

## **SIO 15 (FQ 2024) – Homework #1 Due October 8, 2024**

Maximum score: 20 points + 1 bonus point

Divide by 4 for contribution to total cumulative

**Please watch the Gradescope video (link from geowiki homework page) before you do and submit your first homework! If you have not done so already, register on Gradescope.**

**You need to be registered at Gradescope to be able to submit your homework. You need to register only once while being at UCSD. When first registering, provide your UCSD email address, your full name (your family/last name first) AND student ID. We need your student ID to properly assign your homework!**

**1) Watch the homework 1 video on the class website!**

**2) Add your full name (your family/last name first) to the top on each page.**

**3) Provide only answers (not the questions!) in the document you submit.**

**4) Label each of your answers (1a, 1b, 1c etc.), starting a new line for each of your answers.**

**5) Provide short answers. Shorter is better! No full sentences required. Definitely no long answers. Points may be subtracted for answers that are too long/answers given that are not relevant to the question (including cut-and-paste jobs of entire sections from the class website).**

**6) Hand-written ok as long as the handwriting is easily readable.**

**7) Submit a single pdf to Gradescope. Only submit a high-quality pdf. Cell phone photo scans are not ok! Instead, use a professional app, such as Turboscan.**

**8) Important!!!!!! After you uploaded your pdf but before hitting the submit button, please identify on which page each of your answers to problems 1 - 10 are. Only when this is completed, hit the submit button.**

### **Topics 1 – 4**

- 1) a) Which of the obvious (fatal) natural disasters is the most frequently occurring? (0.5 pt)
  - b) Name the 2024 Atlantic hurricane that made landfall in the big bend area in Florida in late September. (0.5 pt)
  - c) As of the time of lecture 1, how many customers lost power in the U.S. due to that storm? (0.5 pt)
  - d) So far, during the 2024 Atlantic hurricane season provide the name and category of the strongest hurricane? (0.5 pt)
  - e) In which U.S. state and with which category did this storm make landfall? (0.5 pt)
- (2.5 points total)

- 2) a) Use the class lecture notes and tables. Which type of severe weather has had the highest fatality rate in the U.S., in the last 30 years or so? (0.5 pt)  
b) Which two types are second and third, in the correct order? (0.5 pt)  
c) Heat waves and the elderly. In a year with no heat wave, the elderly (60+ age group) accounted for which fraction of all deaths? What is this fraction for a year with heat wave? (0.5 pt)  
d) Aside from the heat island effect, name two other human-caused aggravating factors that contributed to the deadly 1995 Chicago heat wave. (0.5 pt)  
(2 points total)
- 3) a) What is exerted on a coil spring to make it longer? What is the equivalent expression along an earthquake fault? (0.5 pt)  
b) Which type of energy is associated with a loaded coil spring? (0.5 pt)  
c) When a body at the top of a slope was previously at rest and is now sliding down, which type of energy transforms into which other type of energy? (0.5 pt)  
d) By how much does Earth's surface receive more heat from the Sun compared to that from Earth's interior? (0.5 pt)  
(2 points total)
- 4) a) Provide two examples for an outer planet in our Solar System. (0.5 pt)  
b) What other expression do we use for such planets? (0.5 pt)  
c) What kind of celestial body is Ceres? (0.5 pt)  
d) Between which planets in our Solar System would we find Ceres? (0.5 pt)  
(2 points total)
- 5) a) How often do spring tides occur? (0.5 pt)  
b) In October 2024, on which day does La Jolla have the highest high tide? (0.5 pt)  
c) Which Moon phase does this likely correspond to? (0.5 pt)  
d) What is the tidal range on this day? INCLUDE UNITS! (0.5 pt)  
(2 points total)
- 6) a) Name the three principal material properties relevant to Earth's rocks? (0.5 pt)  
b) What is the radius of the Earth? (0.5 pt)  
c) What is the radius of the (outer) core, i.e. the radius of the core-mantle boundary? (0.5 pt)  
d) In percent, the core consequently takes up how much of Earth's radius? (0.5 pt)  
(2 points total)

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- 7) a) Name and describe the two angles that define the orientation of a magnetic field line. (0.5 pt)  
b) In 2000, what was the position of magnetic north and geomagnetic north? (0.5 pt)  
c) What were these positions in 2020? (0.5 pt)  
d) Which process generates Earth's magnetic field? (0.5 pt)  
(2 points total)
- 8) News Clip September 14, 2024:  
a) A storm caused power outages in Louisiana. Which energy company is responsible for providing electricity in that area? (0.5 pt)  
b) Which storm caused the power outages? (0.5 pt)  
c) As of that Friday afternoon, how many customers in Louisiana remained without power? (0.5 pt)  
d) Is this incident unusual/a one-time or rare occurrence? (0.5 pt)  
(2 points total)
- 9) News Clip September 14, 2024:  
a) How many major blazes raged in Southern California at the time? (0.5 pt)  
b) What helped firefighter gain ground against the fires? (0.5 pt)  
c) Provide the name and acreage burned of the largest of these fires. (0.5 pt)  
d) By this time how much more area burned in California than in all of 2023? (0.5 pt)  
(2 points total)
- 10) Google Earth (stand-alone or Web browser version ok but Google Earth Pro desktop works best)  
a) Zoom in on the Pacific coast of Mexico. Along the stretch between 15.5 and 20.5°N, which 5 states have Pacific coasts? (0.5 pt)  
b) Provide the capital for each of the 5 states? Depending on which version of Google Earth you use, you may have to consult additional resources, such as Wikipedia. (0.5 pt)  
c) Provide the population number for each of the 5 states. Depending on which version of Google Earth you use, you may have to consult additional resources, such as Wikipedia. (0.5 pt)  
d) In which of these states do we find Acapulco? (0.5 pt)  
e) Measure the distance, in km, between Acapulco and Mexico City (INCLUDE UNITS! allowed error margin 10 km) (0.5 pt)  
Special hint when you use the browser plugin rather than stand-alone app: you may have to place placemarks on top of the marks in both cities before you do a measurement.  
(2.5 points total)