

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

- STILL VIEW
- SOLAR STUDY

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# ARCH 1250

## APPLIED ENVIRONMENTAL STUDIES

### CLASS TWO - CLIMATE

#### Macroclimate and Microclimate

## Solar Study Activities Using Revit

Professor Paul C. King, RA, AIA, ARA  
Assistant Professor

# The Sun and Climate - Charting the Sun

## Reading the Sun Chart

### Revit Step by Step – Still View

### Revit Step by Step – Solar Study Animation

#### SUN CHART

##### READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

##### TRACKING THE PATH

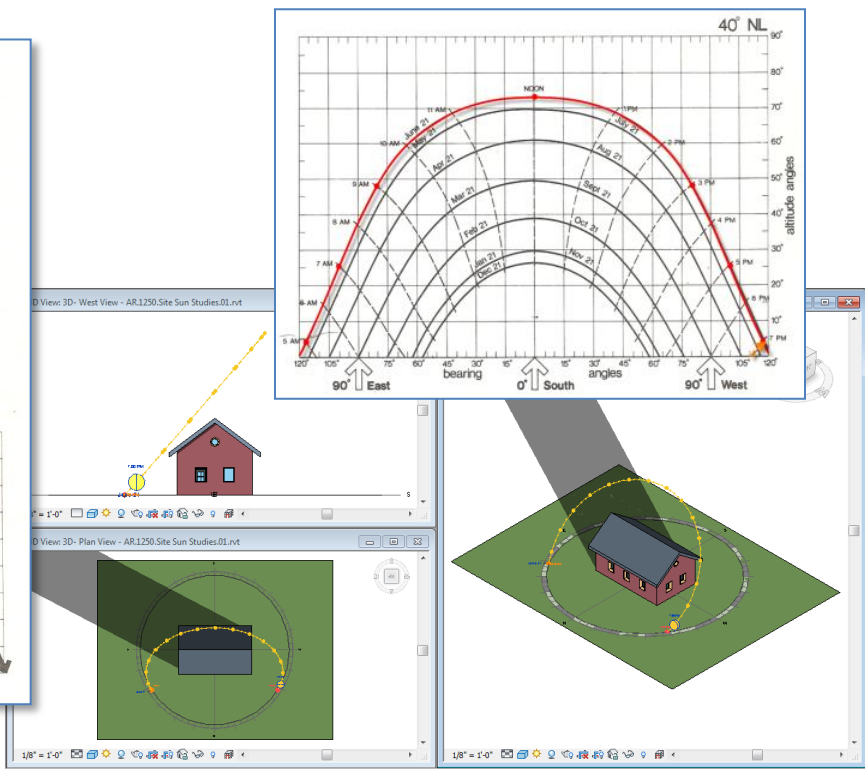
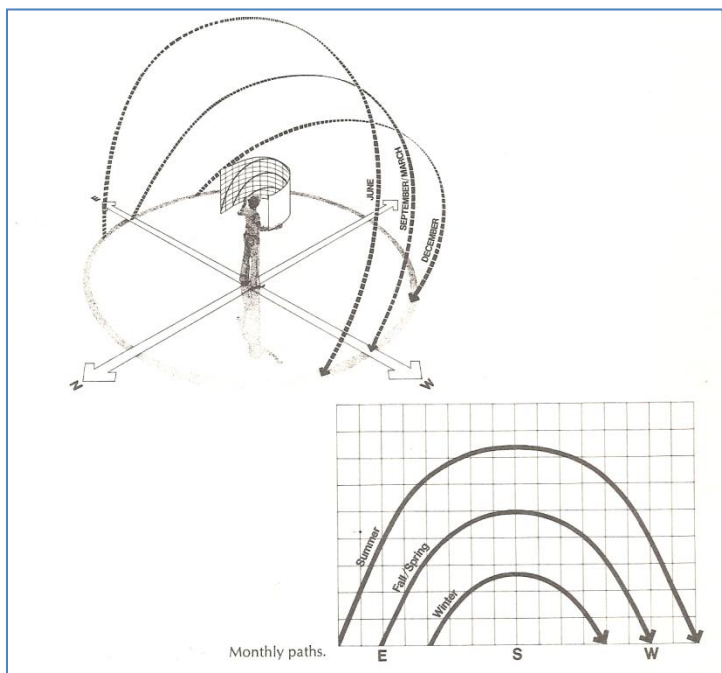
- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

##### REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

##### EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
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REVIT TUTORIAL

- STILL VIEW
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EXERCISES

- NEW MONTH
- NEW LOCATION
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# The Sun and Climate - Charting the Sun

Standing in a single location we project the path of the sun onto a graph marking its location for every hour from sunrise to sunset. The chart will show.

The sun's **altitude** or angle above the horizon

The sun's **azimuth** or angle relative to true North

for  
Each month of the year  
Each hour of the day

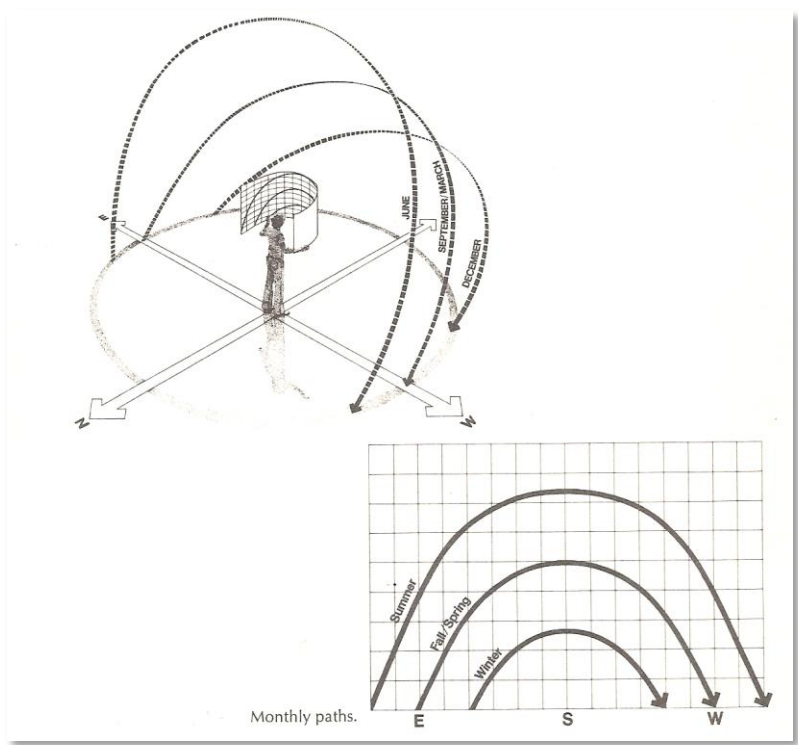


Image Source:  
The Passive Solar Energy Book  
by Edward Mazria

SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

REVIT TUTORIAL

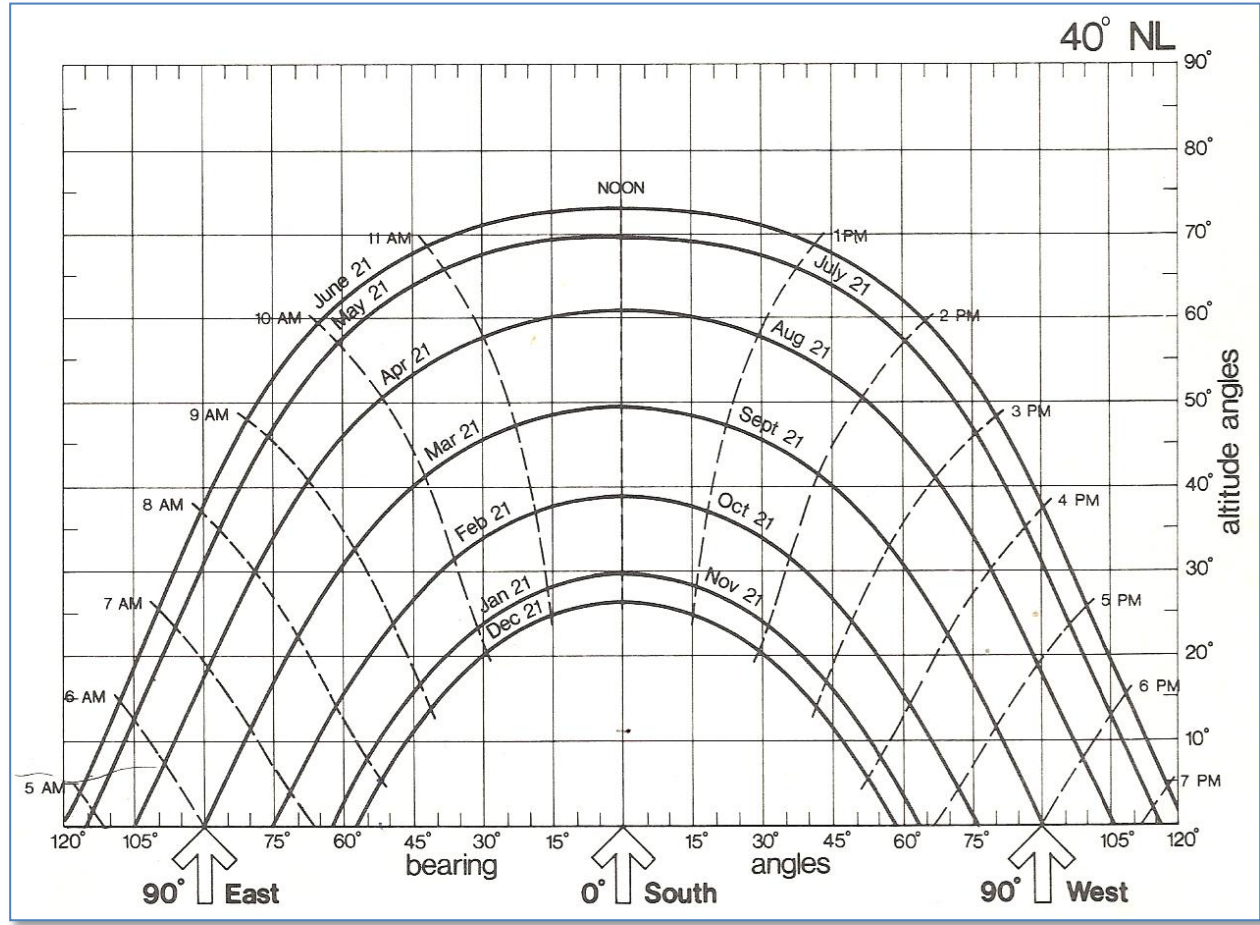
- STILL VIEW
- SOLAR STUDY

EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun – Reading the chart

*The chart tells us the location of the sun at a given time and place. This chart is for 40 degrees North Latitude (NYC)*



READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

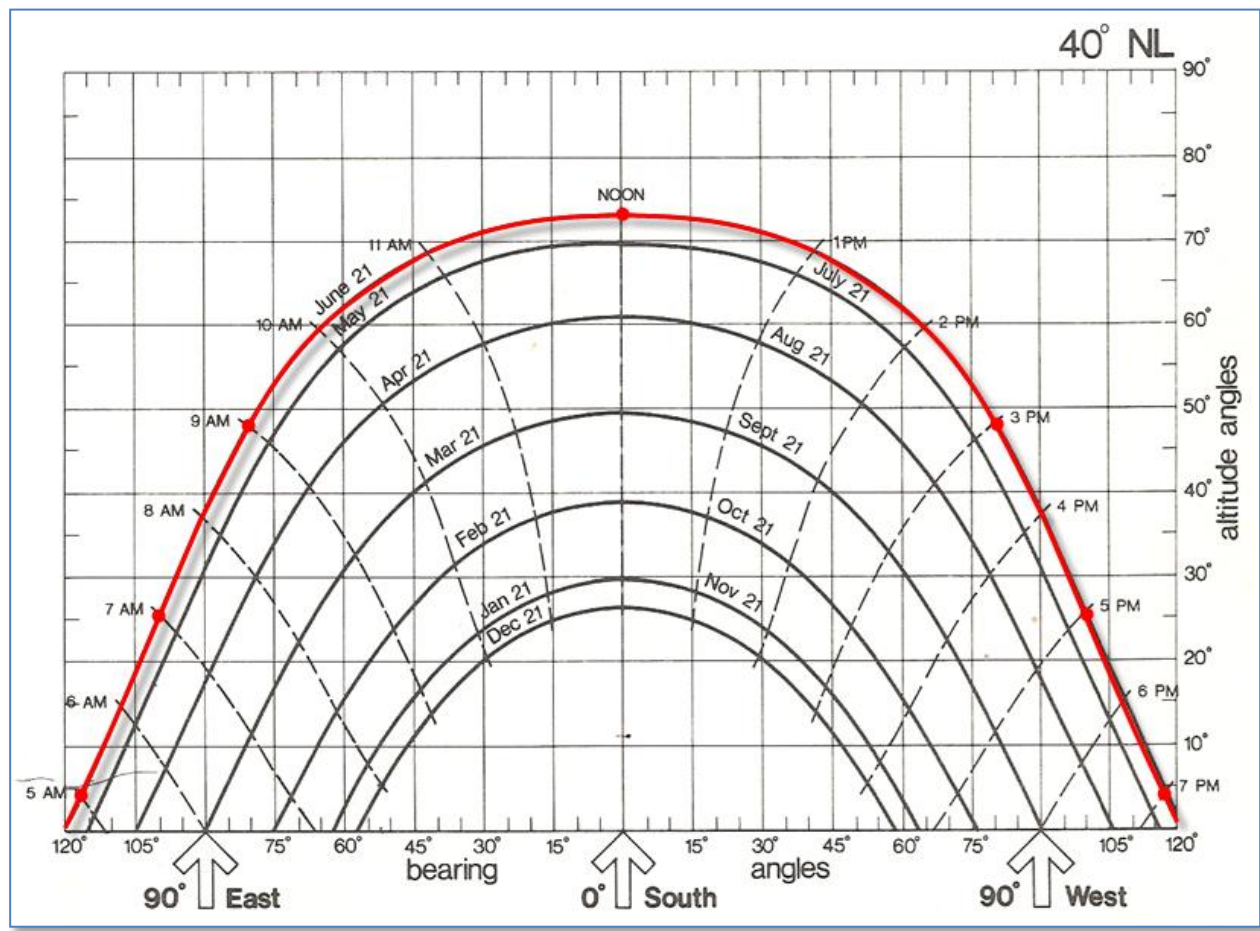
REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

The Sun and Climate - Charting the Sun – Reading the chart  
*Summer Solstice – June 21 @ 11 AM*      Where is the sun?  
*Step 1: Identify the Sun Path for the chosen day*



SUN CHART

READING THE CHART

- PATH/DATE
- **TIME**
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

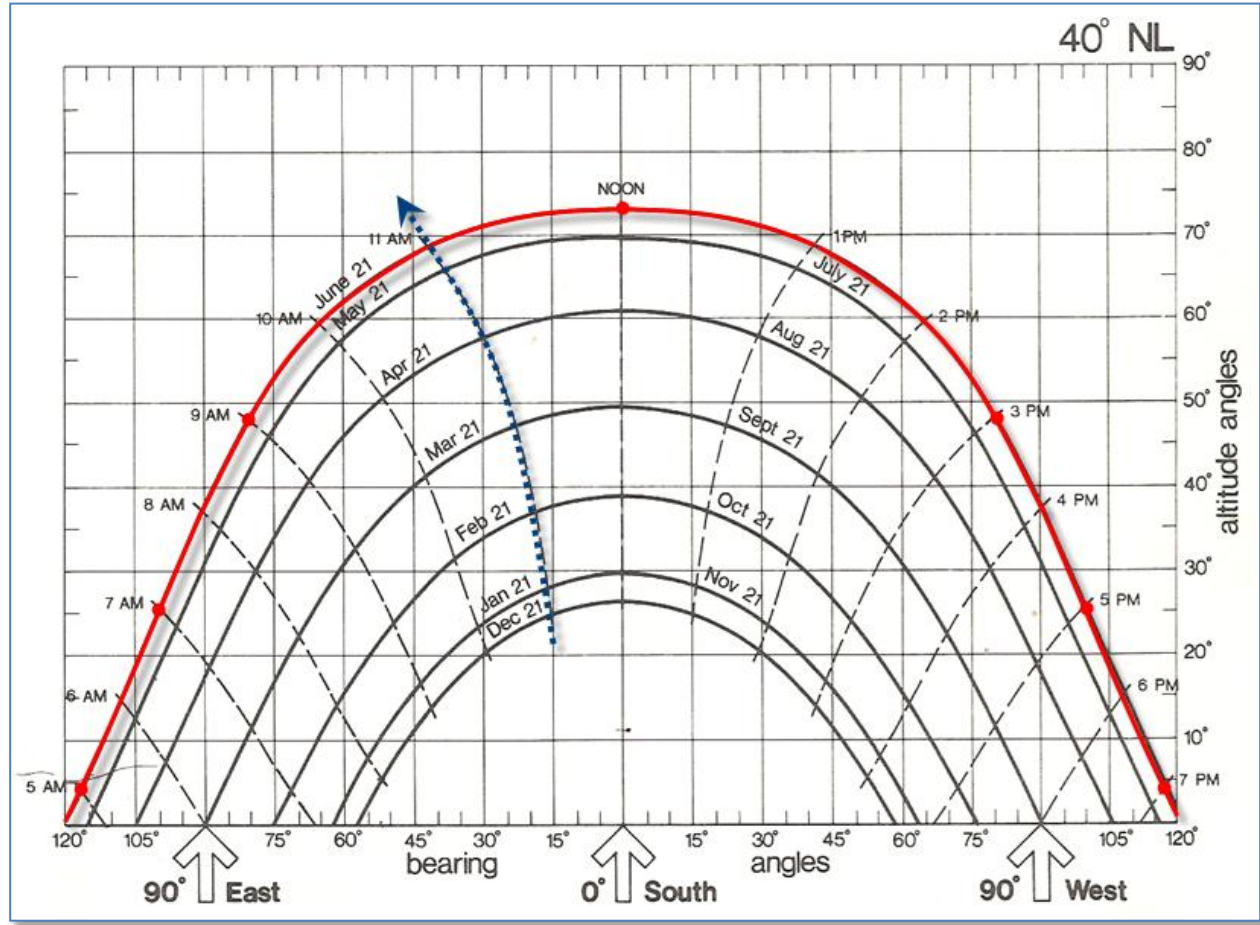
REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A

The Sun and Climate - Charting the Sun – Reading the chart  
*Summer Solstice – June 21 @ 11 AM*      Where is the sun?  
*Step 2: Locate the chosen time (11 AM for example)*



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- **ALTITUDE**
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

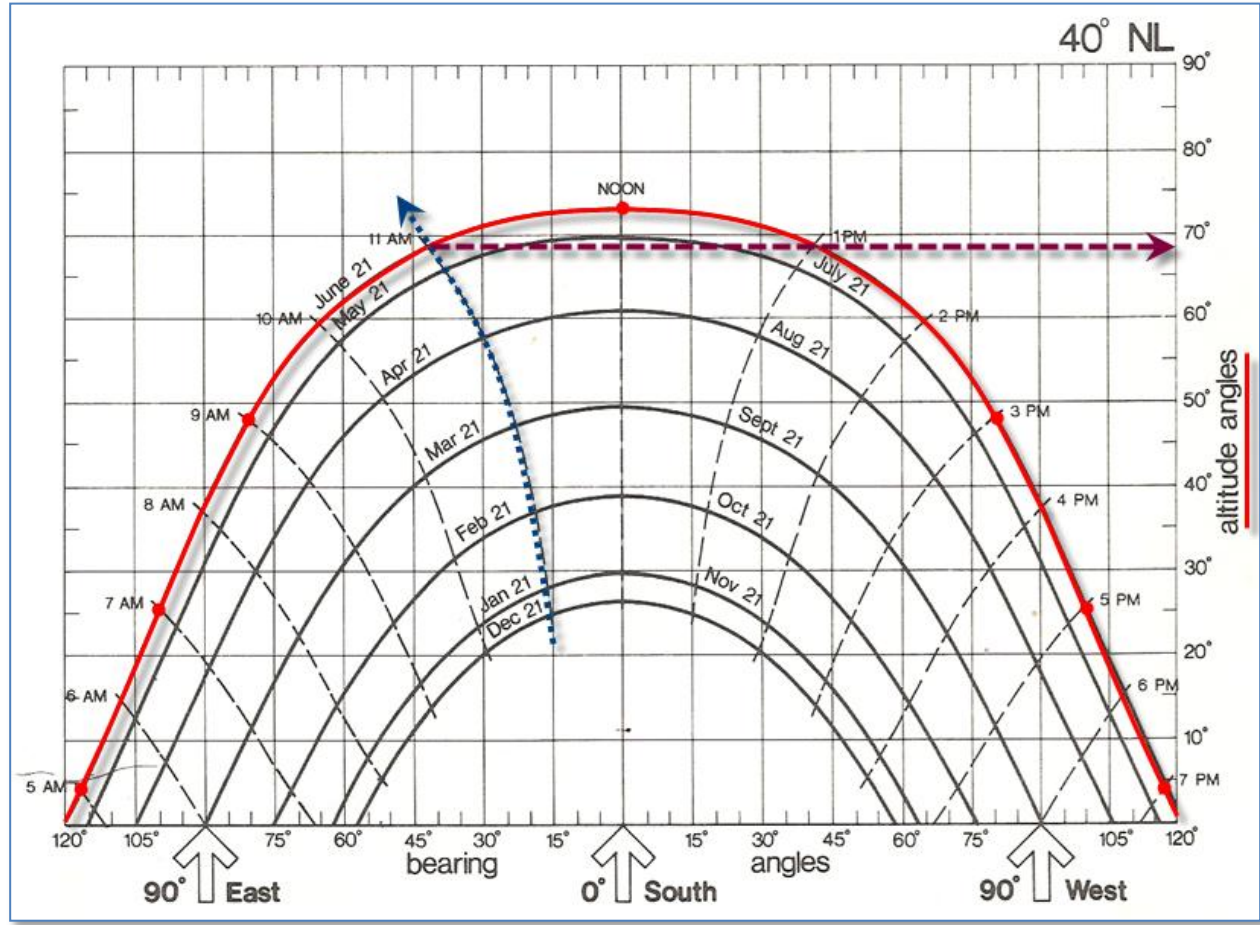
REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A

The Sun and Climate - Charting the Sun – Reading the chart  
*Summer Solstice – June 21 @ 11 AM*      Where is the sun?  
*Step 3: Track across to find altitude (68 degrees)*



SUN CHART

READING THE CHART

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- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
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- 5 PM
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

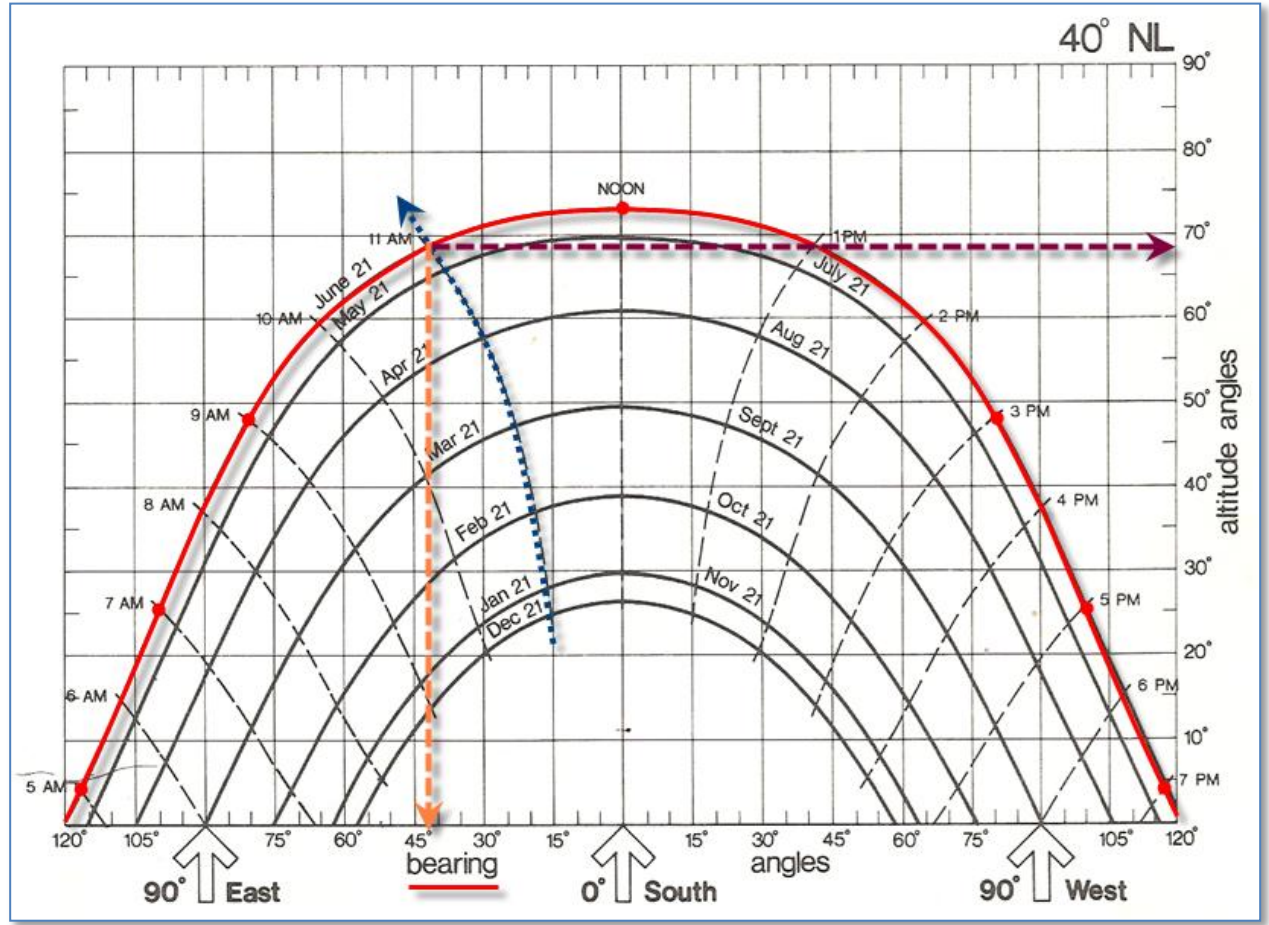
EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun – Reading the chart

*Summer Solstice – June 21 @ 11 AM*      Where is the sun?

*Step 4: Track down to find bearing relative to south (42 degrees)*





SUN CHART

READING THE CHART

- PATH/DATE
- TIME
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- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
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- 3 PM
- 5 PM
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

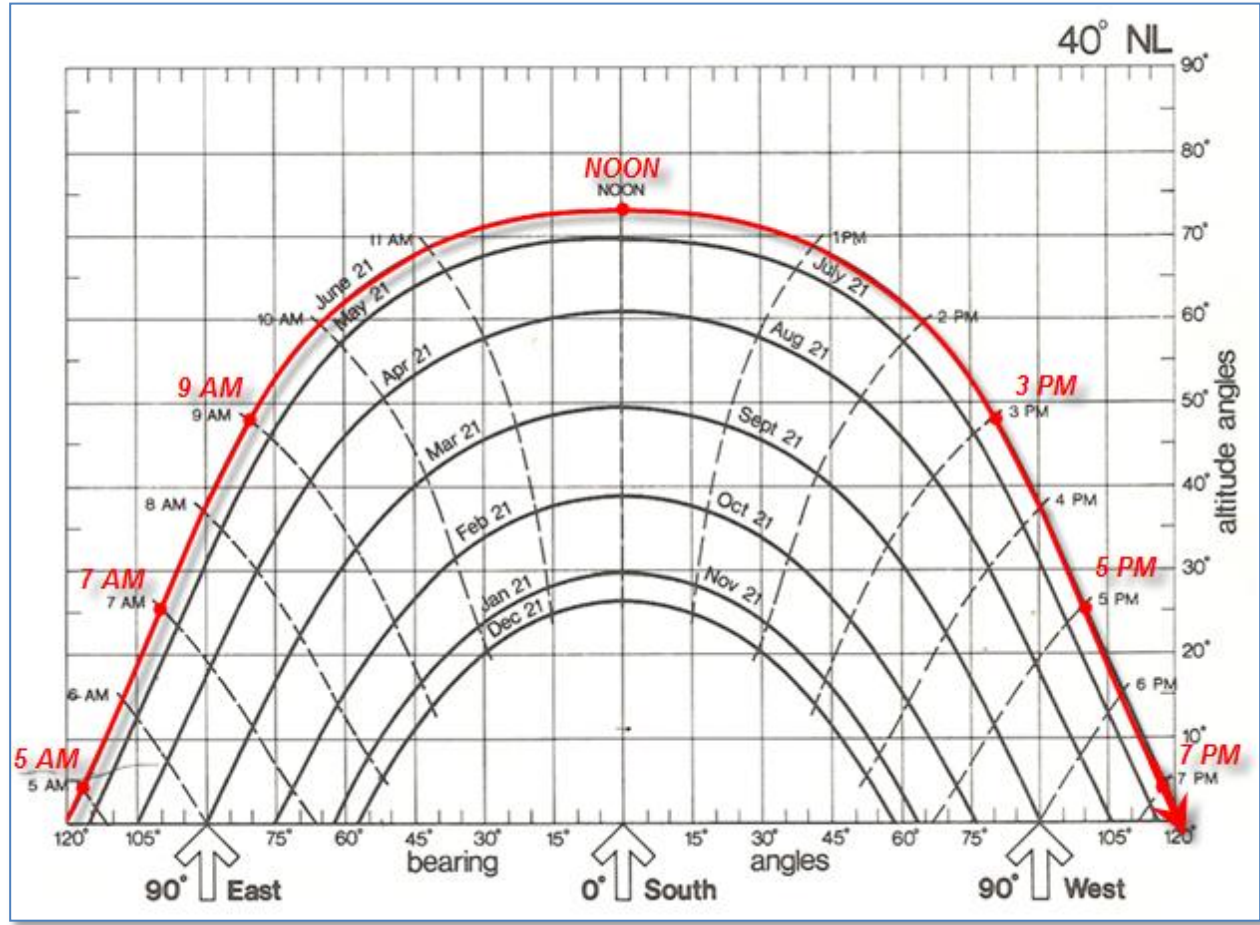
EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun

*Summer Solstice – June 21 at 40 degrees North Latitude*

*Track the path of the sun from 5 AM till 7 PM*



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

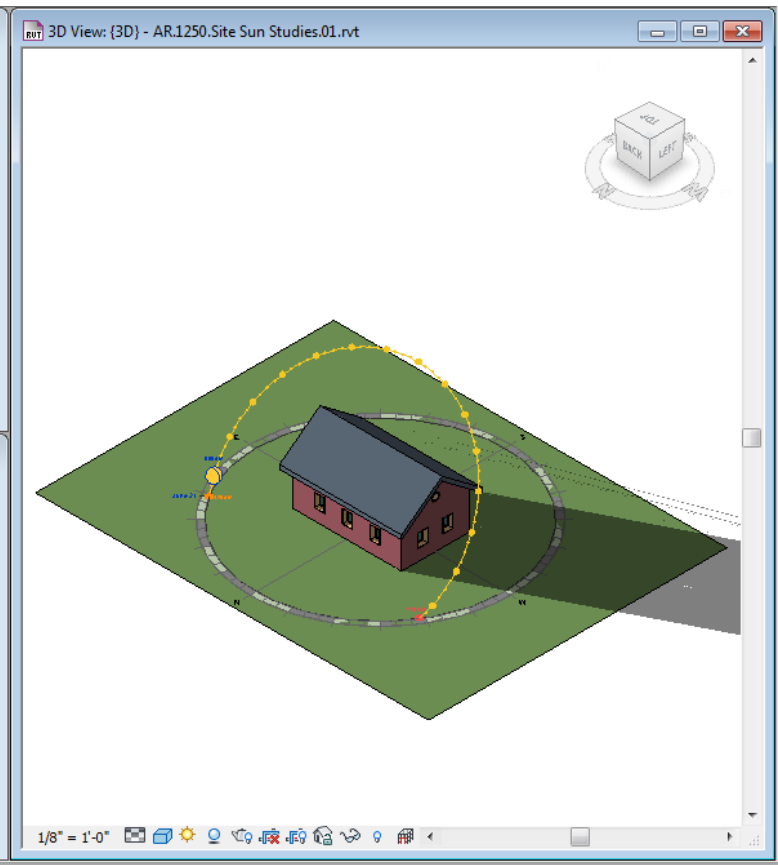
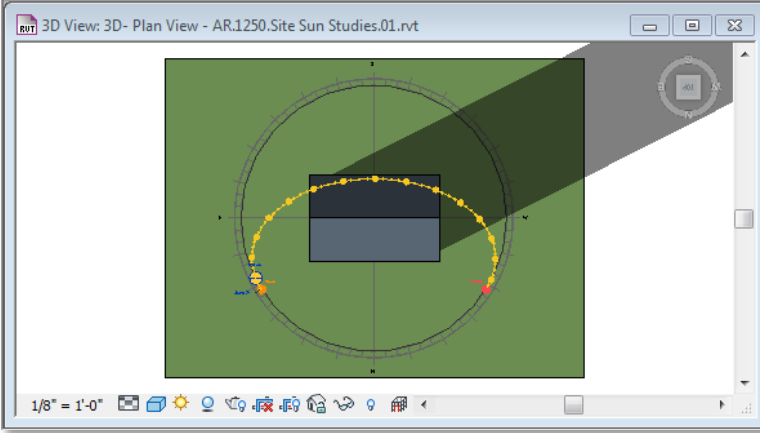
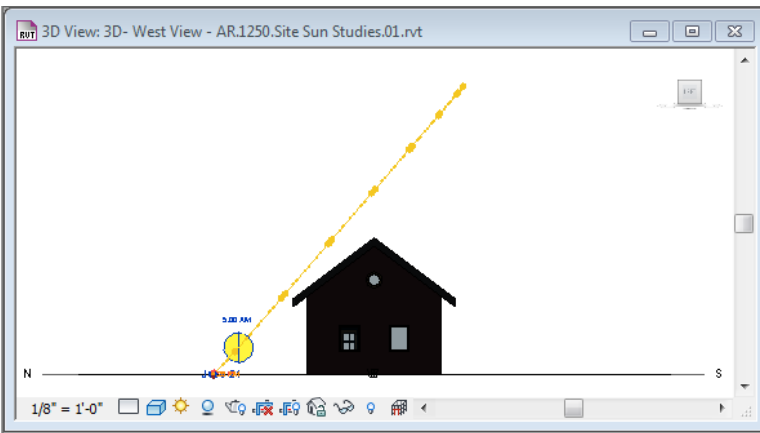
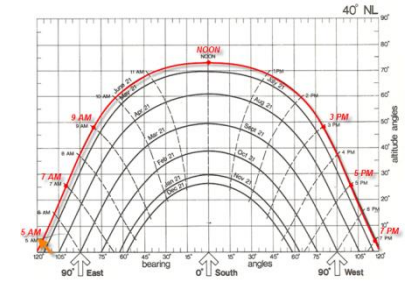
EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun

## Summer Solstice – June 21 @ 5 AM

### Brooklyn NY 40 degrees North Latitude



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- **7 AM**
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

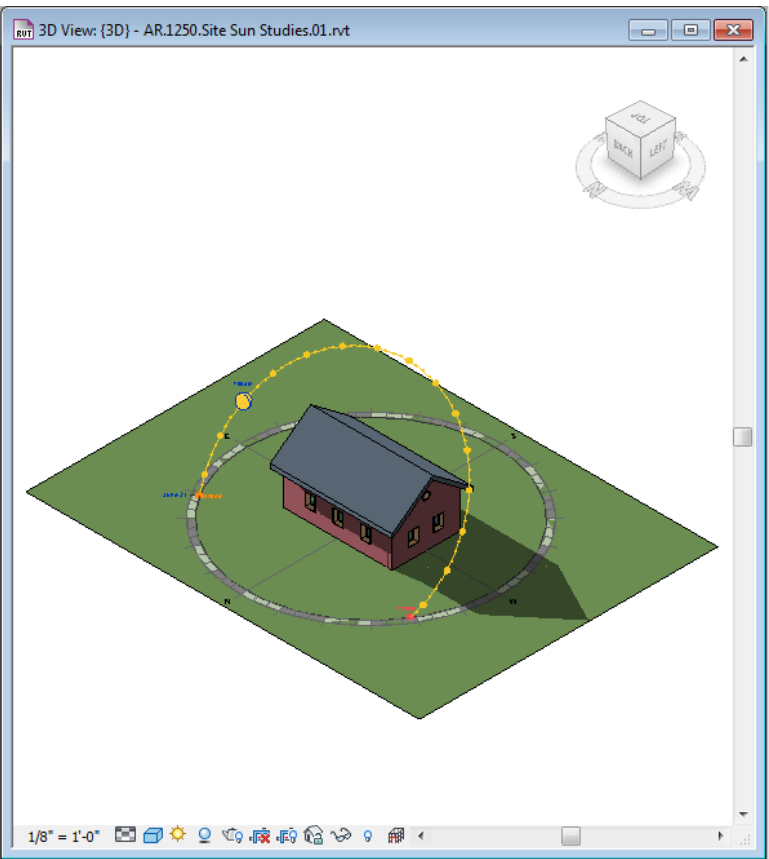
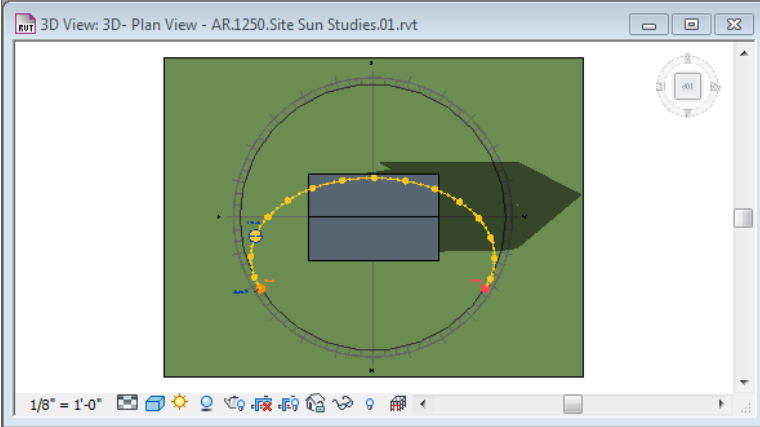
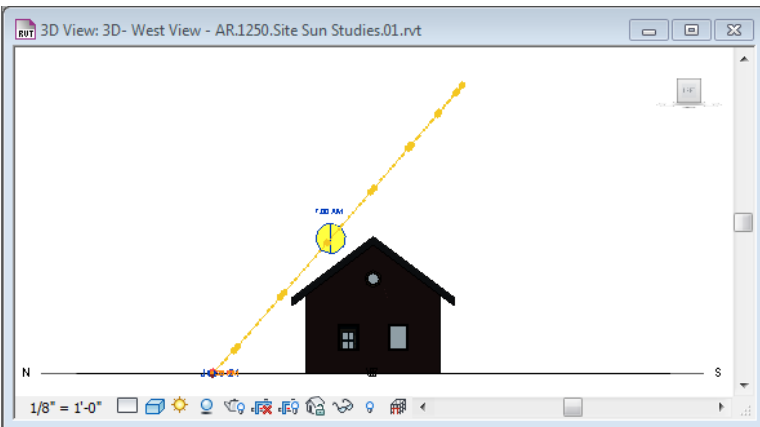
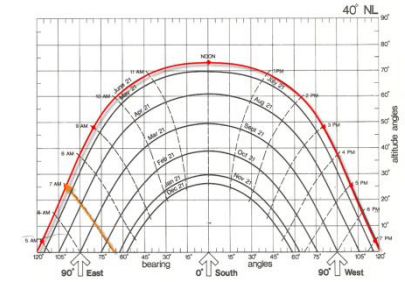
EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun

## Summer Solstice – June 21 @ 7 AM

### Brooklyn NY 40 degrees North Latitude



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- **9 AM**
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

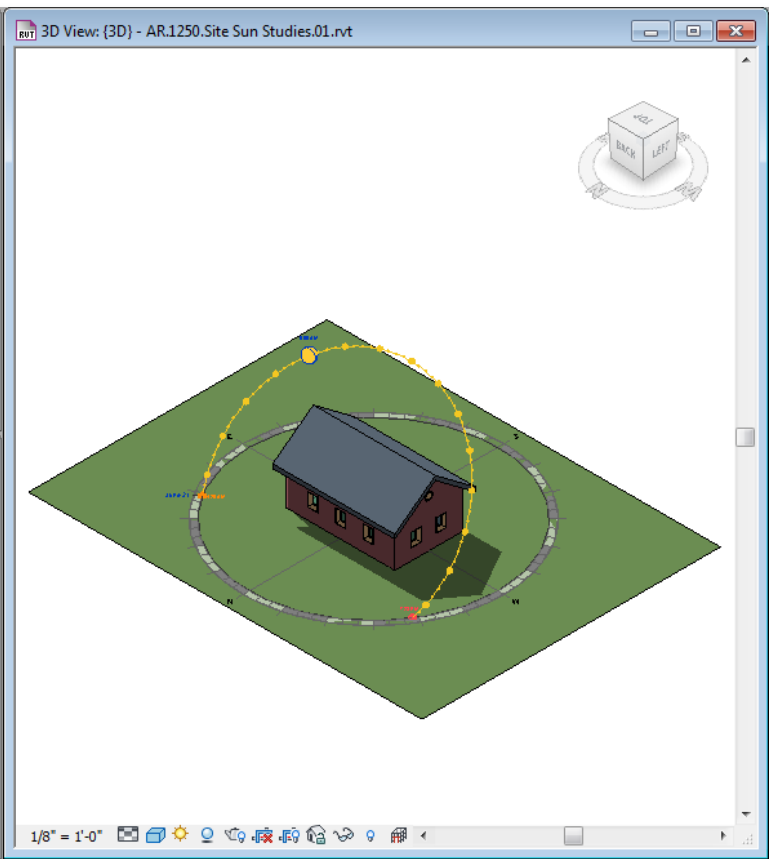
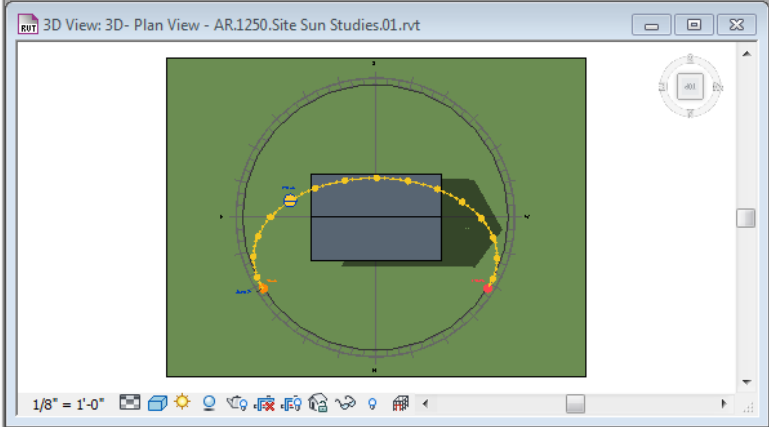
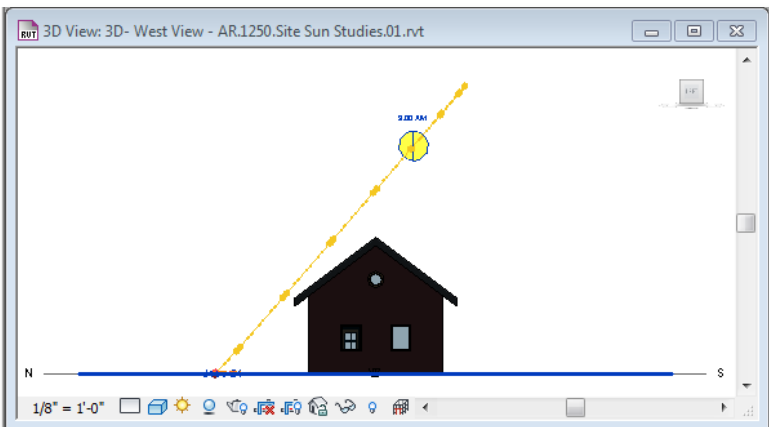
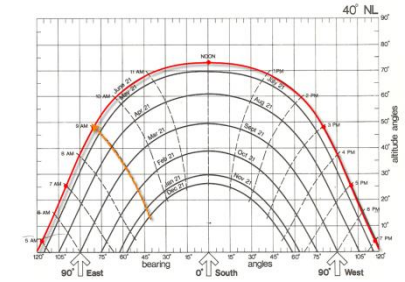
EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun

## Summer Solstice – June 21 @ 9 AM

### Brooklyn NY 40 degrees North Latitude



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- **12 NOON**
- 3 PM
- 5 PM
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

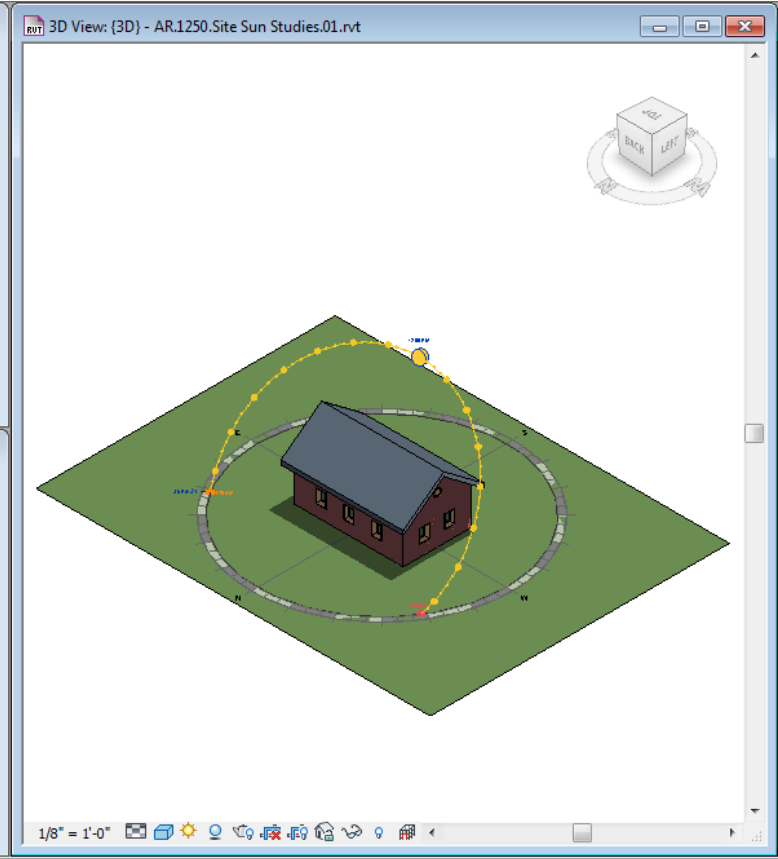
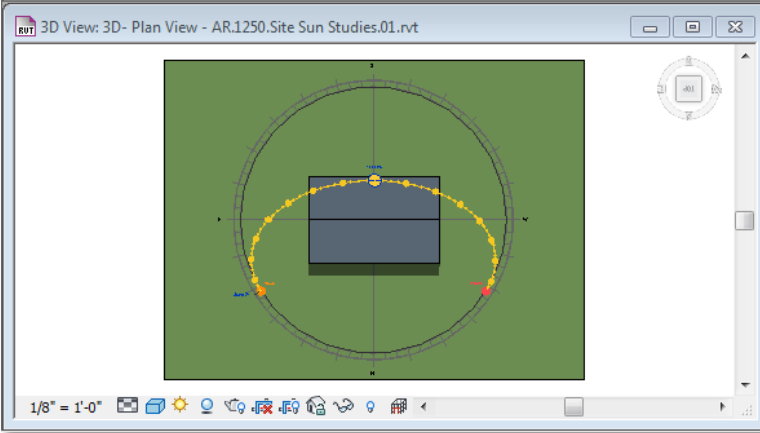
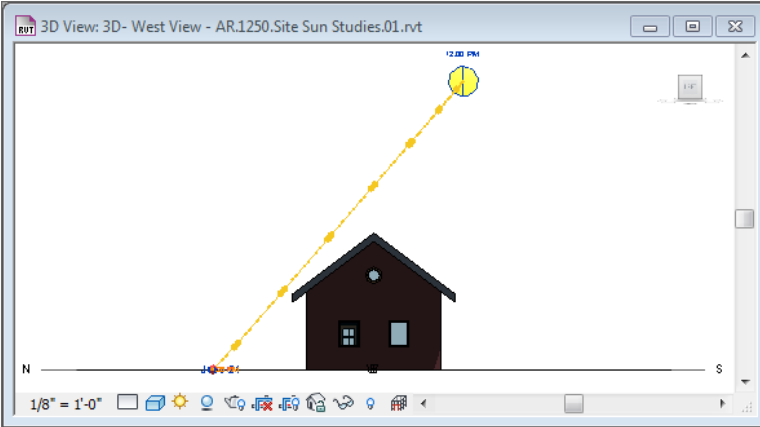
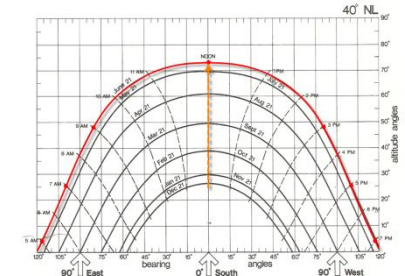
EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A

# The Sun and Climate - Charting the Sun

## Summer Solstice – June 21 @ 12 Noon

### Brooklyn NY 40 degrees North Latitude



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- **3 PM**
- 5 PM
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

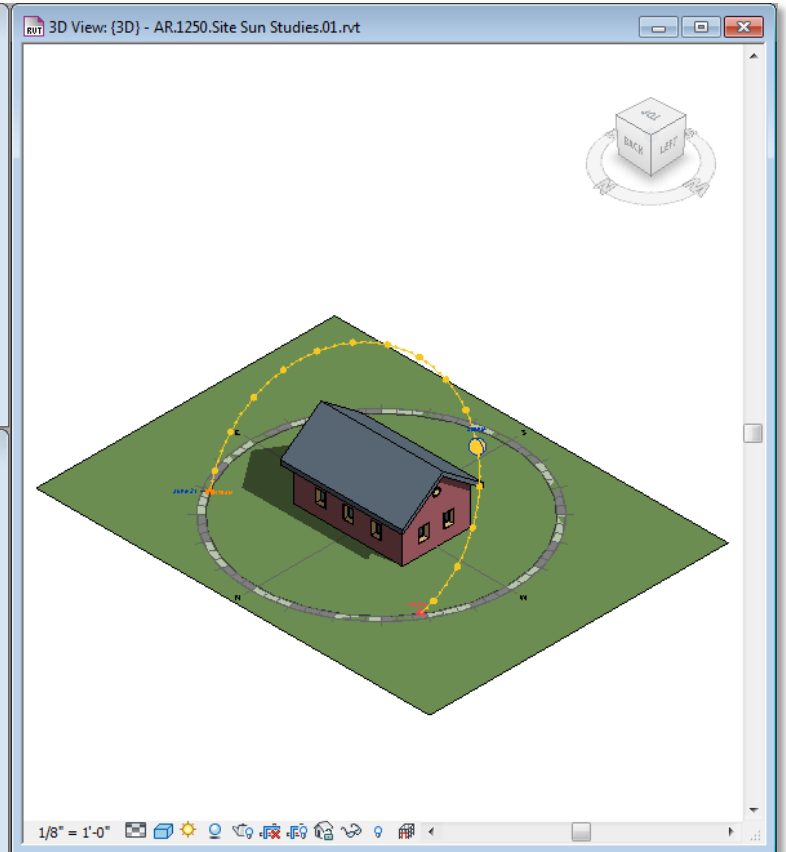
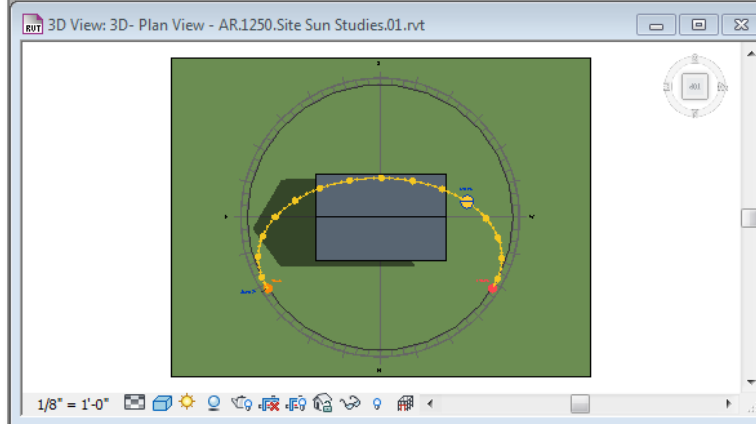
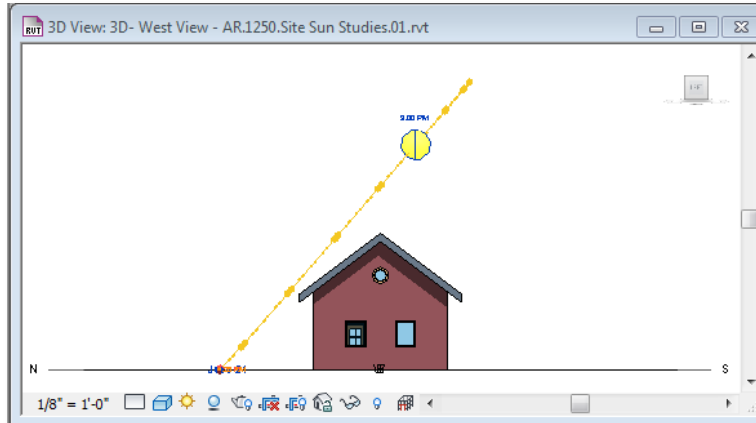
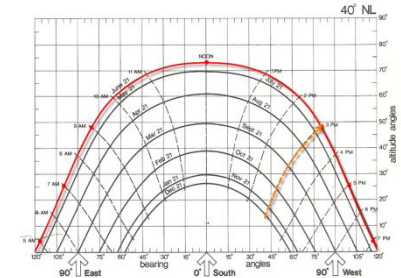
EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A

# The Sun and Climate - Charting the Sun

## Summer Solstice – June 21 @ 3 PM

### Brooklyn NY 40 degrees North Latitude



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- **5 PM**
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

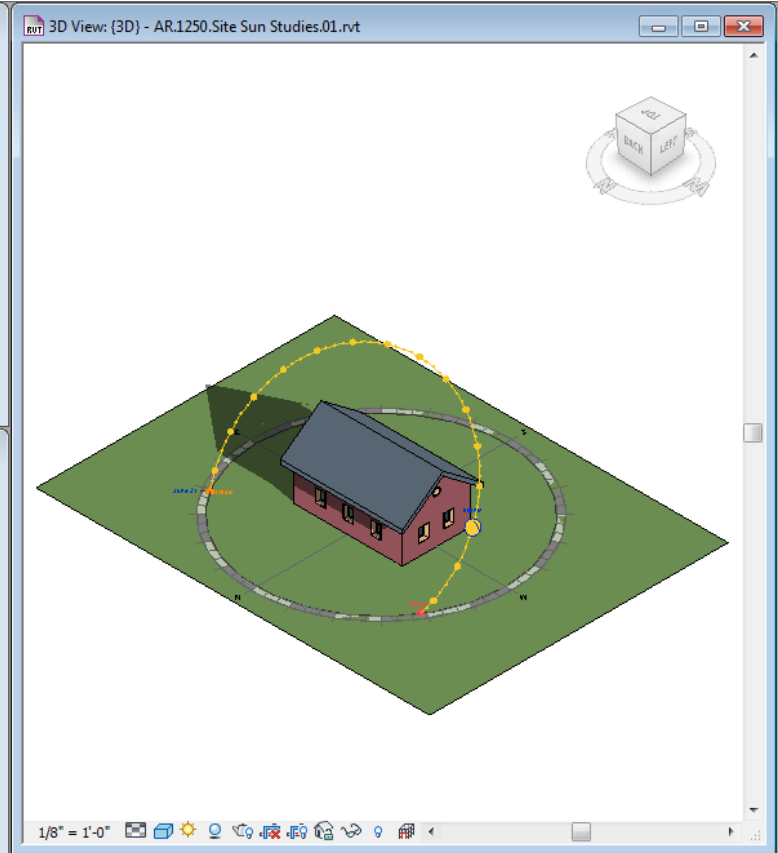
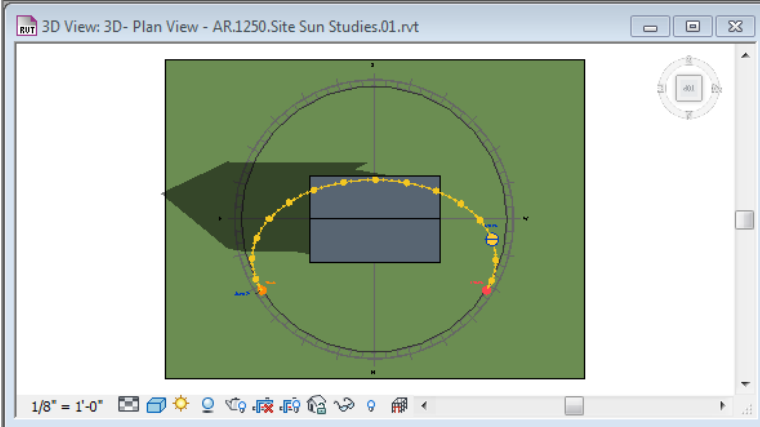
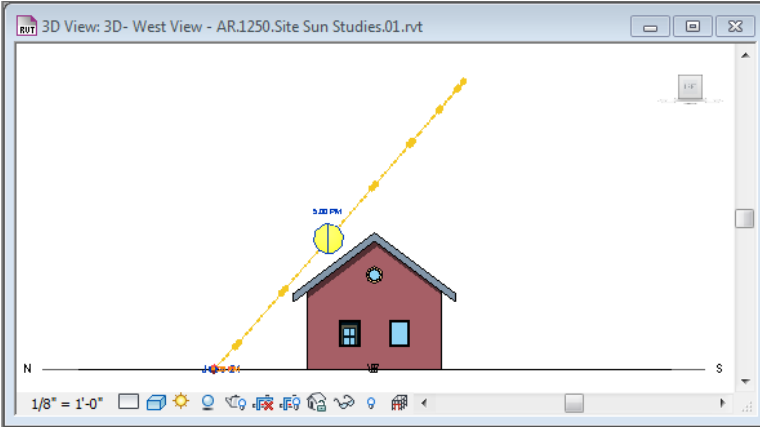
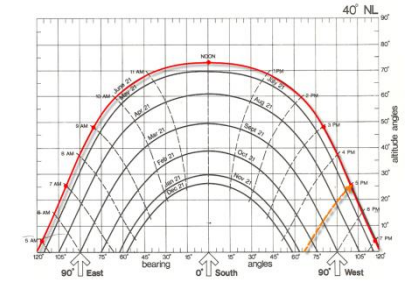
EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun

## Summer Solstice – June 21 @ 5 PM

### Brooklyn NY 40 degrees North Latitude



# LECTURE TWO CLIMATE

## SUN CHART & EXERCISES

### SUN CHART

#### READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

#### TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- **7 PM**

#### REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

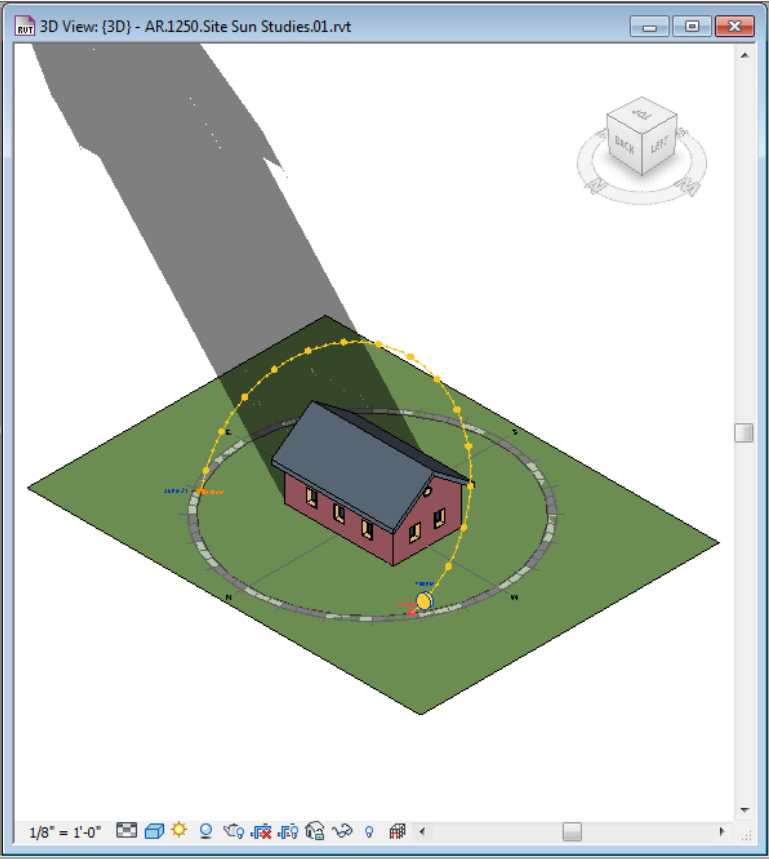
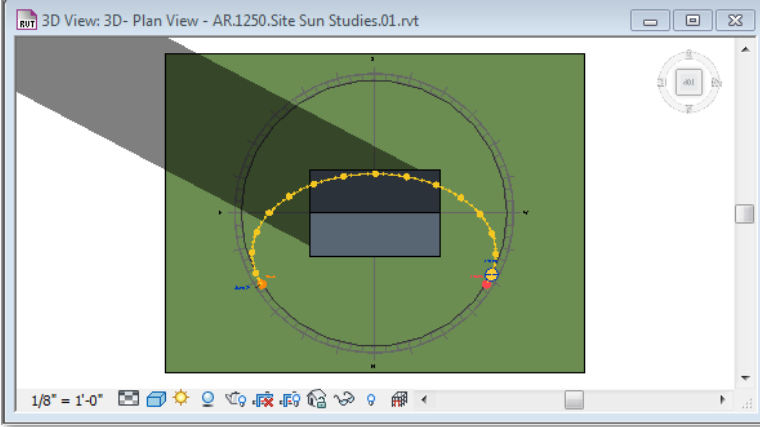
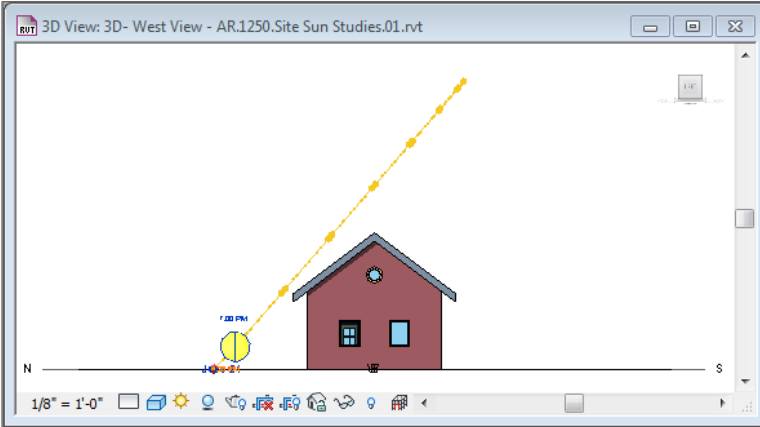
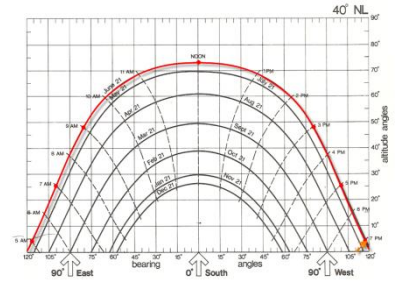
#### EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun

## Summer Solstice – June 21 @ 7 PM

### Brooklyn NY 40 degrees North Latitude





- PATH/DATE
- TIME
- ALTITUDE
- BEARING

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

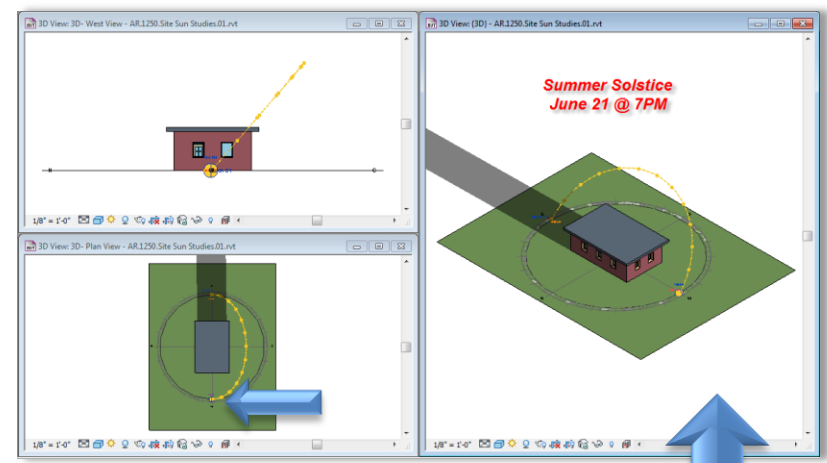
- STILL VIEW
- SOLAR STUDY

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

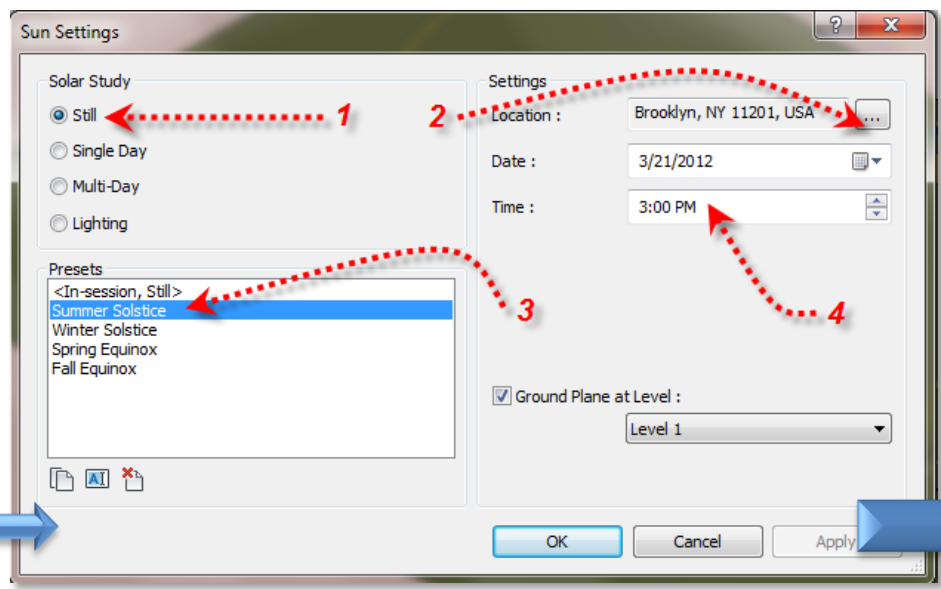
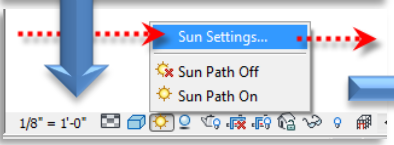
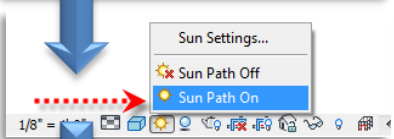
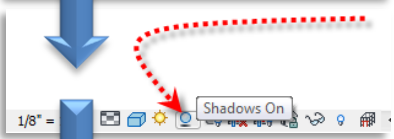
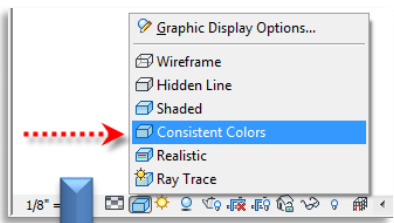
# The Sun and Climate - Charting the Sun

## Revit Step by Step – Still View

- *Consistent Colors*
- *Shadows On*
- *Sun Path On*
- *Sun Settings*



### Start Here



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

EXERCISES

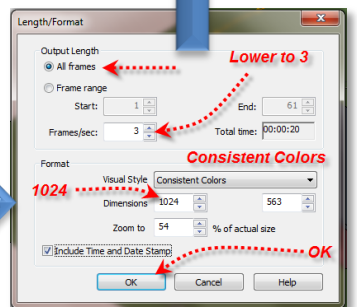
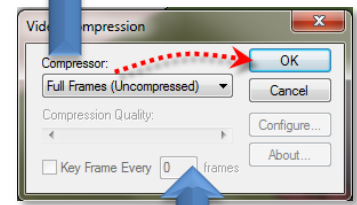
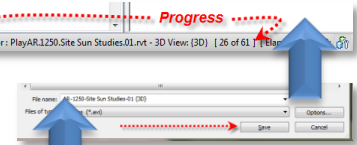
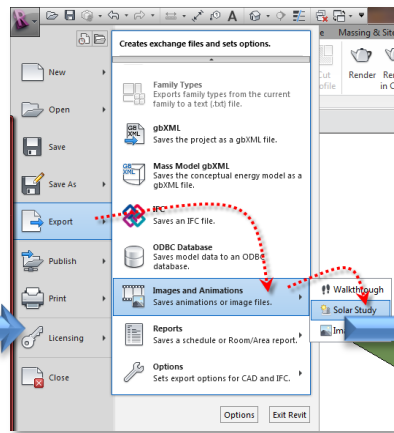
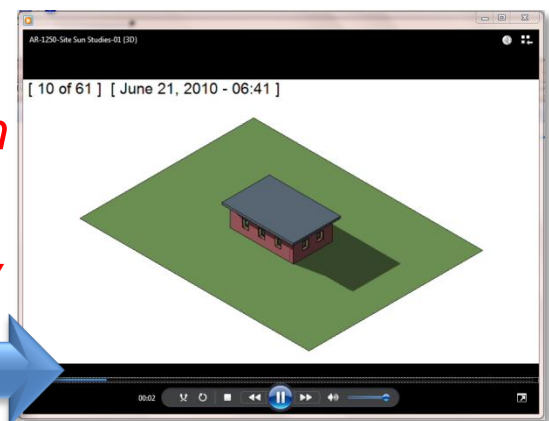
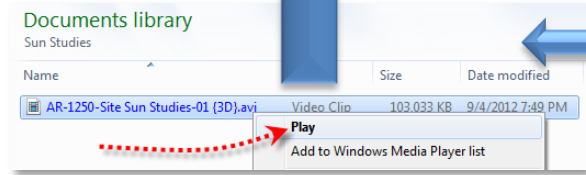
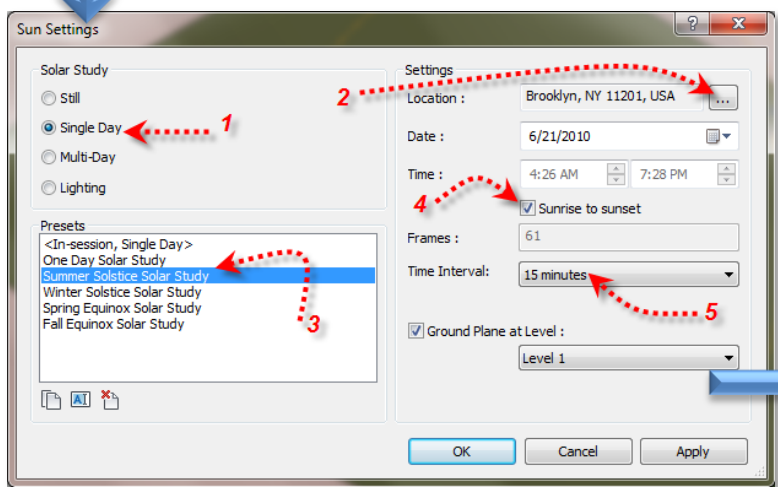
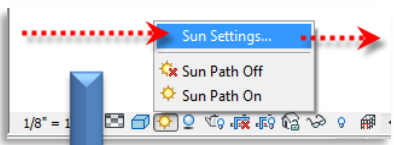
- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun

## Revit Step by Step – Solar Study Animation

- Sun Settings
- Export > Images & Animations > Solar Study
- Select AVI > Play

Start Here



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

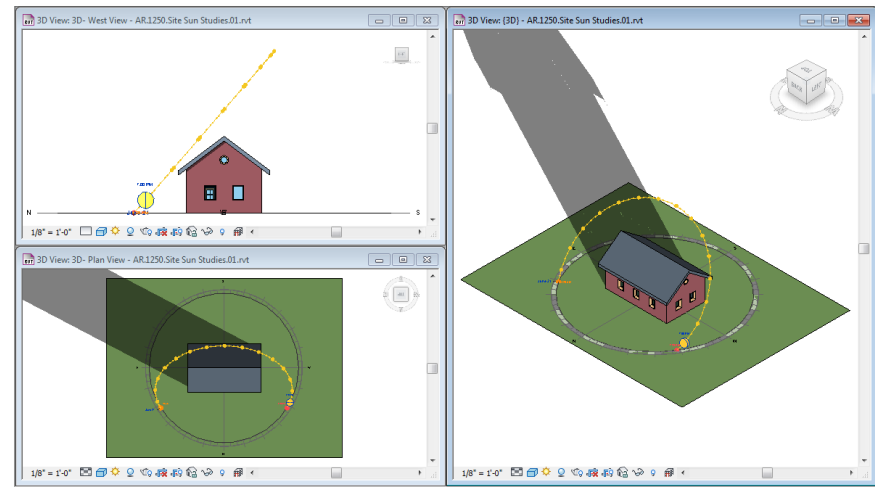
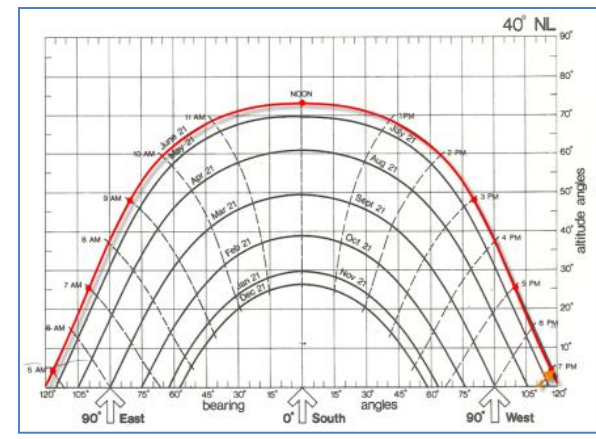
EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun

*Try a different month and compare:  
for 40 degrees North Latitude  
(Brooklyn NY)*

- *The Winter Solstice (December 21)*
- *The Fall Equinox (September 21)*
- *The Spring Equinox (March 21)*



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
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- 3 PM
- 5 PM
- 7 PM

REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

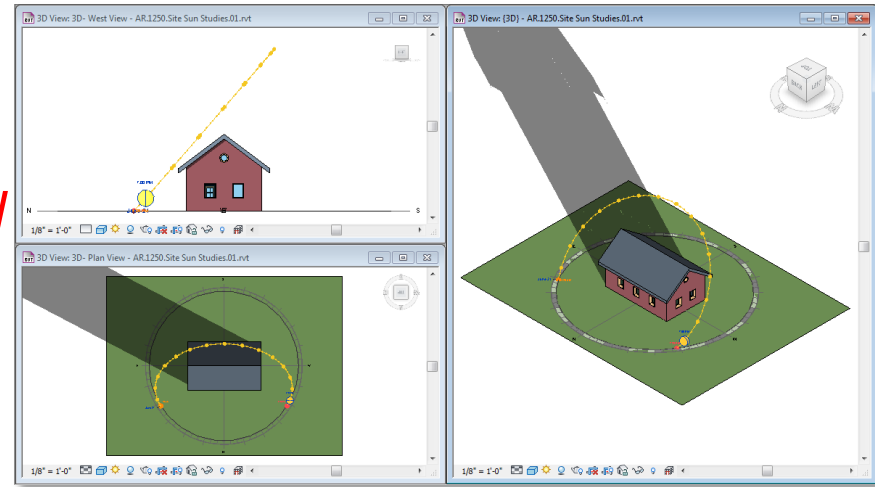
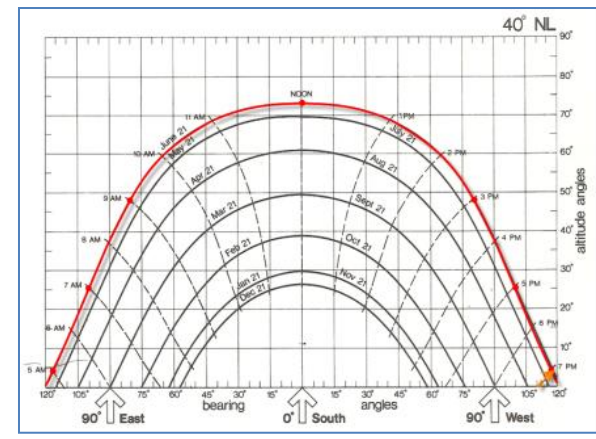
EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun

*Try a different location and compare:  
for the Spring Equinox (March 21)*

- Nome Alaska
- Minneapolis Minnesota
- New York NY
- Key Largo Florida
- Buenos Aires
  
- *Try a place you have lived  
or a place you might like  
to visit.*



SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM

REVIT TUTORIAL

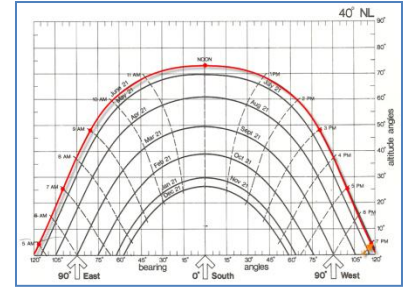
- STILL VIEW
- SOLAR STUDY

EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- HOMEWORK

# The Sun and Climate - Charting the Sun

*Try answering the following questions using the chart for 40 north latitude*



- *At what time does the sun set on April 21?*
- *What day of the year has the fewest hours of daylight? (how many hours would that be?)*
- *What day(s) of the year has exactly 12 hours of daylight?*
- *On which day(s) does the sun rise due east and set due west?*
- *On which day(s) does the altitude of the sun reach a maximum of 38 degrees?*
- *What time does the sun rise on May 21 & what is the bearing?*
- *At 3 PM on August 21 what is the altitude and bearing of the sun?*
- *Repeat the questions for a different latitude...*

SUN CHART &  
EXERCISES

SUN CHART

READING THE CHART

- PATH/DATE
- TIME
- ALTITUDE
- BEARING

TRACKING THE PATH

- 5 AM
- 7 AM
- 9 AM
- 12 NOON
- 3 PM
- 5 PM
- 7 PM


REVIT TUTORIAL

- STILL VIEW
- SOLAR STUDY

EXERCISES

- NEW MONTH
- NEW LOCATION
- Q & A
- **HOMWORK**

# The Sun and Climate - Charting the Sun - Homework



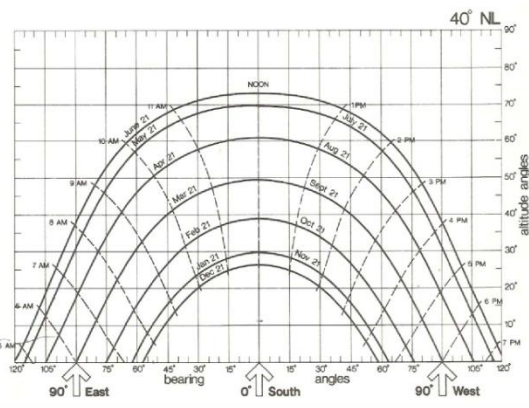
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**ARCH\_1250 Site Planning & Sustainability  
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**Sun Chart for 40 degrees North Latitude**  
Answer each of the following questions using both of the charts

1. What time does the sun rise on October 21?
2. What is the altitude of the sun on December 21st at noon?
3. How does the sun path on March 21 compare to Sept 21?
4. At 4pm on April 21st what is the altitude of the sun?
5. What time does the sun set on the day of the summer solstice?
6. What is the bearing of the sun as it rises on the equinox?
7. What day has the greatest number of daylight hours? How many?



AR1250 Day.02 MacroClimate SunChart.Diagram.40N.docx  
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Page 1 of 2  
Q & A Worksheet

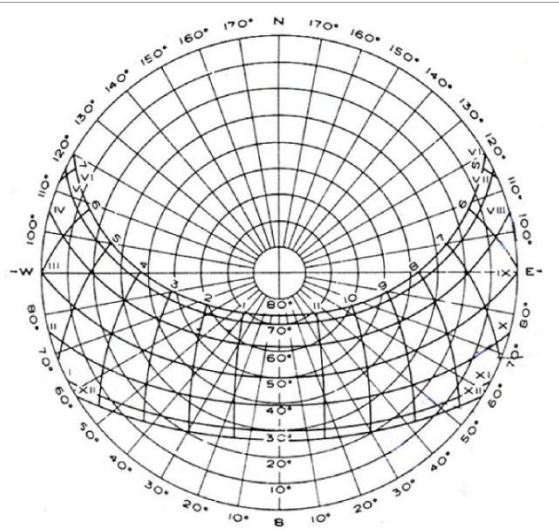


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**Sun Chart for 40 degrees North Latitude**



**SUN CHART FOR 40° NORTH LATITUDE**

*For each of the charts pay attention to how the directions of east and west and the direction that the sun travels are indicated. Are they the same?*

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Page 2 of 2  
Q & A Worksheet