**Standards of Learning**

3.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

a) observations are made and are repeated to ensure accuracy;

c) objects with similar characteristics or properties are classified into at least two sets and two subsets;

j) inferences are made and conclusions are drawn;

3.3 The student will investigate and understand that objects are made of materials that can be described by their physical properties. Key concepts include

b) physical properties remain the same as the material is changed in visible size

**Know**

* Matter has mass and takes up space.
* Objects can be made up of more than one material.
* Physical properties remain the same even if the object is reduced in size.
* Examples of physical properties are color, texture, elasticity, thickness and waterproofness.
* Objects can be described and classified based on their physical properties.

**Understand**

All matter can be described and classified in terms of physical properties.

**Do**

* Make observations of physical properties of objects.
* Explain that physical properties are observable characteristics that enable one to differentiate objects.
* Compare the physical properties of smaller, visible pieces of a material to those physical properties of the entire material.
* Conclude that materials have their own set of physical properties that are observable.

**Context Statement:** You are a textile engineer that works for a company that designs outdoor clothing. Your boss has asked you to evaluate several types of materials the company is considering for a new outdoor fashion line. You must recommend an outdoor activity that would be suitable for each fabric.

**Task:** Your task is to examine and evaluate five material samples and recommend which fabric is suitable for each given outdoor activity and explain your reasoning.

**Clear Tasks:**

* Identify and describe the physical properties of five fabric samples.
* Differentiate between two samples based on their physical properties.
* Identify an outdoor activity that is best suited for each fabric.
* Explain your reasoning behind your choices.
* (OPTIONAL) Design an advertisement for one of your fabric choices.

Teacher Directions

**Before the project:**

1. Make copies of student sheets 1-4 and the final rubric. Modify the chart on Student Page 1 to match the samples you will be using in your class.
2. Prepare five different similar sized samples of the various fabrics (i.e. cotton, burlap, flannel, jersey, canvas, etc.). Teacher will identify/display each fabric type with a name card in front of samples for student use. Teacher will provide multiple samples of each fabric type based on class size. The teacher should also have available at least two larger pieces of material samples to be displayed for Student Page 1. (Samples may be gathered from parents, fabric stores, Goodwill, peers and other free resources.)
3. Provide magnifying glasses, small bathroom cups of water, eyedroppers or small straws and paper towels. Teacher may need to model using the straw to collect water as a makeshift eyedropper.
4. Explain that the purpose of the project is to evaluate materials for an outdoor fashion line and decide which fabric is suitable for each given outdoor activity. The outdoor activity will determine which fabric is best for the clothing line.
5. Go over the rubric with the class and answer any questions on expectations.
6. Suggested resources for students:
	1. Books on outdoor sports
		1. Great Things to Do Outside by Jamie Ambrose
		2. Go Outside!: An Activity Book for Outdoor Adventures by Nancy Blakey
	2. Websites on outdoor sports
		1. [Wikipedia: List of Sports](https://en.wikipedia.org/wiki/List_of_sports)
		2. [Outdoor Sport & Leisure](https://en.wikipedia.org/wiki/List_of_sports)
	3. Websites on textiles, their make-up and use
		1. [Wikipedia: Textile](https://en.wikipedia.org/wiki/Textile)
		2. [Wikipedia: List of Fabric Names](https://en.wikipedia.org/wiki/List_of_fabric_names)

**Session #1 (30 minute block) Task #1**

1. Students will be given five fabric samples and all necessary tools to test their samples.
2. Students will examine each fabric sample and record their observations on Student Page
3. Students will compare the properties of the large and small fabric materials.
4. Students will select two of the above fabrics and explain how they can use the physical properties to differentiate between the two fabrics.

**Session #2 (30 minute block) Task #2**

1. Students will examine the list of outdoor activities on Student Page 2 and then match each fabric samples (1-5) to the outdoor activity it would best be suited when creating outdoor apparel.
2. Students will explain their reasoning utilizing vocabulary and observations from Student Page 1.

**Session #3 Enrichment**

1. Students will complete Student Pages #3-4 graphic organizers.
2. Using the information from the graphic organizer, student will create an advertisement which will be used in their promotional sales pitch to the sports company.

 **Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Fabric Matters - Student Page 1**

**Task #1**

**Directions:**

Using the equipment provided, investigate your fabric samples and complete the chart below.

| **Sample:** | **Thickness** **(Thick or Thin)** | **Waterproof****(Repels Water or Absorbs)** | **Elasticity****(Stretchy or Not Stretchy)** | **Texture****(Rough, Smooth, Slick)** |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Compare the smaller sample at your desk with the larger sample provided by the teacher. Explain whether or not the two samples have similar properties. Be specific.**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Select two of the fabric samples above.**

**Using the chart above, explain how you could use the physical properties to differentiate between the two samples you chose.**

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**Student Page 2**

**Task #2**

| **Outdoor Activities** |
| --- |
| Swimming | Hunting | Fishing |
| Tennis | Camping | Wakeboarding |
| Snow Skiing | Kayaking | Soccer |
| Hiking | Skateboarding | Football |
| Golfing | Water Skiing | Cheerleading |

**Fabric Sample #1**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Outdoor Activity:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Explain why this material is best suited for apparel or accessories:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Fabric Sample #2**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Outdoor Activity:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Explain why this material is best suited for apparel or accessories:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Fabric Sample #3**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Outdoor Activity:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Explain why this material is best suited for apparel or accessories:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Fabric Sample #4**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Outdoor Activity:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Explain why this material is best suited for apparel or accessories:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Fabric Sample #5**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Outdoor Activity:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Explain why this material is best suited for apparel or accessories:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Fabric Matters Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Student Page 3**

**Task #3**

**Plan Your Advertisement**

Where will you advertise your products for consumers to see?

What outdoor clothing or apparel did you design with your fabric?

Who is it for, which age group?

Why do people need your product?

What sport would most likely use your fabric? Why?

What outdoor sport store will sell your product?

**Student Page 4**

**Task #4**

**Presentation**

Design an advertisement using at least two of your fabric samples to design the most suitable apparel for your chosen outdoor activity. Explain why your fabric samples would be the best material for your design.

**Final Product Evaluation for Task #1**

|   | **Proficient** | **Developing** | **Beginning** |
| --- | --- | --- | --- |
| **Completion of Chart** | The student correctly identifies physical properties for all (20 out of 20) fabrics.  | The student correctly identifies at least 16 of 20 physical properties of the fabrics. | The student correctly identifies less than 16 physical properties of the fabrics.  |
| **Comparison of Different Sized Material Samples** | The student correctly compared the two provided material samples. | The student correctly compared one provided material sample. | The student was unable to compare the two provided material samples.  |
| **Comparison of Two Material Samples** | The student correctly compared physical properties (4 out of 4). | The student correctly compared physical properties (3 out of 4). | The student correctly compared less than 3 physical properties.  |
|  **Matching of Sample to outdoor activity** | Matches 4 out of 5 samples correctly | Matches 3 out of 5 samples correctly | Matches 2 or less samples correctly |
| **Explanation**  | Provides an accurate explanation using vocabulary from observation chart as to why the material is best suited for 4/5 outdoor activities.  | Provides an accurate explanation using vocabulary from observation chart as to why the material is best suited for all 3/5 outdoor activities.  | Provides an accurate explanation using vocabulary from observation chart as to why the material is best suited for 2 or less outdoor activities.  |

**Evaluation for Task #3 - Optional Extension Activity**

|  | **Advanced**  | **Proficient** | **Developing** | **Beginning** |
| --- | --- | --- | --- | --- |
| **PRINT AD: All information given is accurate and relates to the unit topics** | Student was able to create an advertisement using more than 2 fabric samples. Student was able to explain in detail why their fabric samples would be the best material for their design. | Student was able to create an advertisement using at least two fabric samples. Student was able to explain why their fabric samples would be the best material for their design. | Student was able to create an advertisement using only 1 fabric sample. Student was able to partially explain why their fabric samples would be the best material for their design. | Student was unable to create an advertisement using at least two fabric samples. Student was unable to explain why their fabric samples would be the best material for their design. |