Name: _____ Date: _____ Class: _____

Arch Research Worksheet Answer Key

1. Find the name of a type of arch that the Romans used in building, and draw a sketch of it below. If you can, find out **why** the arch you chose has that specific shape. Often, the shape enabled it to support more material or was for aesthetic purposes. (There are many types of Roman arches, so pick the one you find the most interesting. Wikipedia, howstuffworks.com, and history.com are useful websites for this question).
   Example answer: **Expect students to name the round or semicircle arch as the most commonly used arch shape in aqueducts, and in Roman architecture in general. Other students may choose to describe the segmental arch, horseshoe arch, lancet arch, elliptical arch or equilateral pointed arch. The purpose of this query is to get students to observe different styles of arches and find information on how the arches helped with architectural possibilities. Look for answers that involve how the arches spread weight to different points and enabled the carrying of larger weights on top of them, and sketches with pertinent details.**

2. Find the name of the device that the Romans used to ensure a steady slope of the aqueducts and describe how it was used. Is there any device used today that incorporates a similar method of measurement? If so, name it and describe how it is used. (If you have trouble, try looking up tools specifically used for Roman aqueducts.)
   Example answer: **The instrument the Romans used was a chorobate. This tool was used to measure a surface's level by pouring water into a trough carved into the surface of the device. Then the water was observed and if the surface was level, you would see no angle in the waterline. Chorobates also were used to measure the angle of a slope by using something called plumb lines on either side. These hung from the device by a string and would always be hang straight down with a measure of angle along a piece of wood on the device. Today, most people use a tool called a level that has air bubble in a tube that moves left and right depending on whether the surface is level or not. Other surveying instruments that were used include the diptra, groma and libella.**

3. Do some **research on Roman aqueducts**, such as the Pont du Gard, Aqua Claudia, etc., for the next 15 minutes. Collect information on how they were built and find the formulas that the Romans used to calculate the details of the architecture of the aqueducts. Also look for information on the materials and tools used, what type of human power it took to build these water channels, and any other information you find relevant. Take notes in the space below and be prepared to share what you learn with the class.
   Reminder: You are looking for information on **how aqueducts were engineered, not their history**, so avoid dates and people's names.
   Example questions to answer: *What materials did the Romans use? What was different about how the Romans held their materials together? How many types of arch designs were you able to find? How did the Romans go through mountains at a constant slope? What sort of formulas did the Romans use in their engineering? How do you apply these formulas? What sorts of other tools did the Romans use? How long would it take to build one of these arches?*
   Example answers: **The Romans typically used stone, brick, concrete and occasionally lead pipe for some aqueduct sections. Roman concrete used volcanic ash, which made it extremely strong and why some Roman building still stand today. Devices called chorobates and dioptra were used to calculate slopes. Aqueducts took s1-2 years to finish depending on size and length.**