



Caterpillar Metamorphosis

Elementary STEM Backpack Tour

This interactive tour of the Atlanta Botanical Garden, Gainesville will give your students a chance to find and identify all stages of a butterfly's life cycle. They will be searching for eggs on milkweed, caterpillars on plant leaves, and maybe even butterflies drinking nectar from flowers.

Georgia Standards of Excellence:

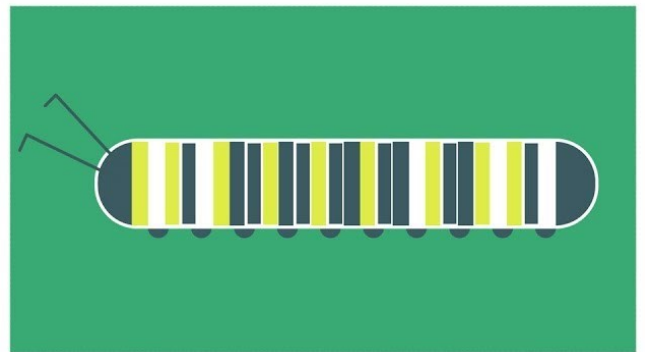
First S1L1

Second S2L1

Third S3L1 and S3L2

Fourth S4L1

Fifth S5L1 and S5L2





Caterpillar Metamorphosis

Elementary STEM Activity

Teacher Instructions

Have students complete the following:

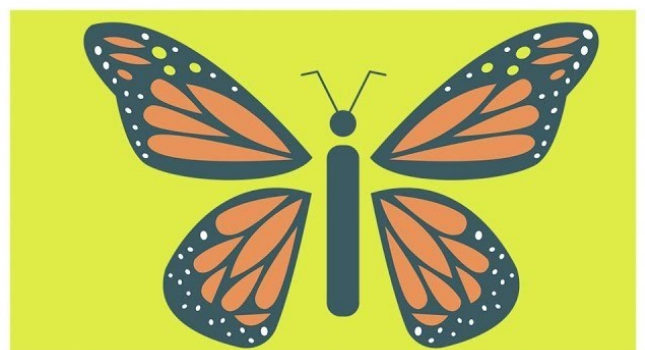
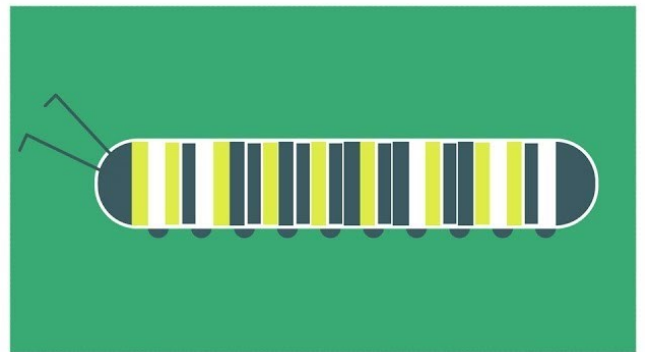
Common Butterflies Species in Georgia

Scavenger Hunt

Metamorphosis Inquiry

Metamorphosis Defined

When you and your group have completed the activities, play the **Go Bug! card game** as a recap. Instructions and cards will be included in the teachers packet. Each back pack will have the activities, a clip board, a pencil, and something to color with. When you have completed your visit, let the front desk know and they will inform Rebecca Abdou, education coordinator, and she will help you view the butterfly metamorphosis habitat.






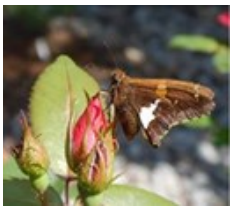




Caterpillar Metamorphosis



Common Butterfly Species in Georgia

Butterfly	Name	Characteristics	Host plant
	Pipevine Swallowtail	Black with shiny metallic blue/green on back wing. Row of 7 orange spots on underwing. Poisonous when ingested. Wing span is about 3 1/4 inches.	Brazilian verbena Butterfly bush Mexican sunflower Milkweed Phlox
	Monarch	Upper side of wings are orange with black borders and black veins and white spots on borders. Males have scent glands on lower wings that appear as black dots. Wing span 3 3/8 - 4 7/8 inches	Any milkweed plant variety
	Eastern Tiger Swallowtail	Males are yellow with dark strips while females can be the same or others are black with pale dark stripes. Hind wing of females have row of blue chevrons with iridescent blue. Wing span 2 1/4 - 4 1/2 inches	Wild cherries Sweetbay Basswood Birch Ash Willow
	Gray Hairstreak	Small butterfly with a tail like structure on hind wing. Upper side is blue/gray with a red spot near the tail while under side is more gray. Wing span 7/8 - 1 3/8 inches	Southern hog peanut Pea and mallow families Adults feed on as-sorted of flower nectar; catnip, butterfly weed, salvia, mint, sunflower, and more.
	Painted Lady	Open wings display black at the wing tips with white dots and bars, orange around the body, and one white spot in outer square. Wing span 1 3/4 - 2 5/8 inches	Pussy toes Everlasting Pearly Everlasting Adults feed on nectar from butterfly bush, milkweed, marigold, and more.
	Silver Spotted Skipper	Brown wings with a short hindwing. When the wings are closed, distinctive white bands can be seen. Wing span 1 3/4 - 2 5/8 inches	False indigo Black locust tree Adults drink a large variety of nectar.





Caterpillar Metamorphosis

Scavenger Hunt



Explore the garden and find the host plants of these common Georgian butterflies call home. Write down what you see. What color is the plant/flowers, texture, smell, and anything else you notice

Butterfly	Name	Host plant	Plant Observations
	Pipevine Swallowtail	Brazilian verbena Butterfly bush Mexican sunflower Milkweed Phlox	
	Monarch	Any milkweed plant variety	
	Eastern Tiger Swallowtail	Wild cherries Sweetbay Basswood Birch Ash Willow	
	Gray Hairstreak	Southern hog peanut Pea and mallow families Adults feed on assorted of flower nectar; catnip, butterfly weed, salvia, mint, sunflower, and more.	
	Painted Lady	Pussy toes Everlasting Pearly Everlasting Adults feed on nectar from butterfly bush, milkweed, marigold, and more.	
	Silver Spotted Skipper	False indigo Black locust tree Adults drink a large variety of nectar.	



Caterpillar Metamorphosis

Metamorphosis Inquiry



History of the word “metamorphosis”

Science terms can seem complicated and difficult to understand. Science terminology usually comes from Greek or Latin origins. When we break down a word, we can better understand where it came from and why it is used. Look at the breakdown of the word metamorphosis below and discover why we use this word to describe what so many organisms do!

METAMORPHOSIS

Meta (Greek origin) — changed or altered

Morph (Greek origin) —shape or form

Osis (Latin origin) — condition or state of

With a partner, try to think of some advantages of completing metamorphosis. How does it help organisms survive and reproduce? Hint: Think of differences between the early and later stages of the metamorphosis cycles.



Caterpillar Metamorphosis

Metamorphosis Defined



Using your background knowledge, create your own definition and drawing of the two main types of metamorphosis.

Incomplete Metamorphosis

My Definition

My Drawing

Complete Metamorphosis

My Definition

My Drawing

Metamorphosis Card Game Instructions

Rules of *Go Bug!*



Goal: To collect as many complete sets of insect cards.

Setup: Split into groups of 3-6 students. Five cards are dealt to each player. All remaining cards are placed face down in a draw pile.

Gameplay: Very similar to "Go Fish!"

- Youngest player will go first.
- On your turn, ask a player for a specific type of insect out of the cards currently held in your hand. For example, if you'd like to add to your beetle cards, ask: "Katy, do you have any beetles?" You must already hold at least one card of the requested insect.
- If the player you ask has any cards of the requested insect, she must give all of her cards of that insect to you. In the example, Katy would have to give you all of her beetle cards.
- If you successfully receive one or more cards from the player you ask, you get another turn. You may ask any player for any insect you already hold, including the same type you just asked for. Your goal is to collect all of the stages for that insect.
- When you collect a complete set of three or four insect cards (depending on whether that insect undergoes complete or incomplete metamorphosis), immediately show the set to the other players and place the three or four cards face up in front of yourself. Place them in order from egg to adult.
- Continue asking for cards until the person you ask has no matching insects. Then they say, "Go Bug!" You then draw the top card from the draw pile.
- If you happen to draw a card of the insect you asked for, show it to the other players and you get another turn. However, if you draw a card that's not the type you asked for, just add it to your hand. It becomes the next player's turn.
- **NOTE:** The "next player" is always to the right of the student who just played.

Parasite Cards:

- If you draw a parasite card, you may use this card to infest another player's completed set of insect cards in order to add some cards to your collection. Note that parasite cards are specific to different insect stages; for example, some parasites can attack only larvae, and others can attack only nymphs. At the beginning of your turn, rather than asking for insect cards, you may choose to play your parasite on top of another player's displayed card. You can then collect the stage specified on the parasite card, plus whatever stage(s) follow it. For example, if you play a Larval Host Parasite, then you will collect another player's larva, pupa and adult of whatever host set you choose.
- **NOTE:** even though the host set of cards you collect will be incomplete, it will still be placed face up in front of you and these cards will be counted at the end of the game.

Winning:

- Go Bug! continues until all the cards have been played. If a player runs out of cards before the others, they must still collect from the draw pile and give up cards when asked. Once the draw pile is depleted, game play continues without collecting a card each turn.
- In order to win, you must have the most cards laid in front of you. Often this means having the most sets of insect cards, but because sets may be three or four cards, and because you may have collected cards from using a parasite, it is the total number of displayed cards that wins the game.



Caterpillar Metamorphosis

Butterfly Life Cycle Paper Toy Flexangle



What you need

- printable templates
- paper
- scissors
- a tool for scoring – nothing fancy a simple craft stick will do (or a pen, ruler, card....)
- Glue

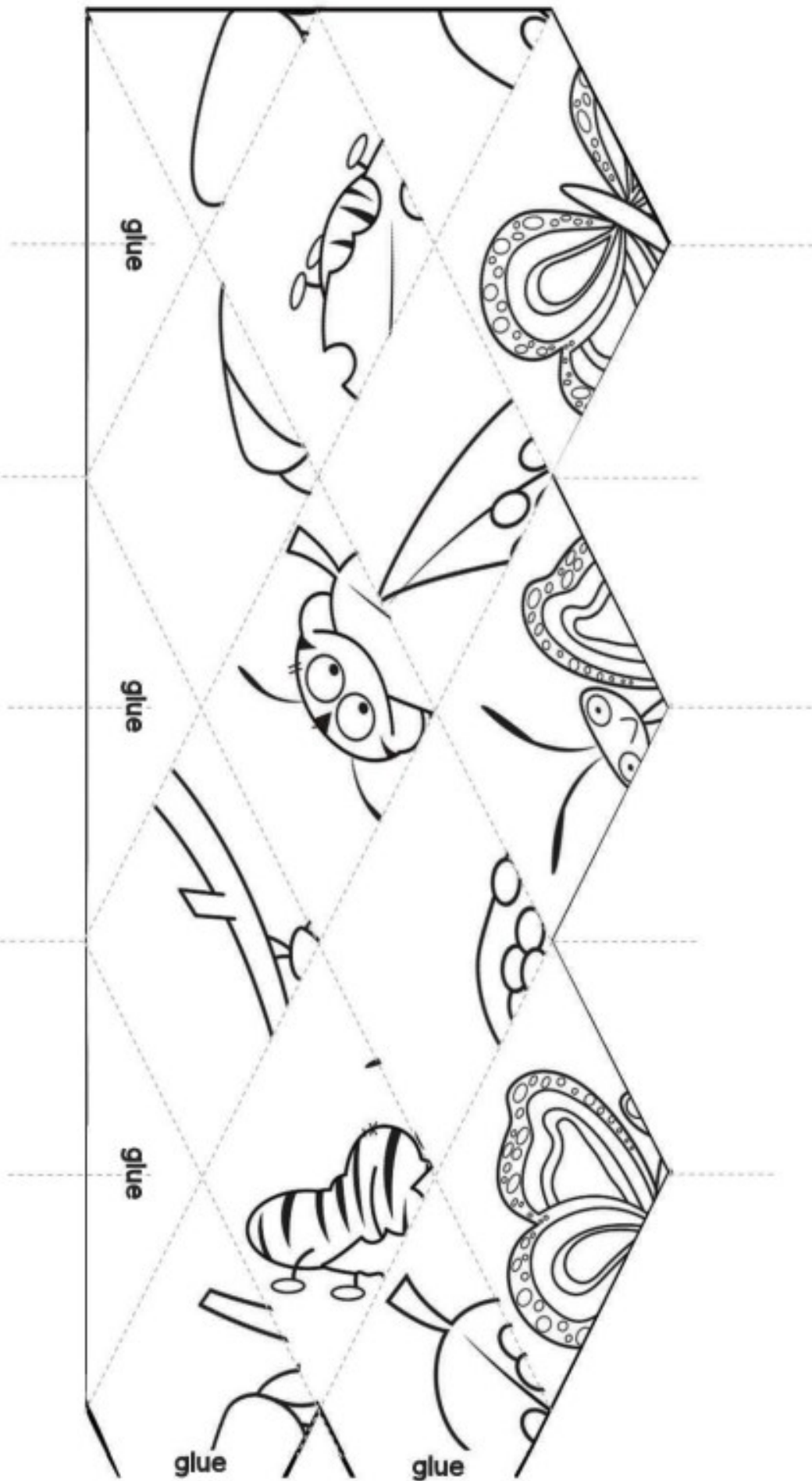
Instructions

1. Watch Video Tutorial: <https://www.youtube.com/watch?v=CpxkTPxdaHE>
2. Start by printing the template. If you printed the black and white one, this is the time to color it.
3. Cut out the template along the black outline. You will see the two flaps at one side don't have a black line – it's best to cut in the direction of the line to the edge of the paper.
4. Now comes quite a lot of folding and scoring. It is super important you score the folds as this will make the craft easy (if you don't score them, they will be hard to nicely put in place). We just used a craft stick and it worked out nicely.
5. First fold along all the verticals (these are marked on the template, but are marked outside the actual paper toy).
6. Now fold along all the dashed diagonal lines.
7. Now comes the part that might seem a bit tricky but it really is not! "Roll" the template into a tube – just to get the feel of it.
8. You'll see a few white triangle that have the word glue on it. Apply glue there (start by just applying the glue to one).
9. Now roll it into a tube again, pressing the triangle with a pattern that is on the opposite side of the tube on top of the white triangle with glue. I know, I know it sounds confusing but when you actually make it it makes perfect sense (you can always watch the video to see how we did it).
10. Allow the glue to set.
11. Continue with the next pair of triangles. And the last one.
12. you'll see two flaps one one side and a thin opening on the other side of the tube. Apply glue on the flaps (there's that word glue again) and push the flaps into the opening.
13. Press gently for the glue to set. Almost Ready To Roll
14. Now leave it alone for just a short while for the glue to do it's glue magic and then you are ready to roll!
15. Your Butterfly Life Cycle Paper Toy flexangle will be able to roll and roll and roll. The first few twists might be a bit slow, but once all falls into place things will get smoother.



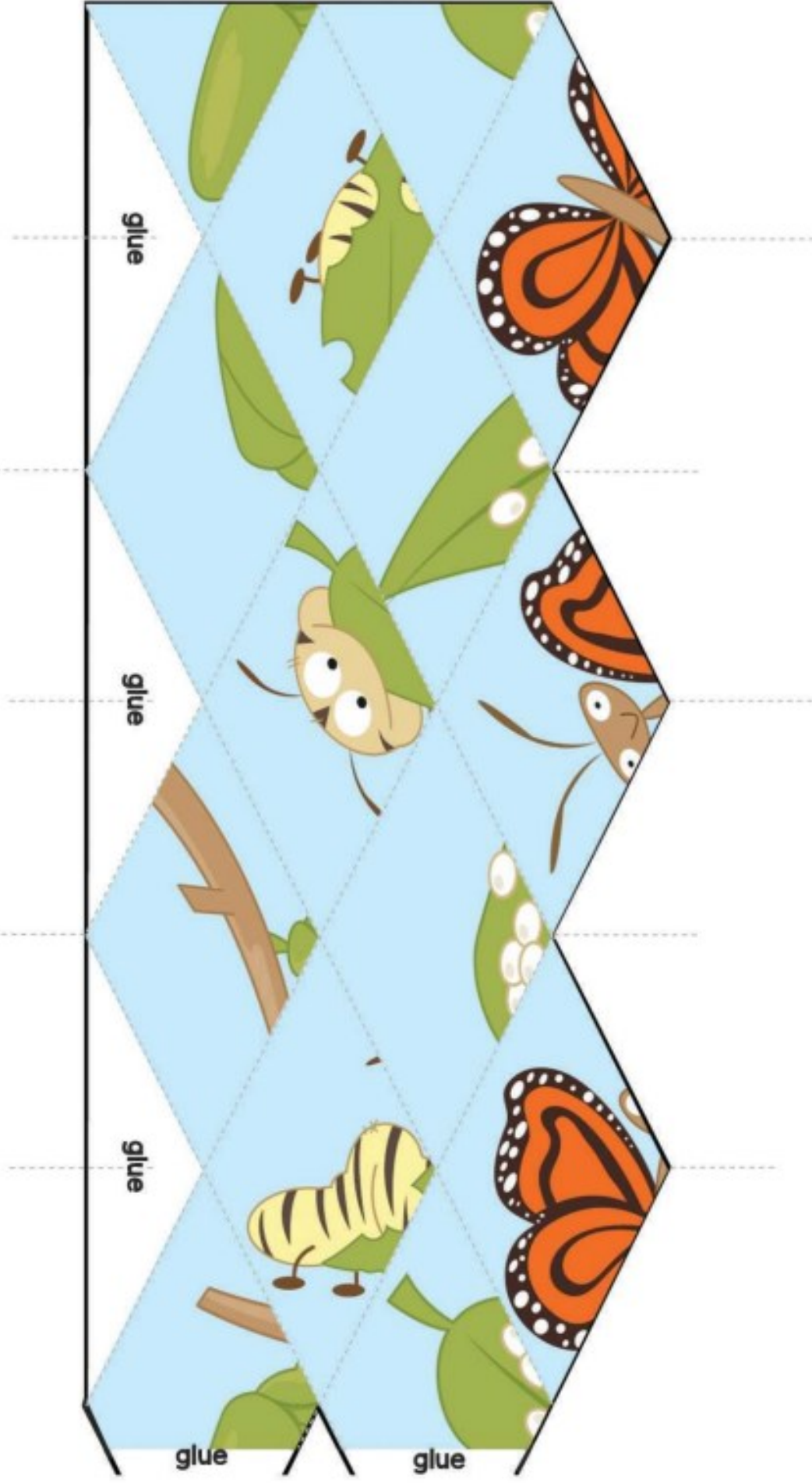
Butterfly Life Cycle Paper Craft Template

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Caterpillar Metamorphosis

Butterfly Life Cycle

Agamograph



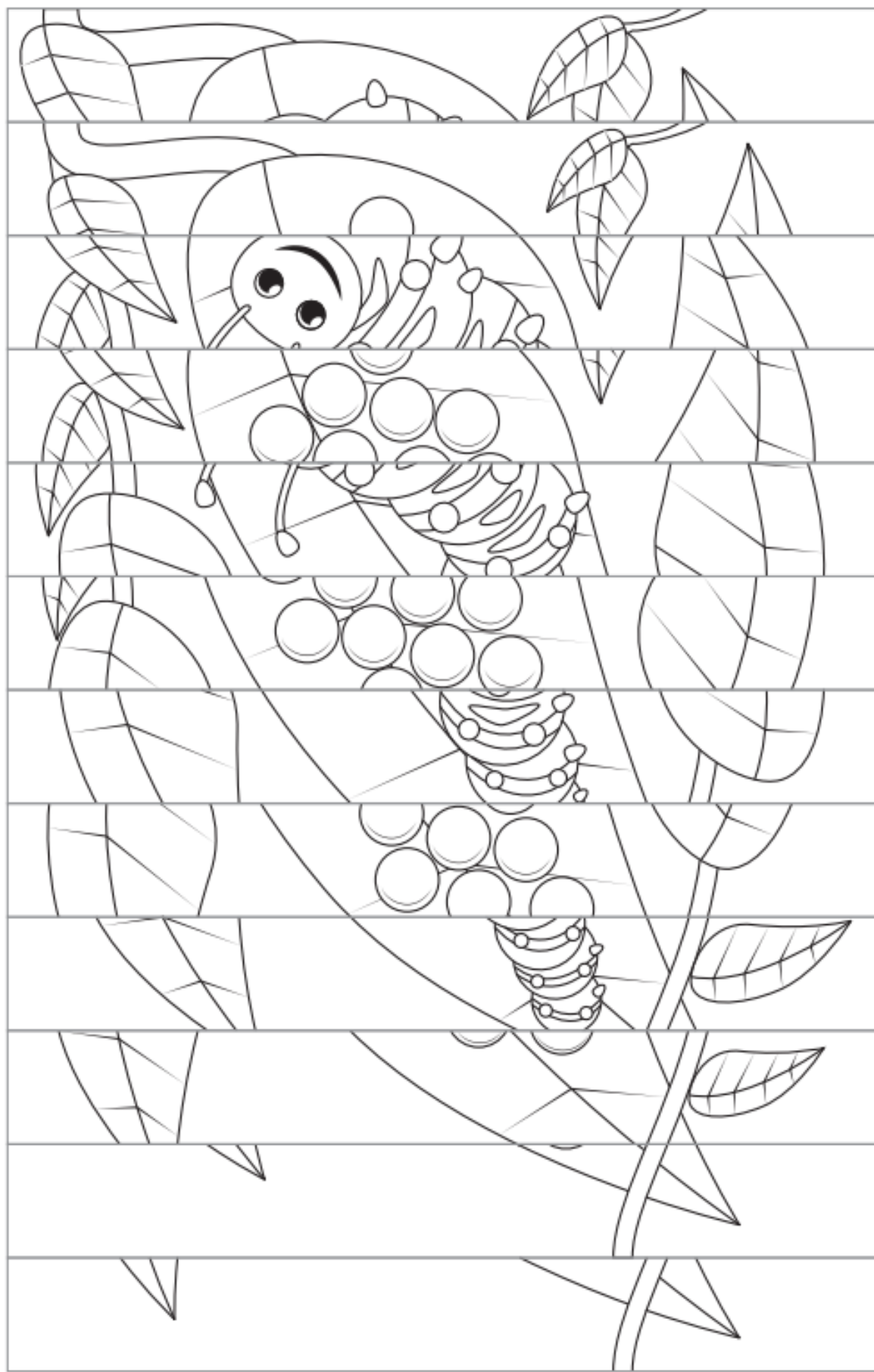
What you need

- printable butterfly life cycle agamograph template
- Something to color with
- scissors
- Printer
- paper

1 Instructions

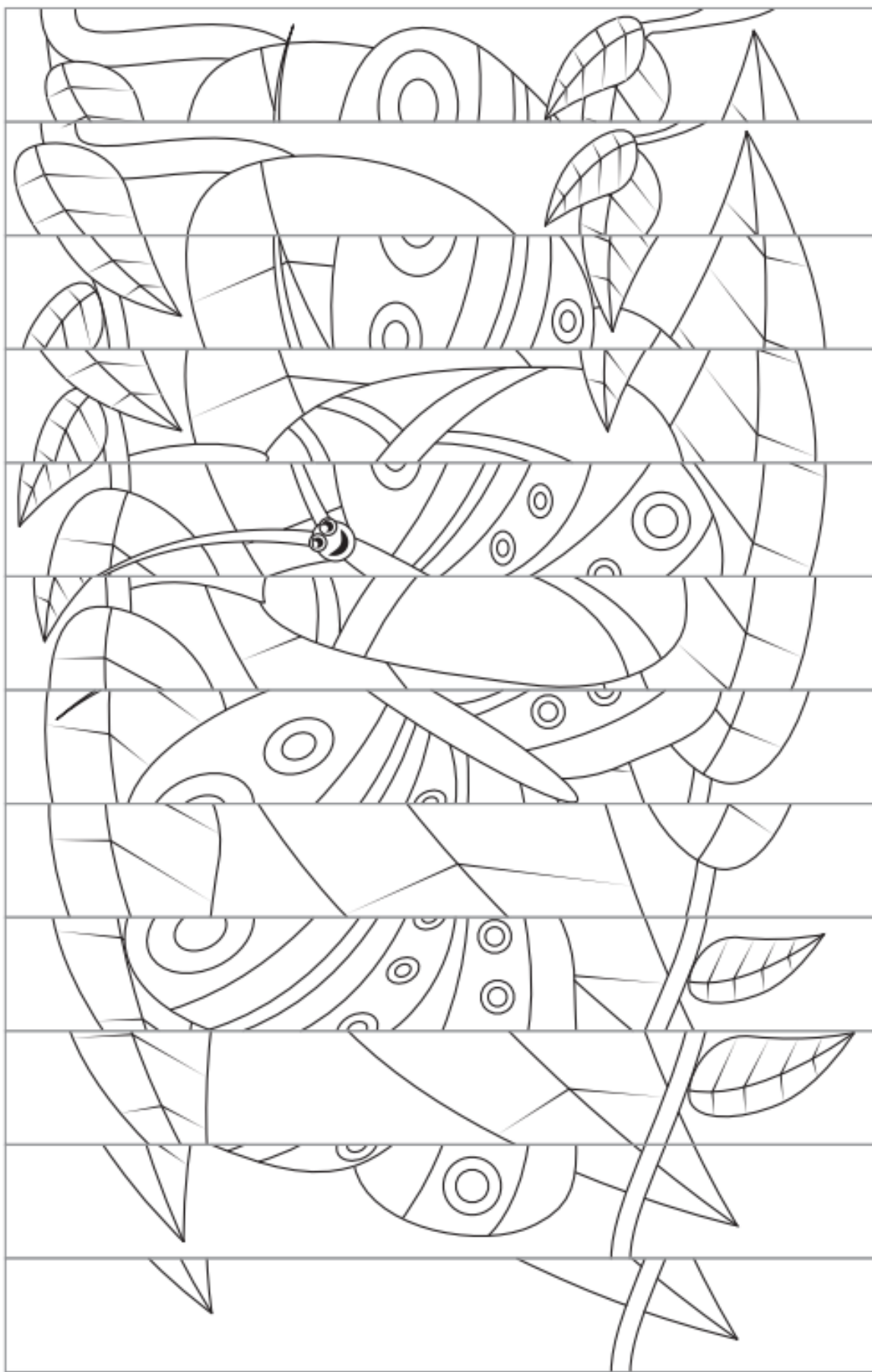
1. Watch Video Tutorial: <https://www.youtube.com/watch?v=zVEj-yMxipE>
2. Start by printing out the butterfly life cycle agamograph template.
3. Color the agamograph template.
4. After the image is colored, cut it out nicely.
5. Score along the lines. You could also use a ruler or any sharper tool to create this effect.
6. Now we need some good folds. Use the accordion fold technique and press down each piece of the agamograph “puzzle” firmly.
7. Repeat all of the steps above with the second part of the butterfly life cycle agamograph template. After both of the templates are colored and folded, it's time to glue the artwork together.
8. Put the second page of the folded agamograph onto the other one and press them firmly together.
9. Your cool butterfly life cycle agamograph is done and ready for display.





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