

Photography in the Classroom
a workbook

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Technical appendix

There are other ways of doing all of this, but we found this system to be by far the quickest, easiest, and cheapest. It makes use of two technical innovations which are invaluable to the classroom teacher: the monobath developing system and the stabilizer printing system. Reference to photo books will help in this area (see bibliography). While this monobath is new, film loading and care is traditional, as is use of the enlarger.

Film Developing

Changing bags

These are two zippered light-tight bags, one within the other, with arm holes to load exposed film into light-tight developing tanks in any classroom (darkroom not required—the bags do it).

Developing tanks

Instamatic cartridges are broken and film removed, or roll film unrolled (*inside the bag*, by touch only), separated from the protective paper, and loaded first onto plastic “aprons,” then dropped in Kodacraft developing tanks. Aprons are matched to the particular film size and are wrapped around the film to keep it from sticking to itself and to allow the chemicals to wash all surfaces effectively. In addition, a metal weight on top of the apron/film combination is used to hold it down once the chemicals are introduced. Of the numerous developing systems available, the Kodak apron/tank method is the simplest and easiest to learn and use. It is also the cheapest. It requires an out-in-the-open practice session with spoiled film first, for students to see what they will thereafter be able to do only by touch. A great learning experience. (“I can’t do it! I can’t do it! . . . This is easy!”)

Monobath

Once film is loaded into the tank, we use a “monobath” developing system—one chemical which both develops and fixes the film (i.e., makes it no longer sensitive to light). The traditional system requires at least three separate stages where proper timing, temperature, and method of agitation are crucial. This formula makes the above concerns virtually irrelevant and is thus far more feasible for large numbers of children. This is one of the

technical hearts of our system. It saves unbelievable amounts of time and trouble, without losing any quality. Running water is needed only for film washing. A darkroom is not needed for developing at all. Any classroom with a sink will do. The solution needs to be poured in quickly, the tank turned gently ten times within the first 10 seconds of every minute for ten minutes, and your developing is done. The solution may be used four times during the day before discarding. The film is then washed for 5-10 minutes,





"seesawed" through a soapy solution (Photo-Flo), and hung to dry in as dust-free a place as possible. *This formula was developed for Kodak Verichrome-Pan or Plus-X film only; these are the films we recommend a program be based around. Color will not work at all, and other films require modification of the formula (see bibliography).*

Monobath formula

We mix 8 liters at a time. It keeps for a few weeks if anti-oxidation floating lids are used in chemical storage tanks. Somewhat expensive, but essential. Mixing takes some time, but after practice you can expect to mix 8 liters in less than half an hour. You will need a balance scale, raw chemicals, stirrer, chemical storage tank with spigot and floating lid.

This formula is not yet available commercially. It was developed by Charles Gold, formerly of Indiana University, now at Kenyon College, Ohio, and is available through his courtesy.

Mix in this order only:

	1L	8L
Water @ 90 degrees	600cc	4800cc
Sodium Sulfite	45g	360g
Phenidone ¹	4g	32g
Hydroquinone	3g*	24g*
Sodium Hydroxide (caution)	4g	32g
Sodium Thiosulfate ²	100g	800g
Gluteraldehyde ³	10cc	80cc
Water to make	1 liter	8 liters

*Add a pinch of the hydroquinone, then the sodium hydroxide, then the rest of the hydroquinone. This aids in dissolving the chemicals properly.

Foldout negative storage envelopes greatly aid students in keeping their negatives intact. Any dust, dirt, fingerprints, peanut butter, or scratches will show up on final prints.

1. Phenidone is difficult to obtain, and the single really expensive item in this formula; still worth it, it comes out to approximately 1¢ per roll for developing. You have eliminated other chemical costs. It is an Ilford chemical and is available in 1 lb. sizes through any Ilford distributor. Do not buy it in smaller quantities—its price is prohibitive.

2. Sodium Thiosulfate is substantially cheaper if you purchase this in 100 lb. bags. 85¢/lb. or \$22 for 100 lbs. Available through large camera stores or on special order. It keeps, and is worth the investment. Similarly, sodium sulfite is cheaper in 25 lb. containers.

3. Gluteraldehyde is also difficult to obtain. It is an Eastman Organic chemical, available in 3 kg. bottles from any photo or chemical house which handles this line, usually on special order. (Fisher Scientific in Chicago has this in stock.) Allow time for this. You will need to buy it only once. It comes in two strengths, the weaker and cheaper is fine. All other chemicals are readily obtainable.

Printing

Contact sheets

Essential for study, exercises, and an awareness of where you're at visually at a particular time. Also the only way to seriously see what your negatives look like. It is one sheet of photographic paper with all the negatives of one roll of film placed on top of it (negative emulsion to paper emulsion), exposed to light, then processed. The result is a page, with photographs the same size as the negative. We used an old 8 x 10 contact printing machine, but a sheet of glass to hold the negatives down, and light from the enlarger works fine. We insisted that students make contact sheets before making enlargements, and carefully went over the selection process with them. (See Contact Sheet Voting, Exercise 4.)

Enlargements

You will need to read more extensively about this in any of the photo books listed, but basically an enlargement is made by placing a negative in the enlarger, which is a combination of light bulb, housing, condenser, bellows, and lens which projects the negative image onto a baseboard. Moving the enlarger up or down changes the size of the image, much as moving a slide projector closer to or farther away from a wall does. Photographic paper is



placed in an easel on the baseboard, is hit by the required amount of light, and processed to give the enlargement. Light cannot go through the dark areas of the negative, does go through the clear, and since white light causes photo emulsions to darken after processing, the negative image is reversed and becomes positive. A test strip is required to judge correct exposure, and this

process teaches mathematical concepts as well as aesthetic ones, while requiring a careful, step-by-step procedure on the part of the student. The strip is a small piece of photographic paper, placed in a significant area of the picture, exposed sequentially to different amounts of light. This indicates which time will produce the "best" print. Contrast can be controlled through different grades of paper available.

Stabilizer

In both contact prints and enlargements, we mention that the prints must be processed after exposure to light. This traditionally meant at least three trays of chemicals, taking up several feet of space, and approximately 15 minutes per print, plus the necessity of running water to wash chemicals off of the prints, which took an additional half hour. We have eliminated all of this through use of a stabilization processor, which takes approximately 1½ feet of space, does not need running water, and delivers a finished print after exposure in 10 seconds. This is the second technical heart of our photographic system. The quality is indistinguishable from conventionally processed photographs, and saves vast amounts of time. Large numbers of students could not go through this program without it. The prints last approximately five years, which seems long enough, but conventional re-fixing and washing can make the prints "archival" (50 years +). We went this extra step for all prints selected for final shows. It can be done at any time. This machine enabled us to produce over 15 prints in a half hour session.

Students on all levels had little difficulty in learning all the required photographic processes. Practice and almost one-to-one instruction in the beginning was essential. After that, we sometimes got in the way.

Budget

This is what we used. Your individual situation will determine how much of this can be cut, expanded, or changed.

Equipment

4 Bogen 22A enlarging kits with 2 lenses ea ¹	@ \$85	\$ 340
4 Time-O-Lite GR-72 timers	@ 22	88
4 8x10 Speed Ez-Els ²	@ 5	20
1 Agfa Rapidoprint LD-14 Stabilization processor ³		445
1 kitchen timer		5
2 bulb type or other safelights	@ 10	20
1 glass for contact sheets		2
1 2½ gal. Arkay Vue-Thru Chemical Storage tank with spigot and floating lid		20
1 17 in. East Street Gallery Archival Film Washer ⁴		26
	<i>Total</i>	<u>\$ 966</u>

Materials and supplies

6 Kodacraft developing tanks with aprons and weights	@ \$ 5	\$ 30
4 changing bags	@ 6	24
1 thermometer		4
4 16 oz. Yankee plastic graduates	@ 2	8
1 chemical mixing paddle		1
2 dispenser kits for stabilization chemistry	@ 3	6
1 8x10 tray		3
	<i>Total</i>	<u>\$ 76</u>

Chemicals

25 lbs. Sodium Sulfite		\$ 10
1 lb. Phenidone		25
1 lb. Hydroquinone		3
1 lb. Sodium Hydroxide		2
100 lbs. Sodium Thiosulfate		25
3 kg. Gluteraldehyde		8
1 qt. Photo-Flo		2
2½ gal. cubetainer Agfa Activator chemical for stabilizer		15
2½ gal. Agfa Stabilizer chemical		20
	<i>Total</i>	<u>\$ 110</u>

Paper

5 x 100 sht. boxes Agfa FC 1 #2 Contact paper, 8x10	@ \$17	\$ 85
5 x 100 sht. boxes Agfa FP 1 #3 Enlarger paper ⁵ 8x10	@ 17	85
	<i>Total</i>	<u>\$ 170</u>

Other

5 100 pkg. folding negative storage envelopes	@ \$ 5	\$ 25
Clothespins, wires		5
2 negative cleaning brushes	@ 3	6
	<i>Total</i>	<u>\$ 36</u>
	<i>Grand total</i>	<u>\$1,358</u>

Optional

Gra-Lab Timer	\$ 30
8x10 contact printer	50
Premier 8x10 paper safe	25
Dry mount press	100
Tacking iron	10
Mount boards and tissue	30
Beam scale	30

Camera stores

Find one you can rely on. In Chicago, we found Darkroom Aids, 3449 N. Lincoln Ave. to have the best prices and best attitude. They specialize in used equipment and you can find *anything* there. A pleasure. Central, Standard, and General complement this.

1 Enlargers—there are many different kinds and prices. This is a tested, basic, solid, cheap, excellent machine. Highly recommended.

2 Easels—paper slides right in. Adjustable easels tend to fall apart, unless you spend a fortune.

3 Stabilizer—this is an excellent, medium priced machine. Avoid the cheaper ones if possible—rollers do not last, and cleaning, which is essential, is more difficult. General Camera in Chicago offers this at this price with a lifetime guarantee, which helps school boards justify the expense.

4 Film washer—best and cheapest. Available from East Street Gallery, 723 State St., Box 68, Grinnell, Iowa 50112. This size handles an entire class.

5 Paper—you may wish to get some with a higher contrast. #4 is extremely helpful with "thin" underexposed negatives.

Bibliography

Annotated

A Handbook of Structured Experiences for Human Relations Training, Volumes I-IV. J. Williams Pfeiffer and John E. Jones, editors. University Associates, publisher.

A particularly useful set of books, including approximately 100 clearly outlined exercises and activities. This material is easily adaptable to various educational and therapeutic settings.

Taking Part: a Workshop Approach to Collective Creativity. Lawrence Halprin and Jim Burns. The M.I.T. Press, Cambridge, Mass. 1974.

A wealth of ideas and energy from a community of people who live and design their lives as art, tying in dance with city planning, Gestalt therapy, recycling, etc.

Photography: Source and Resource. S. Lewis, D. Tate and J. McQuaid, editors. Turnip Press, Pennsylvania, 1973.

An excellent sourcebook with many different teachers writing about their approach to photography. Information on workshops, publishers, galleries, bibliography, etc.

The Family of Man. Edward Steichen, editor. Museum of Modern Art, New York, New York.

The classic picture book from the photographic and anthropological point of view.

Just Before the War. Newport Harbor Art Museum, Balboa, California. 1969.

Urban America from 1935 to 1941 as seen by photographers of the Farm Security Administration. This catalogue contains the original assignments suggested by Robert Lynd, author of *Middletown*, for documenting the times. Interesting to compare and contrast it with how one would set out to document our own times.

Photography. Phil Davis. Wm. C. Brown Co., Dubuque, Iowa, 1972.

Good introductory book for the teacher, with summarizations in the margins. Covers all areas of photography from history of the medium to all technical processes. Extensive information.

"Monobath Processing as a Teaching Aid" by Charles Gold in *Exposure Magazine*, Vol. 12:2, 1974.

All the information on our monobath. Variations in formula, including how to use the monobath to increase or decrease contrast, problems and solutions, explanation of how it works, etc. Invaluable. Available from the Society for Photographic Education, P.O. Box 1651, FDR Station, New York, N.Y. 10022.

Supplementary

Ideas and orientation

Visual Thinking. Rudolf Arnheim. University of California Press. Berkeley, 1971.

"Cameras Don't Take Pictures." Paul Byers. Columbia University Forum, LX:1:27-31, 1966.

Gestalt Therapy. Paul Goodman, Ralph Hefferline and Frederick Perls. Delta Books. New York, 1951.

Second Collected Writings. Anna Halprin and others. San Francisco Dancers' Workshop, 1975.

Discover Yourself Through Photography. Ralph Hattersley, Association Press, New York, 1971.

Deschooling Society. Ivan Illich. Harrow Books. New York, 1971.

Art Therapy with Children. Edith Kramer. Schocken Books, Inc. New York, 1971.

100 Ways to Have Fun with an Alligator and 100 Other Involving Arts Projects. Laliberte and Kehl. Art Education. 1969.

Photographers on Photography. Nathan Lyons, ed. Prentice-Hall. Englewood Cliffs, New Jersey, 1966.

Dynamically Oriented Art Therapy: Its Principles and Practice. Naumberg, Grune, and Stratton. New York, 1966.

Art and Photography. Aaron Scharf. Penguin Books, Ltd. Baltimore, 1974.

Picture books

Jacob A. Riis, Photographer and Citizen. Alexander Alland, Sr. Aperture, Inc. Millerton, New York, 1974.

Sweet Flypaper of Life. Roy deCarava and Langston Hughes, Hill and Wang. New York, 1967.

Family. Ken Hyman and Margaret Mead. The Macmillan Co., New York, 1965.

Photography in the Twentieth Century. Nathan Lyons, ed. Horizon Press in collaboration with the George Eastman House. Rochester, New York, 1967.

The History of Photography. Beaumont Newhall, Museum of Modern Art, New York, 1964.

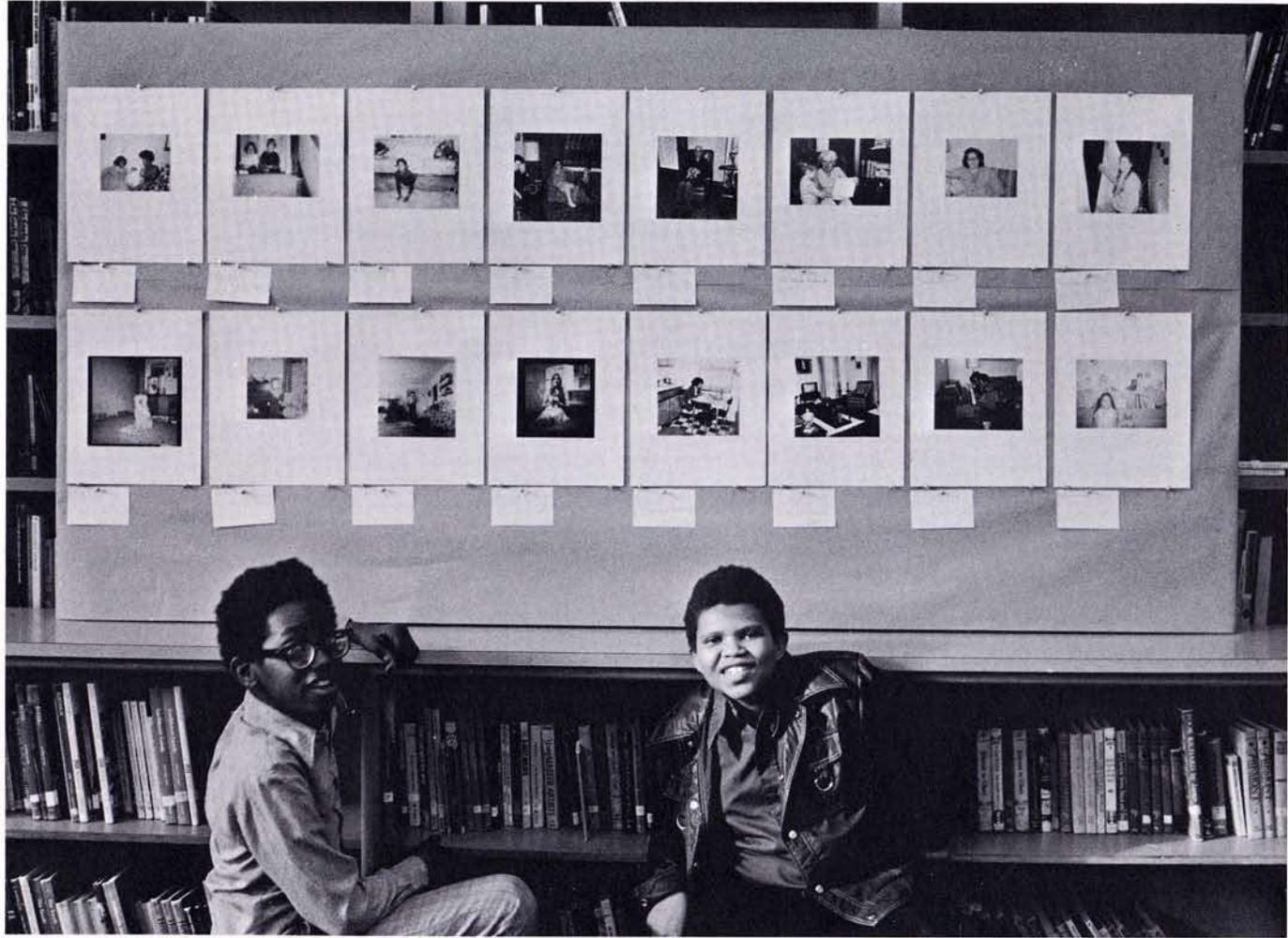
The Dream Collector. Arthur Tress. Avon Books, New York, 1972.

Technical information

Photography: A Handbook of History, Materials and Processes. Charles Swedlund. Holt, Rinehart and Winston, Inc. New York, 1974.

Organizations and institutions

1. Society for Photographic Education, Peter Bunnel, President, P.O. Box 1651, FDR Station, New York, N.Y. 10022. The national office is in New York; there are also several regional chapters, primarily college oriented. Holds annual meetings and publishes "Exposure" magazine.
2. The American Art Therapy Association, Don L. Jones, President, c/o Harding Hospital, Worthington, Ohio. Certifies art therapists and holds annual meetings.
3. The Illinois Art Therapy Association, Ralph Levinson, President, 923 W. Sheridan Rd., Chicago, Ill. 60613. Holds monthly meetings.
4. Photography Instructors' Association, California. Newly formed organization for elementary and secondary school teachers of photography. Open forum in "Petersen's Photography Magazine" through which this organization may be contacted.
5. George Eastman House, Rochester, New York. A museum of photography, a research and learning institution, and a publishing house. Membership available. Offers a slide set history of photography for \$350 mounted or \$250 unmounted. This is not recommended unless you have an exorbitant budget. Slides can always be made from books when necessary. Also, City and University libraries, the National Endowment for the Arts/Washington, D.C. 20506, the National Film Board of Canada, and several educational film houses offer a wide variety of films, either for free or for a nominal fee.
6. International Center of Photography. 1130 5th Avenue (at 94th Street), New York, New York 10028. A museum and educational institution which promotes the practice and understanding of documentary photography. Membership available.
7. Smithsonian Institution, Washington, D.C. The greatest repository of photographs and negatives of American documentary photographers. Copies of photographs may be ordered from their catalogue for a nominal fee. A gold mine. Membership in the total institution available.



The authors

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Cover photograph by Ardath Meeden
Design by Susan Brodsky, Chicago, Illinois
Typesetting by A&P Typographers, Chicago, Illinois
Printed by Rohner Printing, Chicago, Illinois