



Alabama Geology, Flora & Fauna in 3-D “Cross” Books

Target Grade: 7th (adaptable to other grades)

Length: Two or three 45-minute sessions

Enduring Understanding: Artists experiment with forms, structures, materials, concepts, media, and art-making approaches.

Essential Question: How do artists learn from trial and error to create works of art that effectively communicate?

Objective: Students will create a small, three-dimensional booklet about Alabama geological features, rivers, flora and/or fauna, with pop-up images and text.

Arts discipline: Visual Arts

Alabama Anchor Standard 2: Organize & develop artistic ideas & work.

Creating 5 – Apply graphic design strategies (paper engineering techniques) to produce a work of art that clearly communicates information or ideas.

Creating 6 – Reflect on & explain personal artwork in a story about Alabama

Non-arts discipline: English Language Arts, Science, Math

English Language Arts:

ELA7.27.3 – Gather relevant information from multiple print and digital sources to use as text.

ELA7.34.2 – Include multimedia components and visual displays in presentations to emphasize salient points.

Science:

SCI.7.8.4 – Construct an explanation to predict patterns of interactions in different ecosystems in terms of the relationships between and among organisms.

SCI.7.10. – Use evidence to explain how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of both animals and plants.

SCI.7.10.3 & 4 – Use evidence to explain how seeds are dispersed and how plants reproduce.



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Mathematics–Geometry:

M.7.12 – Create geometric shapes with given conditions.

M.7.12.2. – Draw segments of a given length using a ruler.

M.7.13 – Describe two dimensional figures that result from slicing three-dimensional figures.

M.7.13.3. – Recognize the relationship between two and three-dimensional figures.

M.7.13.3. – Recognize symmetry.

M.7.13.5 & 6. – List attributes of two & three-dimensional figures.

M.7.15 – Solve real-world and mathematical problems involving angle measure.

M.7.15.5. Discuss parallel, perpendicular, and intersecting lines.

Materials & Supplies:

- Previously researched information about Alabama river ecologies, flora & fauna
- Images of plants, animals, insects, and organisms unique to Alabama rivers
- Maps of Alabama rivers & ecosystems
- 8½" x 11" cardstock, cut in half length-wise – 2 halves/student
- 4"x 5" colored cardstock or construction paper – 2/student
- Strips of colored cardstock
- Pencils & erasers
- Scissors
- Rulers
- Elmer's X-Treme glue stick & regular glue sticks
- Colored and patterned paper
- Sharpie markers, colored pencils, crayons or oil pastels
- Water colors, brushes, water, and paper towels

Prerequisite knowledge – arts:

- Understand that a collage is made from cutting and assembling different images to create a new whole.
- Understand that an illustration may be expressed in symbols and words, as well as by drawing and coloring.
- Understand basic paper engineering techniques & terms(see vocabulary page)
- Practice making different folded angles with small pieces of copy paper: parallel-folds and V-folds.

Prerequisite knowledge – non-arts:

- Show a map of Alabama rivers and discuss the importance of river watersheds in Alabama geology. Choose a river basin of interest to depict in a story.
- List the types of plants and animals found in the river watershed, and find images of these, as well as important geological formations in the area, attributes, and symbolic associations related to the river environment chosen for the story creation and illustration.
- Write a short story about the river ecology chosen, including a title, beginning, middle, and end for the story.

Arts vocabulary addressed:

line,color,shape,form,space;proportion,pattern,variety;symbol,collage;vertical&horizontal;base, gully or gutter, gluing tab, plane, parallel fold, V-fold



Non-arts vocabulary addressed: Alabama geological formations, river ecology and watersheds, flora & fauna, river pollution

Introduction:

Discuss the importance of Alabama's unique rivers to the health of the state's environment. Help the students research geological features, flora & fauna unique to a river watershed near their location. Show an example of a "cross" book and tell the students that they will be creating mini books and stories about their chosen river ecology.

Sequence of activities:

1. Choose a river environment to depict in the pop-up book.
2. List significant geological & geographical features, flora & fauna unique to the river ecology, and find images of these to use for the story illustration.
3. Write a short story describing the river environment on one-half sheet of 8½x 11" cardstock (5½" x 8"). Make sure the story includes a title, beginning, middle, and end.
4. To create the base of a simple "cross" book, cut 1 piece of 8½" x 11" white cardstock in half length-wise (hotdog style).
5. Place one half so that it is tall (vertical) in front of you. Place the second half on top horizontally to form a large plus or cross sign. All four sides of the "cross" should be approximately the same length (33/8"). Fold each of the 4 sides as illustrated in ***Instructions for Making a Simple "Cross" Book***.
6. Take the 2 pieces of paper apart. Put glue on the center of the tall, vertical paper. Center the Horizontal piece of paper on top of the vertical one, so that the overall shape resembles across, with each protruding side approximately equal. Press down the center shape to help the glue adhere.
7. Fold the sides up to form a book. The title of your Alabama story can be placed at the top of the "cross", with the illustrations, images, and symbols arranged in the center, bottom, left and right sides of the book.
8. Draw and color images, or collage patterned and colored paper on the left, center, and right sides of the book to illustrate a river environment.
9. Use the 4"x5" colored cardstock to make 2 different types of pop-up folds: a parallel fold and a V fold (see ***Two Basic Pop-ups***). Cut down the extra paper around the 2 pop-up folds. Glue the 2 pop-ups inside the book, so that one opens on the left side of the center and one on the right side. Make sure that every pop-up spans a gully of the book and that each pop-up is balanced on each side of the gully.
10. Draw or cut-out images of flora & fauna found in the river environment and glue on the pop-up olds.
11. Experiment with adding other pop-up folds in your book, using smaller strips of colored cardstock (1-1½" wide x 2½ -3½" long). Glue the tabs of each fold.
12. Add some written text and other drawings, patterned or colored paper, & cut-out images from magazines and other printed sources on the inside and outside of the book to create interesting variety.
13. Punch a hole in the center of the top flap of the book, and add a loop of yarn to display the book.





Paper Engineering Techniques & Terms

Vocabulary:

- Acute angle: angle less than 90 degrees
- Base: double page on which pop-ups are built
- Gluing tab: the small flap on which glue is spread
- Gully or Gutter: a fold line that closes (or flattens out) as the base is closed
- Mountain-fold: a crease that comes forward towards the viewer
- Obtuse angle: angle greater than 90 degrees
- Parallel-fold: all the creases are parallel to the spine
- Plane: flat surface of a piece or card
- Right angle: 90 degree angle
- Spine-fold: central crease down the middle of the base card
- Spread: double page with a pop-up built onto it
- Valley-fold: a crease that goes back, away from the viewer
- V-fold: all the creases converge at the same point on the spine

Simple Rules:

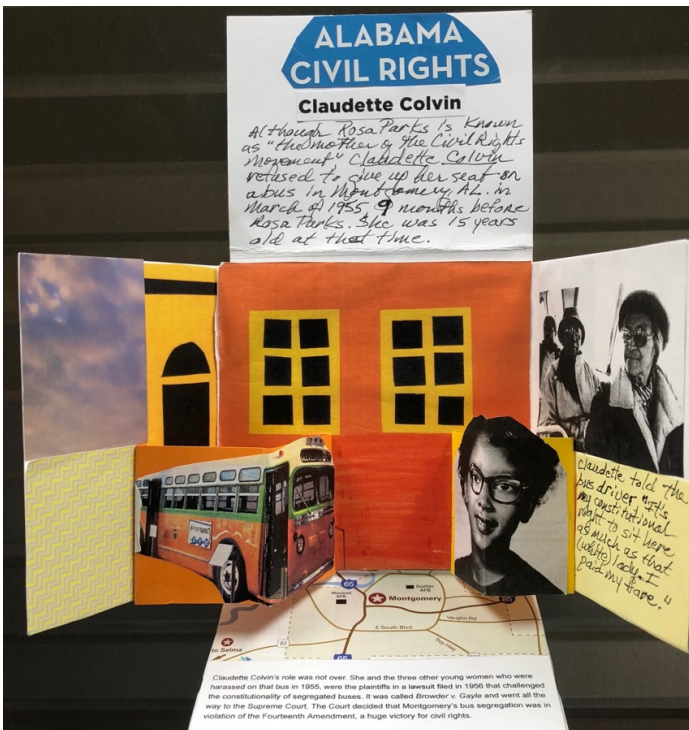
- Every pop-up must span a gully.
- Pop-ups must be balanced on each side of the gully.

Techniques:

- Folding- always crease every fold very thoroughly: fold, crimp, fold the crease back on itself, then crimp again.
- Gluing tabs – should be at least 3/8” (1 cm) wide, to avoid pulling off, and can point forwards or backwards, be hidden or part of the design.
- Gluing – smear Elmer’s X-Treme glue on the tabs, NOT on the surface the tabs will be glued to, right up to the edge of the crease. After sticking each piece in place, shut the base card and then press firmly, to ensure that the tab holds.
- Primary foundation shapes - the basic forms are the V-fold and the Parallel-fold, which each have just 2 planes and 3 creases: two where the tabs are attached to the page, and one above the spine.
- V-folds – all the creases converge at the same point on the gully.
- Parallel-folds – all the creases are parallel to the gully.

Instructions for Making a Simple “Cross” Book

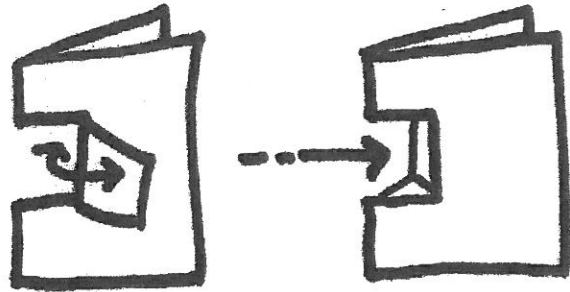
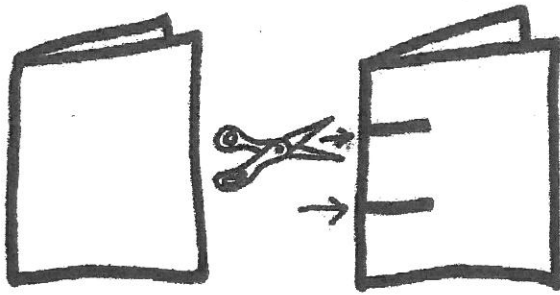
- Cut 1 sheet of 8 ½” x 11” cardstock in half, lengthwise (“hot dog” style)
- Place one half piece so that it is tall (vertical) in front of you
- Place the second piece on top horizontally to form a large plus or “cross”
- All 4 sides should be approximately the same width (3 3/8”)
- Take the bottom of the vertical paper & fold it up over the horizontal paper.
- Fold the right side of the vertical paper over the horizontal paper.
- Repeat with the left side of the horizontal paper, folding it over the other 2 pieces.
- Fold down the top of the vertical paper over the other 3 pieces.
- Take the folded book apart. Put glue on the center of the tall vertical half.
- Center the horizontal half on top of the vertical one, so that the overall shape resembles a “plus” or “cross” sign, with each protruding side approximately equal.
- Press down the center of the “cross” to help the glue adhere.
- Fold up the sides to form a book.
- The title of the book can be placed at the top of the “cross”, with illustrations, images, symbols, and text arranged on the other sides of the book.
- Punch a hole in the center of the top flap of the book and add a loop of yarn, if desired.



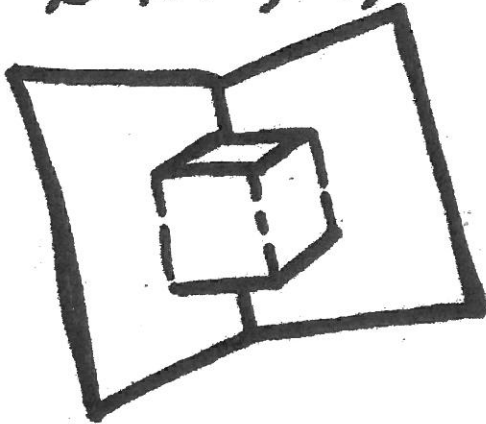
Two Basic Pop-Ups

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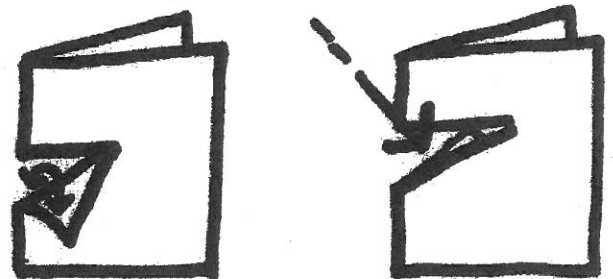
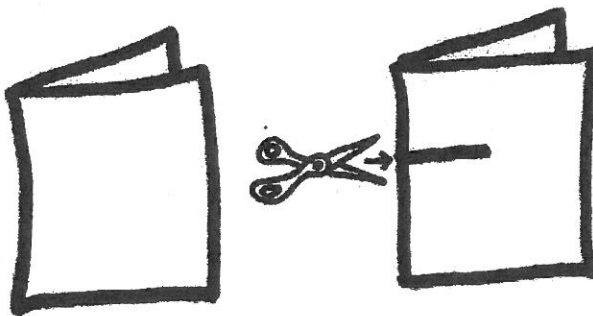
Most pop-ups are made from variations and additions onto the Box and V-Fold.



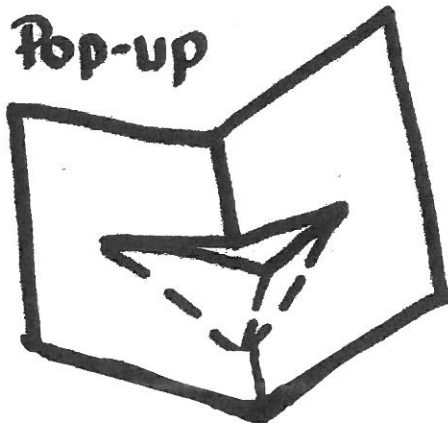
Box Pop-up



1. Fold a piece of paper in half, making sure that the fold is crisp and sharp.
2. Cut two lines on the fold, like a wide, sideways "eleven".
3. Fold the flap between the cut lines back and forth to make a sharp fold at the base of the "eleven".
4. Push the flap to the inside, between the pages of the folded paper.
5. Open the paper and discover the box pop-up!



V-Fold Pop-up



1. Fold a piece of paper in half, making sure that the fold is crisp and sharp.
2. Cut one line on the fold.
3. Fold a triangle down from the end of the cut line to somewhere on the fold. Make this into a sharp fold by folding the triangle back and forth.
4. Push the triangle to the inside, between the pages of the folded paper.