

# Frame By Frame

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**Objective:** To identify the sequence of events for a Space Shuttle launch.

**Grade Level:** K-4  
**Subject(s):** Physical Science,  
Mathematics, Art  
**Prep Time:** < 10 minutes  
**Duration:** One class period  
**Materials Category:** Classroom

National Education Standards	
Science	3b
Mathematics	9a, 9b, 12a, 12b
Technology (ISTE)	
Technology (ITEA)	
Geography	

**Materials:**

- Student Sheets
- Color pencils or crayons
- Scissors
- Construction paper
- Glue

**Related Links:**

None

**Supporting NASAexplores Article(s):**

Drop Everything!

[http://www.nasaexplores.com/lessons/02-006/k-4\\_article.html](http://www.nasaexplores.com/lessons/02-006/k-4_article.html)



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## Teacher Sheets

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### Background

NASA has cameras filming drop tower experiments because some of the reactions and processes involving computer chips come in 500 milliseconds or a ½ second. To record this and other information, the cameras film the drop tower events at 1,000 frames per second. For something as fast as a microelectronic reaction, the crucial information is captured in as few as 14 frames. NASA can then play back the film in slow motion to evaluate every action that takes place.

In this activity, students will be sequencing an object in motion by creating frame-by-frame pictures of the motion.

### Guidelines

1. Read orally with the class the K-4 NASAexplores article, “Drop Everything!”.
2. Discuss why it would be important to film the experiments in the drop tower. Explain that being able to observe each second of the experiment in a frozen picture allows NASA scientists to analyze what is happening.
3. Hand out the Student Sheets.
4. Review the following instructions with the class.
  - Color each picture on the handout.
  - Cut out the pictures.
  - Decide on the order they should appear, and write the number in the square on the bottom of each picture (e.g., 1, 2, 3, and so on).
  - Glue them in the correct sequence on your piece of construction paper.
  - Make sure to write your name on the bottom of your construction paper.

### Discussion / Wrap-up

- Have students share their pictures. Explain why they placed the pictures in the sequence.
- Discuss how the students interpreted the position of the Space Shuttle during the launch from the pictures. Explain that when a Space Shuttle is launched, it only takes about 8 minutes to reach orbit. It is important to NASA to be able to observe each second of the launch in a frozen picture. This allows NASA scientists time to analyze what is happening. It helps them in correcting any problems.
- Display the student’s work.

### Extensions

- View actual footage of a Space Shuttle launch using the web site below.  
<http://science.ksc.nasa.gov/shuttle/missions/sts-95/movies/movies.html>



# Frame-By-Frame

Student Sheet(s)

