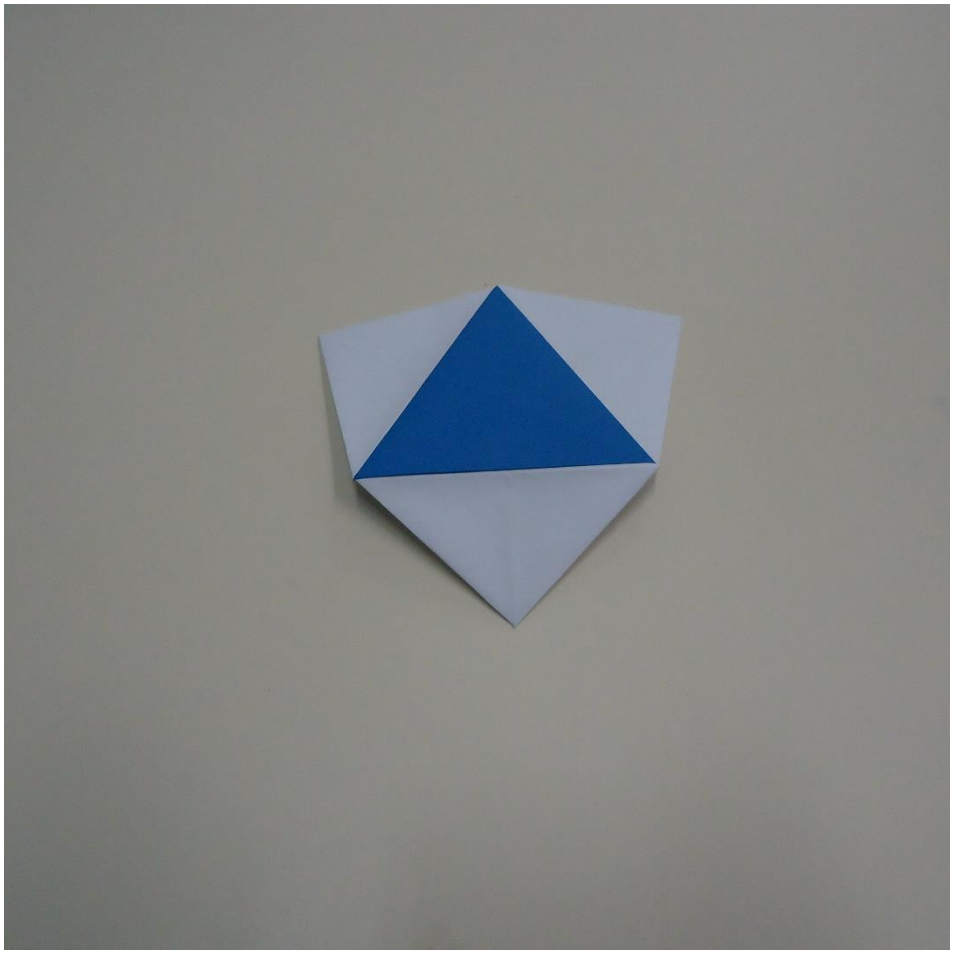


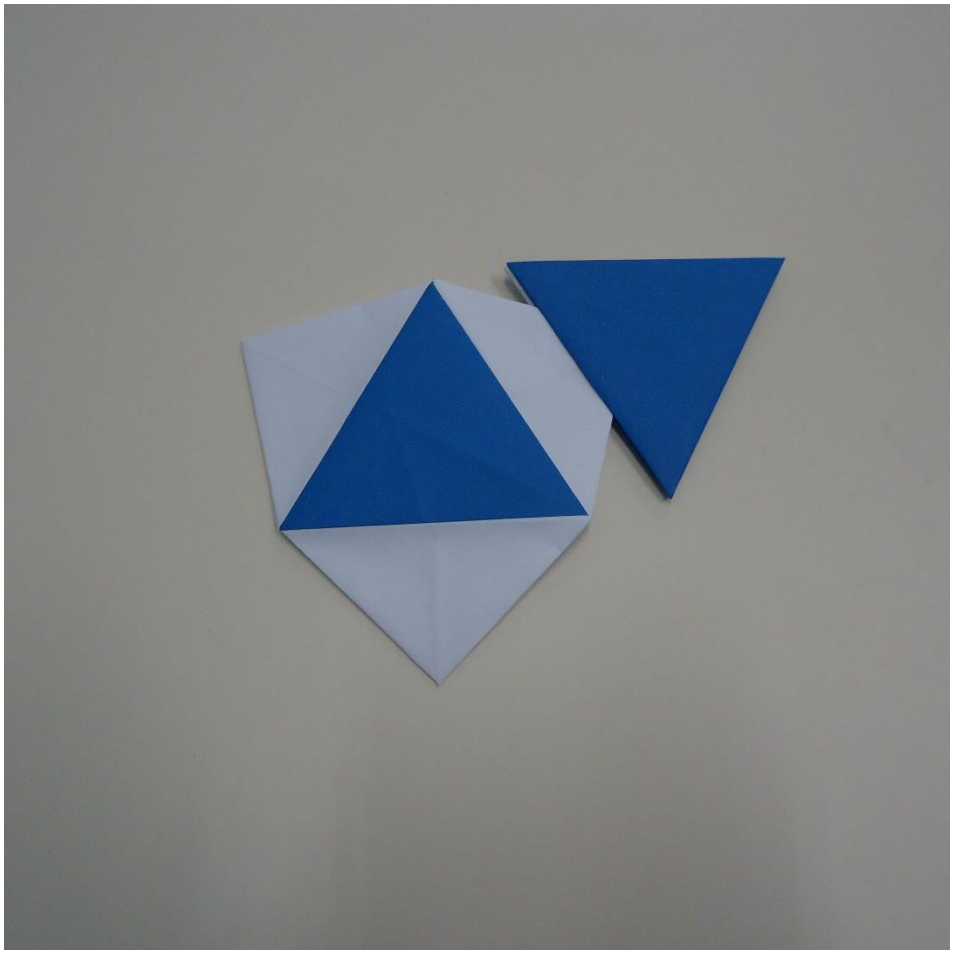


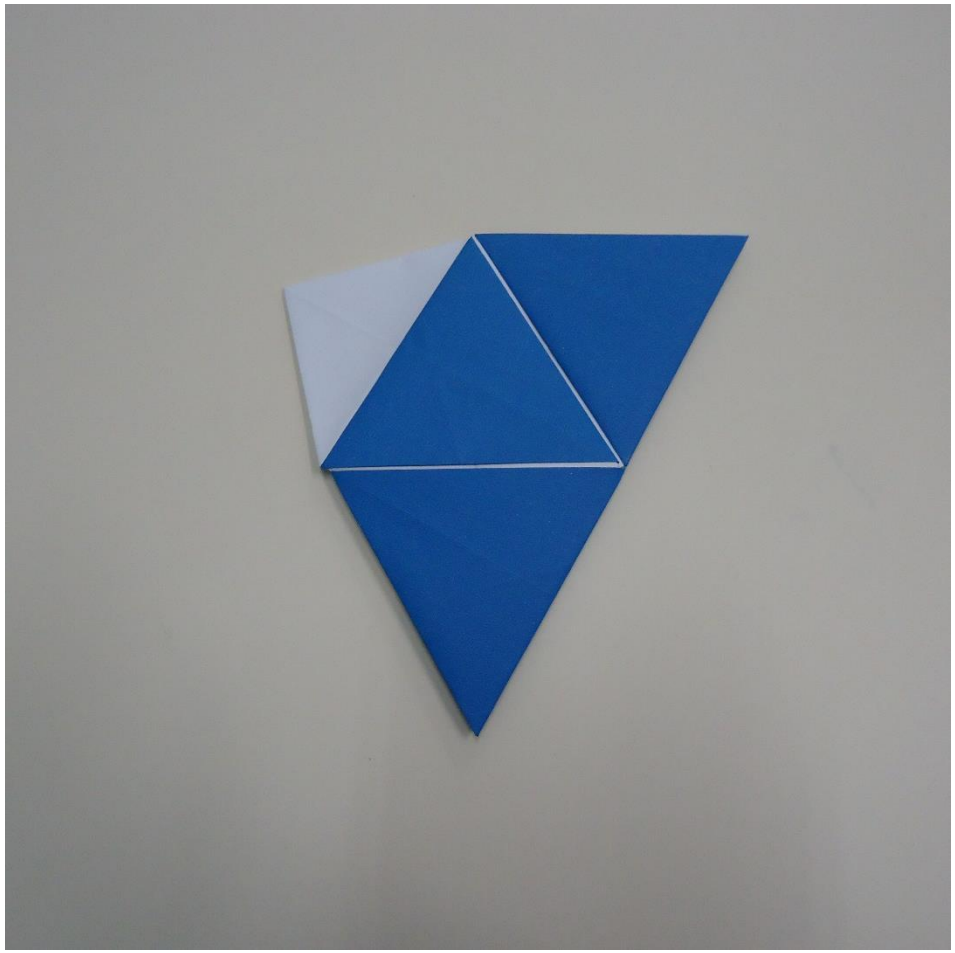
Para a construção de um tetraedro, utilizaremos quatro módulos triangulares e seis módulos de encaixe.

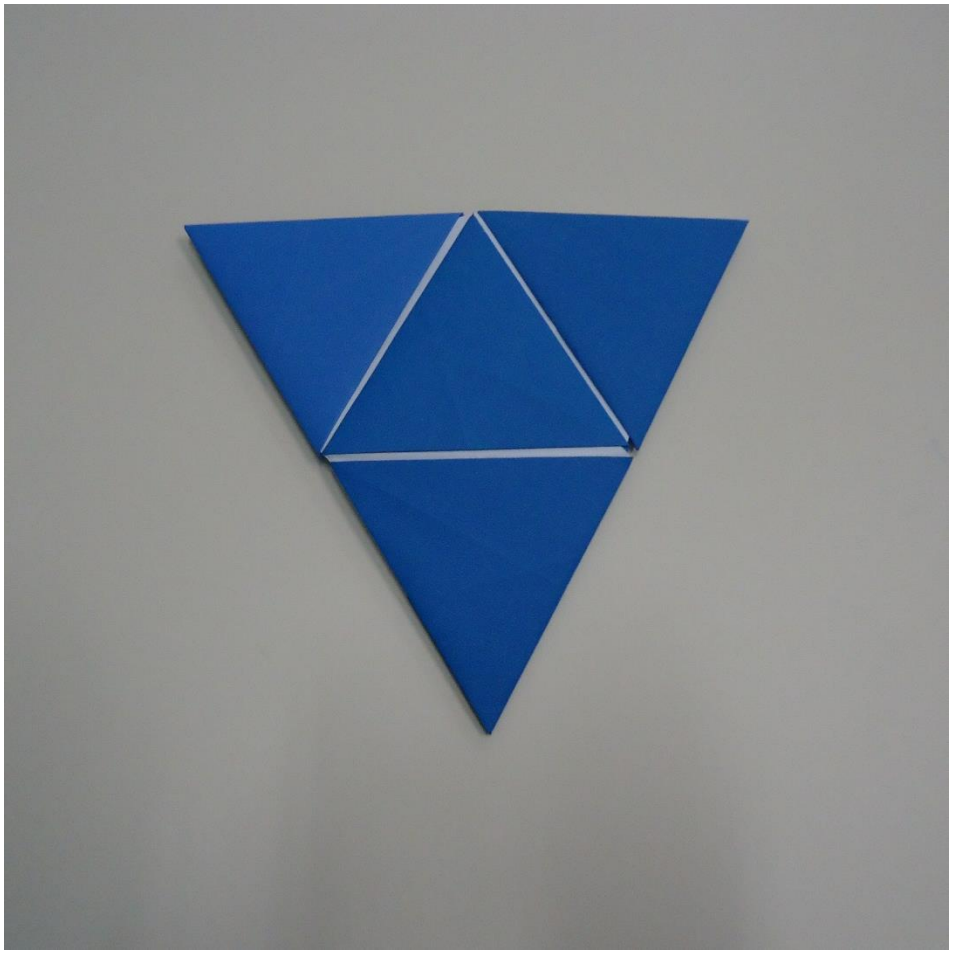


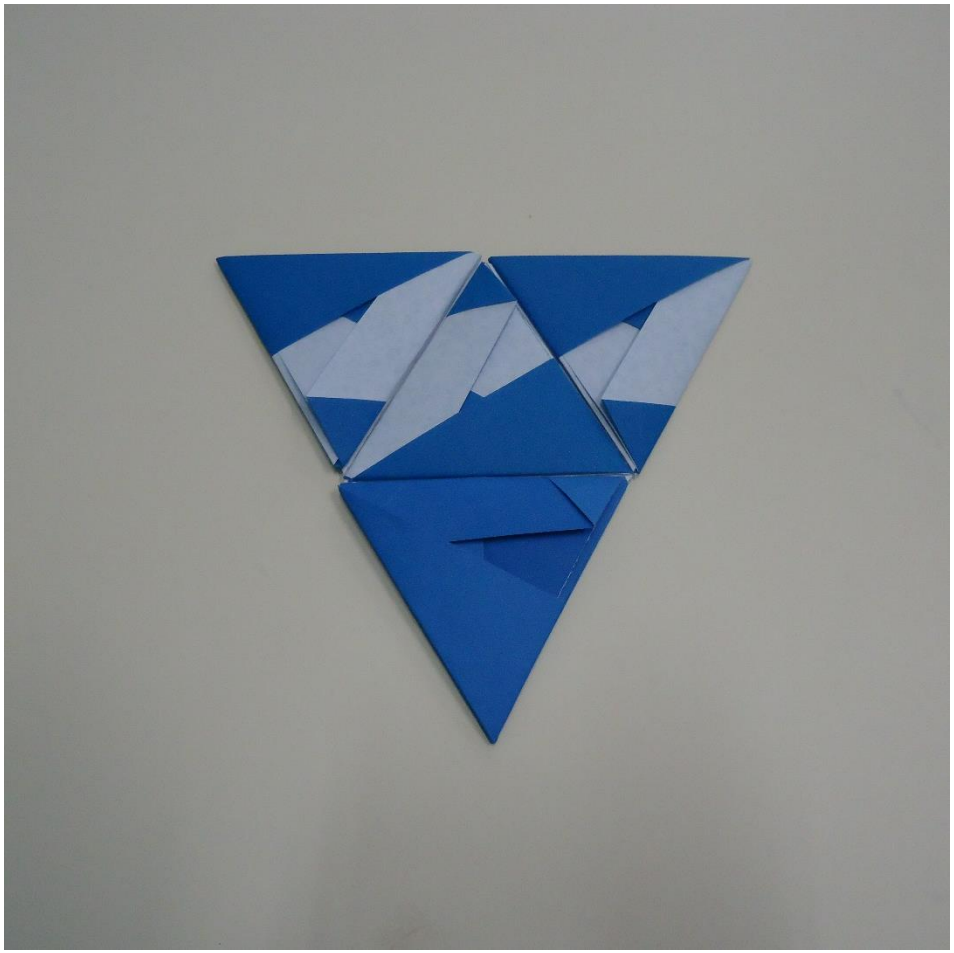


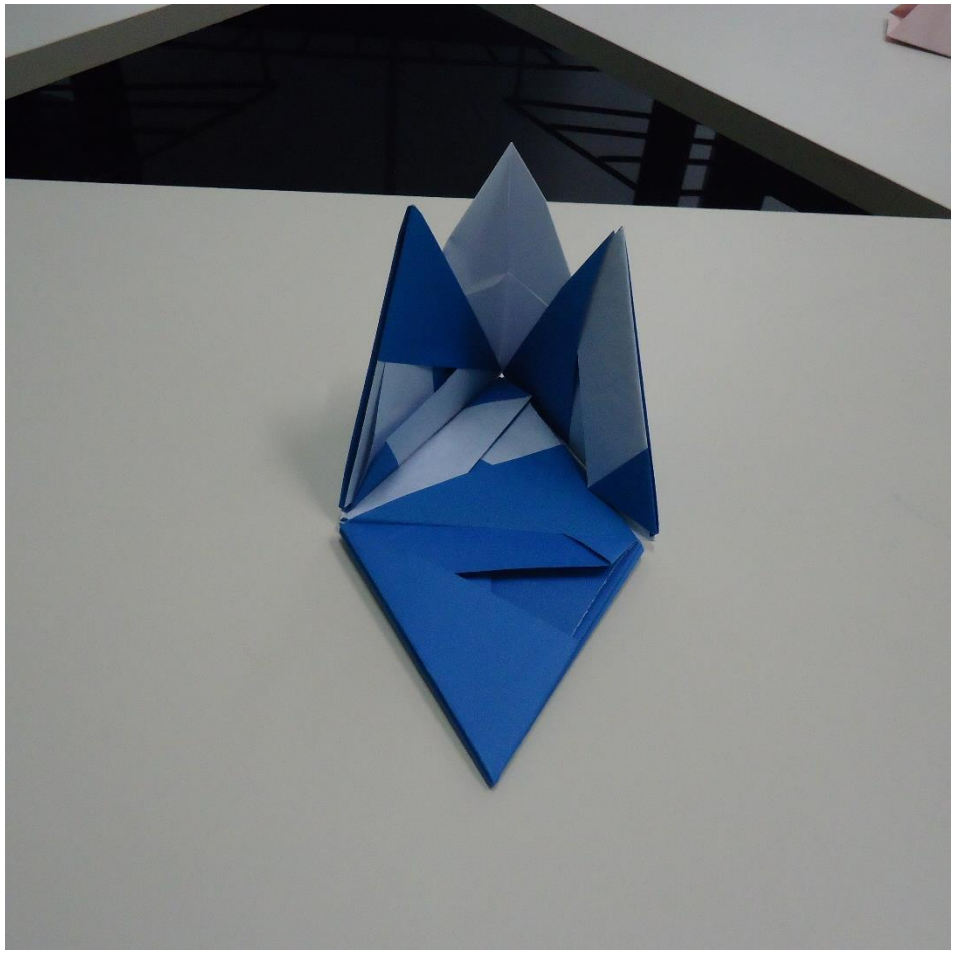


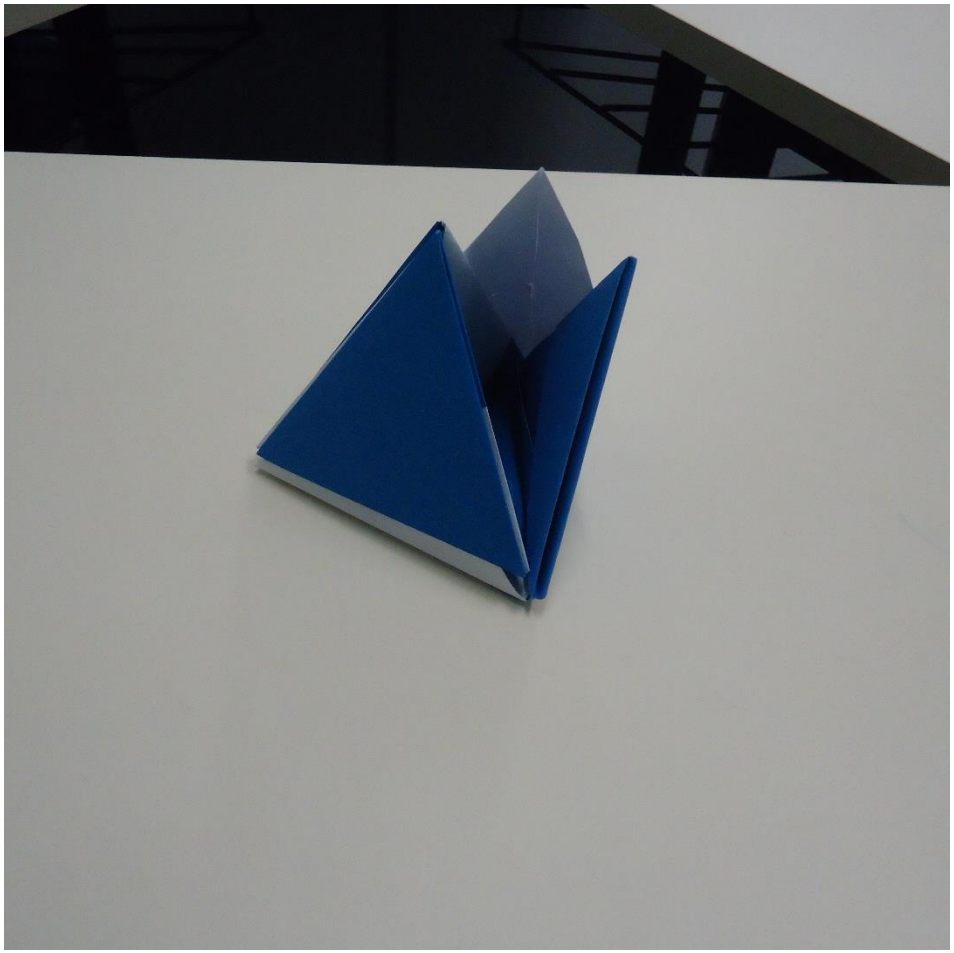


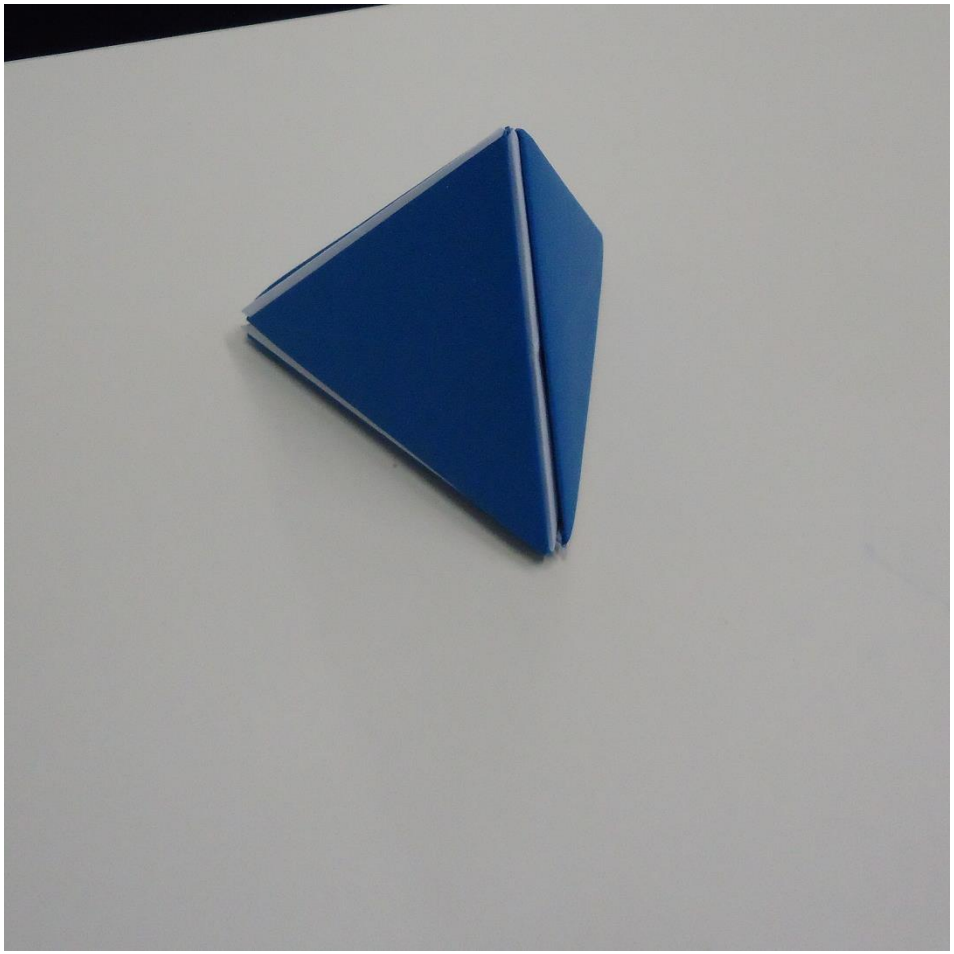




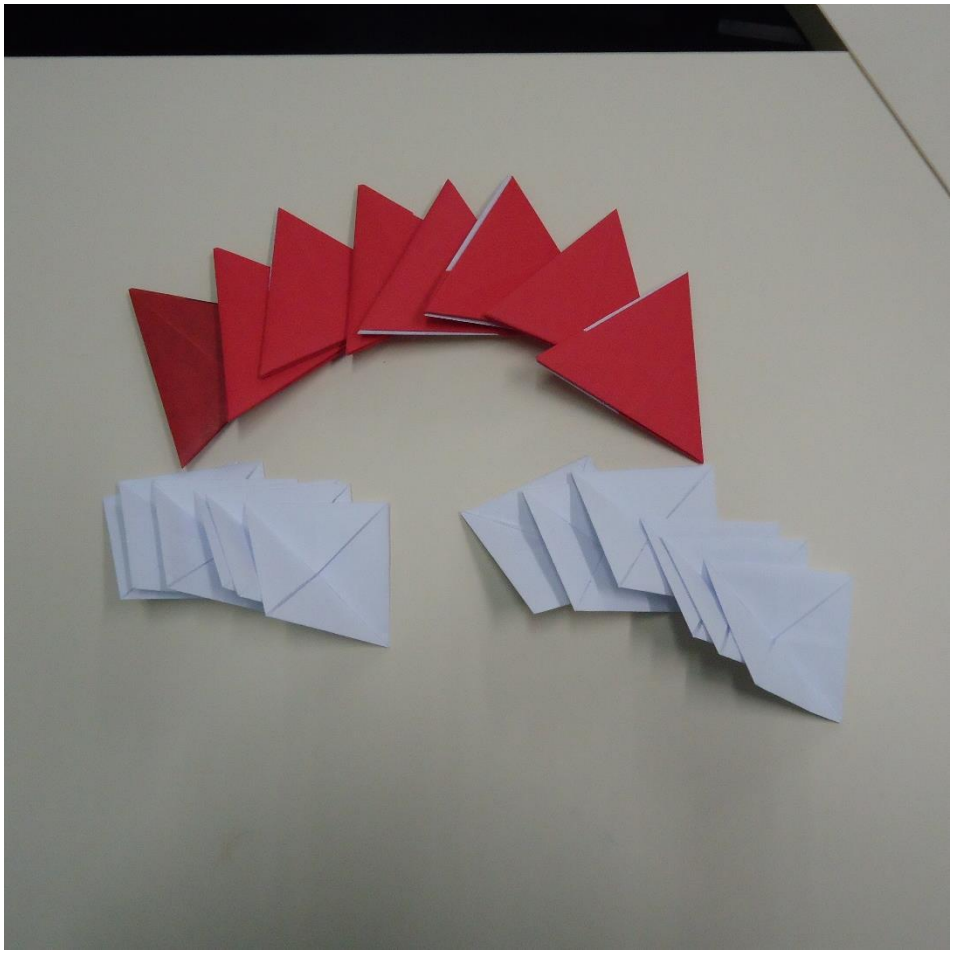


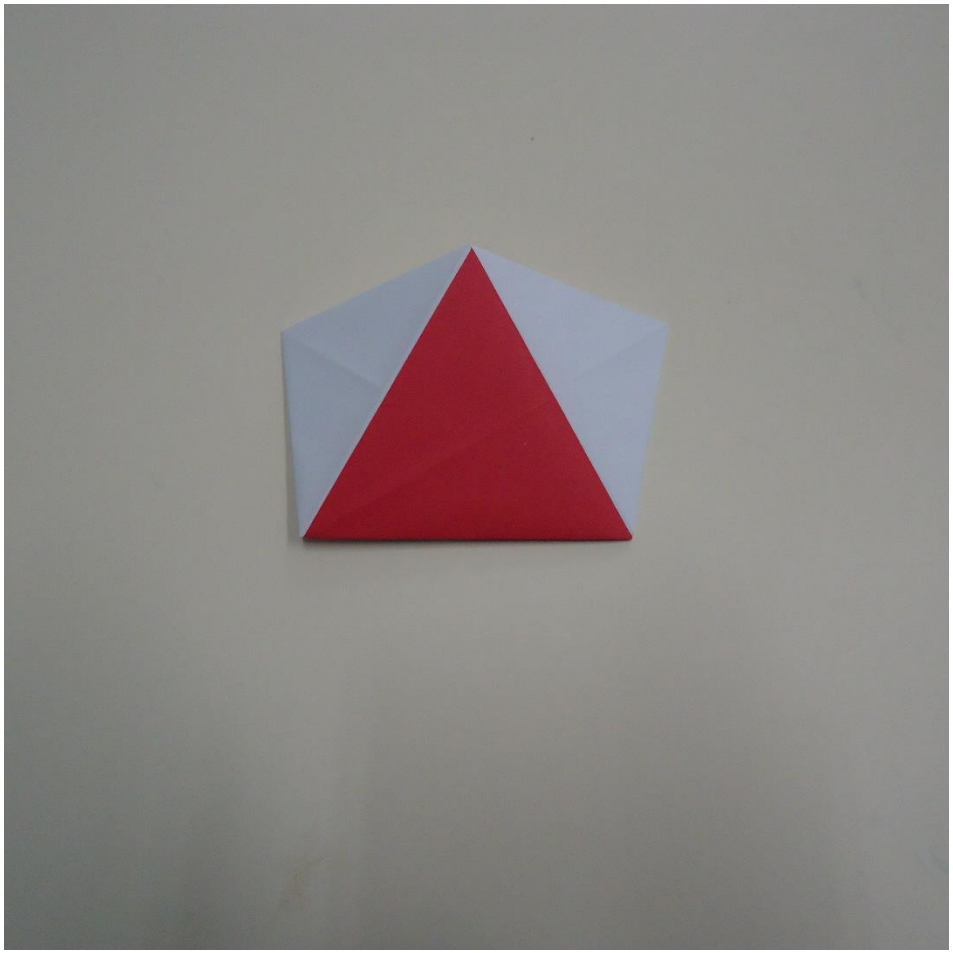


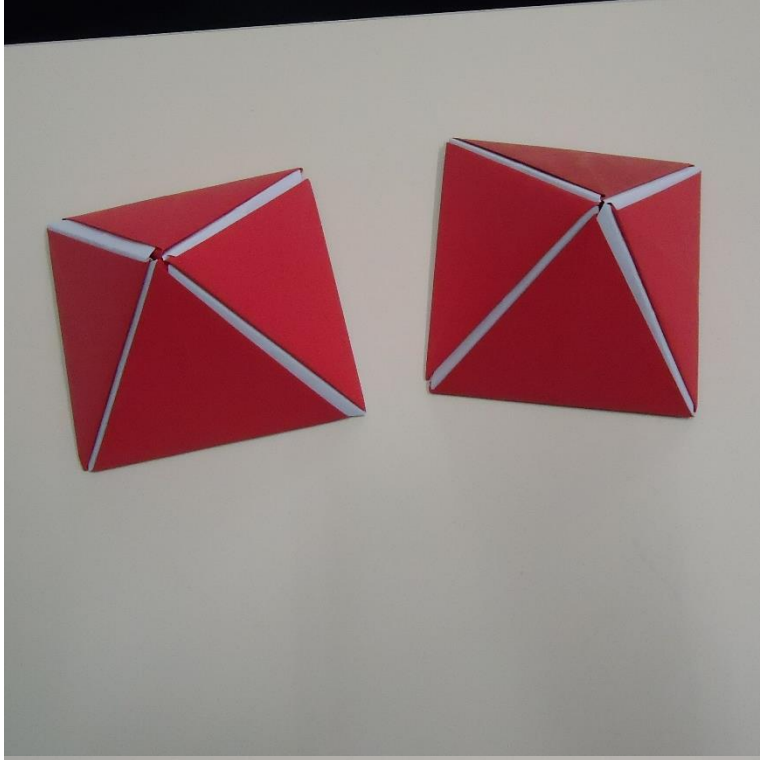


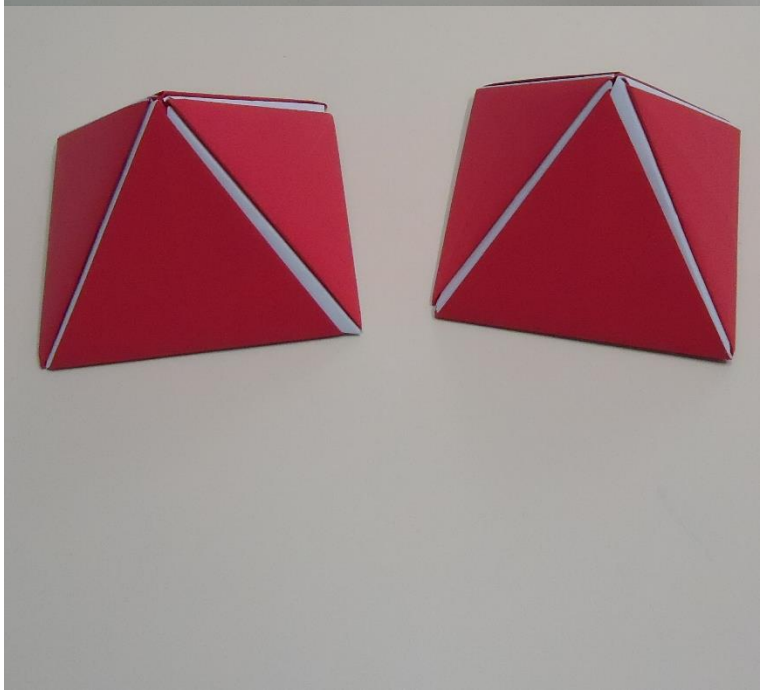


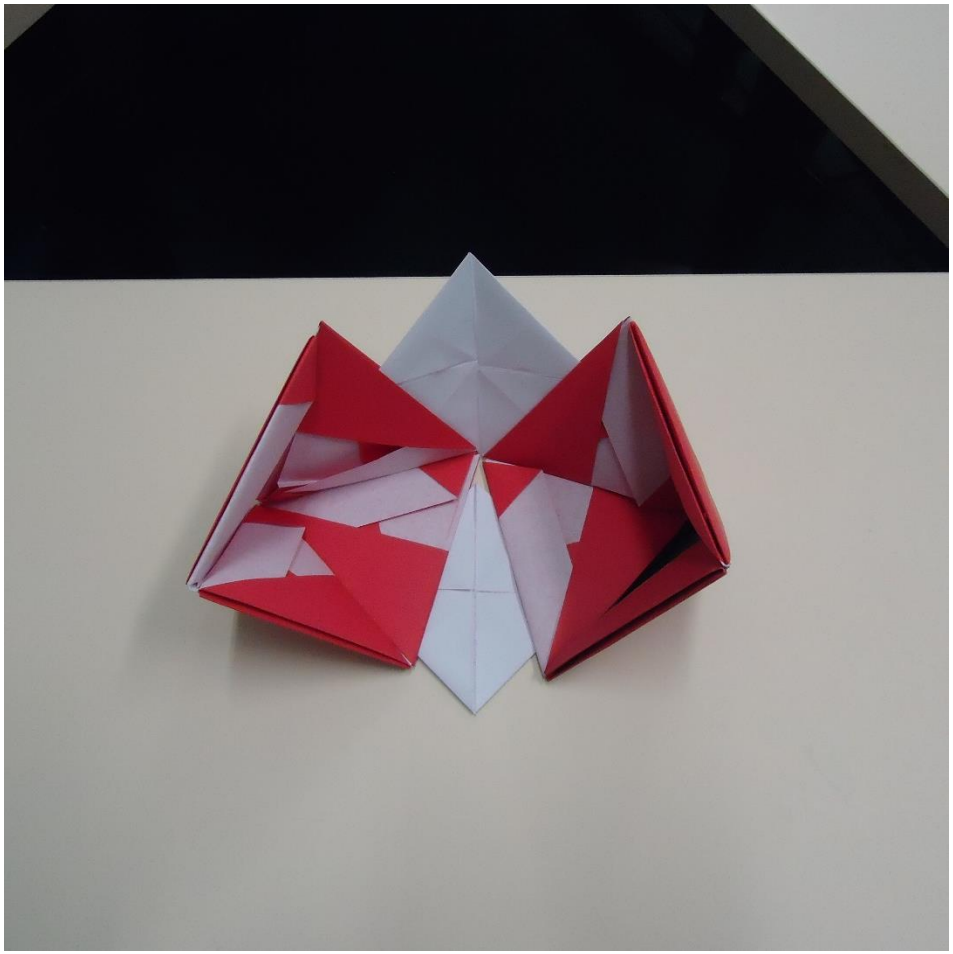
Para a construção de um octaedro, utilizaremos oito módulos triangulares e doze módulos de encaixe.

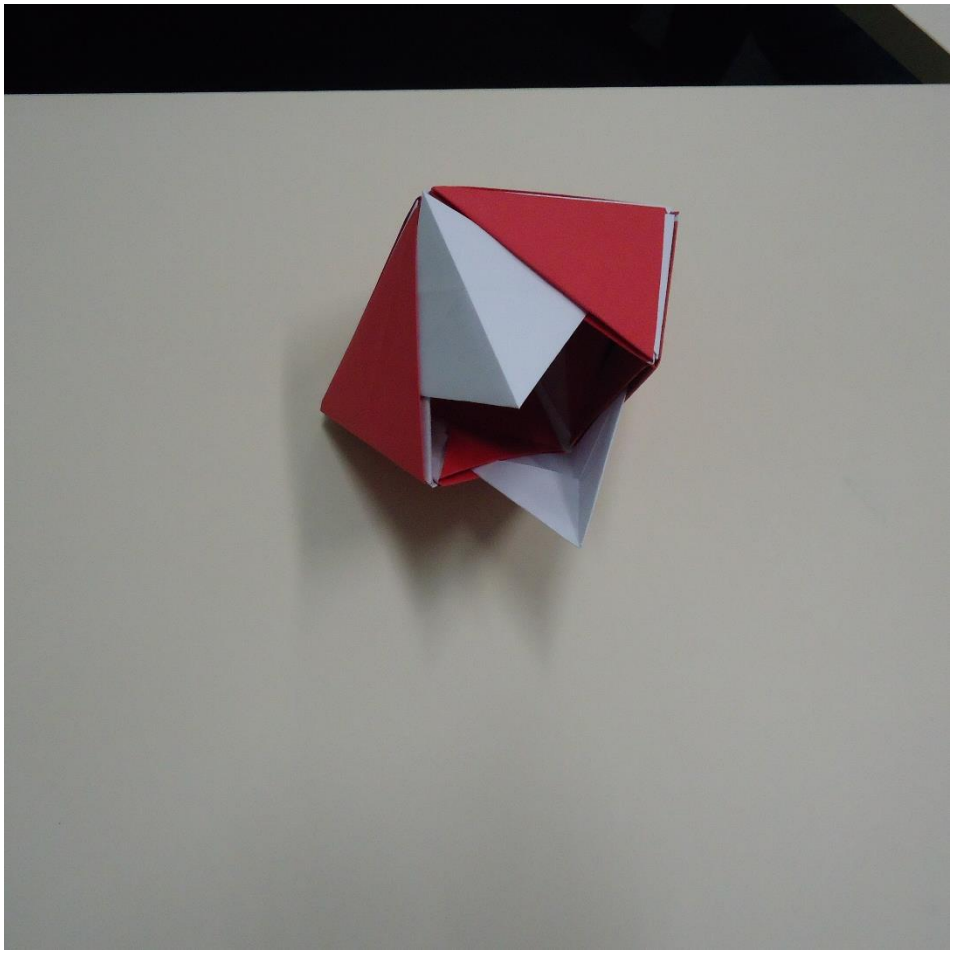


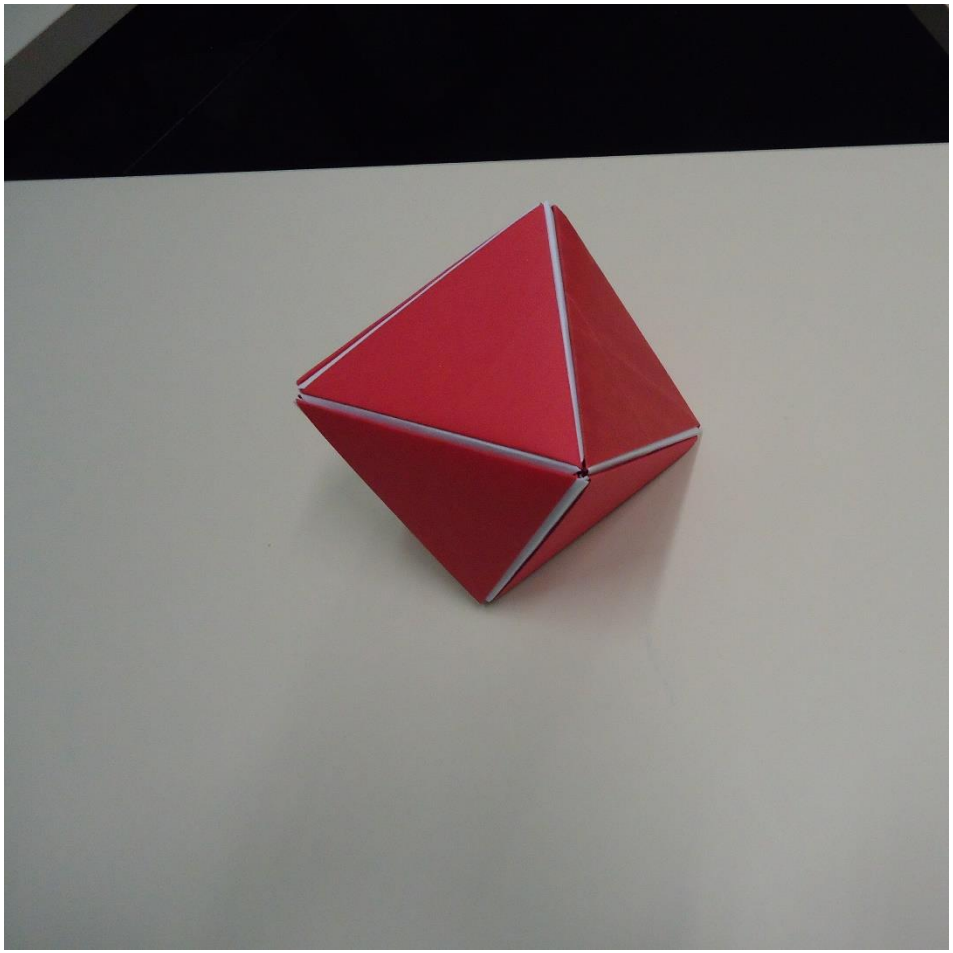




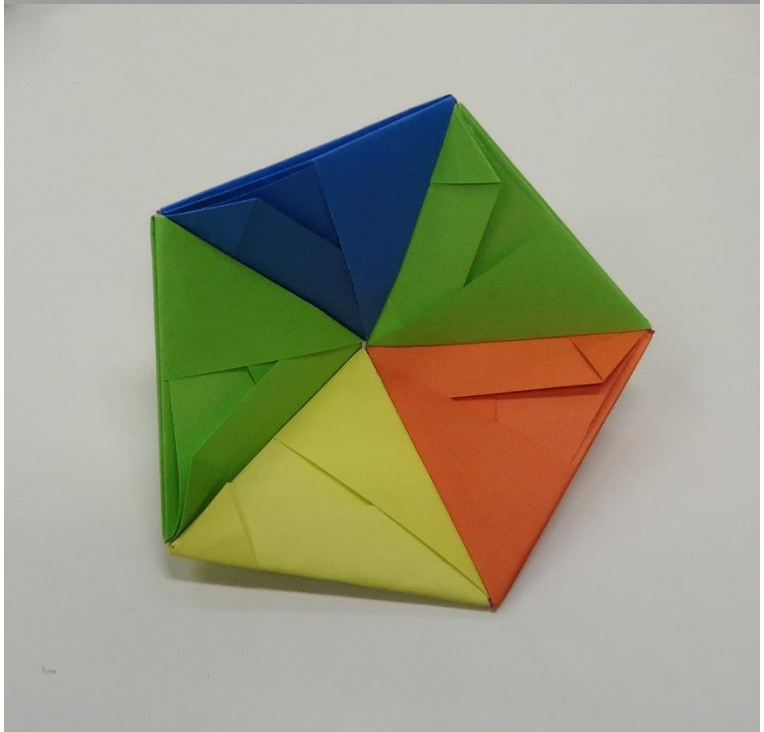


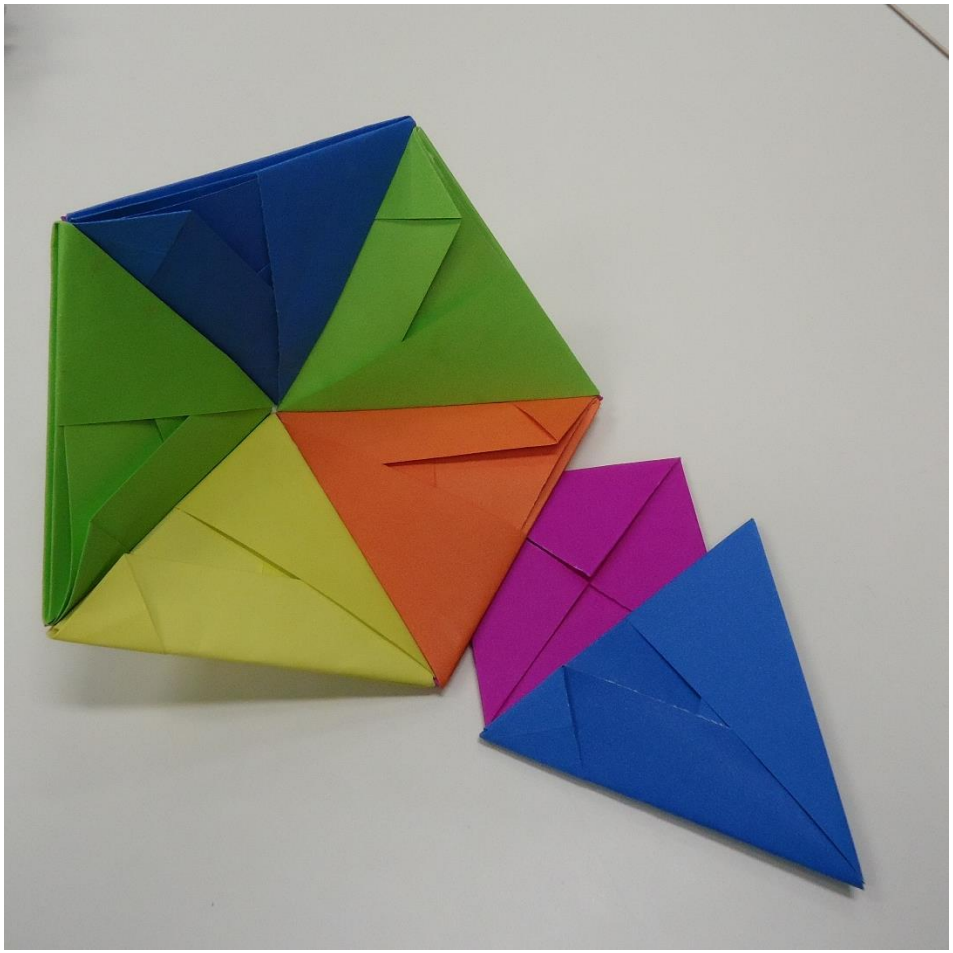


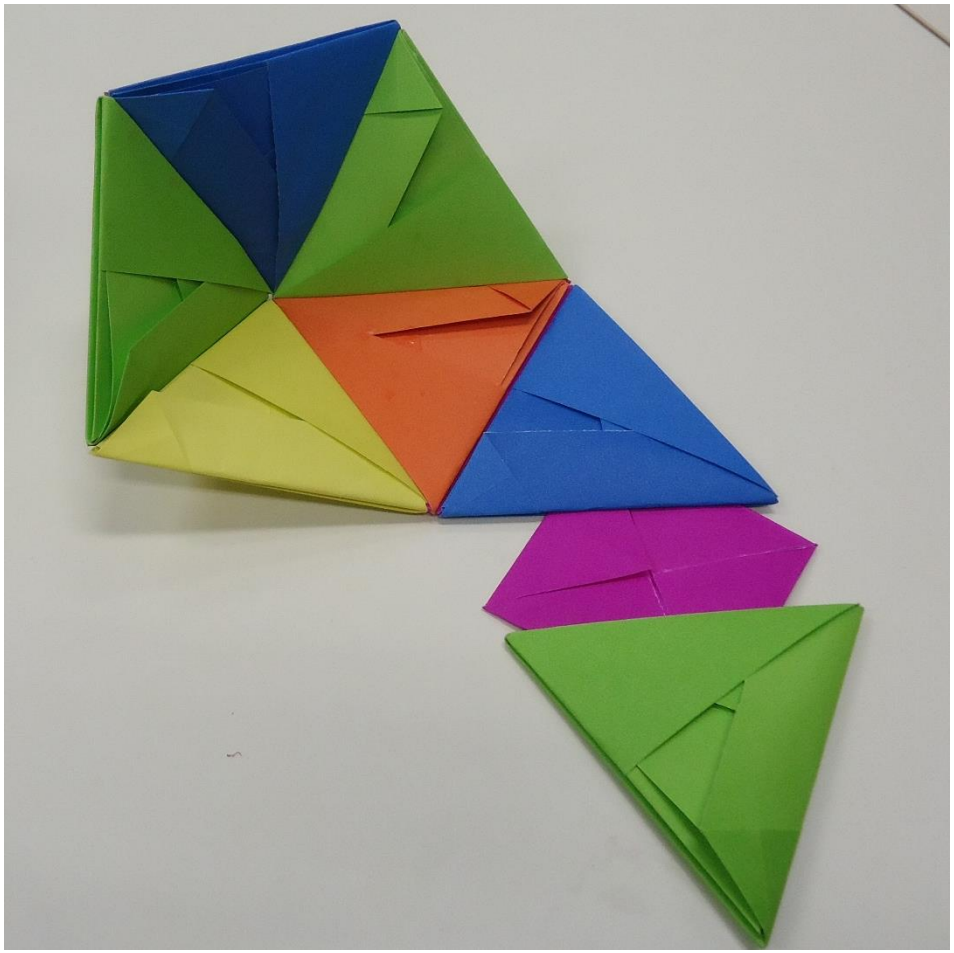


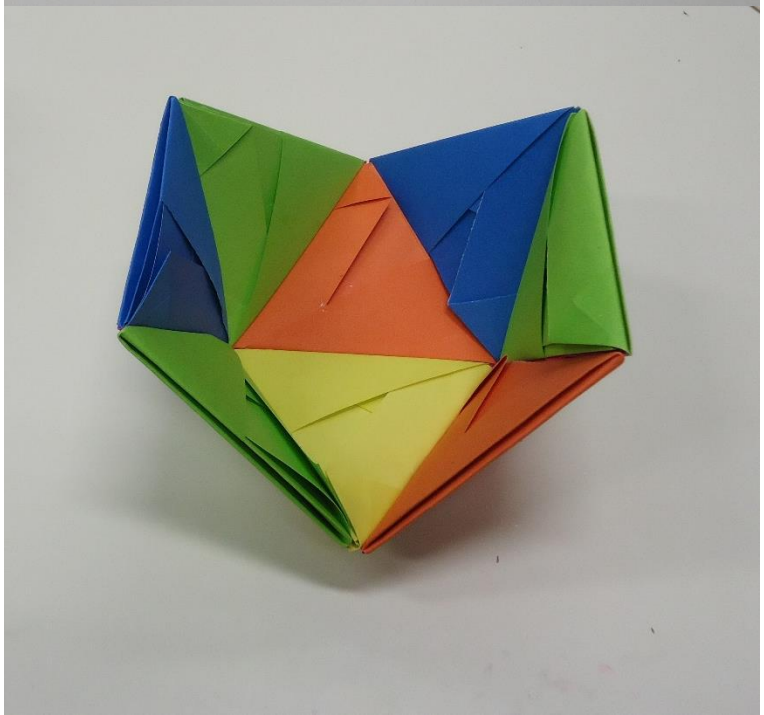


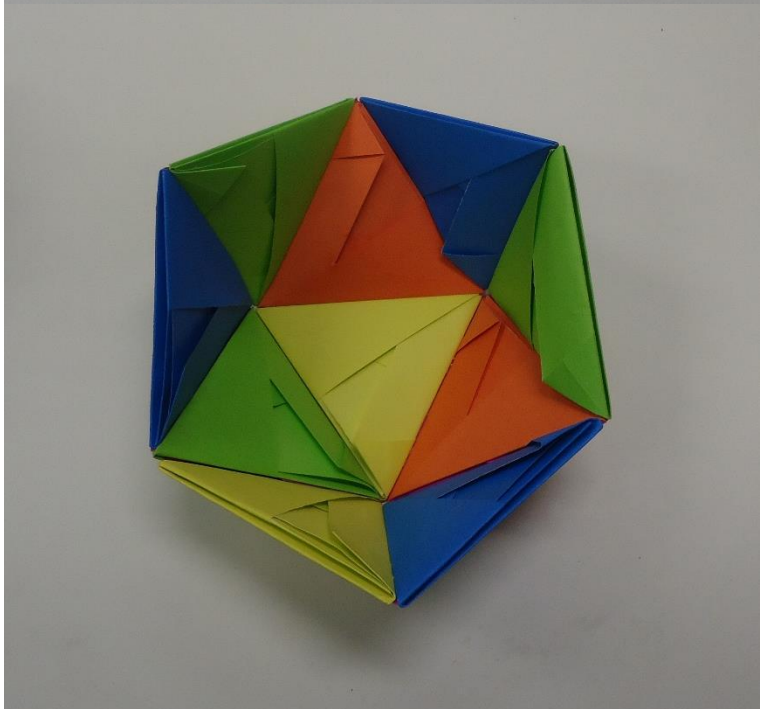
Para a construção de um icosaedro, utilizaremos vinte módulos triangulares e trinta módulos de encaixe.

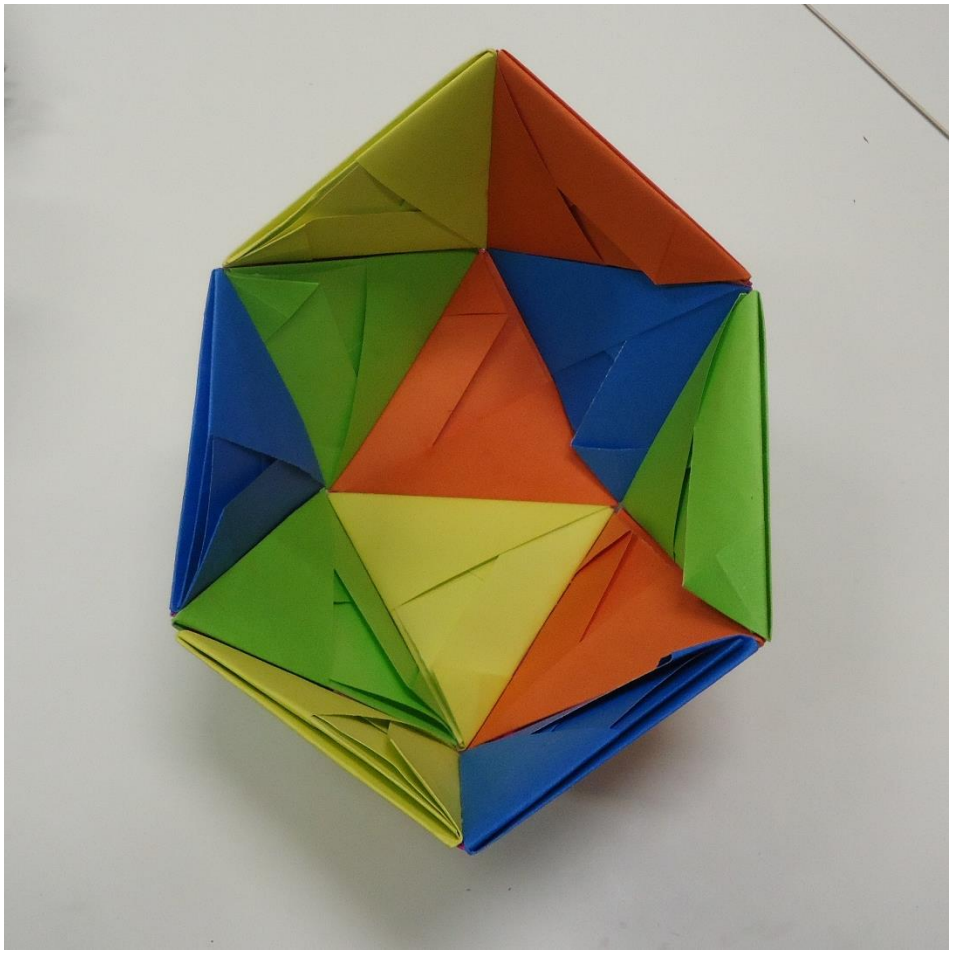


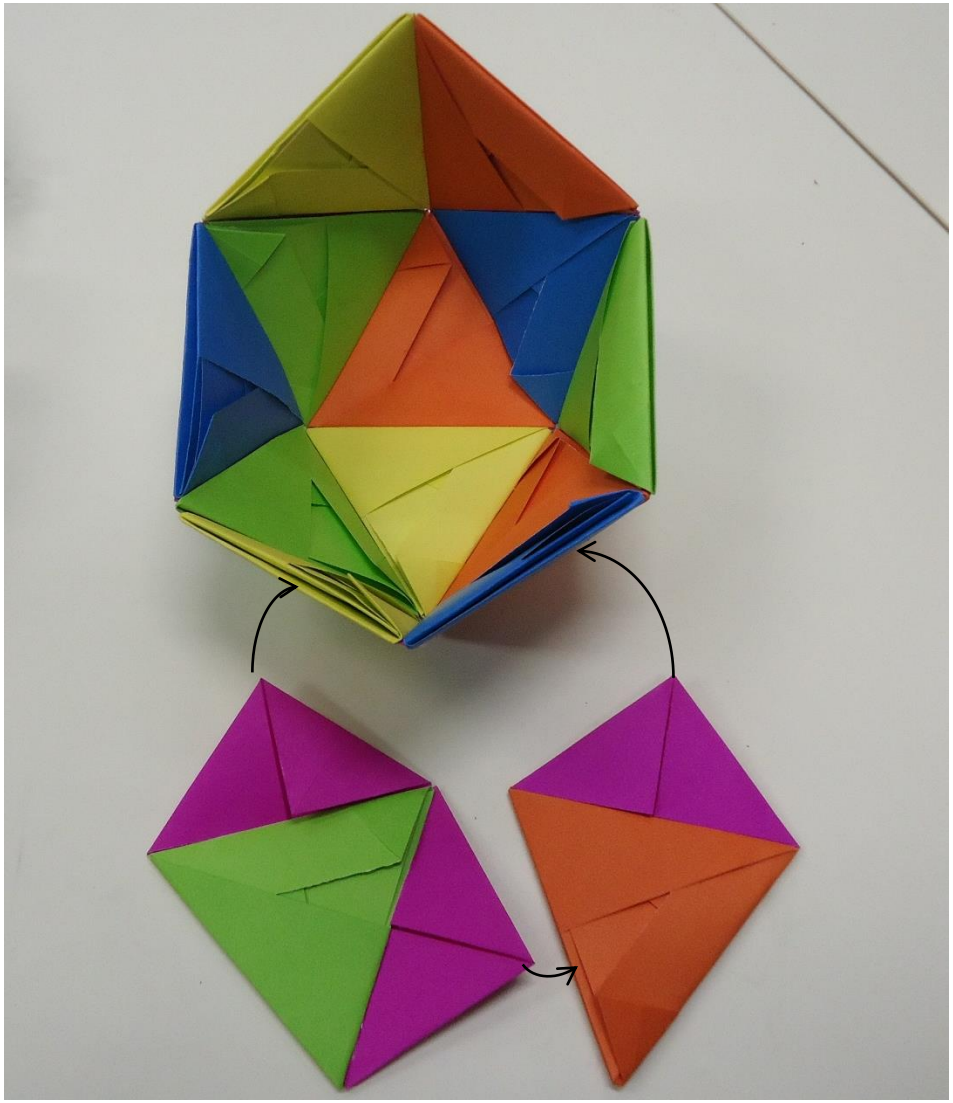


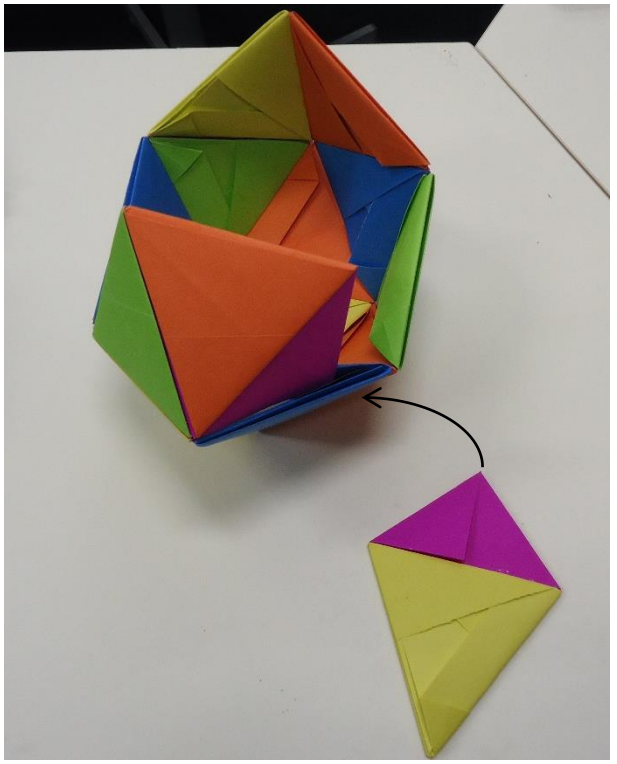


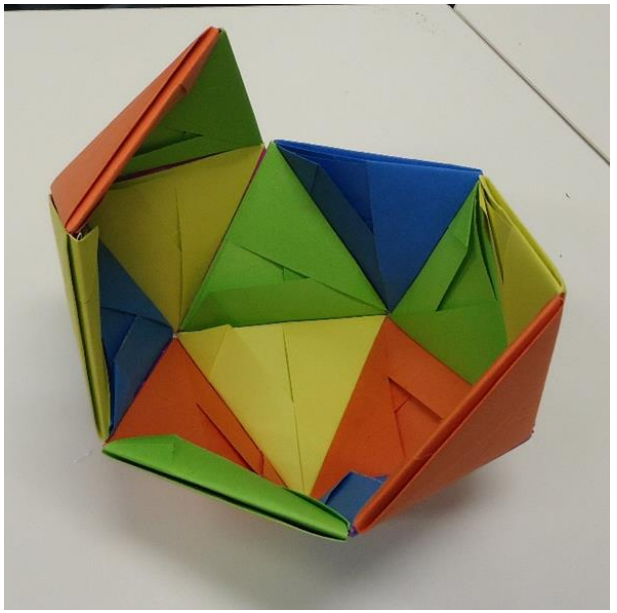


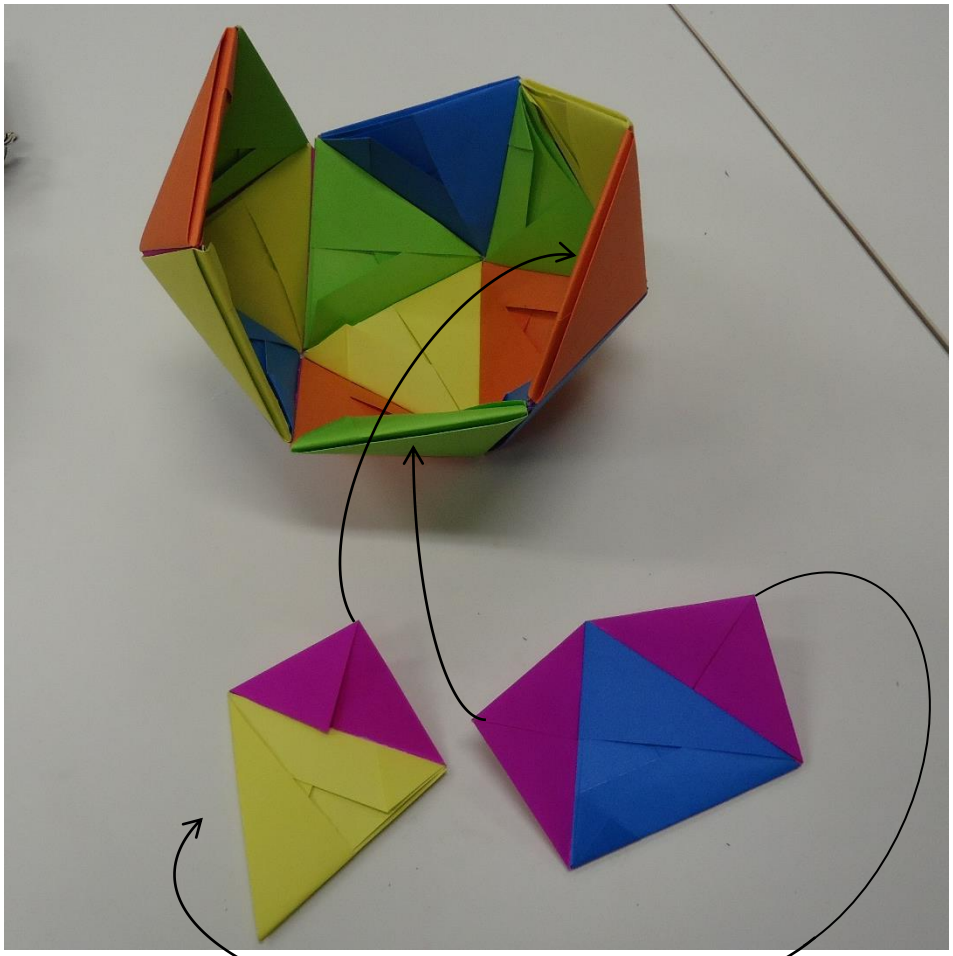


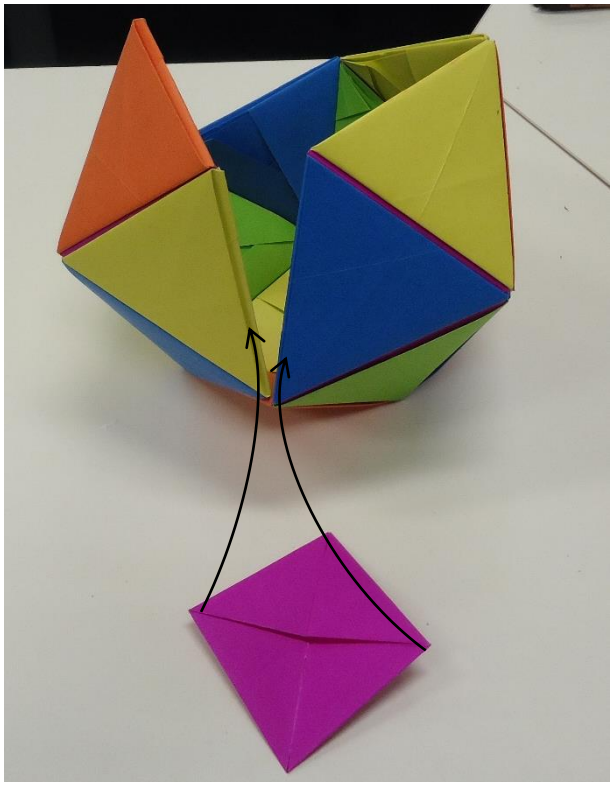


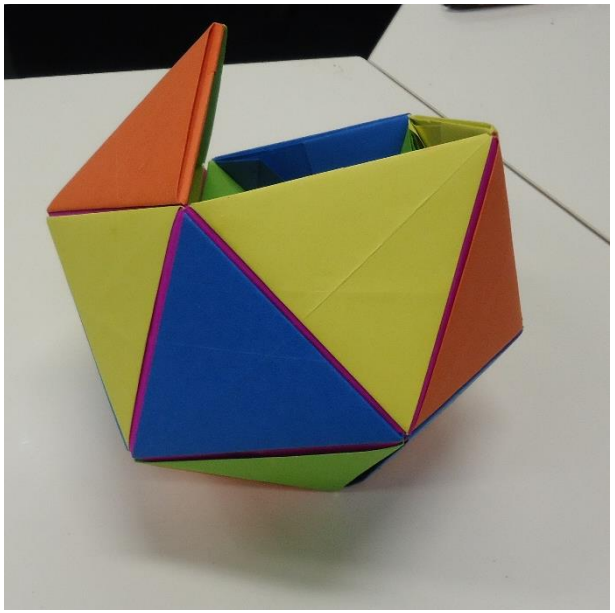


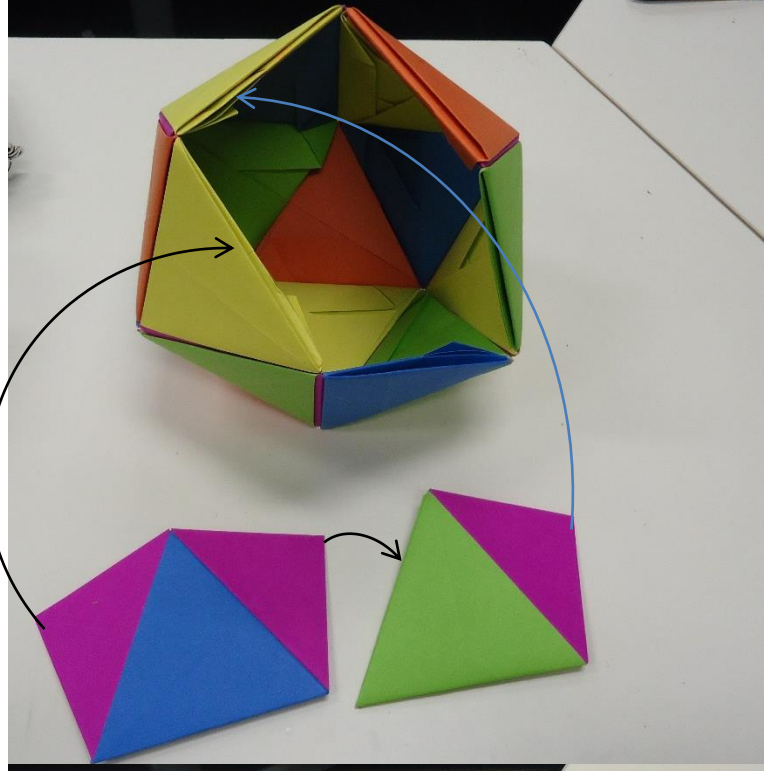


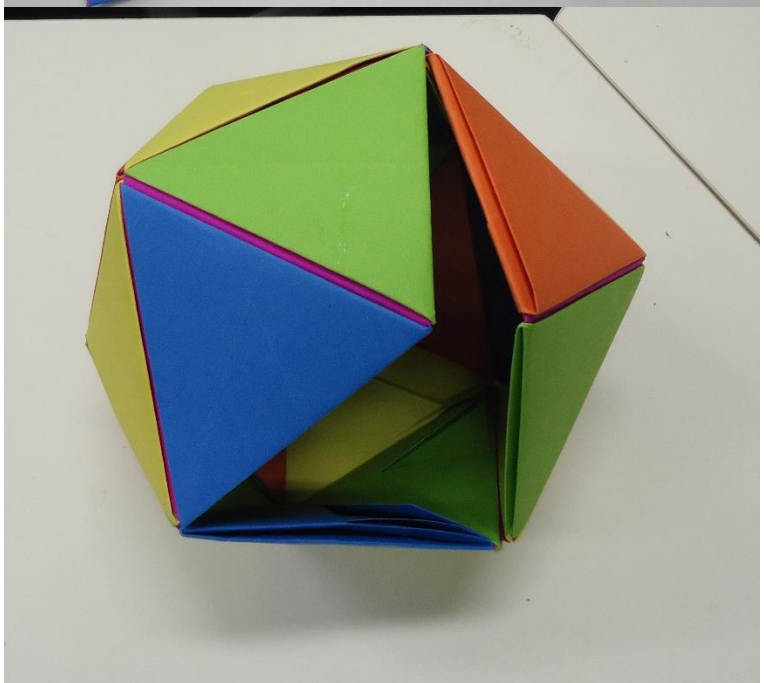


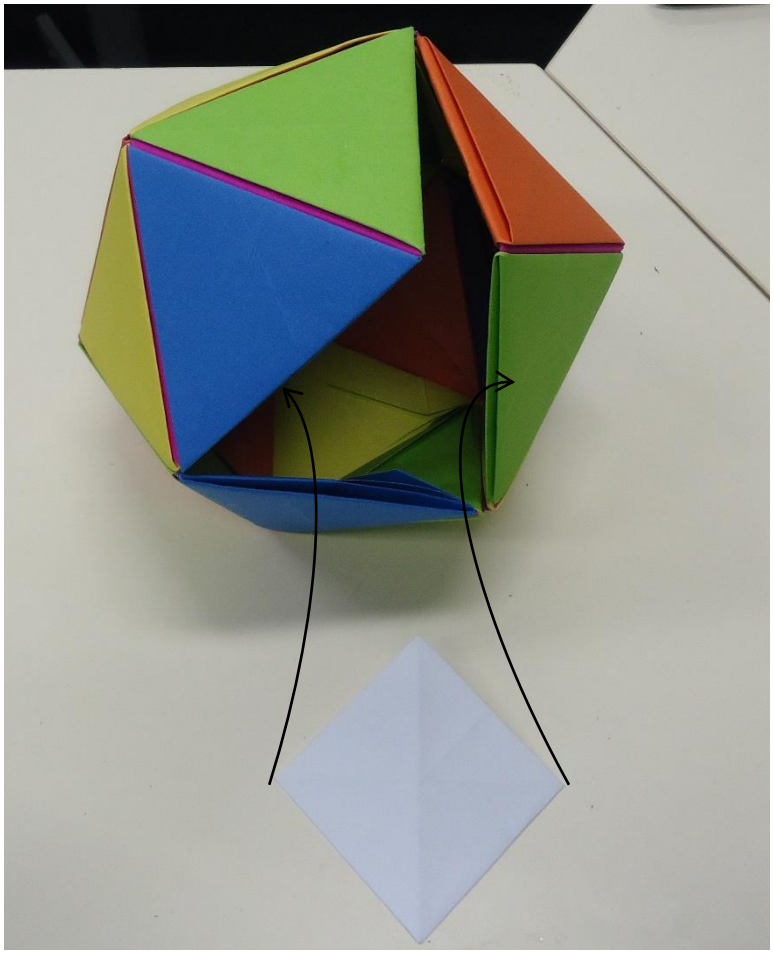


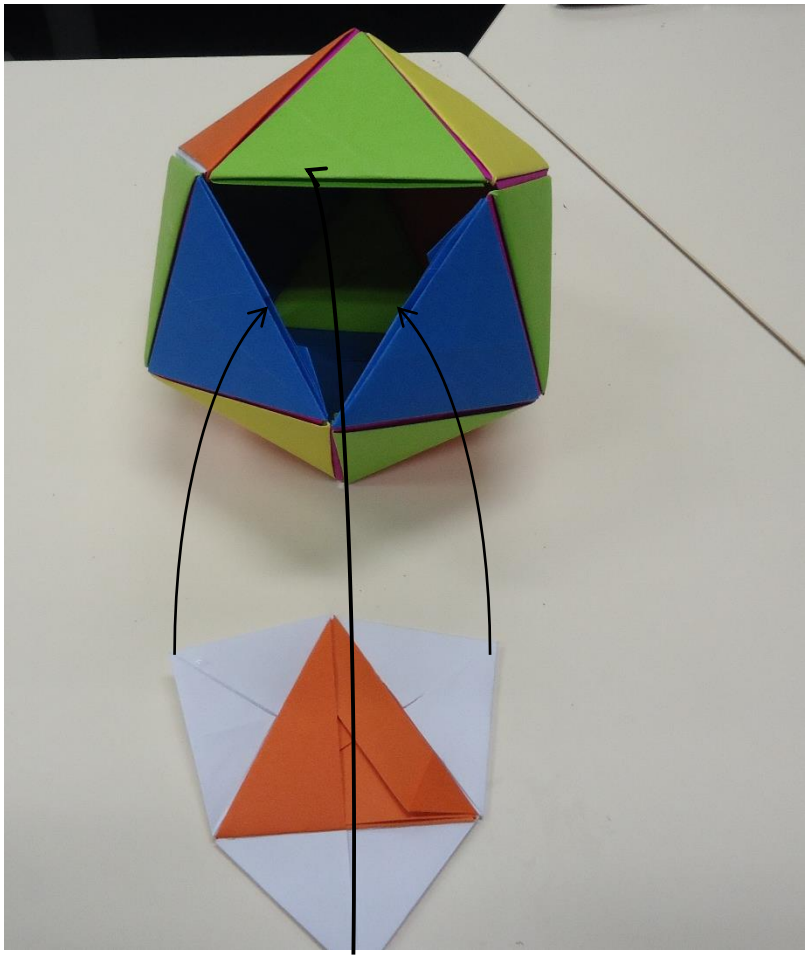


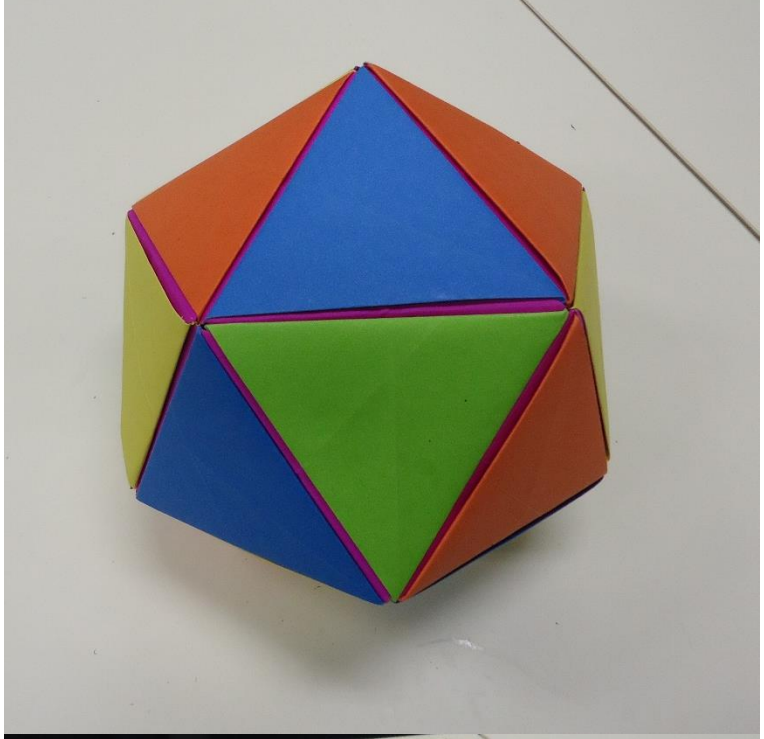


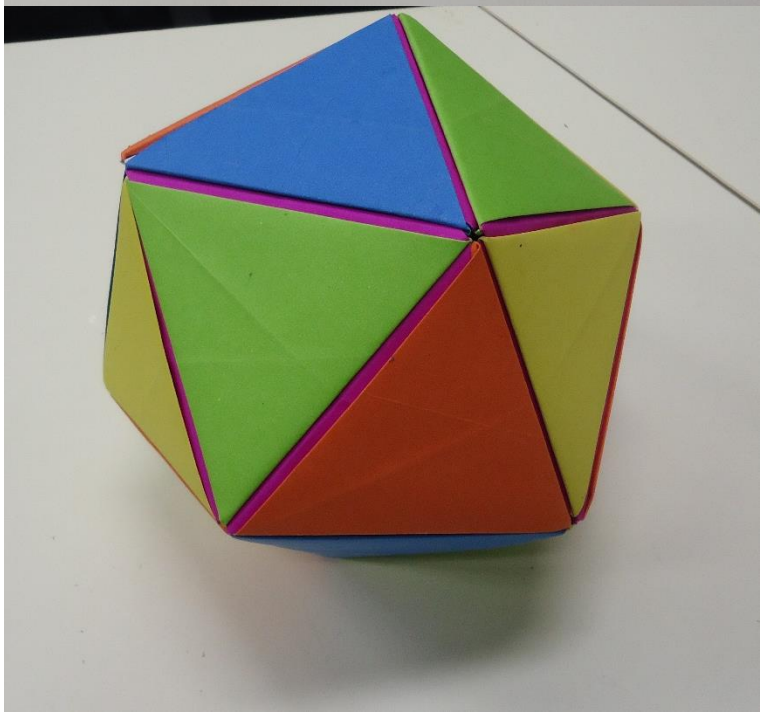






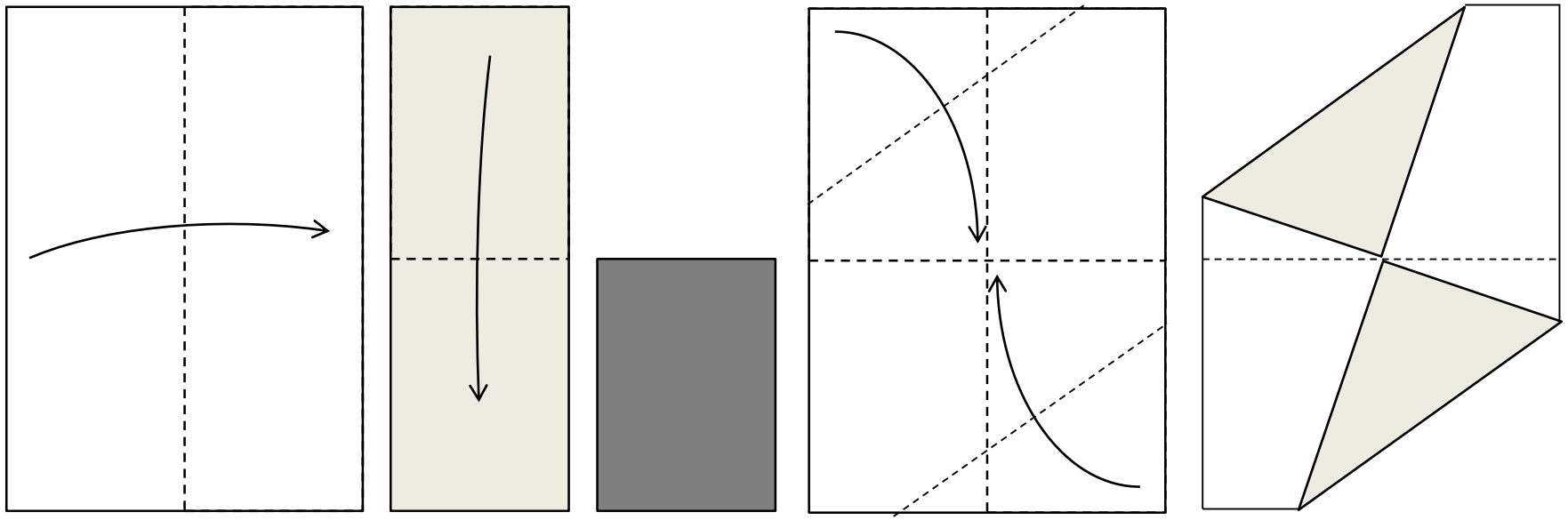






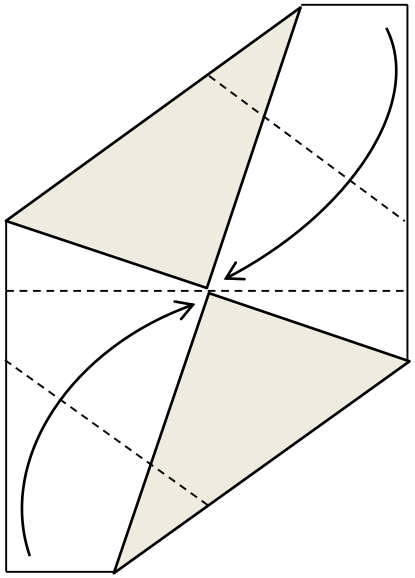
Construção dos poliedros de Platão
Dodecaedro - Pentágono Regular

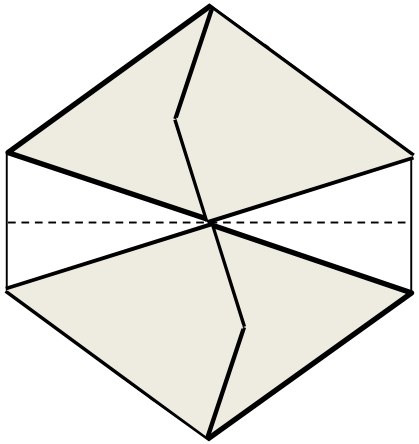
1) Seja uma folha retangular ABCD, com AB e CD = 1, AD e BC = $\sqrt{2}$. Dobre-a ao meio.
2) Dobre-a ao meio novamente. Obtém-se as duas mediatrizes.
3) Dobre os vértices superior esquerdo e inferior direito ao centro da folha.



Construção dos poliedros de Platão
Dodecaedro - Pentágono Regular

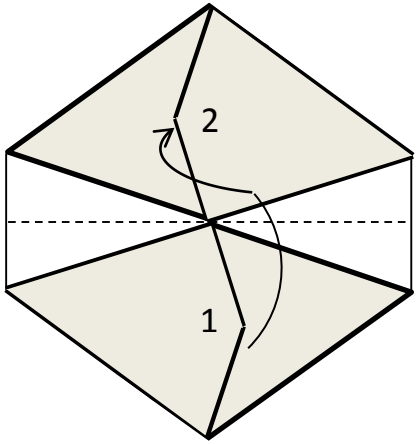
4) Proceda conforme o passo anterior, com os outros dois vértices.

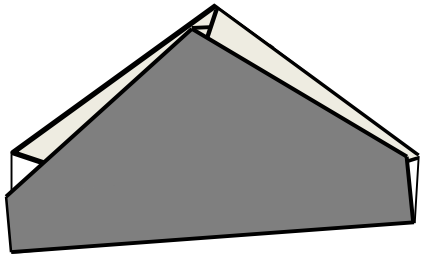




Construção dos poliedros de Platão
Dodecaedro - Pentágono Regular

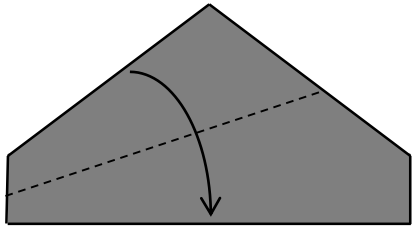
5) Dobre ao meio encaixando a parte 1 por baixo da parte 2.

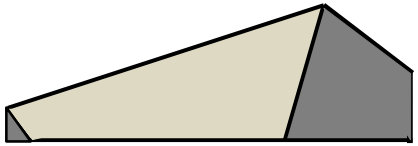


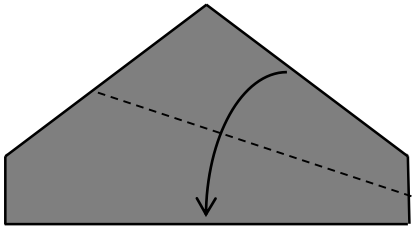


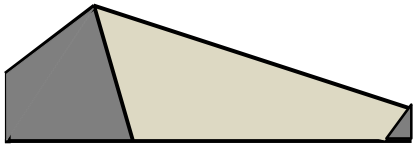
Construção dos poliedros de Platão
Dodecaedro - Pentágono Regular

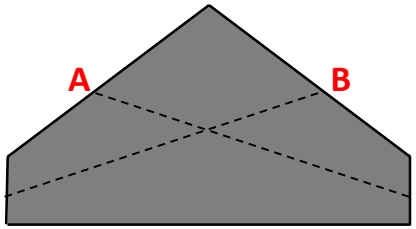
6) Dobre conforme a figura.





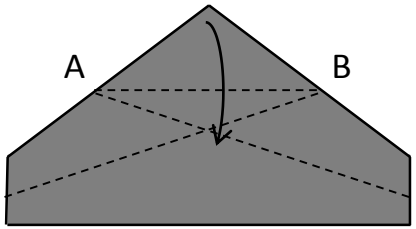


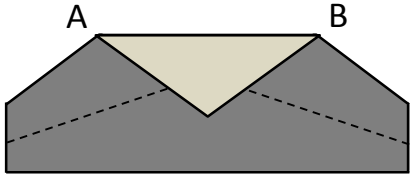




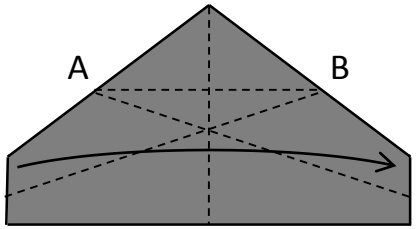
Construção dos poliedros de Platão
Dodecaedro - Pentágono Regular

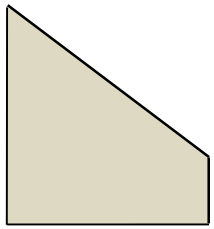
7) Faça uma dobra que passe pelos pontos A e B.

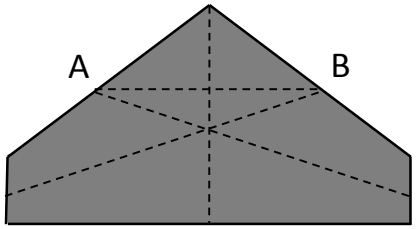




8) Dobre a peça ao meio. Desdobre.

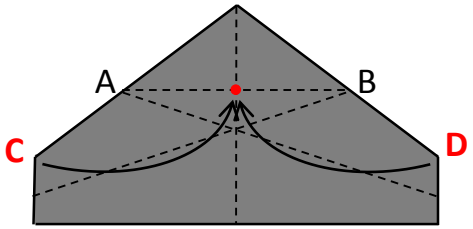


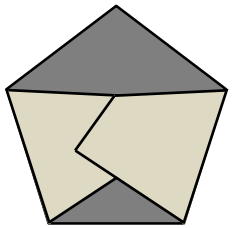




Construção dos poliedros de Platão
Dodecaedro - Pentágono Regular

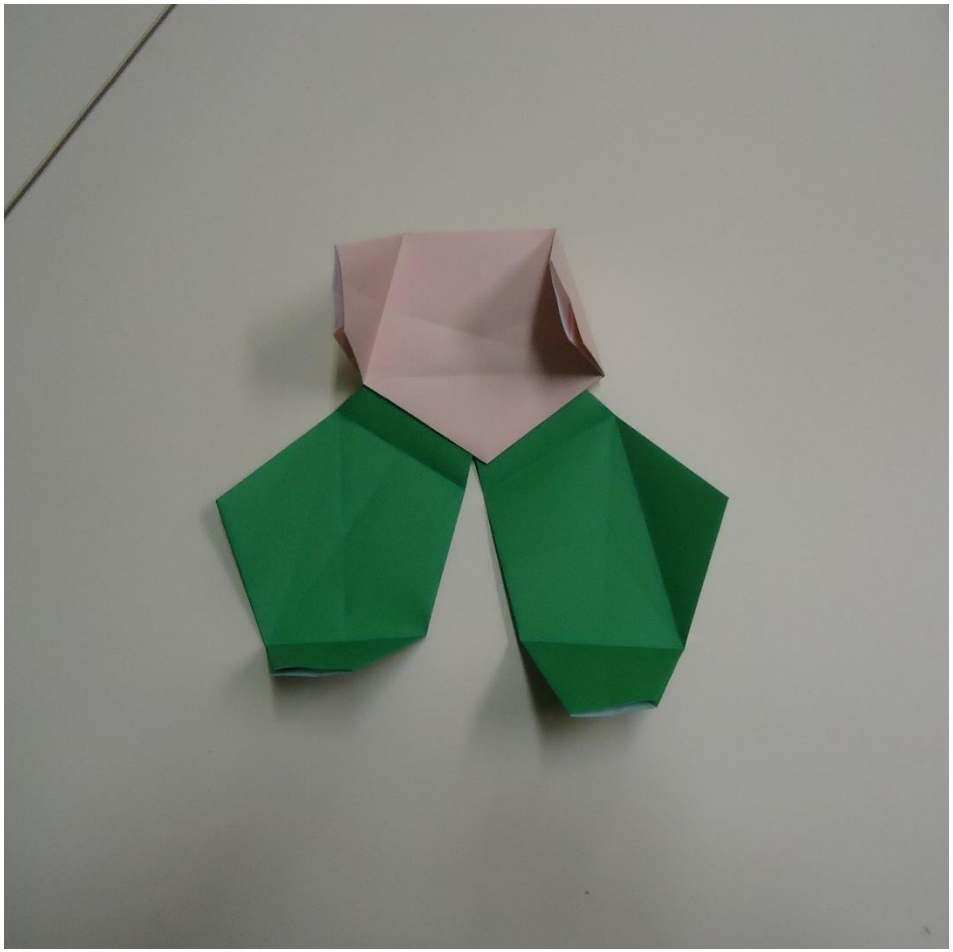
9) Leve C e D ao ponto indicado.

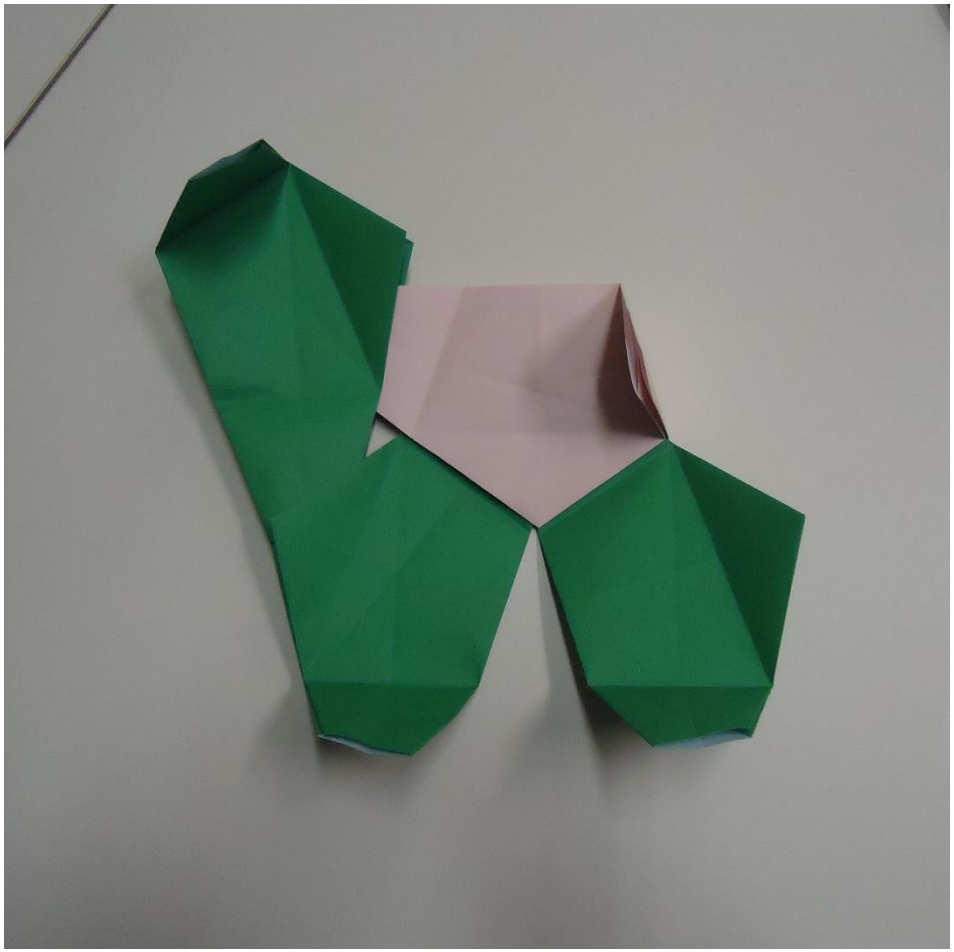


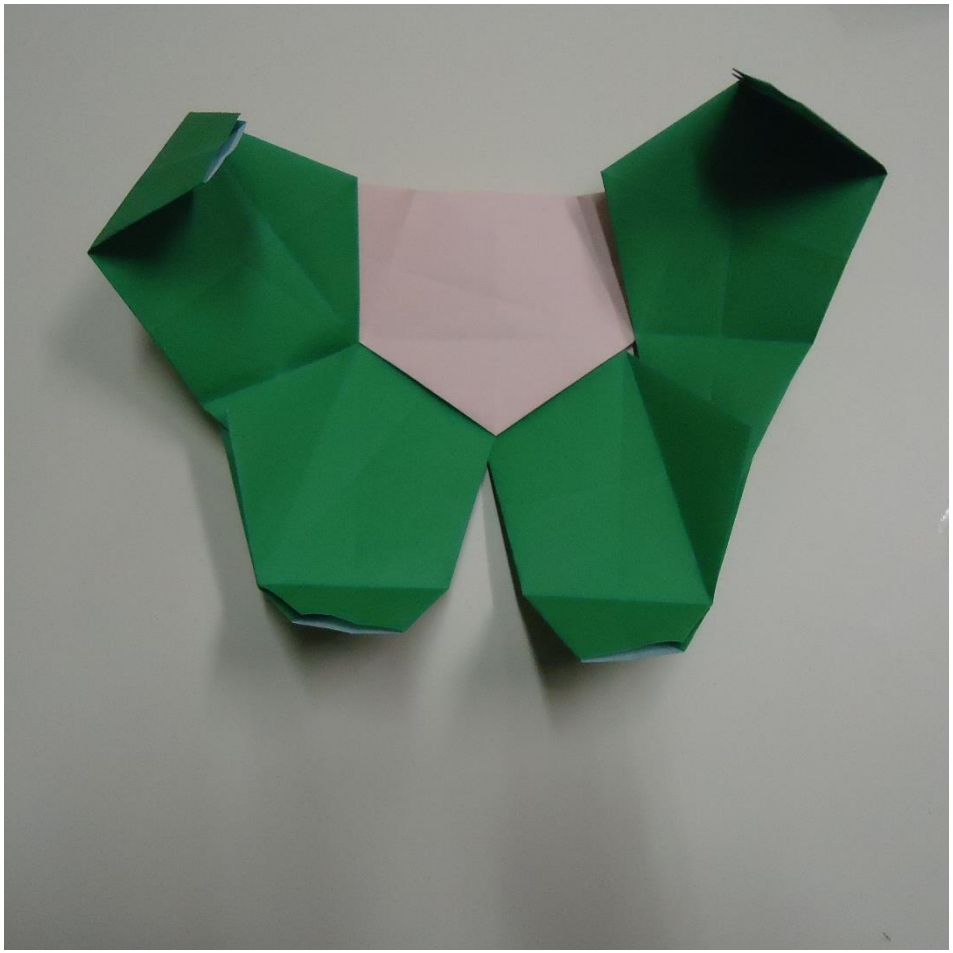


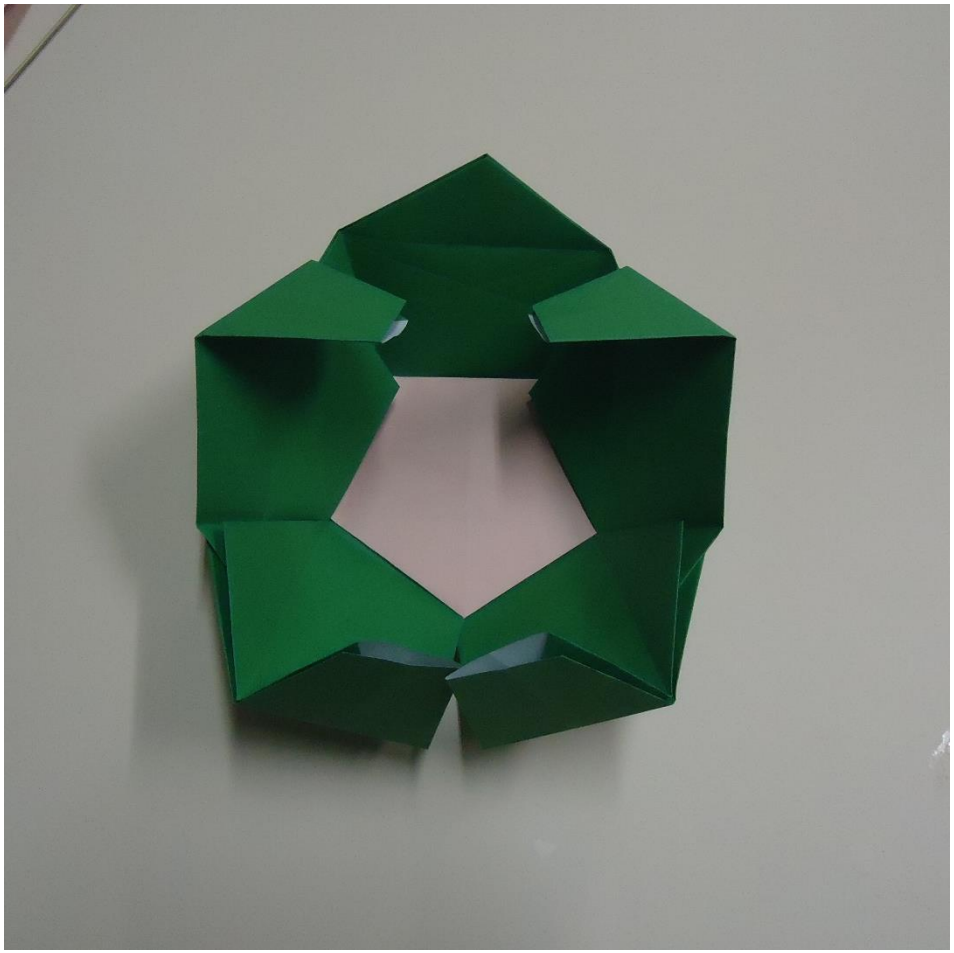
Formamos um pentágono regular.

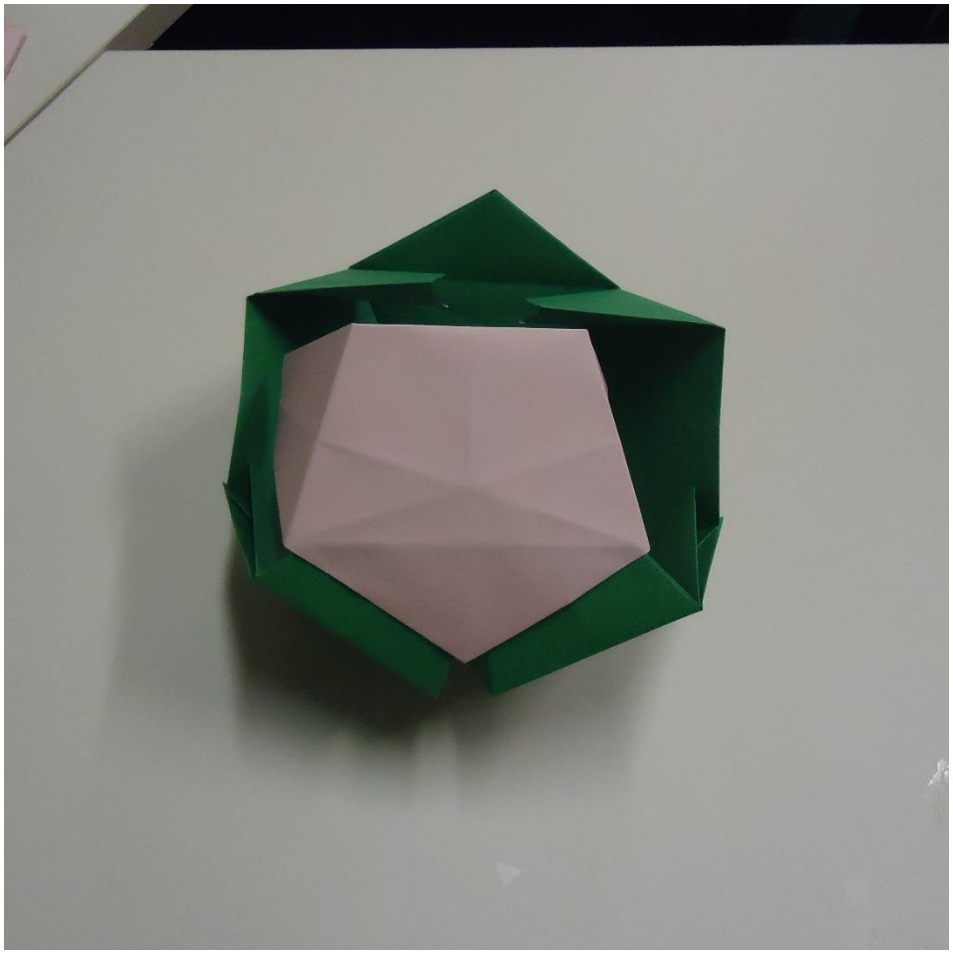
Para a construção de um dodecaedro, utilizaremos doze módulos. Neste caso, um módulo será um pentágono regular.

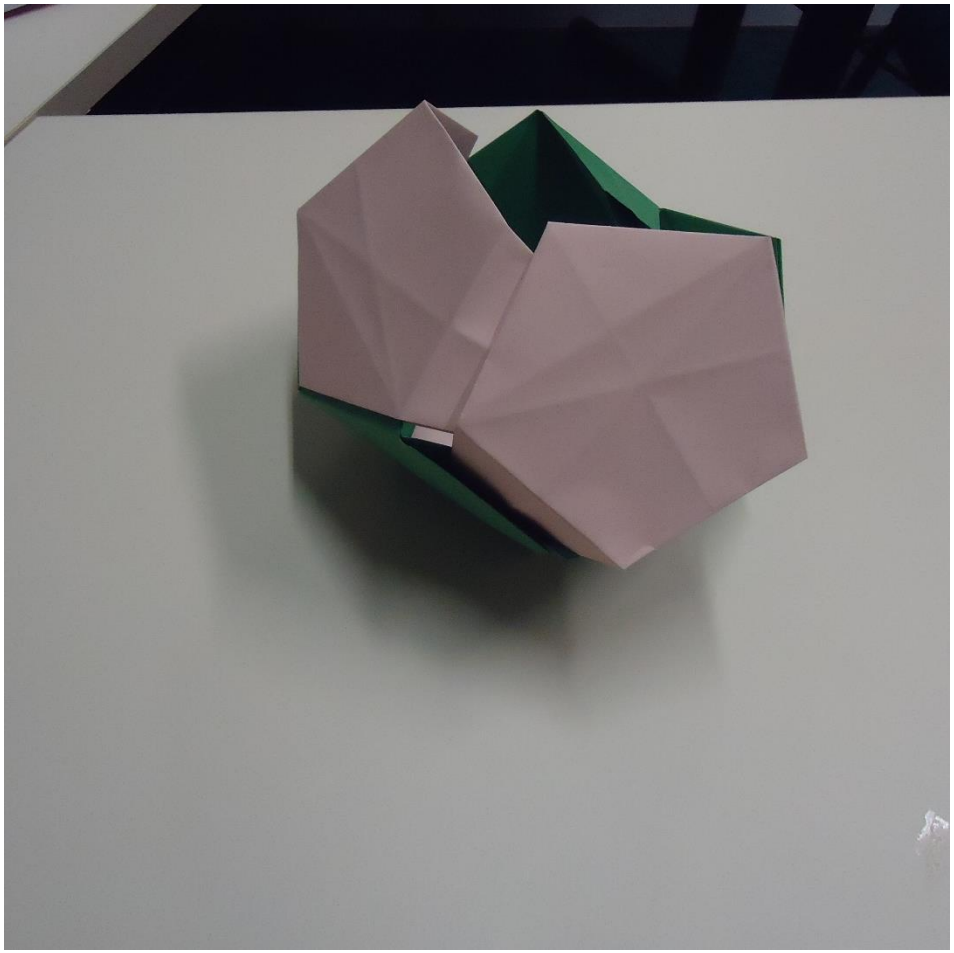


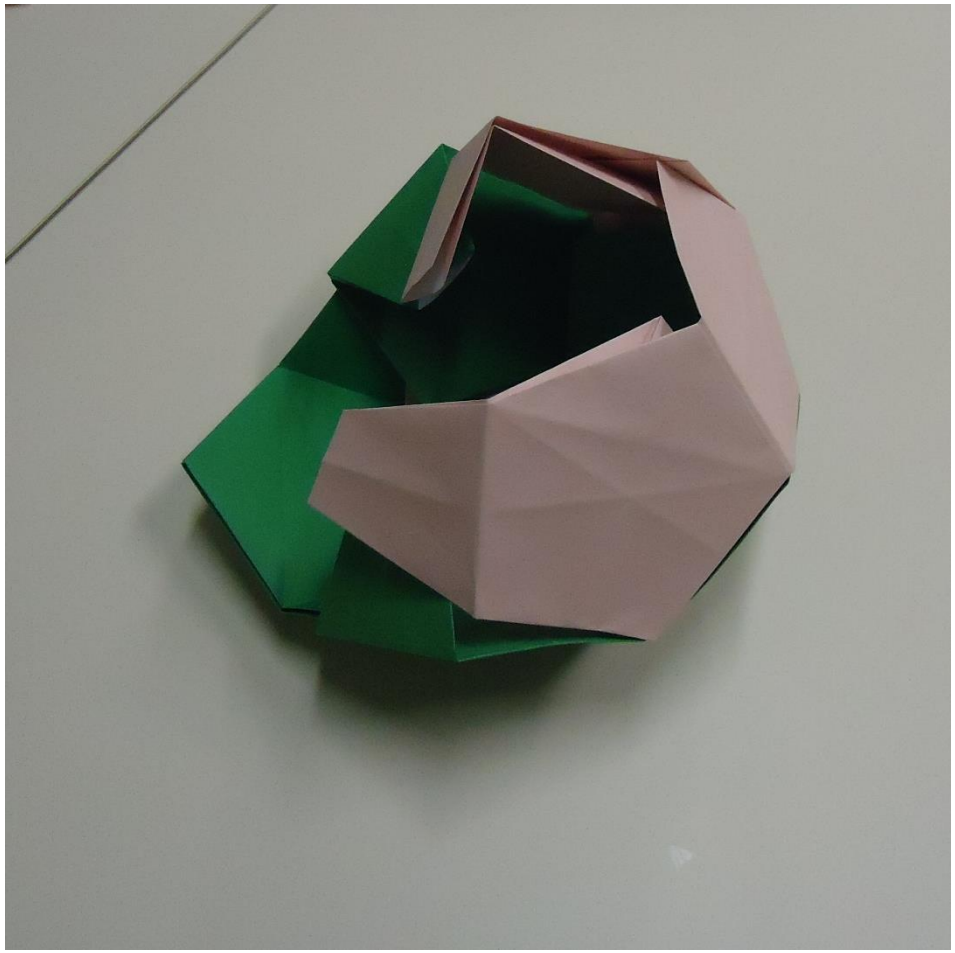


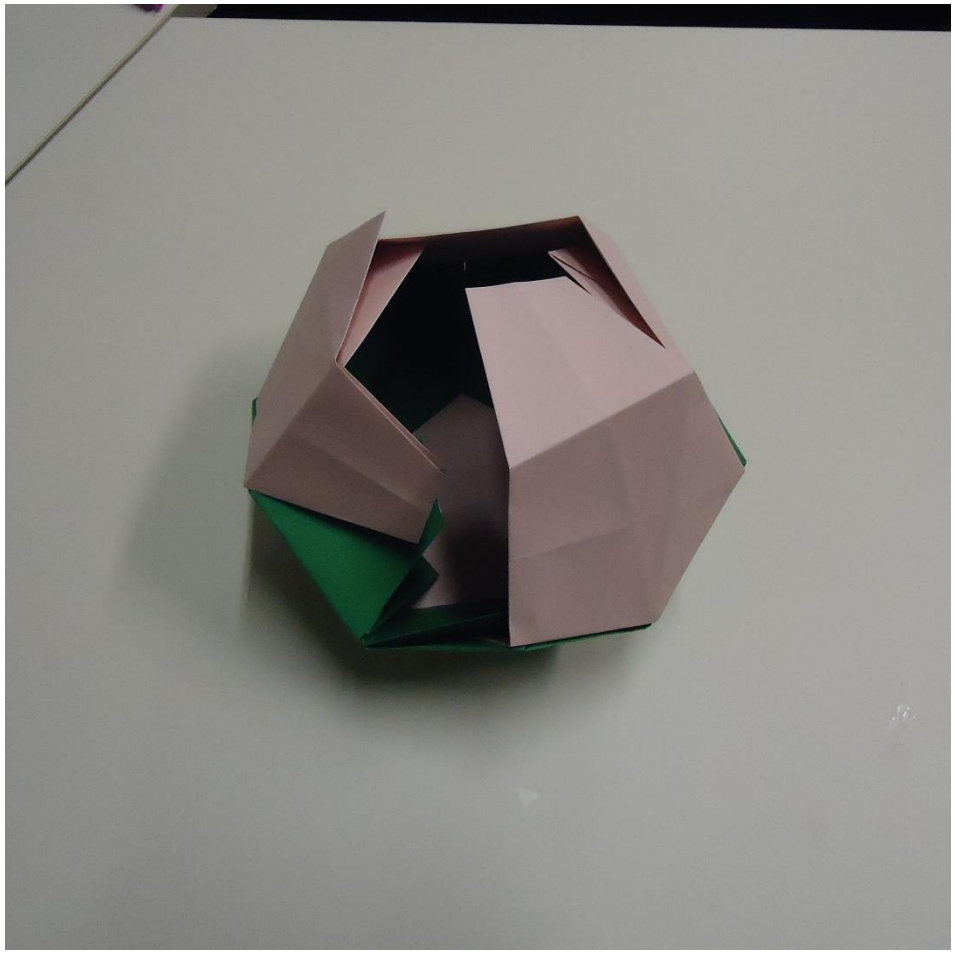


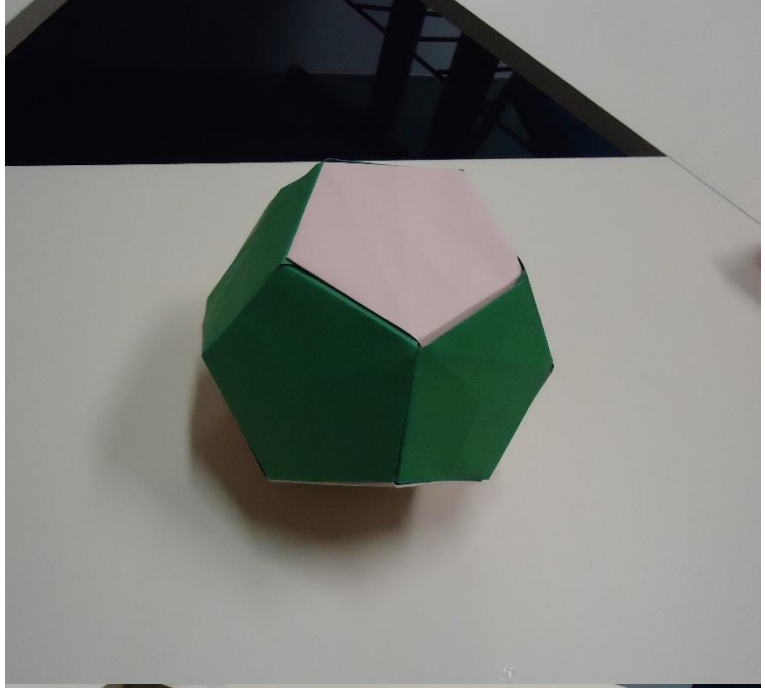


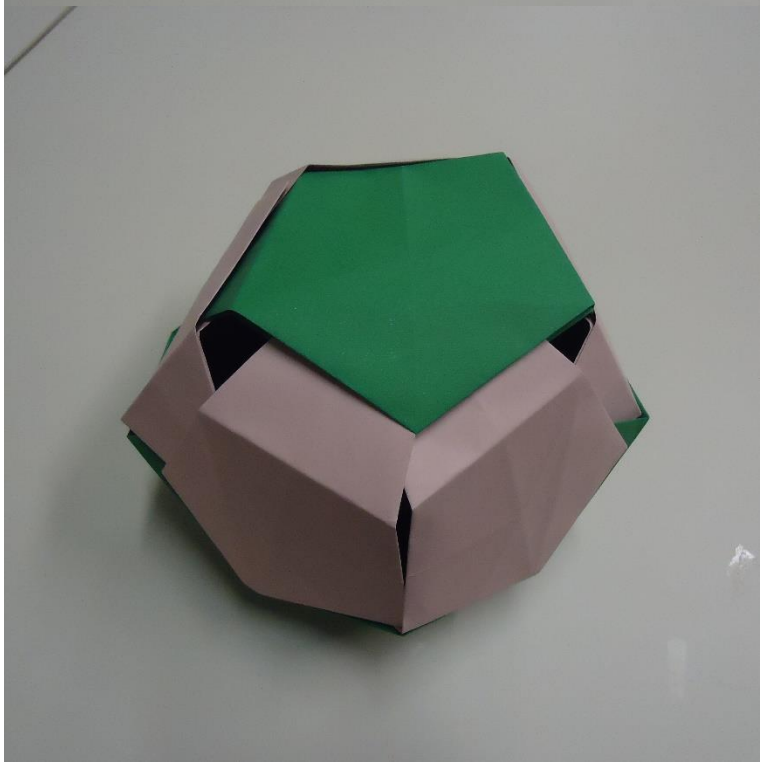


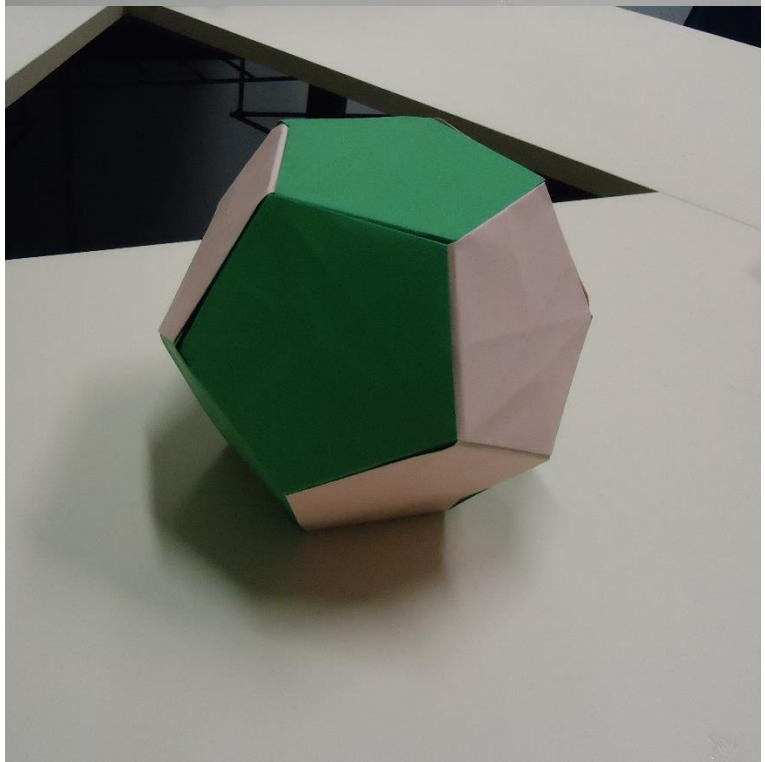






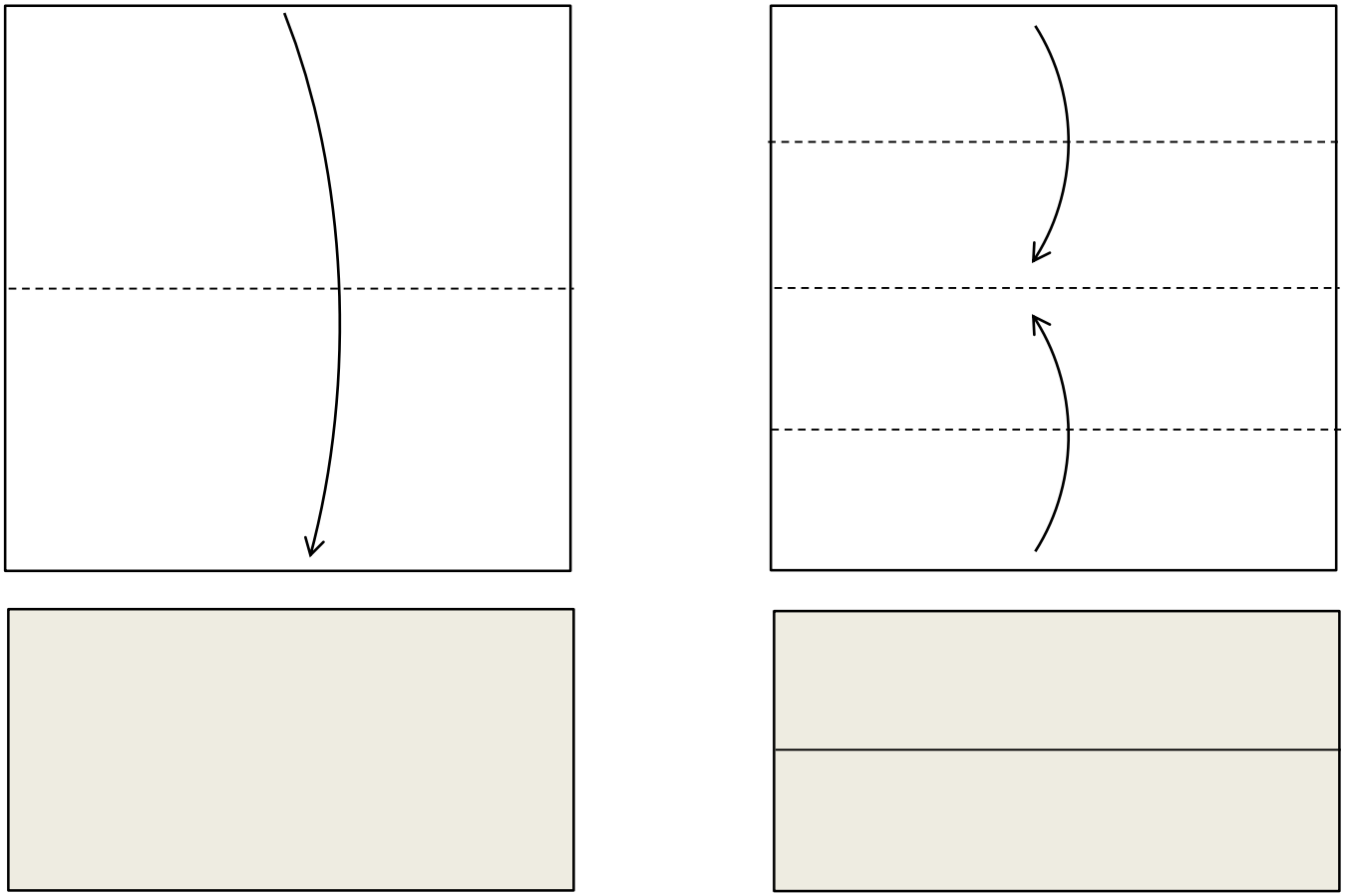




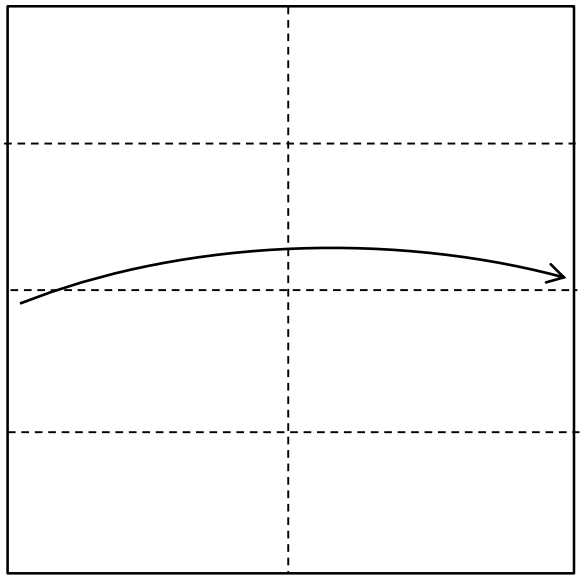


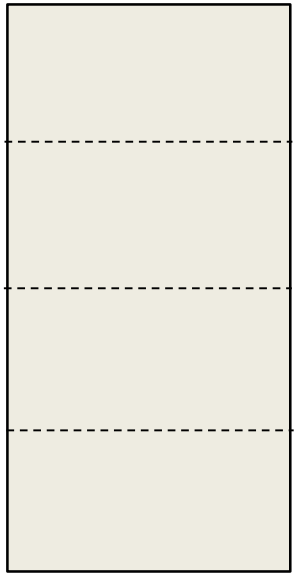
Construção de prismas ocos
Módulo I

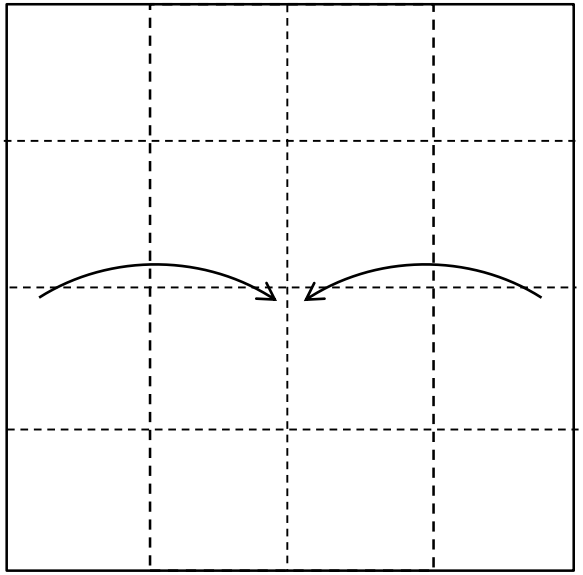
1) Partindo de um quadrado e através de dobradura, divida-o em dezesseis partes iguais, conforme as figuras.

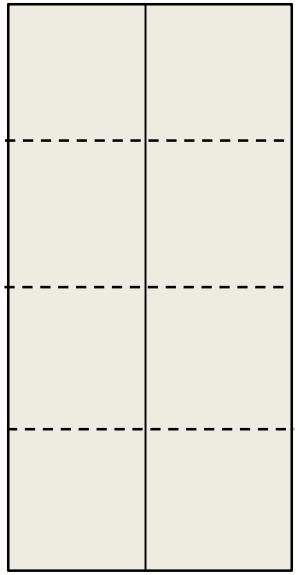


Construção de prismas ocos
Módulo I



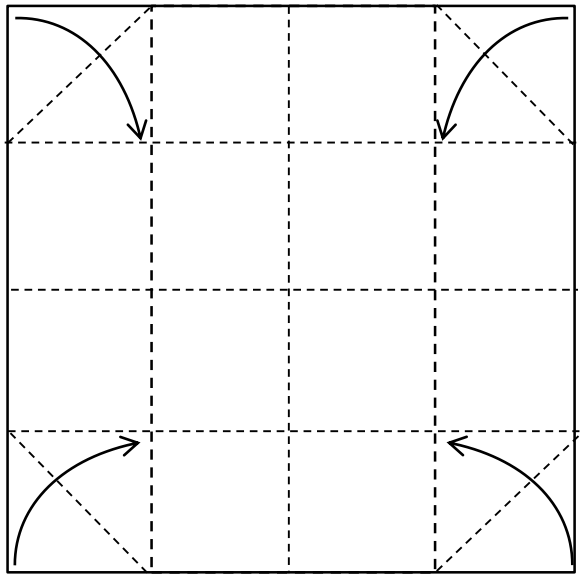


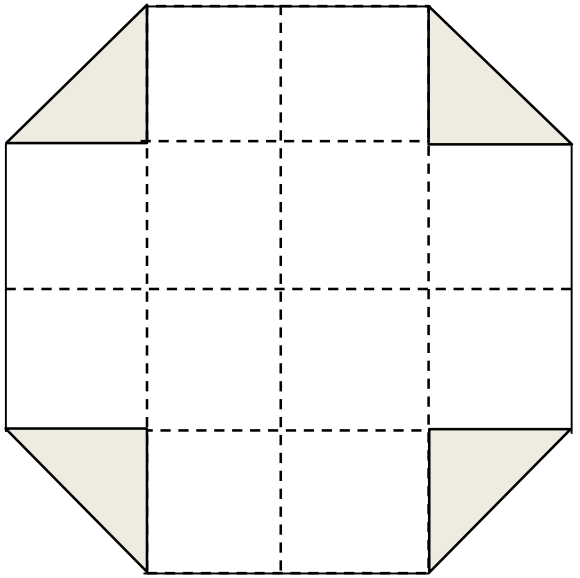




Construção de prismas ocos
Módulo I

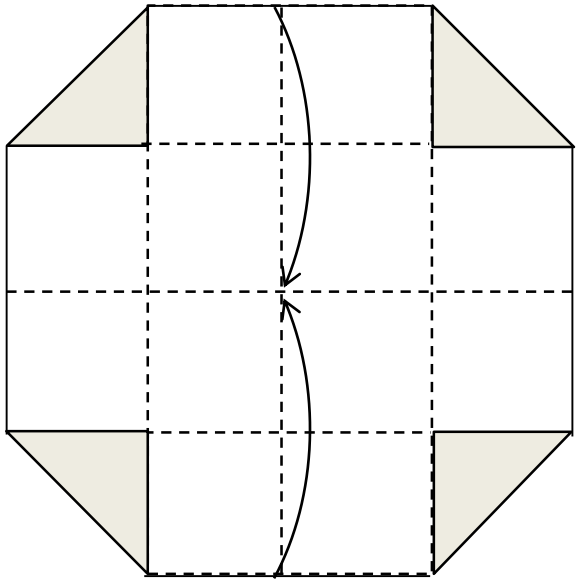
2) Dobre a diagonal dos quadrados dos vértices.

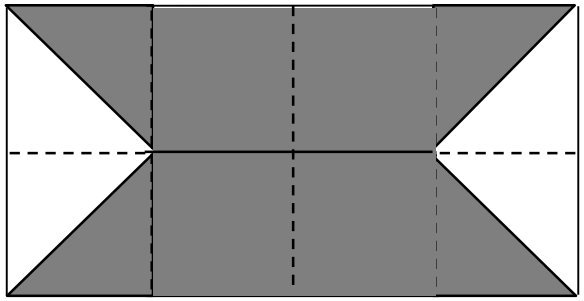




Construção de prismas ocos
Módulo I

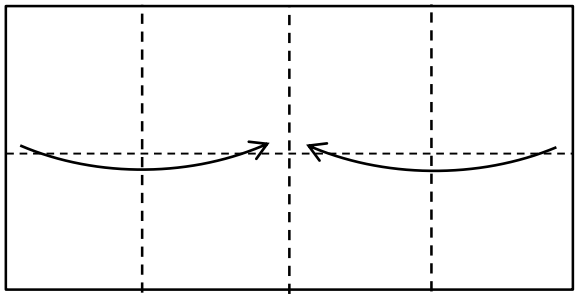
3) Dobre levando as bordas superior e inferior da folha ao vinco central.

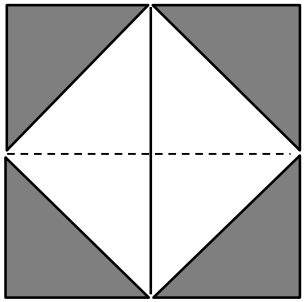




Construção de prismas ocos
Módulo I

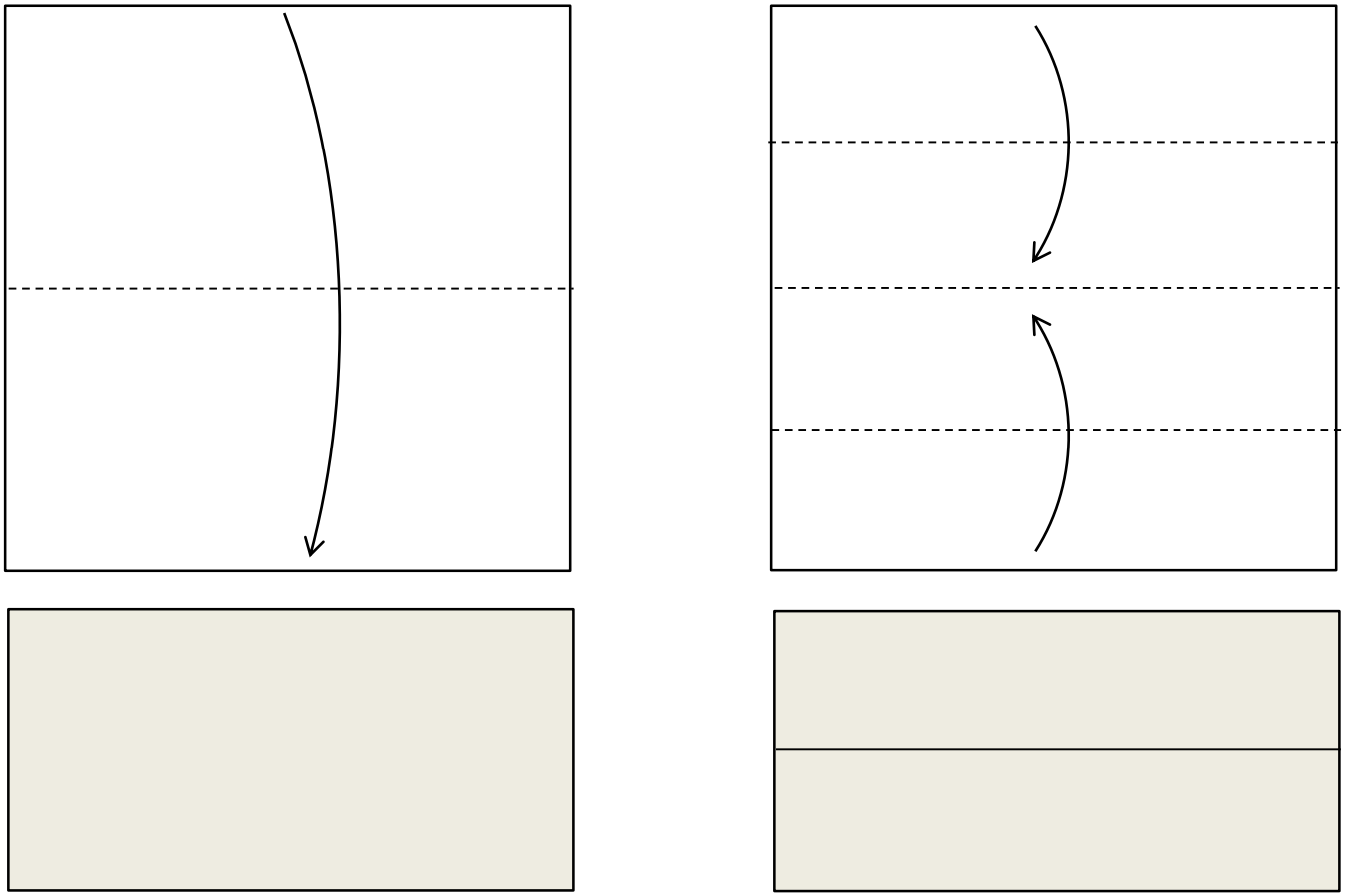
4) Vire a peça. Dobre novamente, desta vez levando as bordas laterais ao centro. Desdobre.



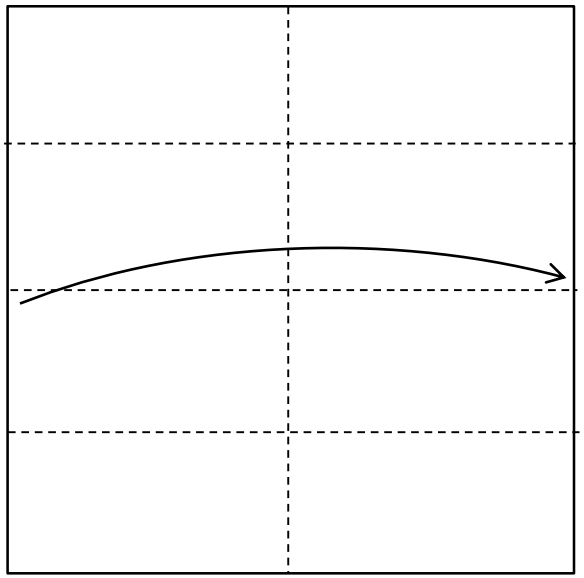


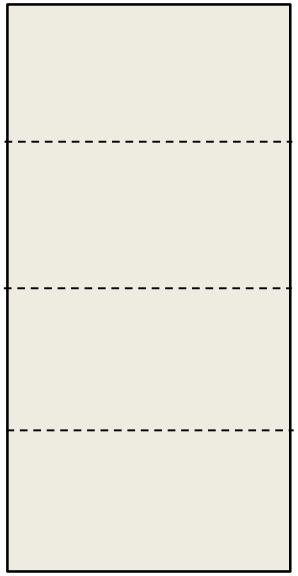
Construção de prismas ocos
Módulo II

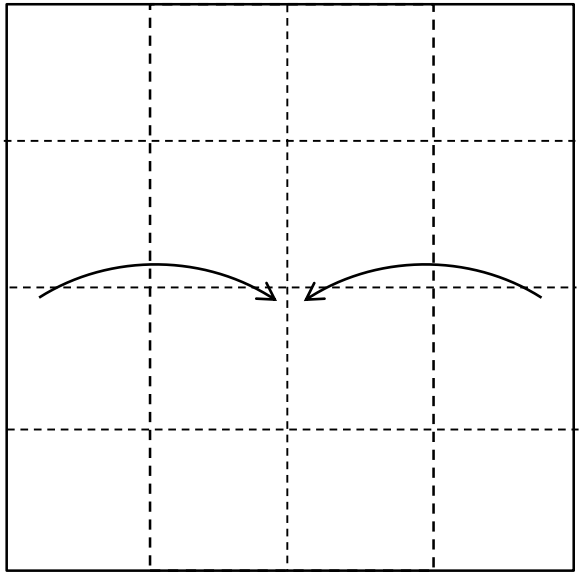
1) Partindo de um quadrado e através de dobradura, divida-o em dezesseis partes iguais, conforme as figuras.

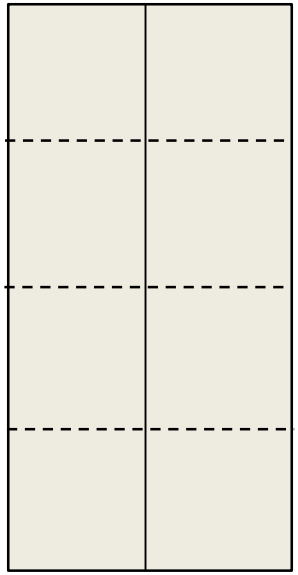


Construção de prismas ocos
Módulo II



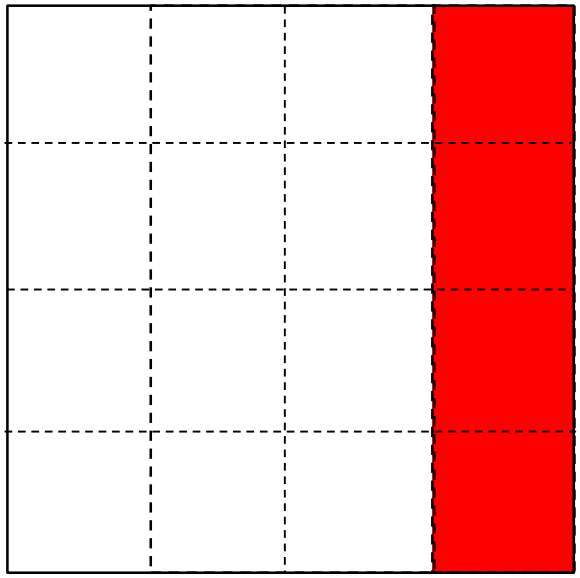


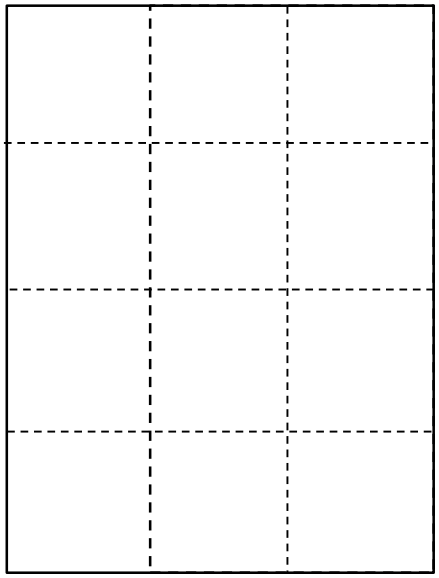




Construção de prismas ocos
Módulo II

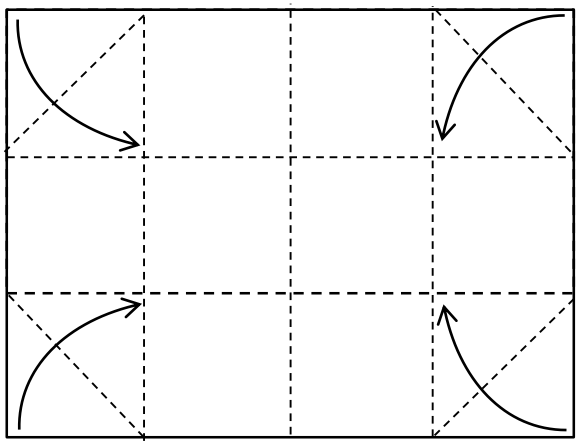
2) Recorte a coluna destacada em vermelho.

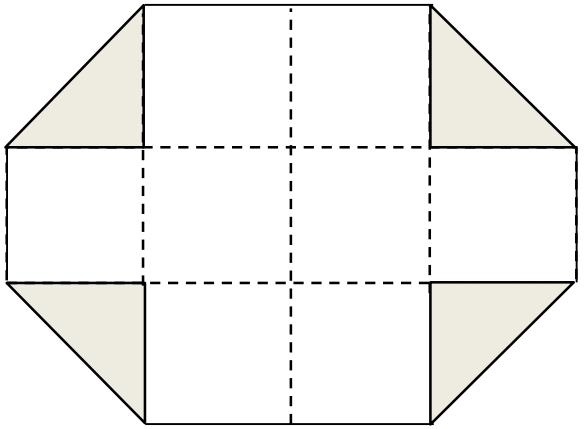




Construção de prismas ocos
Módulo II

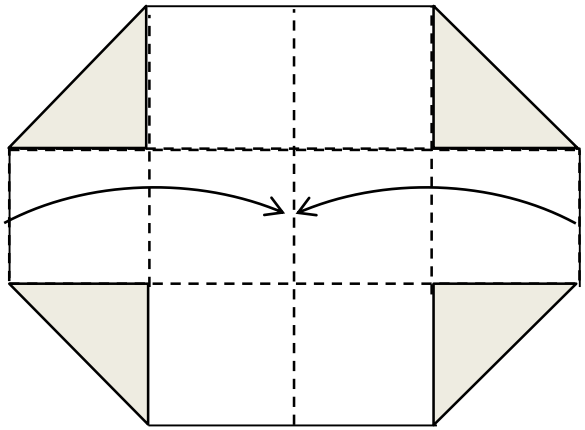
3) Gire a folha. Dobre a diagonal dos quadrados dos vértices.

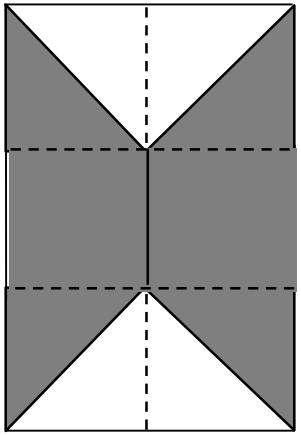




Construção de prismas ocos
Módulo II

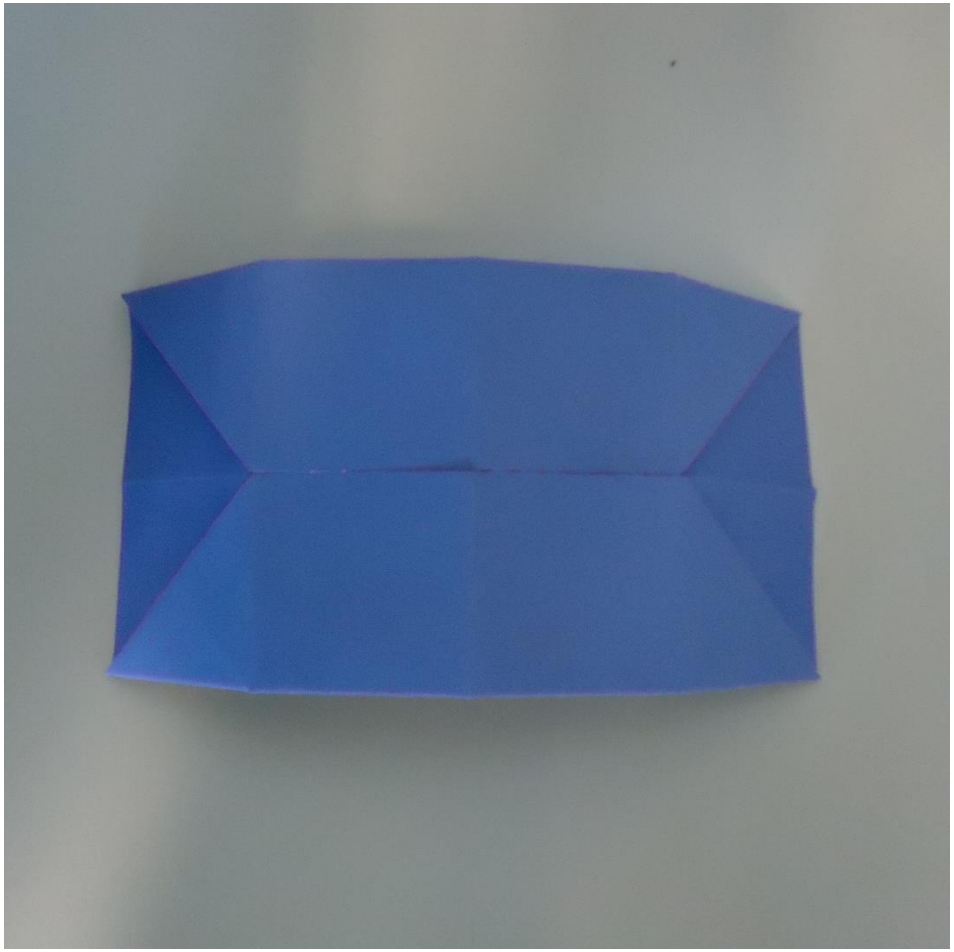
4) Dobre levando as bordas laterais ao centro.



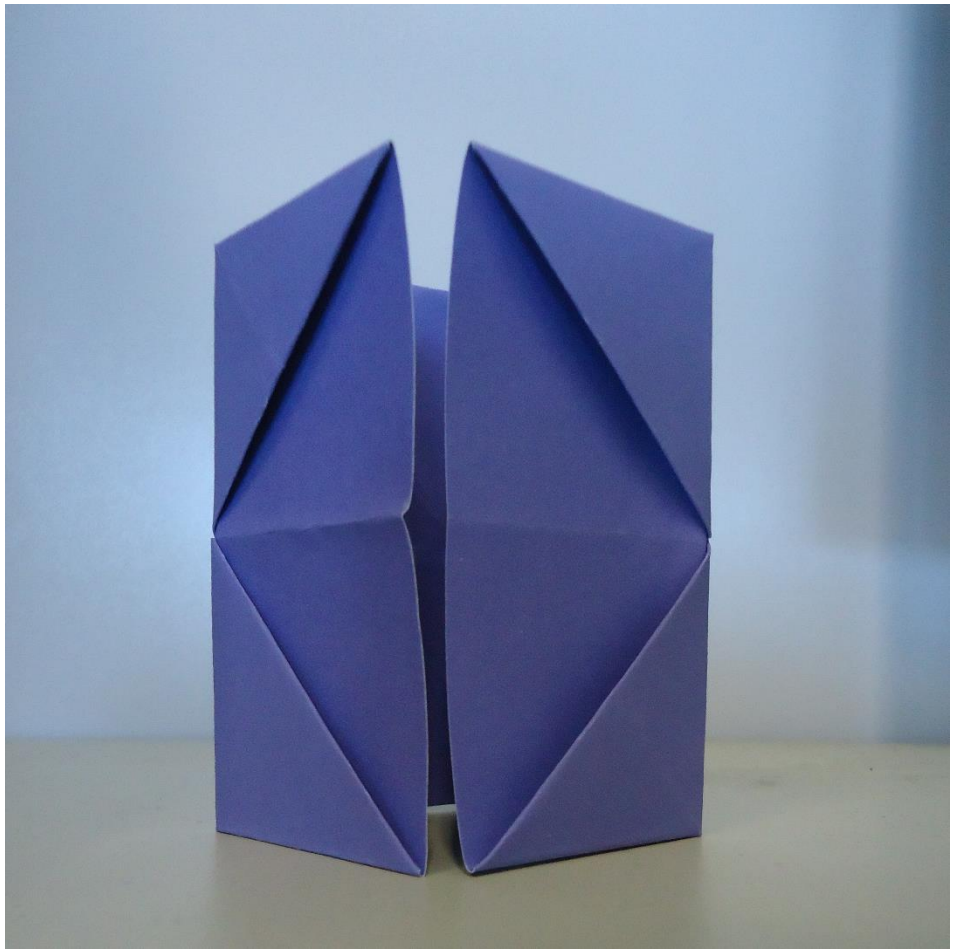


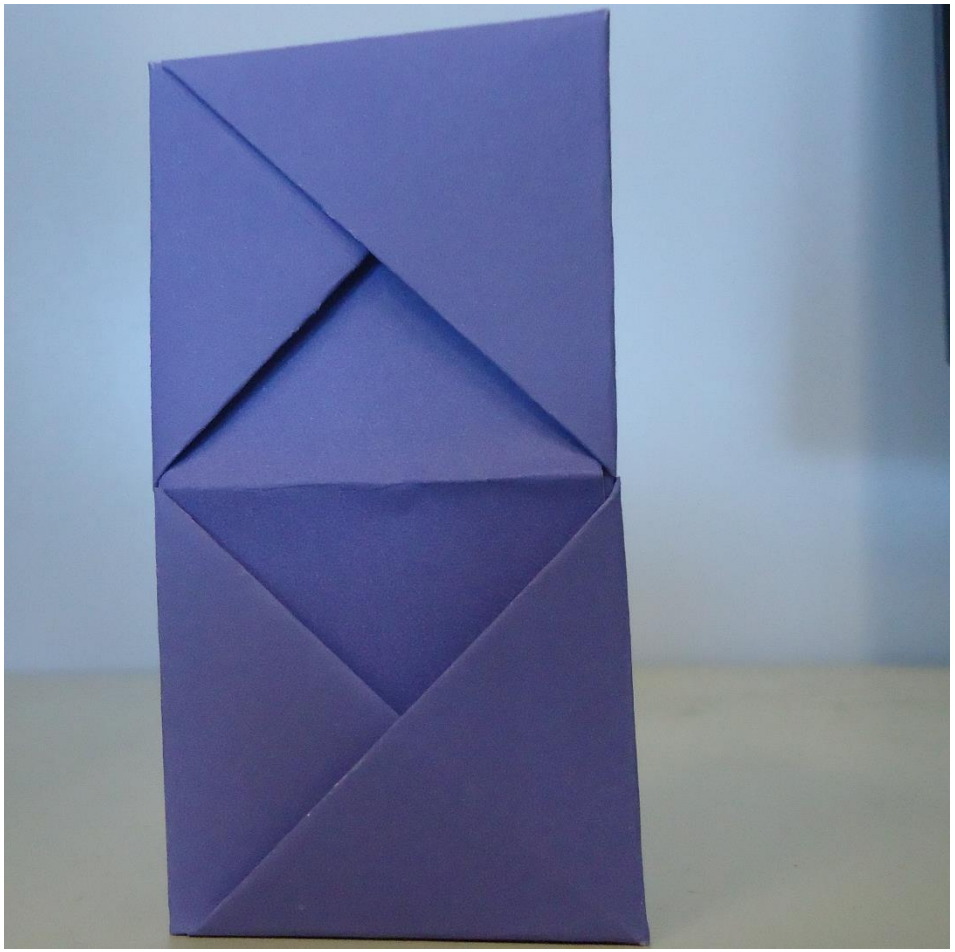
Prisma de base triangular

Utilizaremos apenas um módulo I.

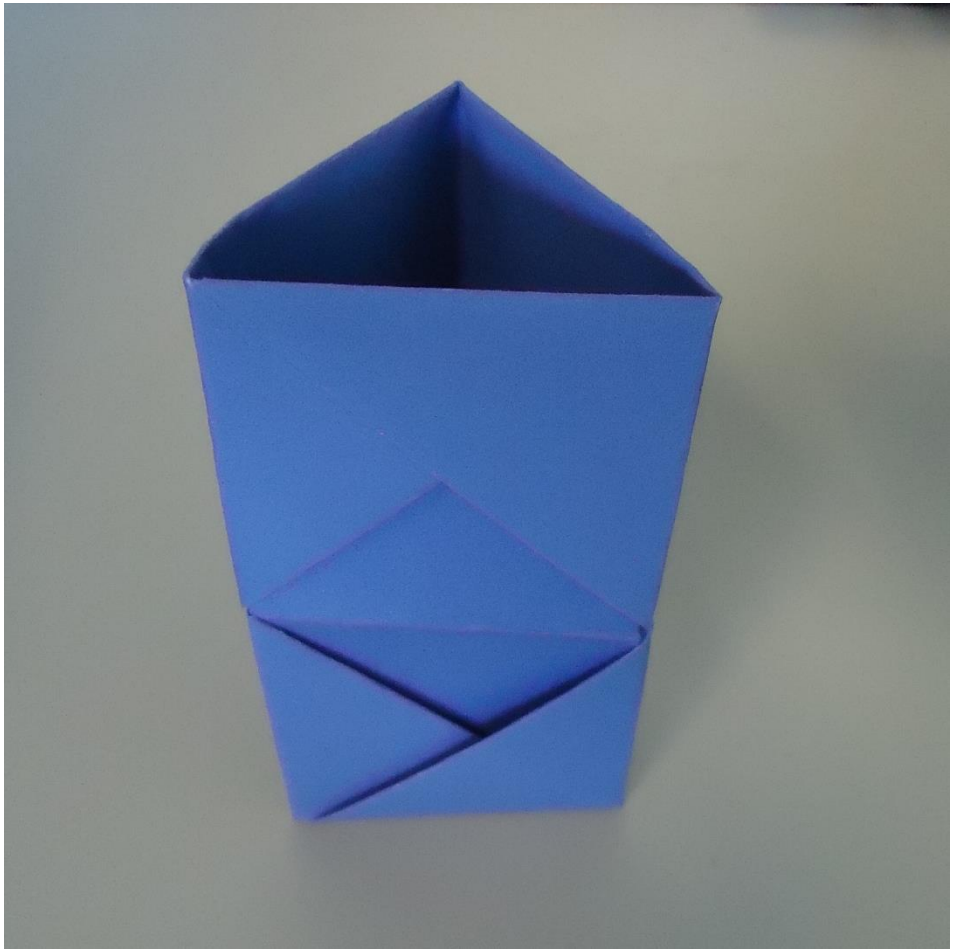


Prisma de base triangular



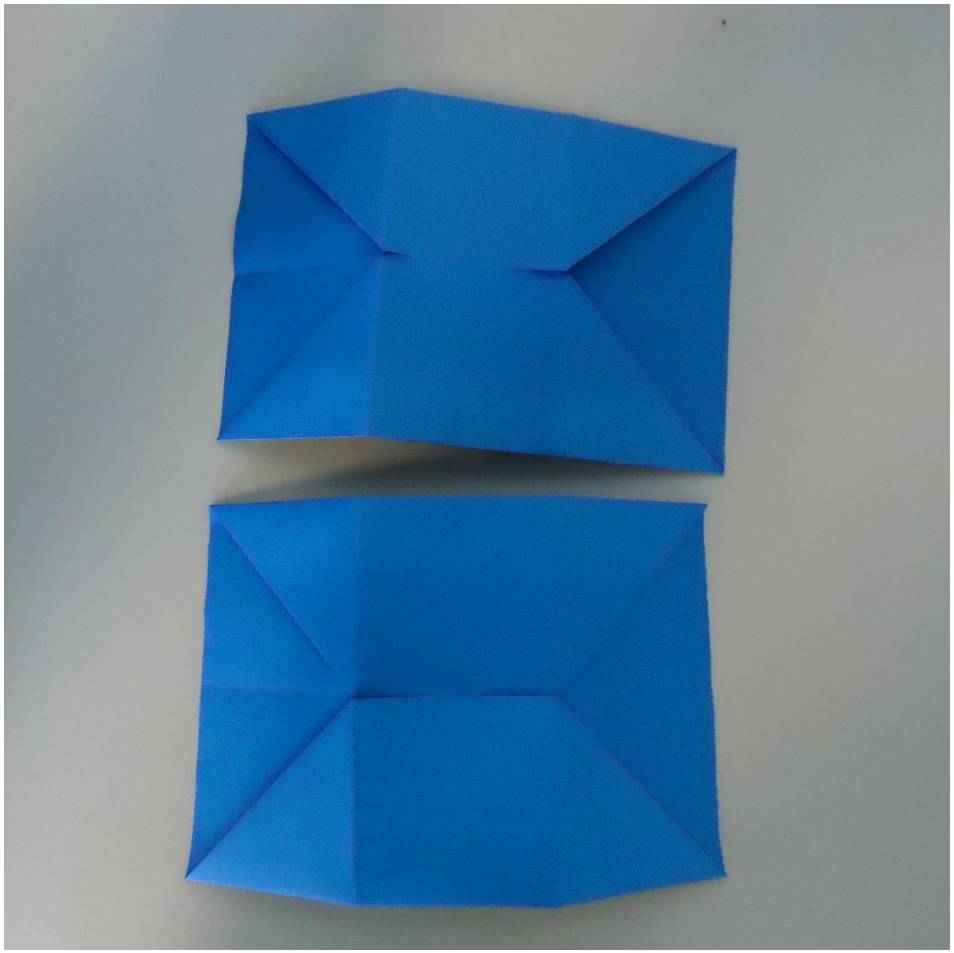


Prisma de base triangular

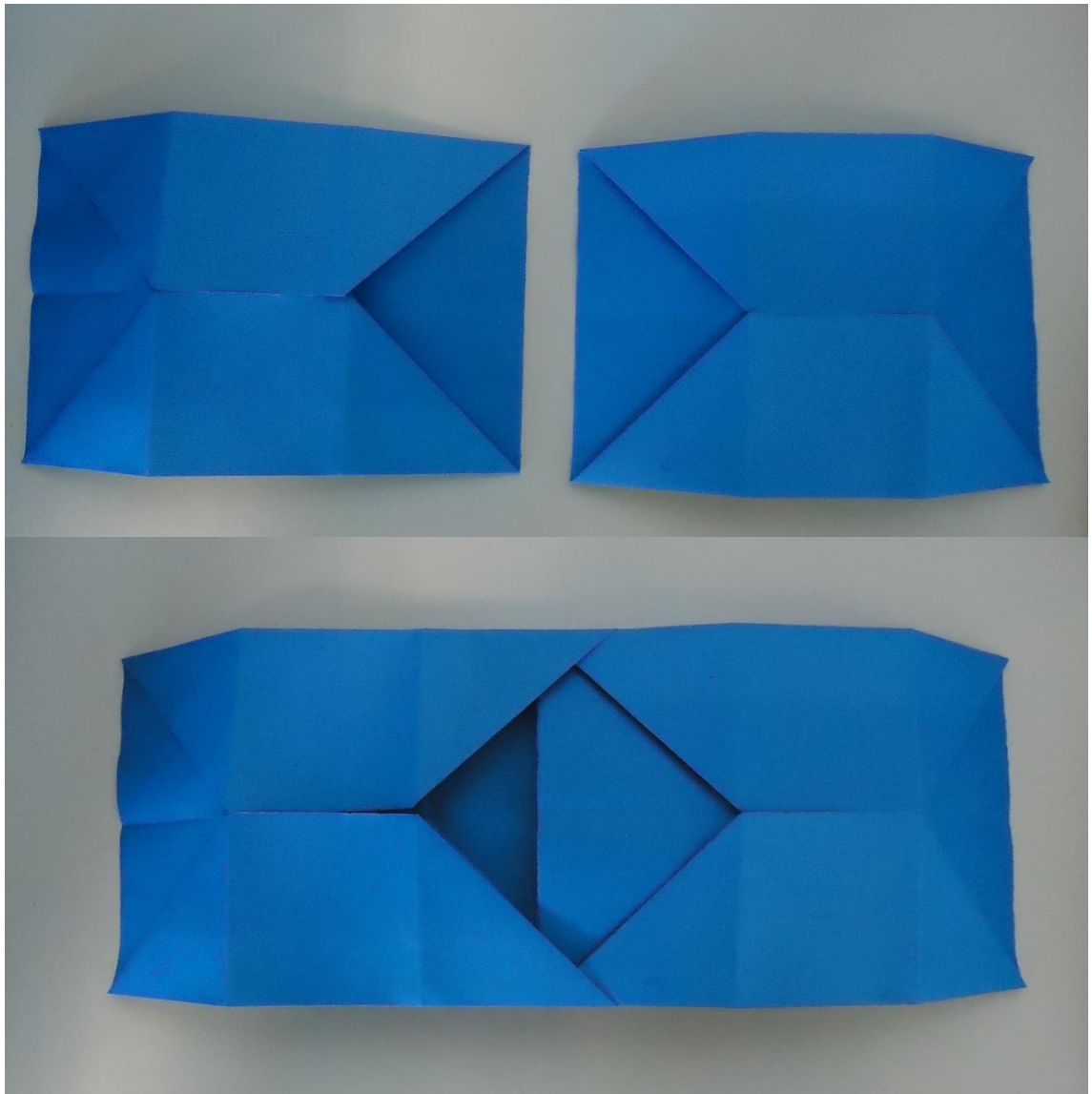


Prisma de base quadrangular

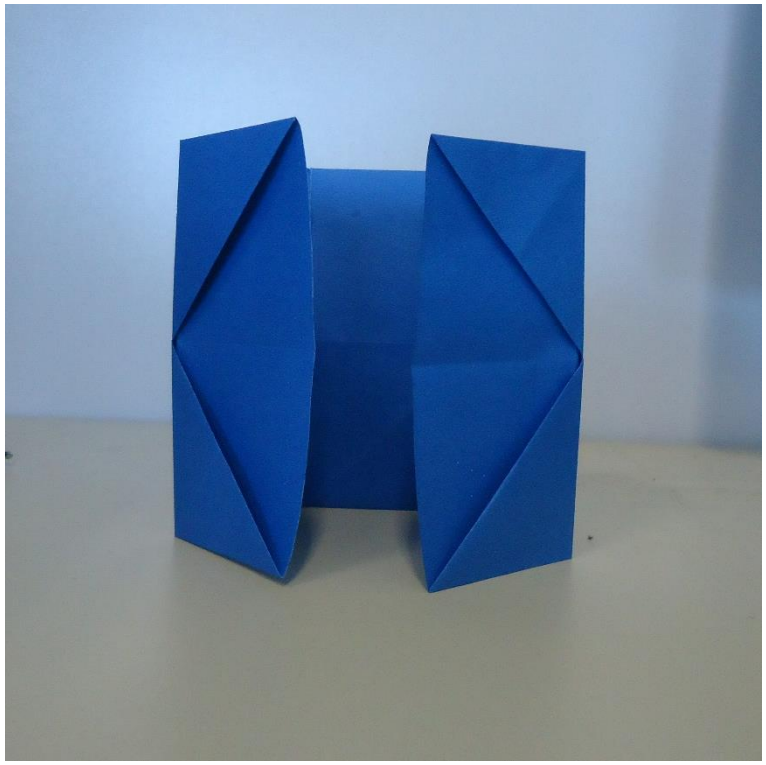
Serão utilizados dois módulos II.

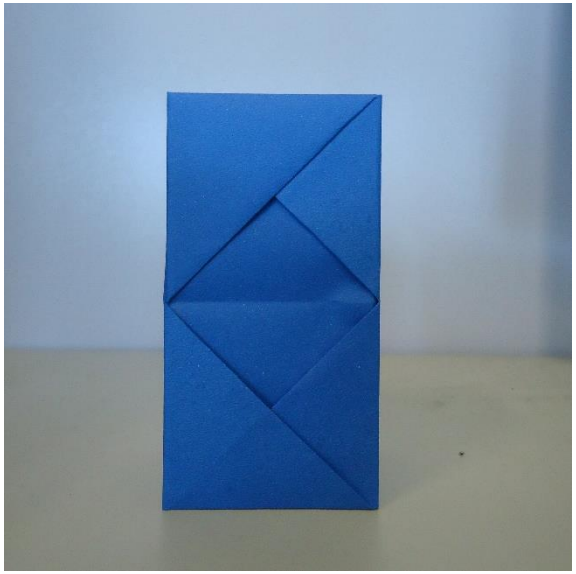


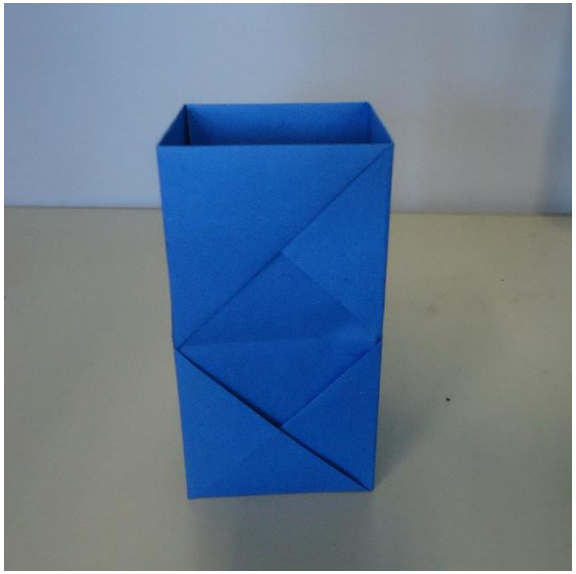
Prisma de base quadrangular



Prisma de base quadrangular

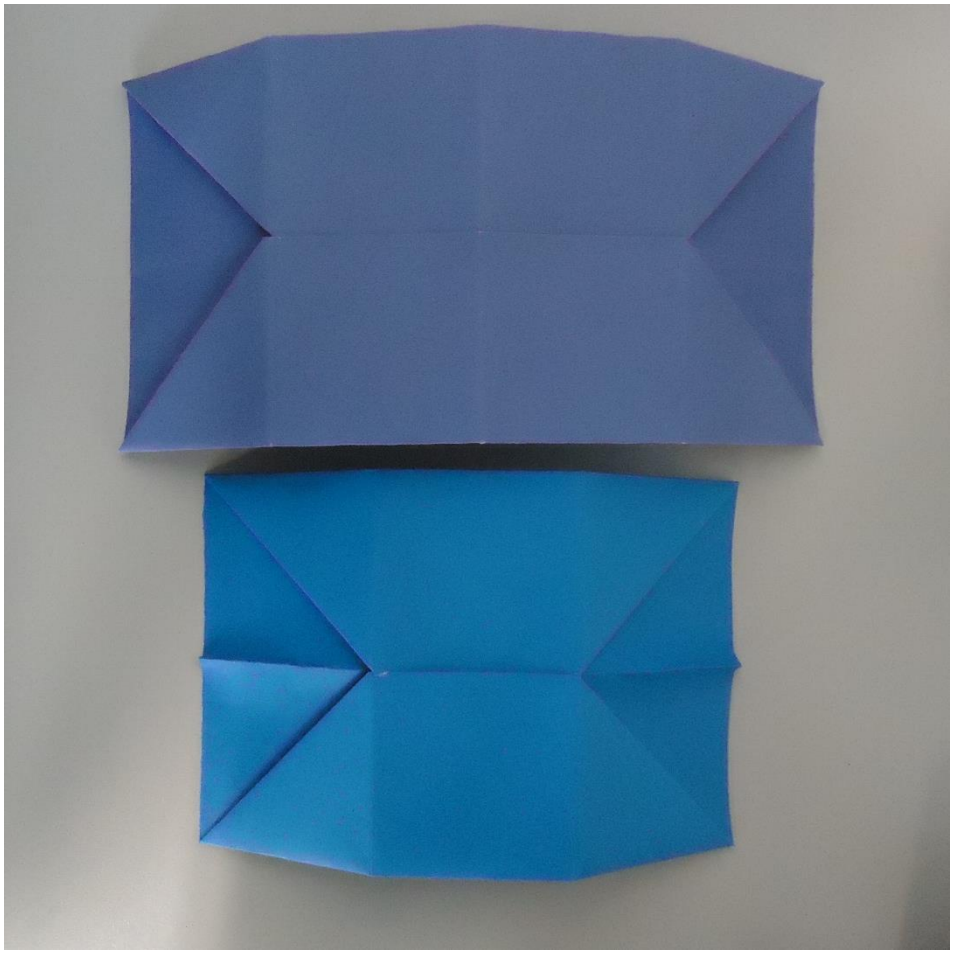




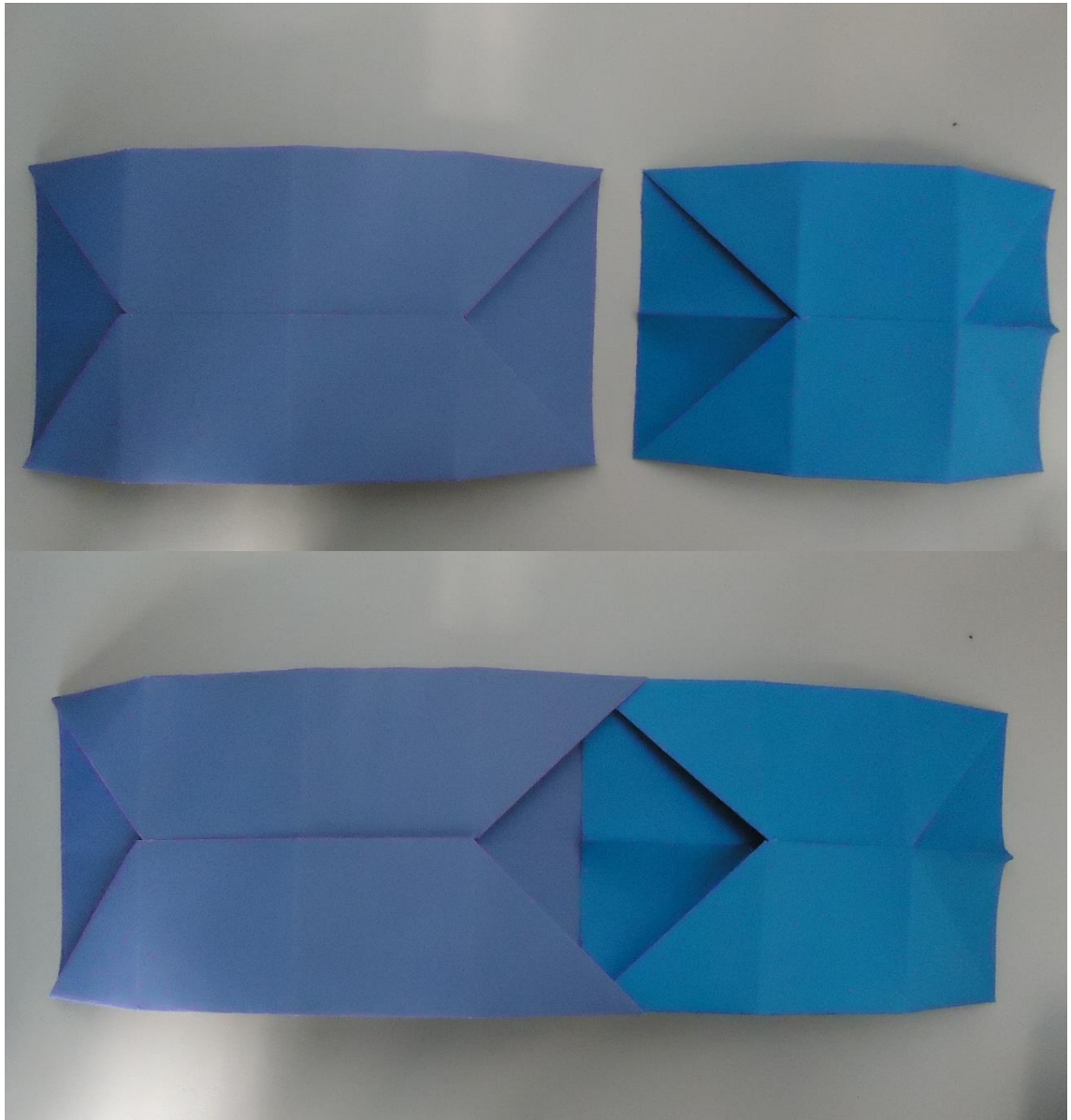


Prisma de base pentagonal

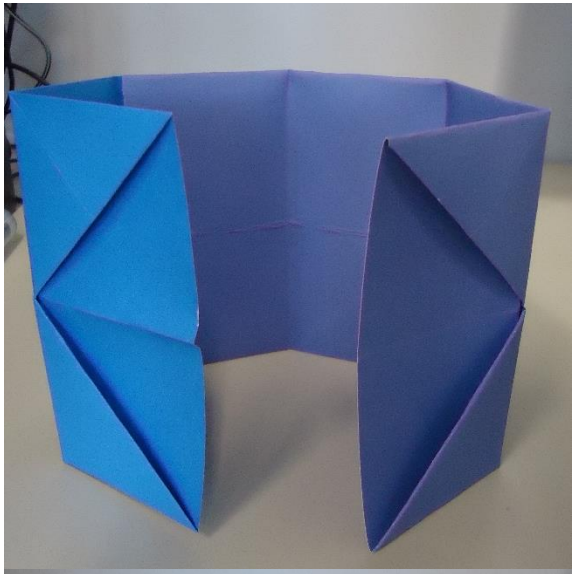
Serão necessários um módulo I e um módulo II.

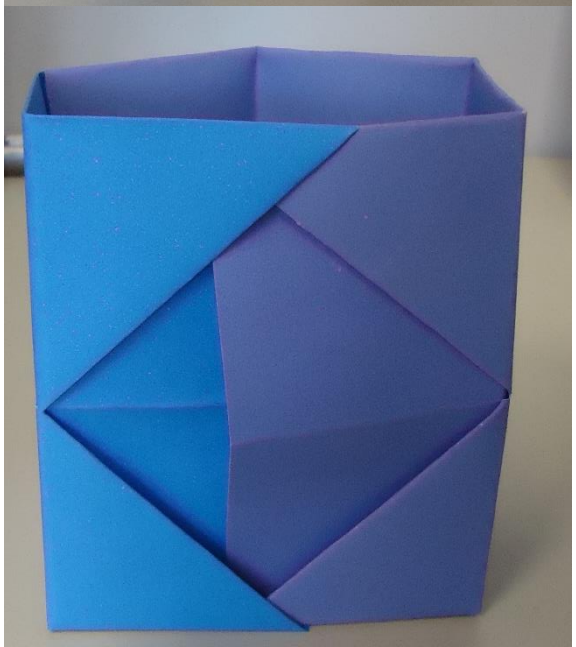


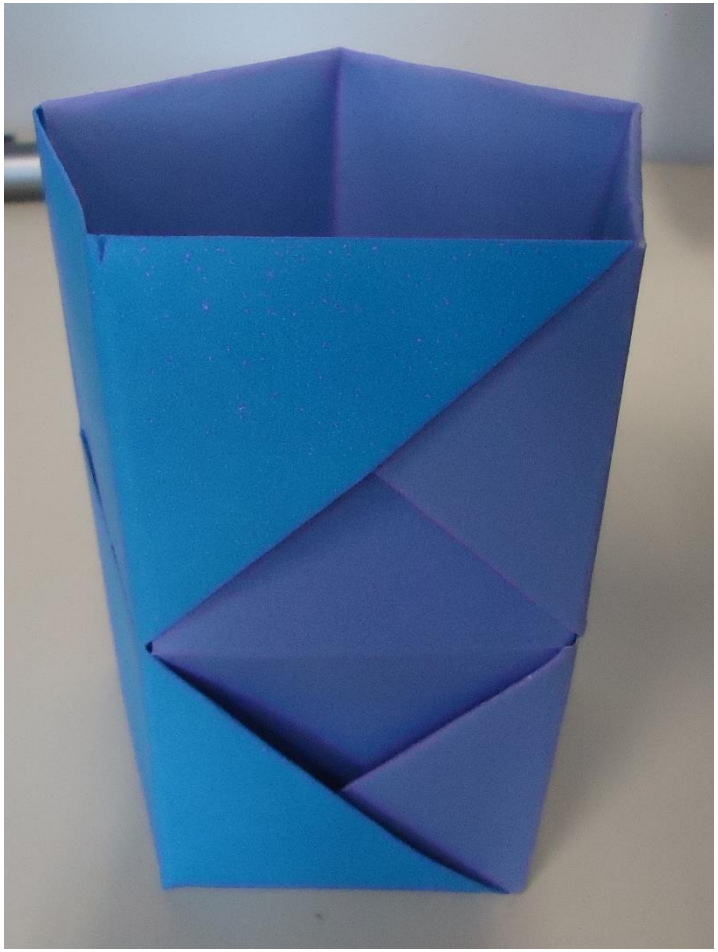
Prisma de base pentagonal



Prisma de base pentagonal

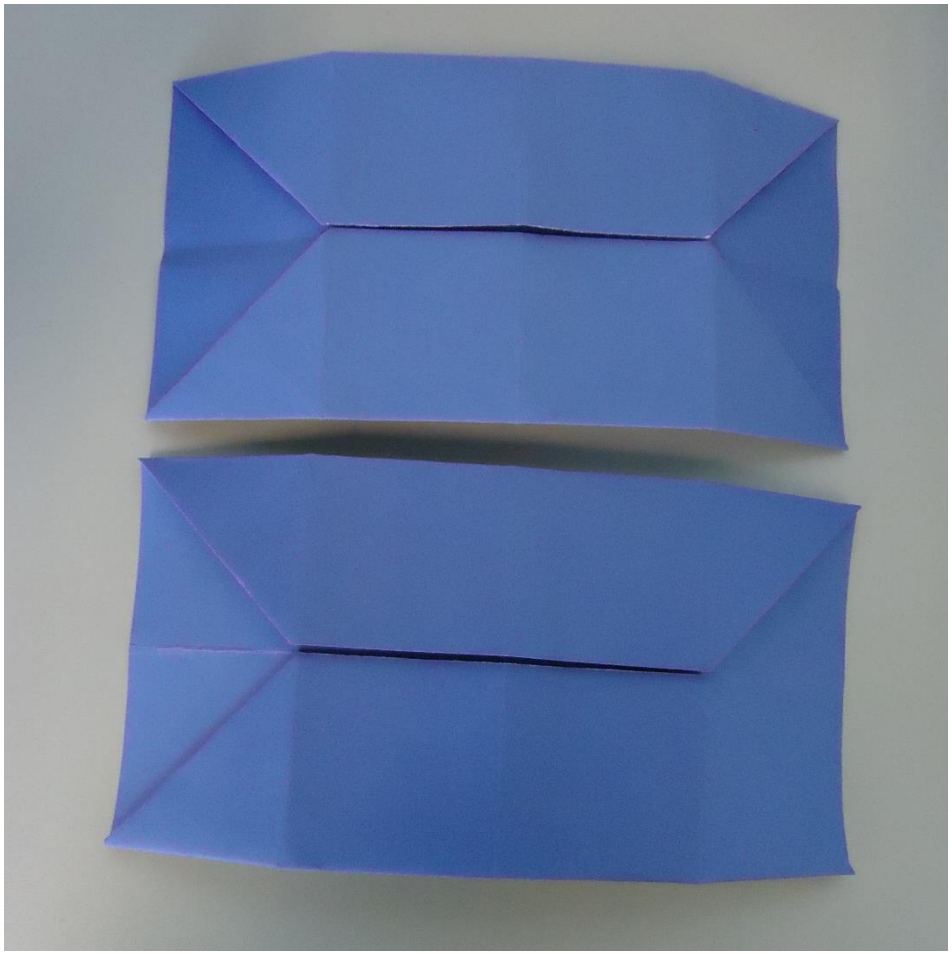




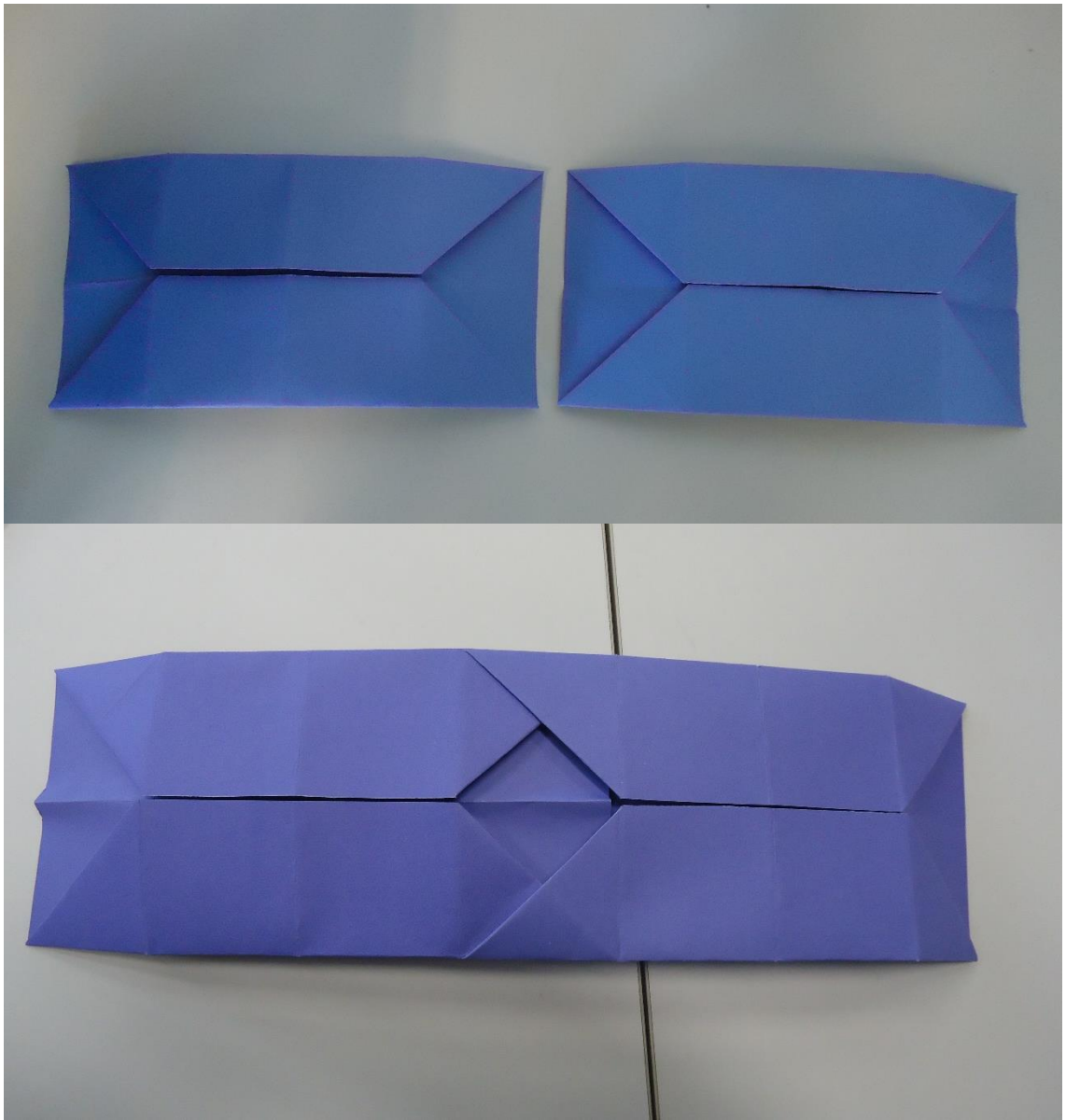


Prisma de base hexagonal

Utilizaremos dois módulos I.



Prisma de base hexagonal



Prisma de base hexagonal