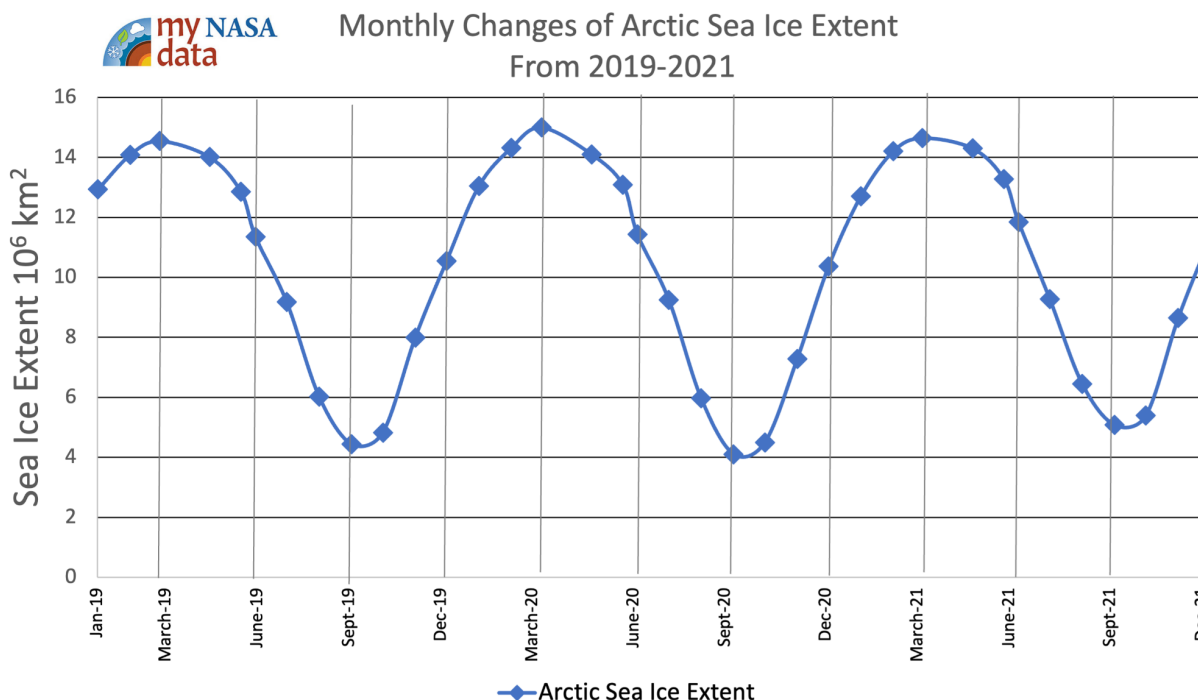




Name: _____ Date: _____ Class: _____

Title: Arctic Sea Ice Changes and Earth's Energy Budget
Student Sheet

Trends in Sea Ice Extent

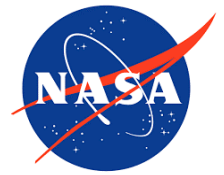


Monthly Changes of Arctic Sea Ice Extent. Source: My NASA Data | <https://mynasadata.larc.nasa.gov/sites/default/files/inline-images/Arctic%20Sea%20Ice.png>

Question Set # 1:

- Identify** the range of sea ice extent measured during the monthly recorded sea ice minimum.
- Calculate** the percent change in sea ice extent between the sea ice maximum and minimum during 2020.



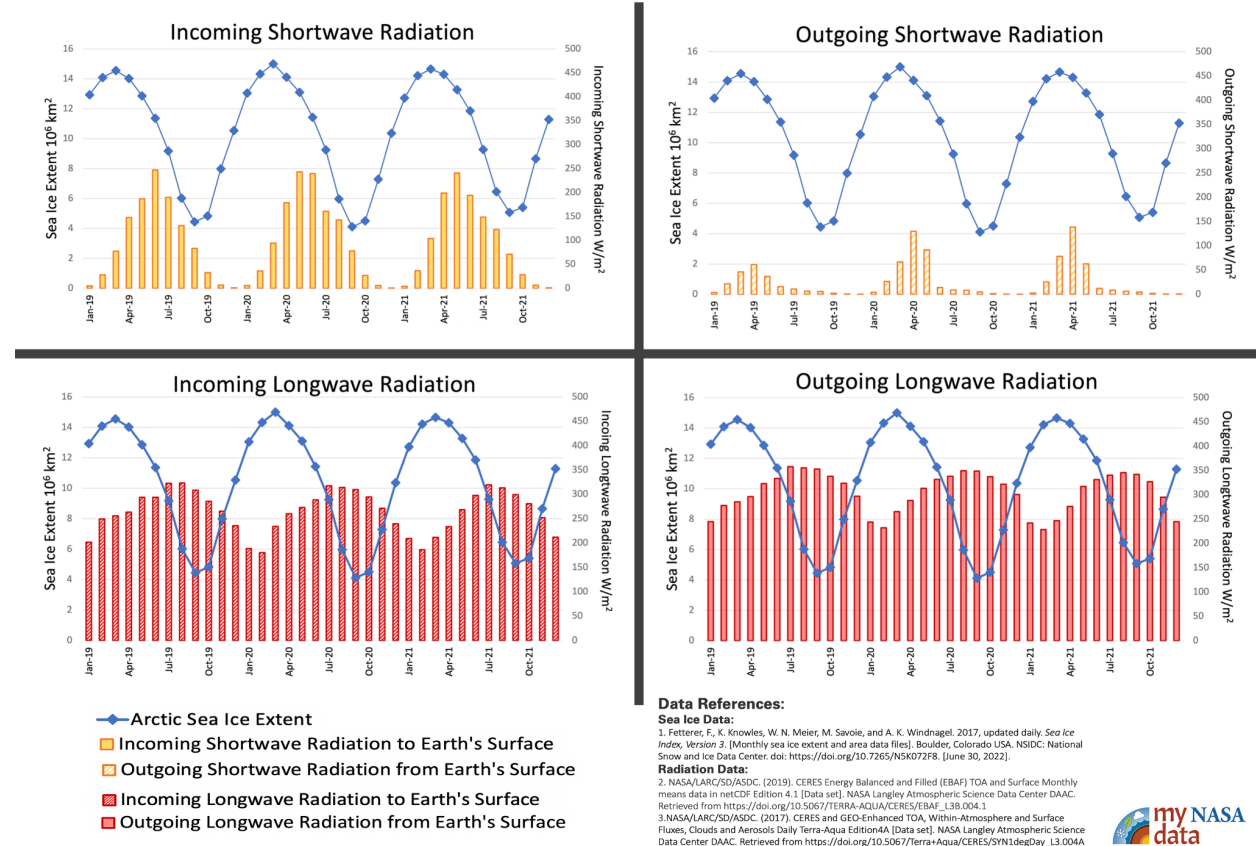


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c. **Identify** the month of the year when Little Diomede will most likely have sea ice surrounding it?

Relating Monthly Changes in Sea Ice Extent to Earth's Energy Budget

Monthly Changes in Arctic Sea Ice Extent and Energy Flow Values Offshore Little Diomede, Alaska (65.5°N, 168.5°W)



Four separate mixed bar and line graphs displaying monthly changes in Arctic sea ice extent and energy flow of short and long wave radiation that enters and leaves from Earth's surface. Source: My NASA Data | <https://mynasadata.larc.nasa.gov/sites/default/files/inline-images/DiomededeCharts.png>





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Question Set # 2: Differentiate between shortwave and longwave radiation.

- a. Incoming “shortwave radiation” is the term typically used to describe solar radiation. **Explain** how this type of radiation can come from Earth’s surface.

- b. Outgoing “longwave radiation” is the term typically used to describe terrestrial radiation. **Explain** how this type of radiation can come from Earth’s surface.

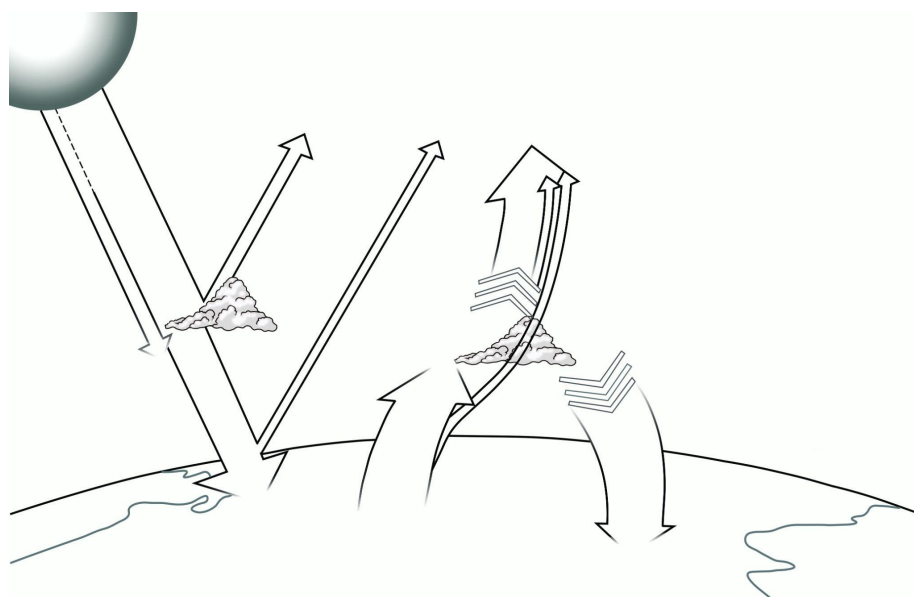
- c. **Identify** which arrows in the model below represent the energy transfer for each of the four data sets. Assigning numbers or letters to the arrows. Mark them on the model and write them on the lines next to the data set indicated.

____ Incoming Shortwave Radiation

____ Outgoing Shortwave Radiation

____ Incoming Longwave Radiation

____ Outgoing Longwave Radiation





Name: _____ Date: _____ Class: _____

Question Set # 3: Connect energy transfer in the Earth System to changing sea ice extent.

- a. **Describe** the relationship between shortwave radiation flowing in the Earth system and changes in sea ice extent in the Arctic.

- b. **Describe** the relationship between longwave radiation flowing in the Earth system and changes in sea ice extent in the Arctic.

- c. **Discuss** how both shortwave radiation and longwave radiation together drive the changes observed monthly in sea extent in the arctic region.

Question Set # 4: Consider the impact humans have on sea ice extent.

- d. **Identify** one human activity that may ultimately affect the natural seasonal cycles of sea ice gain and loss.

- e. **Explain** the connection(s) that link the human activity you stated above with its' effect on annual sea ice.

- f. **Propose** one realistic solution to reduce the anthropogenic impact you described above.