Part 1: Overview of Paper Folding

The Paper Folding test is modeled after a similar task that Binet used with young children. The test requires that the student imagine what happens to a sheet of paper after it is folded and a piece is cut out of it. On the simplest questions, the paper is already folded in half, nothing is cut out of it, and the student must imagine how it will look when unfolded. On other questions, the first pictures show how the paper is folded. The student must understand how these pictures describe the folding of an actual piece of paper. Then a circle (or other shape) is cut through all the layers of paper at that point. The student must then reverse the process and imagine how the paper will appear as it is unfolded while keeping track of the missing holes (or cut-outs). Logical thinking can assist in solving most questions. For example, if the paper is folded in half and a hole is cut through both layers, then the unfolded paper must have two holes.

These practice activities are designed to teach students (a) how to imagine the correspondence between the pictures in the test booklet and the actual folding, cutting, and unfolding of a piece of paper and (b) how to use logical thinking to help them solve the problems. This practice can also help them move from concrete, perceptual strategies to more logical strategies for answering the questions.

Accurate testing requires that students understand the diagrams in the questions. Therefore, the practice session begins with demonstrations that use real paper, and these instructions include real paper cut-outs at the end that can be used to help students understand the diagrams. There are six paper cut-outs, one for each practice question. To use these, cut them out and fold them ahead of time, then use them to demonstrate the unfolding processes as you go over each question. Whenever students are confused by a question, it is helpful to ask them to solve the question using an actual piece of paper themselves.

The more difficult questions in the test look like this:
When practicing the Paper Folding questions, encourage students to use these strategies.

- Imagine how the cut-out will be reflected on the other side of the paper each time it is unfolded.

- Use logical reasoning to say how many holes or cut-outs should be on the unfolded paper. For example, if the paper is folded once and a hole is cut in it, then there will be a hole in each layer of the paper. So there will be two holes in the unfolded paper.

- Examine all of the answer choices before picking one.

- When confused, model the problem using a square sheet of paper.

Students at this level tend to make the following common mistakes.

- Students might select the first answer that looks right without considering other answers.

- Students may ignore the angle of the fold.

- Students might forget to reason about the approximate location of the holes when unfolding the paper.

- Students may ignore the number of holes that must appear on the answer. For example, in the sample question above, the student might forget that there were two layers of paper that were cut and select the second answer choice.
Part 2: Paper Folding Practice Test Script

The following script covers many issues that will help students do their best on the test. Read aloud the text printed in blue italics: these are directions to the students. Directions for you are in parentheses and should NOT be read aloud. Feel free to modify the script to ensure that students understand what they are supposed to do and how to do it.

It may be helpful to make copies of the practice questions in order to display them one at a time on an overhead projector. If this is not possible, hold up a copy of the student practice booklet and point to different parts of each practice question as you discuss them with the class. Also, be sure to have a two-inch-by-four-inch place marker for each student (either a note card or a piece of cardboard). It will also be helpful if each student has a few SQUARE sheets of paper and scissors.

(Cut out the square labeled “P1” at the end of this document. Crease the paper down the middle so it folds easily. Hold up the piece of paper as you SAY:) Watch me fold this square piece of paper in half.

(SLOWLY fold the paper in half.)

How will the paper look if I unfold it?

(Encourage responses. Then unfold the paper.)

Now what is it? (Pause.) It’s a square again.

(Make sure each student has a practice booklet and place marker. Then SAY:) Open your practice booklet to page 3. You should be on the page with the elephants across the top.

(Check that all students have the correct page.)

Each of these questions shows a shape or piece of paper being folded. Then, a piece is cut out of the folded paper. You must imagine how the paper will look when it is unfolded.

Let’s do the first practice question. (NOTE: The picture under each question number and to the left of the top row is item indicator art, and it disappears at Level 8. Read the following sentence only at Level 7.) Put your marker under the airplane.
Look at the top row. The first three pictures show a square piece of paper that is folded in half.

Then, we cut a piece out of the folded paper.

The last picture shows what the folded paper looks like after it has been cut.

What will the paper look like when we unfold it? Try to imagine unfolding it.

It made a triangle. When we cut the paper, we cut through both layers of the paper.

Fill in the circle under the first answer picture. It shows how the paper looks when it is unfolded.

(Points to the first picture in the top row as you say:) Look at the top row. The first three pictures show a square piece of paper that is folded in half. (Points to the scissors cutting the paper in the fourth picture and say:) Then, we cut a piece out of the folded paper. (Points to the fifth picture as you say:) The last picture shows what the folded paper looks like after it has been cut. What will the paper look like when we unfold it? Try to imagine unfolding it. (Encourage responses and then demonstrate by holding up the square piece of paper labeled “P1” from the end of this document. Fold it in half and cut it into a triangle as shown above. Unfold the paper and say:) It made a triangle. When we cut the paper, we cut through both layers of the paper. (If students are confused, repeat the demonstration or ask them to repeat the process with their own pieces of paper.) Fill in the circle under the first answer picture. It shows how the paper looks when it is unfolded. (Check to make sure that all students have filled in the first circle. If students suggest other answers, use the feedback in the figure above to point out what they are missing.)
Let’s do the second practice question. (Read the following sentence only at Level 7.) Put your marker under the van.

Look at the pictures in the top row. What will the paper look like when we unfold it?

When we cut the paper, we cut through both sides of the paper where it was folded. The cut will make a circle, so the paper will have a round hole in the center.

Which picture shows how the paper will look when it is unfolded?

Fill in the circle under the last answer picture to show that the paper triangle with a round hole in the center is the correct answer.

(Encourage responses. Demonstrate with the real paper example labeled “P2” from the end of this document.)
Look at the third practice question. Try to solve this practice question on your own. (Read the following sentence only at Level 7.) Put your marker under the chair.

After one fold, the hole is cut through two layers of paper, so the answer should have how many holes?

It must have two holes: One hole where we made the cut, and one on the other side of the fold.
If the answer must have two holes, then can the first answer picture be the correct answer?

(Encourage responses.)

No, the first answer picture only has one hole. Why can’t the third answer picture be correct?

(Encourage responses.)

The holes in the third answer picture are in the wrong places. So the second picture is the correct answer. Fill in the circle under the second picture to show that it is the correct answer.

(Check to make sure that all students have filled in the second circle. If students suggest other answers, use the comments in the figure above to point out what they are missing.)

Look at the fourth practice question. Try to solve this practice question on your own. (Read the following sentence only at Level 7.) Put your marker under the plant.

(Make sure students have enough time to solve the problem. Then SAY:)

What will the paper look like when we unfold it?

(Encourage responses.)

How did you solve this question?

(Encourage responses. This question is difficult. If students are confused by the explanation,
illustrate using the real paper example. If there are students who don’t understand how to solve the question, go through the process as follows.)

After one fold, the heart is cut through two layers of paper, so the answer should have two holes. One hole is where we made the cut and the other is across the fold. Since the cut-out is a heart, it will flip over when we unfold the paper.

(Demonstrate how this happens. Encourage students to repeat the process themselves.)

So the first picture is the correct answer. Fill in the circle under the first picture to show that it is the correct answer.

(Check to make sure that all students have filled in the first circle. If students suggest other answers, use the comments in the figure above to point out what they are missing.)

Turn to the next page. You should be on the page with the horses across the top.

P5

Look at the fifth practice question. Try to solve this practice question on your own. (Read the following sentence only at Level 7.) Put your marker under the deer.

What will the paper look like when we unfold it?
(Encourage responses.)

**How did you answer this question?**

(Encourage responses. Then demonstrate with the real paper example. If there are students who don’t understand how to solve the question, go through the process as follows.)

*After two folds, the hole is cut through four layers of paper, so the answer should have four holes. The holes will be lined up because the folds are all parallel. Since the cut-out is a triangle, it will flip (reflect) after each fold.*

*So the last picture shows the correct answer. Fill in the circle under the last picture to show that it is the correct answer.*

(Check to make sure that all students have filled in the third circle. If students suggest other answers, use the feedback in the figure above to point out what they are missing.)

**P6**

*Look at the last practice question. Try to solve this practice question on your own.* (Read the following sentence **only at Level 7.**) *Put your marker under the table.*

(Make sure students have enough time to solve the problem. Then **SAY:**)

**What will the paper look like when we unfold it?**

(Encourage responses.)
How did you answer this question?

(Encourage responses. Then demonstrate with the real paper example. If there are students who don’t understand how to solve the question, go through the process as follows.)

*After one fold, two different holes are cut through two layers of paper, so the answer should have four holes: two big and two small.*

*The last answer picture has the wrong number of holes, so it is wrong. It has to be one of the first two answer pictures.*

*We can’t just copy the holes; the holes will flip over when we unfold the paper. So the first picture isn’t correct.*

*The second answer picture shows what the paper will look like. Fill in the circle under the second picture to show that it is the correct answer.*

(Check to make sure that all students have filled in the second circle. If students suggest other answers, use the feedback in the figure above to point out what they are missing.)