Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Group:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Grade 3- Design Challenge (Tunnel)**

**Directions:** After listening to the presentation about the different sites you can choose, complete the following questions.

1. Which site do **you** think is BEST to build a tunnel? **Site 1 Site 2 Site 3**
2. Why did **you** choose this site?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Which site did your **group** choose? **Site 1 Site 2 Site 3**
2. Why did your **group** choose this site?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. As a group, you will choose 2 different methods for drilling through your mountain.
   1. Circle **TWO (2)** materials will you use to drill through your side of the mountain.

**Spoon Wood Stick Pencil**

* 1. How much time do you **estimate** it will take to drill through your half of the mountain? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. Start drilling time: \_\_\_\_\_\_\_\_\_\_\_\_
  3. End drilling time: \_\_\_\_\_\_\_\_\_\_\_\_\_
  4. Actual drilling time: \_\_\_\_\_\_\_\_\_\_\_

**The Design Process**

|  |  |
| --- | --- |
| **Ask:** *How can you design a tunnel through a mountain that is at least 4 cm wide and 6 cm tall?*  **Things to consider for testing:**  **Size:** Is the tunnel at least 4 cm wide? 6 cm tall?  **Water Test:** Does your tunnel leak when water is poured on it?  **Structural Strength:** How does your tunnel hold up to weight put on top of it? How much weight does it hold?  **Materials:** Less is better. How many different kinds of materials did you use?  **Environmental factors:**  Does the design of the tunnel change the landscape of the mountain? | **Imagine:** *Brainstorm YOUR ideas ONLY. Draw illustrations, write down materials, etc. that you believe would work:* |
| **Plan:** *With your group, come up with a list of no more than 4-5 materials that you will use to build your tunnel. Draw a prototype.* | |
| **Materials:**  1.  2.  3.  4.  5. | **Prototype:** *(a basic illustration of your tunnel labeled with materials used)* |
| **Create:** *When you are finished, draw and label your final product that you built.* | **Improve:** *After testing your tunnel, what improvements will you make as a group?* |

**Tunnel Design Rubric**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Group: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
| **Testing Criteria** | **3** | **2** | **1** |
| **Size** | The tunnel meets the required dimensions. It is at least 4 cm wide by 6 cm tall. | The tunnel meets one of the dimensions, but not the other. | The tunnel does not meet either of the dimensions required for the project. |
| **Water Test** | The inside of the tunnel stays dry when water is poured on top of it. | The inside of the tunnel stays mostly dry when water is poured on top of it. | The inside of the tunnel is wet when water is poured on top of it. |
| **Structural Strength** | The tunnel was able to hold up more than 2 textbooks before collapsing. | The tunnel was able to hold up 1 - 3 textbooks before collapsing. | The tunnel was not able to hold the weight of one textbook before collapsing. |
| **Materials Used** | The tunnel was constructed with 1 - 3 materials. | The tunnel was constructed with 4 - 5 materials. | The tunnel was constructed with more than 5 materials. |
| **Creativity & Critical Thinking** | The design of the tunnel does not drastically change the landscape of the mountain and looks appealing. | The design of the tunnel does not drastically change the landscape of the mountain, but does not look appealing. | The design of the tunnel changes the landscape of the mountain and does not look appealing. |
| **Collaboration & Communication** | The team worked well together and communicated effectively. The team compromised when needed. Everyone was respectful at all times. | The team worked well together, but did not always communicate effectively. The team compromised when needed. Everyone was respectful most of the time. | The team could have worked better together and communicated more effectively. The members of the team could have compromised more. Everyone was respectful most of the time. |

**Additional Comments and Notes:**

What did your group decide to do with the materials from digging out the tunnel? \_\_\_\_\_\_\_\_\_\_

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Is there anything you would like your teacher to know? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Teacher Comments: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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