Answer Key: Which Paint is the most Cost Effective?

Vocabulary: Components of Paint

*Binder:* A binder is the material that remains in the paint after it dries – it’s what carries the pigment and creates the final film of color. The quality of binder in your paint determines how durable that final film is, and how well the film adheres to its surface.

*Thinner:* Thinner is the material that makes the paint fluid, or, you could say, “paintable.” It’s important to look at the quality of a thinner because this is what gives the paint a smooth finish and makes for easier application.

*Pigment:* Pigment is the color that is held within the binder. It plays a role in determining how well the paint covers the wall, giving it that bright, solid sheet of color. Pigment can also play a role in how well the paint holds up over time. A quality paint will stay bright while paint with a lesser quality pigment will lose its color over time.

*Additives:* This term refers to the extra materials in paint that make it easier to apply. Additives are actually what affect the thickness of the paint while you’re applying it, the amount of time it takes to dry, how evenly the color is spread throughout the paint (to avoid weird swirls and clumps), and how smoothly the final painted surface looks.

*Reference for vocabulary terms: Nolan Painting*

Pre-lab Questions

1. List several everyday uses of paint:
   Answers will vary. Examples: interior walls, exterior walls, vehicles, buildings, toys

2. List any questions that you have about paint.
   Answers will vary.

3. What do you think will happen to the paint sample if the *binder* is weak?
   The paint may flake off easily, and the color may not look as vibrant when dry.

4. Why is a high quality *thinner* important in a paint sample?
   Allows paint to easily cover a surface.

5. What do you think would happen if you used a paint with a low quality *pigment* to paint the outside of your house?
   The color may fade easily. Weather might effect it quicker than other paints.

6. Are *additives* necessary in paint?
   Yes!

Directions

*Day One:*

1. As a group you are going to conduct an investigation that compares four different brands of paints for different qualities:
   a. Coverability
   b. Scrubability
c. Color accuracy
After comparing those qualities, you are going to determine which paint brand would be the ‘best bang for your buck’, using your experimental data to support your conclusion.

2. Prior to testing, use the Consumer Guides Report and/or the Paint Quality Index provided, research the four different brands of paint that you will be using in your laboratory test. Collect information about each brand in order to help you hypothesize which paint type will be most cost-effective.

<table>
<thead>
<tr>
<th>Paint Brand</th>
<th>Notes/Information Collected</th>
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<tbody>
<tr>
<td></td>
<td>Answers will vary based on brands chosen by teacher.</td>
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3. Examining the data you have gathered through research. Make a hypothesis as to which brand of paint will be the most cost effective one to purchase. Make sure to explain why you have chosen this brand of paint.

**Hypothesis:**

Answers will vary based on brands chosen by teacher, and information collected during research.

4. Next, collect 4 squares of sheet rock from your teacher. Label the back of each piece with your names and the brand of paint you are going to paint it with.

5. You are going to paint each square with a different paint in order to compare the types of paint. List the things that you should keep constant (do the exact same) when you paint each square in order to carry out a fair test:

**Constants:**

Answers will vary, some examples are: Number of strokes when painting, method/style of painting, amount of paint used, size/type of paint brush, color of paint.

6. Following the constants you listed above as guidelines, carefully paint each square using the same method. Set the squares aside to dry overnight.
Day Two:
1. Collect your squares. Examine and compare them to determine which paint brand covered the square of sheet rock the best. Record your observations in the data table. Indicate a rating of 1 for the best paint coverage and 4 for the worst coverage.
2. Examine each square and compare the color on the sheetrock to the color it shows on the corresponding sample paint chip.
3. Record your results in your data table. Give the square that looks most like the paint sample a rating of 1 and the one that varies the most a rating of 4.
4. Mark each square in different places using the items your teacher has available for you. They might be: a dark crayon, a black Sharpie, a ‘squirt’ of ketchup, a ‘squirt’ of mustard, and a bit of dirt.
5. Allow the items to ‘set’ or dry for 5 minutes on the square.
6. While waiting, collect a container of soapy water and a sponge.
7. Attempt to clean the materials off of each square for 30 seconds.
8. Examine each square after cleaning. Give the brand that is the cleanest (least amount of stain remaining) a 1 in your data table and the square with the most visible stains remaining a 4.
9. Total the ratings for each paint type. The lowest total possible is a 3, while the largest total possible is a 12.
10. Clean up your area and materials according to your teacher’s directions.

Results – Answers will vary

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Observations and Ratings</th>
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<tbody>
<tr>
<td></td>
<td>Paint Brand A</td>
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<tr>
<td>Paint Coverage</td>
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<tr>
<td>Paint Color Chip Comparison</td>
<td></td>
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<tr>
<td>Staining</td>
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<tr>
<td>Total Rating (add values from all tests)</td>
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Analysis

Day Three:
1. Your teacher will provide you with the cost of each type of paint. Considering the cost, and the results of your testing, which brand would you recommend buying? Explain your choice in a written paragraph, providing specific details to support your recommendation.

Answers will vary.
2.  
   a. Look back at the hypothesis that you wrote on Day 1. Did the results of your testing support your hypothesis or not? Explain.
      
      *Answers will vary.*

   b. What might be some reasons that the hypothesis wasn’t supported by test data?
      
      *Answers will vary.*

3. During your testing, where might errors have occurred? List at least 2 possible errors.

   Constants were not met – for example the amount of paint used on each square was not exactly measured. So more paint could have been used on one square than other which could affect the outcome.

4. Choose one of the testing errors listed above. How could this error be fixed in a future test?

   Amount of paint could be specifically measured using a measuring device, like a tablespoon, or by weight, using a scale.