

Name \_\_\_\_\_

## **HOMEWORK #5 – Mars & Mercury**

**Due Friday, May 26<sup>th</sup> IN CLASS**

Answers to the questions must be given in complete sentences (except where indicated), using correct grammar and spelling. Please be as brief and to-the-point as possible (*more is not necessarily better*).

**DO NOT COPY DIRECTLY FROM WEBSITES.**

Homework assignments must be legible. Handwritten or typed responses are permitted. Make sure that your assignment is stapled!

### **Grading Summary:**

**Question 1: 80 points**

**Question 2: 20 points**

**Total: 100 points**

Note: For this assignment, please use your notes, the class textbook, and the website indicated in the directions as references to complete the questions. No additional online resources are necessary.

## 1. Google Mars

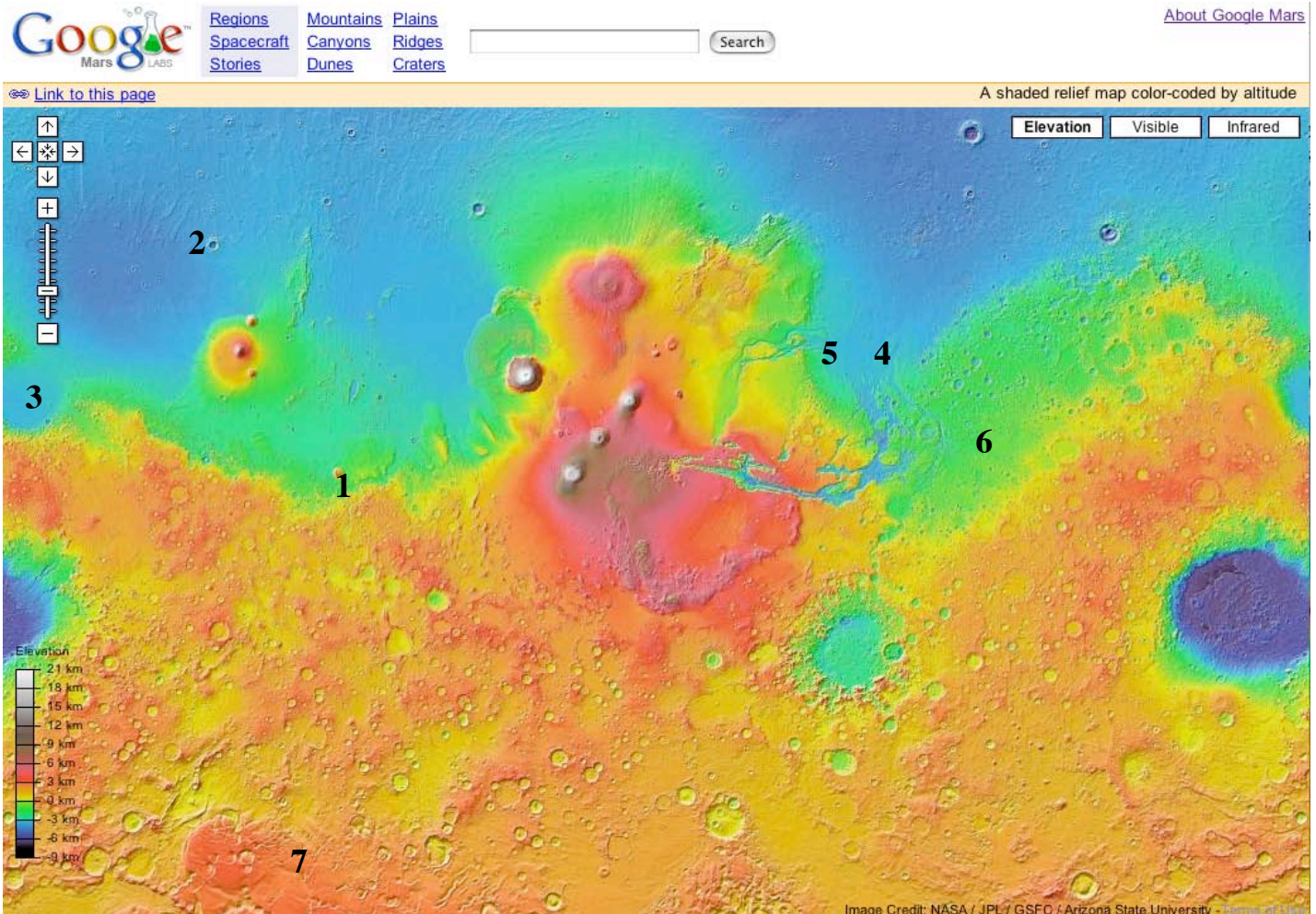
The *Google* guys recently teamed up with NASA researchers at Arizona State University to create one of the most detailed online scientific map and image archive ever made of Mars – **Google Mars**. For this question, you will explore the data and images available on Google Mars to answer the questions below.

To begin, navigate to the following website:

<http://www.google.com/mars/>

*Note: If Internet Explorer does not properly load the page, try an alternative web browser (ie., Netscape)*

After the page finishes loading, you see a colorful image of Mars's topography, similar to the screen snapshot below (without the numbers). Depending on the size of your computer screen, you may need to use the zoom in/out buttons on the left side of the website to view Mars in its entirety. Note that you can also slide the topography image around on your screen by simply clicking and dragging your mouse over the image.



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Click on the link at the top of the webpage named “[Spacecraft](#)”. A column on the left side of the website should appear, providing a list of Martian spacecraft. Clicking on any of these links will produce a pop-up balloon with more information about the spacecraft and mission.

a) Using the spacecraft links on Google Mars, along with the map from the previous page, match the numbered map locations (1-7) with the spacecraft landing sites:

Map Label	Spacecraft Name
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____

b) When were each of these spacecraft launched and how long did each operate?

Map Label	Year of Launch	Length of operation
1		
2		
3		
4		
5		
6		
7		

## 1.2 Martian Surface Features

Next click on the link at the top of the webpage named “[Stories](#)”. A new column on the left side of the website should appear now providing a list of surface features on Mars and related articles. Clicking on any of these links will produce a pop-up balloon with more information about the feature and a link to an associated article about the feature.

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### a) Martian Outflow Channel

Click on the link named “[Outflow Channel in Kasei Valles](#)”. Then click on the link to the article in the pop-up balloon. Read the article and answer the questions below.

1. Of the spacecraft used to answer Q1.1, which landed closest to the location of this outflow channel?
2. The instrument that acquired the images provided in the article is named THEMIS (Thermal Emission Imaging System). On which spacecraft is THEMIS presently operating?
3. What do the colors in the THEMIS-produced images represent?
4. How do scientists think the outflow channel in Kasei Valles was formed? What ‘substance’ is thought to be responsible for this?
5. According to the article, which direction did water flow through the channel?
6. When did the crater at the top of the image form? Before or after the channel was carved? Why?

**b) Martian Lava Channels**

Return to the main page, click on “[Stories](#)” again, and then click on the link named “[Lava Channels on Ascraeus Mons](#)”. Then click on the link to the article in the pop-up balloon. Read the article and answer the questions below:

1. What is the suspected source of the channels seen in this image?
2. On what large-scale volcanic region (on Mars) are these channels located?
3. What type of surface materials (ie., rocks, dust, etc.) do the different colors of the image represent?

Blue:

Yellow:

Reddish-orange:

**c) Martian Dunes**

Return to the main page, click on “[Stories](#)” again, and then click on the link named “[Dunes in Rabe Crater](#)”. Then click on the link to the article in the pop-up balloon. Read the article and answer the questions below:

1. The image in this article features a small part of Rabe Crater. According to the map on the main page, in which geographic region is Rabe Crater located: northern lowlands or southern highlands?
2. What is the name of the giant impact feature located to the east of Rabe Crater?
3. According to the article, what geologic feature is described by a “washboard-texture” that covers much of the crater floor?
4. Winds play a major role in modifying the crater floor. According to the article, what is the direction of the winds?

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## 2. Mercury

2.1 Why do we think Mercury has a very large iron core?

2.2 Describe briefly (1-2 sentences) the unique relationship between Mercury's orbit and spin.

2.3 What Earth-based technique was used to measure this rotation of Mercury?

2.4 What is the name of the only spacecraft to have ever visited Mercury? List two types of data that this spacecraft acquired of Mercury.

2.5 What is the name of the spacecraft en route to Mercury? When should it arrive? List two types of data that it will collect.