

PHYSICAL PROPERTIES

Performance Standard 12C/11A/11B.C

Students will apply the process of scientific inquiry to analyze simple properties and changes of matter accordingly:

- *Knowledge*: identify comparative and distinguishing physical properties of objects.
- *Application*: compare the similarities and differences in physical properties of two different objects.
- *Communication*: explain the identified characteristics as identifying physical properties.

Procedures

1. ***In order to know and apply concepts that describe of matter and energy and the interactions between them (12C) and know and apply the concepts, principles and processes of scientific inquiry (11A), and apply uses of scientific technologies in investigations (13B),*** students should experience sufficient learning opportunities to develop the following:
 - Brainstorm examples of physical properties of matter which can be used to compare and distinguish substances/objects.
 - Devise an inquiry investigation that can question and provide answers for identifying properties of substances.
 - Classify objects according to physical properties.
 - Measure applicable mass, volume is useful if ratios are introduced.
 - Record and analyze “data” about physical properties.
 - Describe observable patterns about using physical properties for comparing and distinguishing substances.

Note to teacher: This activity relates to knowledge associated with standard 12C, while addressing the performance descriptors for stage C within standard 11A and 13B. Applying scientific habits of mind noted in standard 13 A are foundational to these activities. Using various technologies to estimate, measure and record data address some performance descriptors in 13B.
2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Begin inquiry investigation by having students ask questions about how to identify different substances or objects: What color is it? How much does it weigh?* How much space does it occupy?* What is its texture? Does it have an odor? Does it float/sink in water? Does it dissolve in water, etc.? In this introductory activity, students will identify at least five physical properties of their first assigned object (a bowling ball). Following this, offer groups of students a second object to describe (an inflated black balloon, a black basketball, etc.) Provide each student a copy of “Physical Properties” task sheet. Ask students to complete the task sheet as follows:
 - Write at least 5 physical properties of a black bowling ball (or any color ball available).
 - From the items listed for the bowling ball, circle all the physical properties that would be about the same for their second object (comparative).
 - Write a brief explanation of why you circled items as similar characteristics and why the non-circled items are different characteristics.
 - Create a Venn diagram of two interlocking circles to show their comparative and distinguishing properties.
4. Continue the inquiry investigation to identify kinds of questions to ask to compare and distinguish objects and substances. Students should compare the Venn diagrams for different objects from the original activity for additional comparing and distinguishing properties. What does a Venn diagram look like if a balloon and basketball are compared? Ask students to create a checklist for comparing and distinguishing property questions for future use.
5. Evaluate each student’s work using the Science Rubric as follows and add the scores to determine the performance level:
 - *Knowledge*: Part I: Identification of at least 5 characteristics was complete and correct.
Part II: Comparison of the physical characteristics in the Venn diagram was complete and accurate,
 - *Application*: Checklist for physical properties was correct and complete, and
 - *Communication*: Explanation for the comparison and the final checklist were logical, well-organized and well-detailed.

Examples of Student Work not available**Time Requirements**

- 20 – 30 minutes

Resources

- Copies of the “Physical Properties” task sheet
- Bowling ball (black if possible), black basketball, inflated black balloon
- Tub for floating test, if desired
- Science Rubric

Teacher note:

Possible physical properties of matter that students might include are size*, shape*, mass* or weight*, color, texture, hardness or softness, buoyancy, odor, and flexibility.

Another suggestion could include asking students to divide the kinds of physical properties by sight, sound, feel, smell, etc., so that they are encouraged to use all senses to describe objects or substances.

*If the features of size mass, weight, and shape are suggested by students, misconceptions may be encountered. If these extrinsic properties are changed, will the substance or object be totally different? How different?

NAME _____ DATE _____

PHYSICAL PROPERTIES

Objects in our everyday world have many physical properties. Some objects have physical properties that are alike and some physical properties that are different.

- A. Write at least five physical properties of a black bowling ball. Circle the names of all the physical properties in your list that would be about the same for a black bowling ball and your second test object.

1. _____

2. _____

3. _____

4. _____

5. _____

- B. Explain why the items you circled are similar features and the ones you did not circle are different features.

ON A SEPARATE SHEET OF PAPER, do the following

- C. Make a Venn diagram and show how the bowling ball and the second object are similar and different. Write the things that are similar in the middle.
- D. Create a checklist of questions to ask to compare and distinguish objects for their physical properties.