Inquiry: Reason for Seasons
Earth Science

Name: _____
Date: _____ Hr: ____

Question: What causes some places to have seasons (winter, summer) on Earth?

Hypothesis:

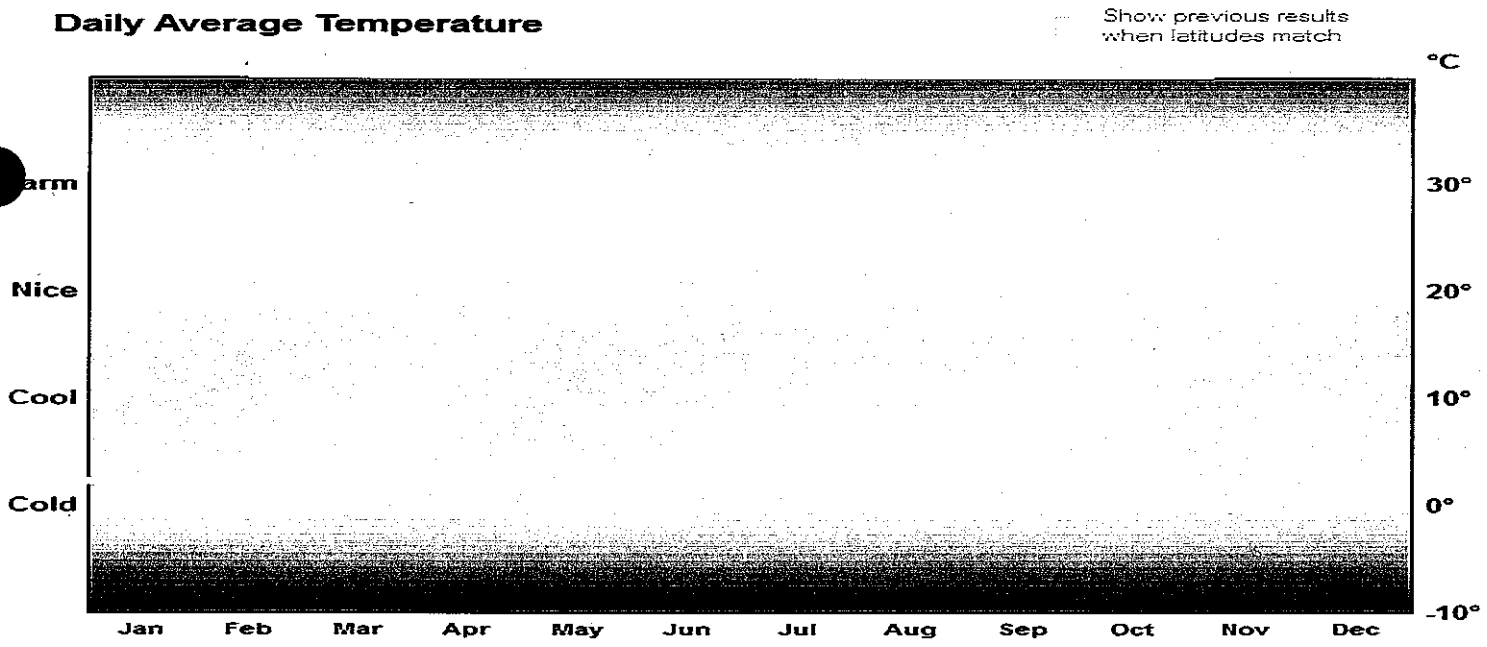
Procedure:

1. Open the Seasons program (Start Menu → All Programs → McNamara-Earth Sci → Science-Seasons).
2. Click the "Daily Solar Energy" button (top left), then Select Latitudes button (top).
3. Select the equator's latitude (data table), check the 2nd "use this latitude" box and type Miami's latitude.
4. Sketch + label what appears on your Temperature graph below. **Use different colors**.
5. Return to the Select Latitudes screen, unselect both latitudes and choose the final 2 latitudes (Grosse Pointe and Arctic Circle).

Observations:

Table #1: Latitudes for 3 Location on Earth

Location	Equator	Miami, FL	Grosse Pointe, MI	Arctic Circle
Latitude	0°	25.7°N	42.5°N	66.5° N



Graphical Analysis:

1. Write a statement comparing the change in temperature between your 4 latitudes.

2. The **Arctic Circle** receives 24 hours of sunlight in June...but it is still <u>not</u> warmer than the equator. Explain why.

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Is it Tilt or D I s t a n c e ?

3. Unselect the Arctic Circle latitude, but leave Grosse Pointe's latitude.
   Now look at 3 different situations (normal tilt, 45° tilt, **and 0° tilt).**
   You will find the EXACT temperature near the TOP LEFT corner of the temperature graph.

   a. With a **NORMAL** AXIS TILT, the HIGHEST temperature in Grosse Pointe is _____°C, and the LOWEST temperature is _____°C. This is a difference of _____°C.

   b. With a **45°** AXIS TILT, the HIGHEST temperature in Grosse Pointe is _____°C, and the LOWEST temperature is _____°C. This is a difference of _____°C.

   c. With **NO** AXIS TILT, the HIGHEST temperature in Grosse Pointe is _____°C, and the LOWEST temperature is _____°C. This is a difference of _____°C.

   d. Describe the relationship how AXIS TILT and TEMPERATURE DIFFERENCE during the year.

4. Re-select Grosse Pointe's latitude, normal tilt, and click the Surface Temperature graph.
   Now look at 2 different orbit shapes (normal Earth eccentricity vs. 0. 50 eccentricity).
   a. Does changing the shape of Earth's orbit cause MAJOR or MINOR changes in the surface temperatures in Grosse Pointe? _____Explain using the graphs.

Earth's Revolution Review (linked from our class webpage)

5. ***Once loaded, CLICK THE BOX LABELED "Show Earth's Profile"***
   The day being shown is March _____th
   On this day, the Sun's vertical rays strike _____, and Michigan experiences _____hrs of sun.

6. ***Press ▶ (PLAY). letting Earth revolve to June 21st***
   The Sun's vertical rays now strike the _____ hemisphere, and Michigan gets **more/less** (circle one) hrs of sunlight.

7. ***Press ▶ (Play) letting Earth revolve to September 22nd.***
   On this day, the Sun's vertical rays strike _____, and Michigan experiences _____hrs of sun.

8. ***Press ▶ (Play) letting Earth revolve to December 21st.***
   The Sun's vertical rays now strike the _____ hemisphere, and Michigan gets **more/less** (circle one) hrs of sunlight.

9. Michigan's temperatures start to cool through October→ November→ December→ January
   Use the terms **'sun angle'** and **'hours of sun'** to explain this trend:

Conclusion: