

Erika Fitzpatrick

INSC 573

November 4, 2020

## **Program in a Bag: Origami Fidgets for Tweens**

### **Activity Description**

This program in a bag has the instructions and materials necessary to lead a group of tweens through three origami projects: a flexagon, a transforming ninja star, and an infinite flower. When completed, each of these projects is a functional fidget toy, so program participants will get to leave the program with a self-made paper fidget. The target age range for this kit is youth between 10 and 13 years.

The amount of time required for participants to complete each item can vary widely. Rough time estimates for each project are 20 minutes for the flexagon, 40 minutes for the transforming ninja star, and 40 minutes for the infinite flower, but participants with prior experience making origami may be able to complete the projects much more quickly, and those who are completely new to paperfolding may take a little longer.

### **Instructions**

#### ***Setup***

Create several stations for participants to work at. Each station should have instructions for one of the origami fidget projects, a completed example of the project, and an assortment of the appropriate-sized paper for the project. Stations for the flexagon should have a selection of the large 12"x6" paper, and stations for the transforming ninja stars and infinite flowers should have the 4"x4" paper.

### ***Presenting the Program***

To kick off the program, use the completed models to demonstrate to participants how each fidget toy moves, and offer them a couple of basic tips for origami (e.g. read the instructions carefully before folding, fold as precisely as possible to ensure straight lines and sharp corners). Have participants select one project to start with, and, if time allows, have them rotate stations to make a second, and possibly even third, project.

While the participants are working on the origami projects, encourage them to work together and help each other when they run into tricky folds. Also encourage them to examine the completed models. This can be particularly helpful with the modular origami projects—the transforming ninja star and infinite flower—where they can even try taking the pieces apart and putting them back together to see how they work.

### ***After the Program***

Before returning the kit, please refer to the materials list to check that all reusable materials are returned to the bag, and complete the evaluation form.

### **Materials**

- Completed examples of each origami fidget toy (5 of each)
- Printed origami instruction pages (5 copies each)
- 4”x4” origami paper in assorted colors/patterns (~1,000 sheets)
- 12”x6” origami paper in assorted colors/patterns (~100 sheets)
- Printout with activity description, instructions for presenting, and materials list (1 copy)
- Printed evaluation form (2 copies)

## Rationale

Though it can be a fun activity for almost any age range, origami is particularly well suited for the developmental needs of tweens and early teens. As an art form, it is a means of creative expression, but one that is quite structured and requires close attention to rules and instructions. Using the written instructions and the completed models as their guides helps participants develop critical thinking skills, practice reading comprehension, and exercise spatial reasoning. Additionally, although each participant will be working on their own projects, this program is designed to encourage collaborative problem solving. Dividing the participants into stations for the different projects ensures that participants will be working near others who are working on the same project, making it easier to ask each other for help or offer tips to one another as they work. This gives participants an opportunity to socialize, an important activity for this age group, which is increasingly interested in and focused on relationships with their peers.

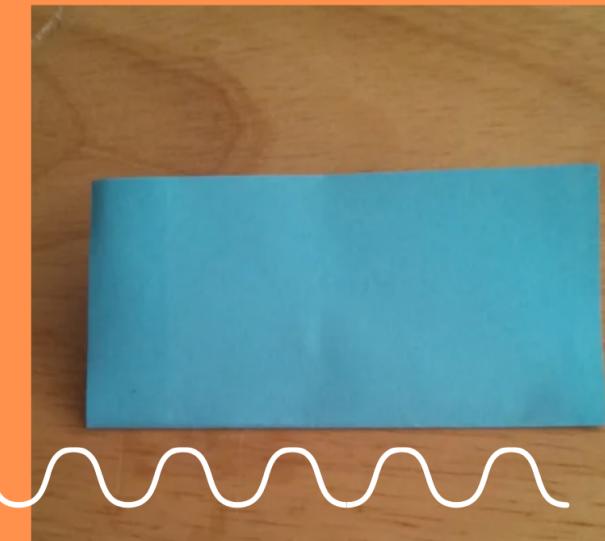
The three specific projects selected were chosen because they are complex enough to present a challenge, but lenient enough that participants will be able to create finished products that are visually appealing and usable within a reasonable amount of time. Leaving the program with products they are proud of will help develop participants' feelings of competence and achievement. Further, by giving them multiple projects options and providing an assortment of colored and patterned paper to choose from, this program allows them to create products that express their unique personalities.

## Instruction Sheets

MODULAR ORIGAMI

# Transforming Ninja Star

Adapted from  
<https://www.instructables.com/How-to-make-a-moving-origami-ninja-star/>



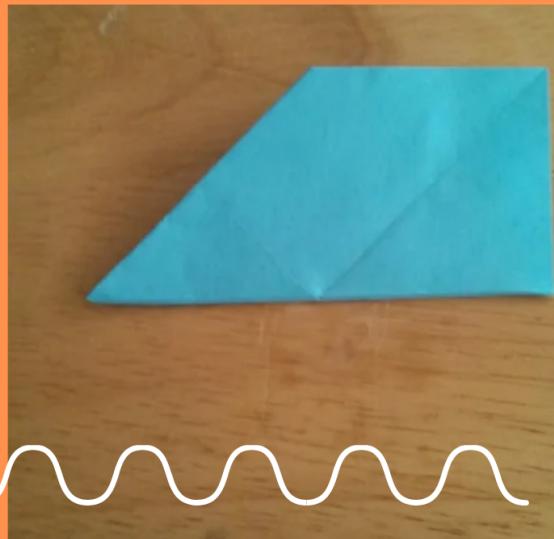
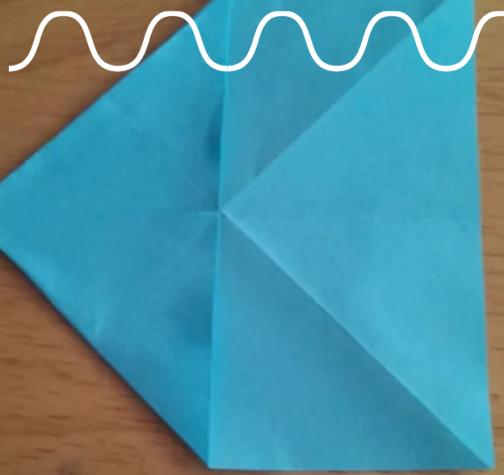
### MATERIALS: 8 PIECES OF 4"X4" ORIGAMI PAPER

1. Take one sheet of paper and fold it in half so that the bottom edge meets the top edge.

2. Open the paper back up, then fold diagonally to form creases in both directions, reopening after each fold.



3. Fold the top left and bottom left corners into the center.



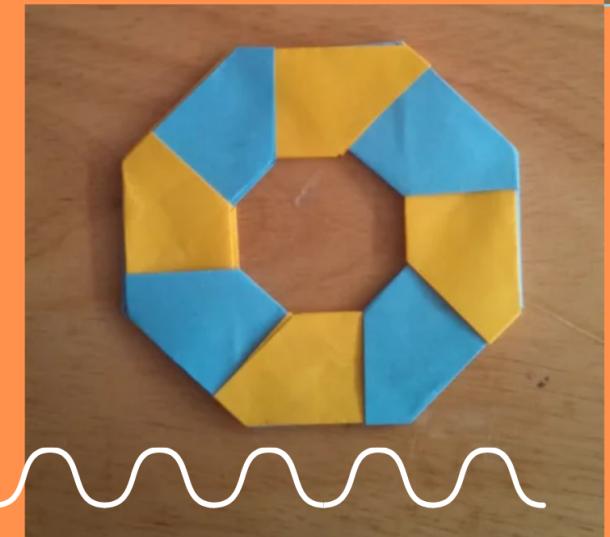
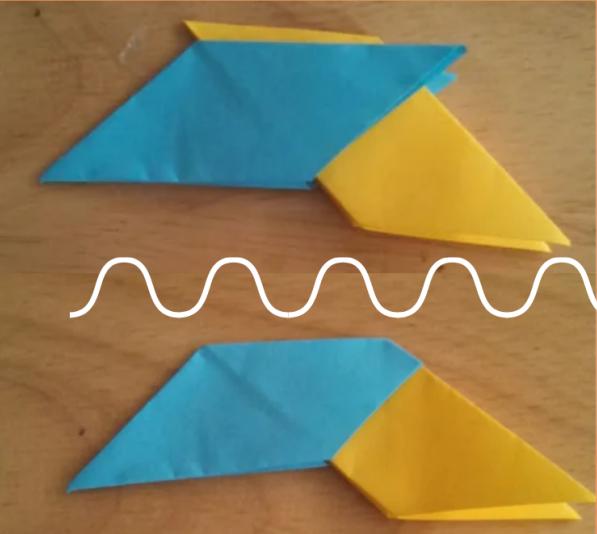
4. Fold the top edge down to meet the bottom, forming the shape shown in the picture to the left.

5. Using the creases you already made, tuck the bottom right corner inside and flatten, forming a parallelogram.

6. Repeat steps 1-5 seven more times to create a total of eight parallelogram pieces.



7. Insert the closed end of one piece into the open end of the other, as shown in the top portion of the picture to the right. To secure the pieces together, tuck the protruding corners of the first piece into the second piece.



8. Repeat step 7 with the remaining pieces to form a ring. Be careful to attach the final piece gently, so as not to tear the paper!

You're finished! Push and pull (gently!) the pieces to watch it transform back and forth between a ring and a ninja star!



MODULAR ORIGAMI

# Infinite Flower

Adapted from  
<https://www.easypapercraft.com/origami/origami-moving-flower/>



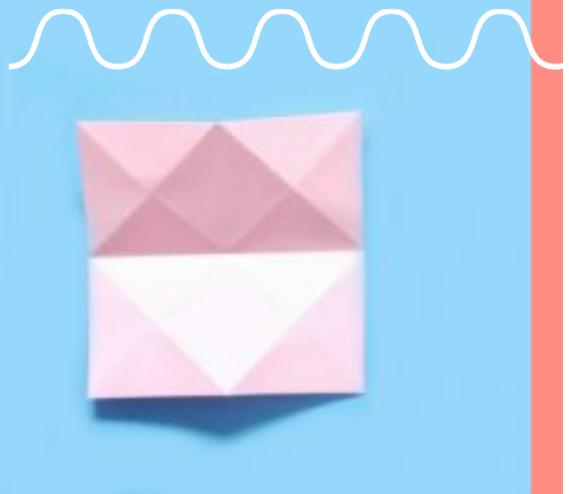
**MATERIALS: 8 PIECES OF  
4"X4" ORIGAMI PAPER**

1. Take one sheet of paper and fold it diagonally in both directions

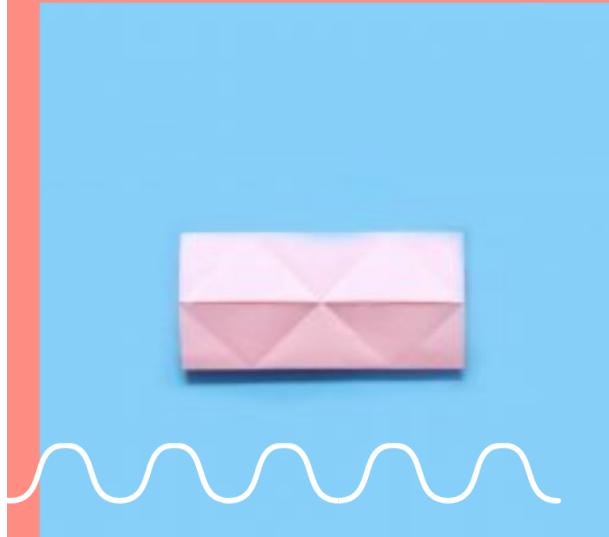
2. Fold each of the four corners into the center of the square



3. Unfold and flip over the paper.  
Fold it in half to crease, then  
open it back up.



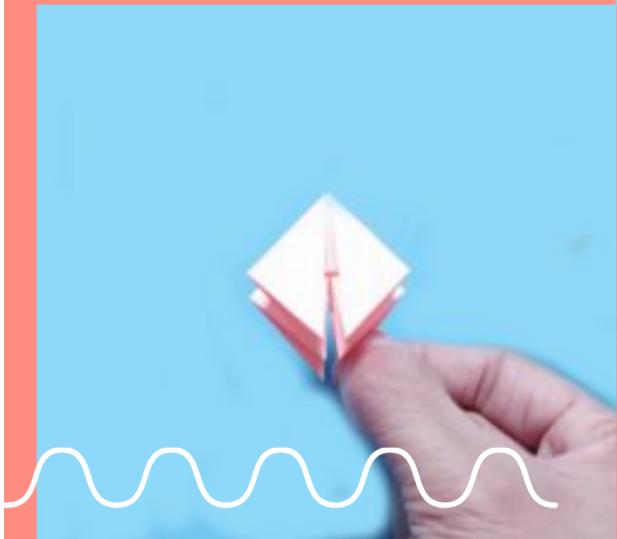
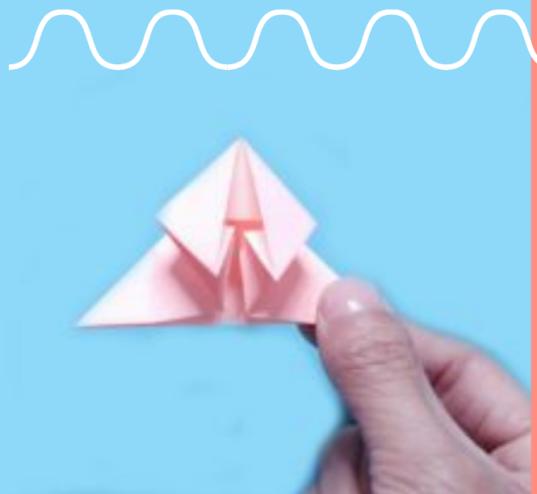
4. Using the crease you just  
made as a guide, fold the top  
and bottom edges in so they  
meet at the center.



5. Unfold the sheet. Using the  
creases you have already made,  
push the center of each side in  
towards the center and fold the  
sheet in half so the top meets the  
bottom, forming a triangle.



6. Continuing to use the creases you have already made, take the center bottom of the triangle and fold it up to the top of the triangle, tucking both sides under to form a square. Flip and repeat on the back, as shown below.

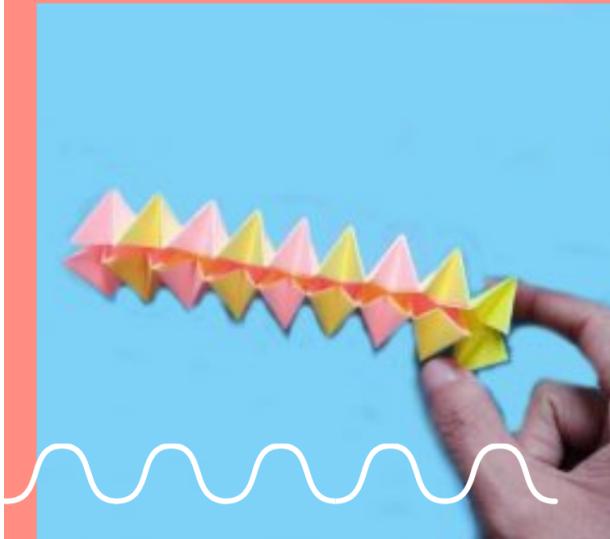
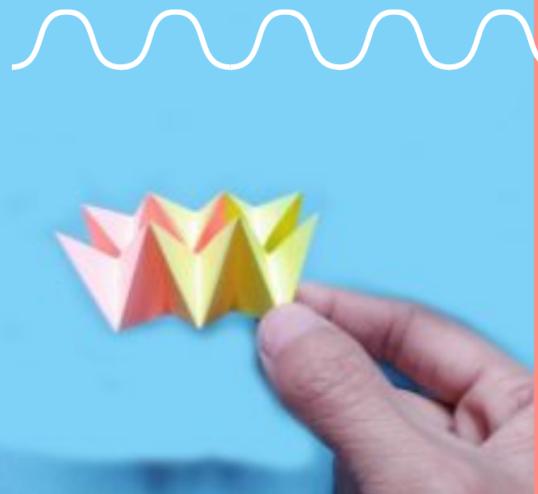


7. Repeat steps 1-6 seven more times for a total of 8 square pieces.



8. Connect each piece by opening the front square of one piece and sliding the back square of another piece inside, as shown in the picture to the right.

9. Continue hooking the pieces together until all eight pieces are connected.



10. Using the same method you used to make the chain, connect the front piece to the back piece to form a loop.

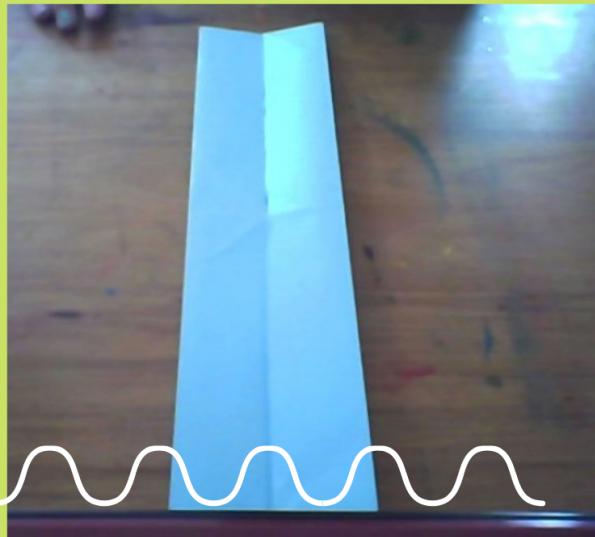
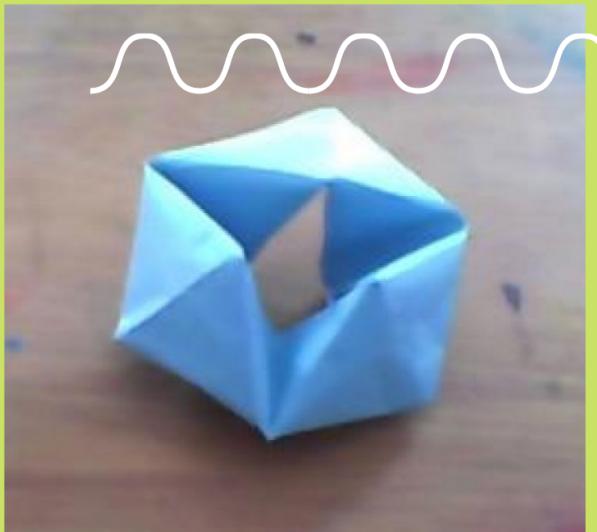
You're finished! Twist your flower petals in or out and watch the infinite loop!



ORIGAMI

# FLEXAGON

Adapted from  
<https://www.teachorigami.com/18-6-origami-flexagon-instructions>



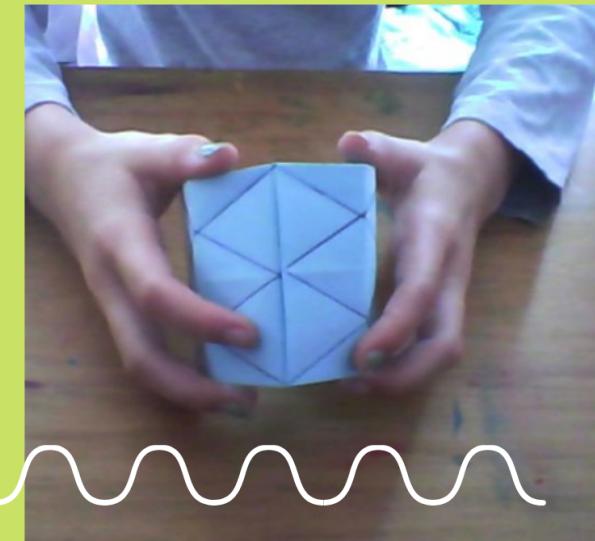
**MATERIALS: 1 SHEET OF 6"X12"  
ORIGAMI PAPER**

1. Fold the piece of paper in half lengthwise to crease, then fold both edges into the center, using the crease as a guide.

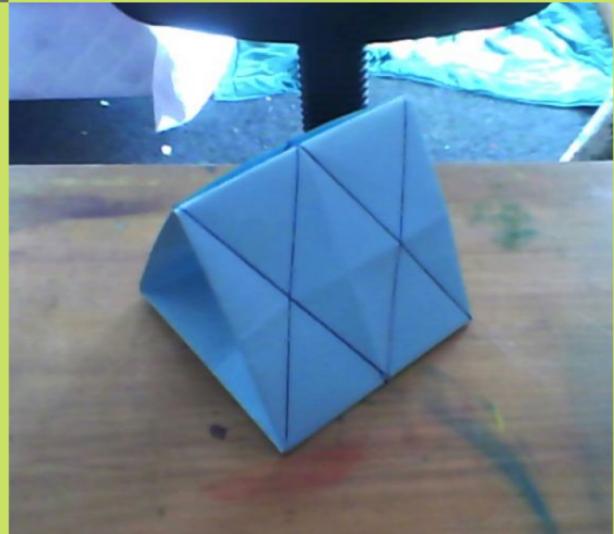
2. In the opposite direction, fold the paper 3 times to crease. This will create a 2x8 grid, as shown to the right.



3. Flip the paper over, and, using the grid as a guide, create diagonal creases by folding along lines that are two squares high and one square across, as shown by the lines in the picture to the right.

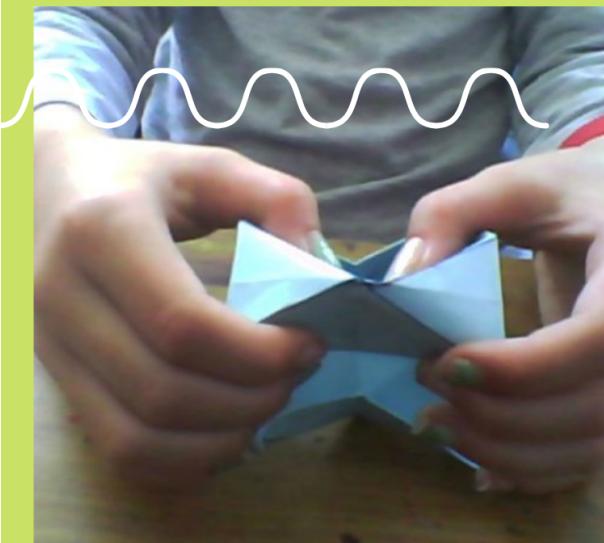
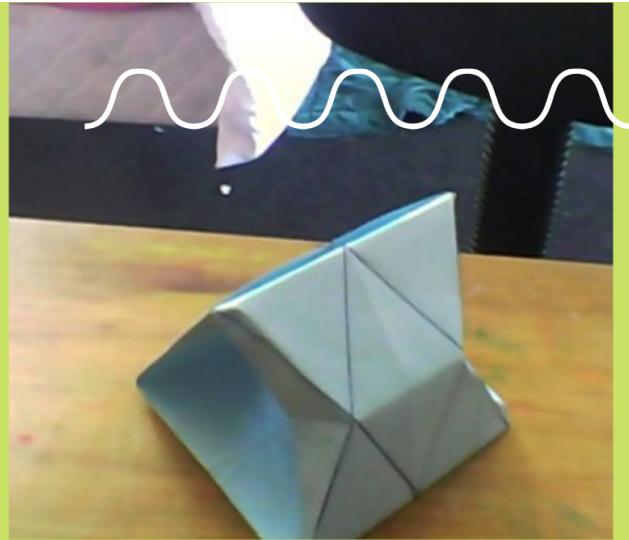


4. Take the two short ends of the paper and insert one end into the other 2 squares deep, forming a loop.



5. Form your loop into a triangle, making sure the creases on each side match those in the picture to the right.

6. Press the center of each side of the triangle in to form a diamond, as shown in the picture to the right.



7. Press in the center of each diamond and crease.



You're finished! Push the sides of the flexagon in to make it rotate infinitely!

## Evaluation Form

1. Please list the number of participants and their age range.

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2. Was the quantity of all materials in the kit sufficient? Were there any materials **not** included in this kit that you would have found helpful?

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3. In your opinion, was this program successful? Was it a good fit for your participants? Did you run into any issues or challenges presenting the program?

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4. Please rank your overall satisfaction with this kit.

1

2

3

4

5

very dissatisfied

dissatisfied

neutral

satisfied

very satisfied

5. Any additional comments or suggestions for improvement?

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