

**Developing Variables**

Since the developer is the agent which reduces the silver and makes it visible, development is a *critical* step in the process of making negatives. There are three variables to be considered in connection with development. They are as follows:

**1. Time of development**

**2. Temperature of the developer**

**3. Agitation during development**

*An increase in any one of these variables has the effect of increasing the contrast and darkness (density) of the negative.* Photographers generally prefer to keep the developer temperature constant, usually near 68°F, and the agitation constant at about five seconds of agitation every 30 seconds. Then the time of development is varied to control the density and contrast of the negative. The type of developer to be used, and the manipulation of the variables to bring about desired qualities in negatives are matters of personal preference. It is best for beginners to use a simple, well - established method.

The processing steps with a few details concerning each are listed as follows. Note that specific times and exact details will not be specified since they vary with the material used and results desired.

**1. Presoaking**

**2. Development**

**3. Rinse**

**4. Fixing**

**5. Washing agent**

**6. Wash**

**7. Wetting agent**

**8. Drying**

1. **Presoaking**

a. Purpose: To presoak film for more even developeraction. Also removes any dust that may have got on the film when film was loaded on reels.

b. Chemical: Water at 68°F

2. **Development**

a. Purpose: To produce dark deposits of silver in areas exposed to light.

b. Chemicals: Reducing agent, usually a derivative of benzene, with additives to control activity of developer, fog production, and keeping qualities.

c. Procedure:

i) Measure developer temperature. 68°F - 70°F; Use water bath to adjust the temperature.

ii) Pour developing solution into developing tank containing film.

iii) Time of development. Time depends on the type of film and developer used and desired contrast. It is usually is in the range of 3 to 15 minutes.

Check the **“Developing Time depending on Temperature Change”** chart.

iv) Agitate, typically five seconds every half minute.

3. **Rinse**

a. Purpose: To stop development and reduce contamination of fixer.

b. Chemicals: Water or, in the case of active developers, weak acetic acid solution.

c. Procedure:

i) Pour water into tank, agitate, and pour out. Repeat two or three times.

ii) Try to keep the rinse water and subsequent solutions at roughly the same temperature as the developer. Otherwise reticulation or cracking and wrinkling of the emulsion may result.

4. **Fixing**

a. Purpose: To remove unexposed and undeveloped silver-halide grains and reduce fading and staining of the image.

b. Chemicals: Sodium thiosulfate (hypo) or, for rapid fixer, ammonium thiosulfate. Usually an acid and hardener are included in the fixer.

c. Procedure:

i) Pour in tank and agitate.

ii) Fix for about twice the time to clear a piece of film. Usually 5 to 10 minutes are required for ordinary fixer or about half this time for rapid fixer.

iii) To assure thorough fixing, test fixer or keep track of amount of film processed in a given batch of fixer.

iv) Developing tank may be opened following fixing.

5. **Washing agent** (optional but highly recommended)

a. Purpose: To reduce washing time, assure more complete removal of fixer, and make cold water more effective in washing.

b. Chemicals: Hypo eliminator or clearing agent consisting of ammonia, sodium sulfite, sodium metaborate, or a commercial preparation.

c. Procedure:

i) Rinse film with water and then add clearing agent and agitate.

ii) Continue for 1 or 2 minutes or as recommended by manufacturer.

6. **Wash**

a. Purpose: To remove fixer and other residual chemicals.

b. Chemicals: Water

c. Procedure:

i) Use running water or fill and empty tank frequently.

ii) Continue for about 30 minutes or recommended shorter time if eliminator or clearing agent is used.

7. **Wetting agent** (optional)

a. Purpose: To prevent formation of water drops on film and thus reduce spots.

b. Chemicals: Ethylene glycol or other wetting agent.

c. Procedure:

i) Immerse film in solution for about 30 seconds. Do not rinse in water afterward.

8. **Drying**

a. Hang in dust free place.

b. If no wetting agent is used, wipe with sponge or rubber blade.

**Assignment:** The students will be given a roll of black and white film and a camera. They will shoot the roll of film shooting pictures of objects and people. The student will then use the development process and develop the film and then print the negatives. Total of 2‑4” x 5” will be turned in [1 of an object, 1 of a person], along with the test strip for each print, matted and put in a plastic sleeve. Also, all the negatives will be turned in. \*NOTE: Student must have teacher sign off that the test strips are properly completed.

**Purpose:** In this introductory assignment the students will begin to master the components of the 35mm camera to take pictures, control exposure, and learn the skill of developing and printing black and white film. Mastery of the ability to use the 35mm camera will be measured as the students shoot one roll of 35mm black and white film. The students will demonstrate their mastery of film development by producing one developed roll of 35mm black and white film. Mastery of the print development will be assessed by the students producing 2 finished black and white print [1 object, 1 person].

**VAPA Content Standards Met:**

2.1 Solve a visual arts problem that involves the effective use of the elements of art and the principles of design.  
2.2 Prepare a portfolio of original two-and three-dimensional works of art that reflects refined craftsmanship and technical skills.

3.4 Discuss the purposes of art in selected contemporary cultures.

4.3 Formulate and support a position regarding the aesthetic value of a specific work of art and change or defend that position after considering the views of others.   
4.5 Employ the conventions of art criticism in writing and speaking about works of art.

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| **Grading: Rate your pictures from 1 to 6 in each of the following categories**.  **ALL** items marked with **► must** be graded 3 or higher to pass the assignment. **Any** **►** item marked 0, 1, or 2 must be fixed to a 3 to pass assignment. | | | | | | | | |
| **► = ES&C** | **Lowest ---------- Highest** | | | | | **EC** |  | |
| **► Exposed**  **Film** | 1 | 2 | 3 | 4 | 5 | 6 | Film is under/over/correctly exposed. All negatives in protective sleeve included with project. | |
| **► Developed**  **Film** | 1 | 2 | 3 | 4 | 5 | 6 | Negative density. Time, temperature and agitation followed. | |
| **► Printing**  **Contrast** | 1 | 2 | 3 | 4 | 5 | 6 | Difference between tones.  Black to white and middle gray. | |
| **► Technical** | 1 | 2 | 3 | 4 | 5 | 6 | Free from dust, chemical marks, and scratches. Chemical process followed. | |
| **► Test Strip**  **Object** | 1 | 2 | 3 | 4 | 5 | 6 | Shows difference between times, and indicates correct exposure.  Matches print. | Teacher Initials |
| **► Test Strip**  **Person** | 1 | 2 | 3 | 4 | 5 | 6 | Teacher Initials |
| **Print**  **Object** | 1 | 2 | 3 | 4 | 5 | 6 | Photo over-all rating. | You cannot be the subject of the photo! |
| **Print**  **Person** | 1 | 2 | 3 | 4 | 5 | 6 | Photo over-all rating. |
| **Creative** | 1 | 2 | 3 | 4 | 5 | 6 | Photo is interesting and creative. | |
| **► Matte** | 1 | 2 | 3 | 4 | 5 | 6 | Matting enhances pictures. Pictures are trimmed, cut square, no glue on pictures, placement on paper, etc | |
| **► Matte**  **Labels** | 1 | 2 | 3 | 4 | 5 | 6 | Presentation enhances pictures.  Labeled; Header/Footer | |
| **Questions** | 1 | 2 | 3 | 4 | 5 | 6 | Questions on back answered. | |
| **Rubric** | 1 | 2 | 3 | 4 | 5 | 6 | Self scored. | |
| **Meets Deadline** | 1 | 2 | 3 | 4 | 5 | 6 | Meets deadline. | |
| **Time Management** | 1 | 2 | 3 | 4 | 5 | 6 | Productive use of time. | |
| **Assignment** | 1 | 2 | 3 | 4 | 5 | 6 | Meets assignment criteria. | |
|  |  |  |  |  |  | | **/80 Total Points** | |

Answer the following questions. You do not need to use complete sentences, but your responses must be understandable and legible.

1. Describe how **Test Strips** are used when printing pictures in Traditional Photography.
   1. What is the purpose of a Test Strip?
   2. How do you change the **Light** of the Enlarger if the Test Strip is **too dark** to be useful?
   3. How do you change the **Time** of the Enlarger if the Test Strip is **too dark** to be useful?
   4. How do you change the **Light** of the Enlarger if the Test Strip is **too light** to be useful?
   5. How do you change the **Time** of the Enlarger if the Test Strip is **too light** to be useful?
2. Why is it important to have your Time, Temperature, and Agitation correct when you are **developing your film?**
3. Define these terms:
   1. Aperture
   2. Background
   3. F-number
   4. Foreground
   5. Point of View