



## GUILD QUEST #4 THE GREAT(ER) BOSTON SUNDIAL SCAVENGER HUNT



due online by 11:59pm Friday November 30, 2018 (one .pdf per guild includes 1<sup>st</sup> page cover letter & then appended Scavenger Hunt Report, only 1 guild member submits)

### 80 XPs TOTAL FOR EACH GUILD MEMBER

- ❑ **Cover Letter** – what did you do, who did what, how did you travel, how much money did your guild spend in total travel costs (round to the nearest whole dollar), what did you discover (any surprises?), and what did you learn that you have applied to your own sundial project. Refer to the Cover Letter Rubric for proper cover letter format which was included in Guild Quest #1 (3 paragraphs, electronic signatures OK). [5 XPs]
- ❑ **Scavenger Hunt** – using the list below of actual sundials located in the Greater Boston area, visit as least 4 sundial locations in total (3 sundials at Harvard University and at least 1 additional sundial anywhere from this list, your choice). Write up your Scavenger Hunt Report according to the rules (below) and report requirements starting on page 9. Convert your document to a .pdf, append it to your signed .pdf cover letter, and submit ONLY ONE (1) .pdf to Blackboard per guild. [75 XPs]

#### Scavenger Hunt Rules

1. Your guild may split up to complete this scavenger hunt but ALL guild members must participate by visiting at least 1 sundial each DURING DAYLIGHT HOURS (sunny or cloudy conditions are OK). Proof of each guild member's participation will be evident in the "selfie" photographs (see below).
2. Only one (1) guild member is required in each educationally appropriate "selfie" photograph with the sundial and any Northeastern logo as proof of your visit, but additional guild members, if present, should be in the photograph too.
3. You should plan your trips strategically and economically using public transportation (subway T or bus). Car ride services such as Uber and Lyft, bike share services and traditional taxis are allowed but will be more expensive. Professor Love has estimated a total cost of about \$4 per guild member to travel by T from Northeastern to one sundial location and back to campus (\$2 each way or \$4 round trip). All sundial locations have been chosen within walking distance of Boston's T or bus stations (orange line, red line, etc). Expenses will not be reimbursed by Professor Love so please travel as economically as possible.
4. You should travel with another person for safety reasons but it is not required. Your companion does not need to be a guild member (it can be another student in the class, a friend or a roommate). **Please avoid travelling alone to complete this scavenger hunt. For safety reasons, please do NOT visit any sundials after dark.**
5. You should take your "selfie" photograph wearing any piece of Northeastern apparel or accessory (hat, sweatshirt) that clearly shows the Northeastern logo in the photograph. Show that Husky spirit!
6. You must visit each sundial ONLY during the day, regardless of whether it is sunny or cloudy.
7. **Sundial Type & Inscriptions** – you must identify each sundial's type (horizontal, equatorial, vertical, polar, armillary, analemmatic, portable, ring or other) in your Scavenger Hunt Report. Identify any mottoes or inscriptions written on the dial or on its base.

8. **Gnomon or Equatorial Dial Plate Angle** – In addition to your “selfie” photograph with you and your Northeastern logo in front of the sundial, you must also determine the angle at which the gnomon or the dial plate is positioned relative to either the horizon or a vertical wall, depending on the type of sundial. IF you can get safely close enough to the sundial, you could try a few strategies:
- Take a separate photograph of the sundial in a way that will allow you to subsequently measure the angle. For example, if the sundial is a horizontal type, you will need to determine if the gnomon’s angle is exactly equal to  $42^\circ$  (Boston’s latitude). Refer to Figure 1 below.



Figure 1. Photograph taken perpendicularly with respect to gnomon on sundial behind Holden Chapel at Harvard University (left) and yellow lines drawn on the photograph in order to measure the angle (right).

- Or use a “bubble level” (device or app) to measure the desired angle. Save a screenshot or write down the angle in your notebook to include in your Scavenger Hunt Report.



Figure 2. Photograph of Bubble Level app.

9. **Gnomon's Direction** – You must also determine the gnomon's direction using a magnetic compass. Is the gnomon pointing toward geographical north or magnetic north or somewhere in between? Remember that geographical north points approximately 15° to the right of magnetic north for Boston (refer to Figure 5). Using your smartphone's compass app, align your phone parallel to the sundial's gnomon and take a screenshot of the compass reading to include in your Scavenger Hunt Report. Refer to Figure 4 for an example.

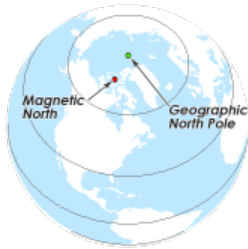


Figure 3. Norths.

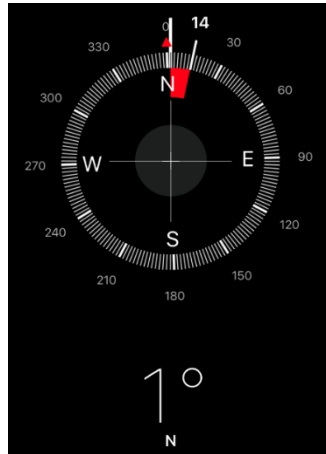


Figure 4. Compass app.

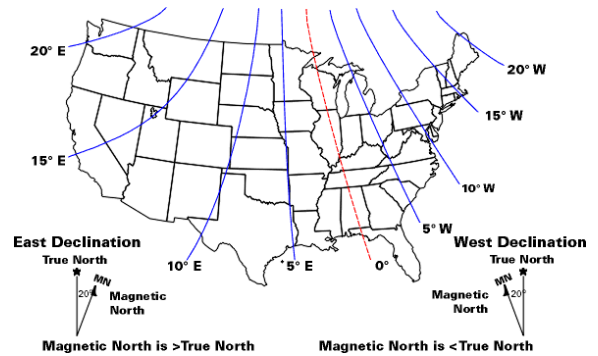


Figure 5. Boston's magnetic north is west of true N.

## SCAVENGER HUNT REQUIRED SUNDIALS – HARVARD UNIVERSITY

- ❖ Find 2 outdoor sundials at Harvard University from the North American Sundial Society's registry:

1. **Smith Hall, part of Kirkland House**, 6 minute walk from Harvard Square down John F. Kennedy Street. You will have to get creative with your gnomon measurements & compass screenshot.

	<h3>Cambridge</h3>	<p>Sundial 45</p>	
<p>State/Province: Massachusetts</p>		<p>Country: USA</p>	
<p>Dial Type: Vertical</p>		<p>Condition:</p>	
<p>Latitude:</p>		<p>Longitude:</p>	
<p>Location:  <span style="color: blue;">■</span> Harvard University Smith Hall, part of Kirkland House.</p>			

2. **Holden Chapel**, 3 minute walk from Harvard Square, located in Harvard Yard along Massachusetts Avenue:

	<h3>Cambridge</h3>	<p>Sundial 556</p>	
<p>State/Province: Massachusetts</p>		<p>Country: USA</p>	
<p>Dial Type: Horizontal</p>		<p>Condition: Fair</p>	
<p>Latitude: 42° 22' N</p>		<p>Longitude: 71° 06' W</p>	
<p>Location:  <span style="color: blue;">■</span> Harvard University behind Holden Chapel</p>			
<p>Description:  <span style="color: blue;">■</span> A stone horizontal dial on a pedestal about 4 ft. high donated to Harvard by class of 1870.</p>			

- ❖ Find 1 indoor collection of historic sundials at Harvard University in the Putnam Gallery of the **Collection of Historical Scientific Instruments**. For this collection, you will not be able to measure gnomon angle or direction but you should take note of various sundials' types, dial furniture and inscriptions, especially any sundials that match the same type of your sundial project. Photographs are allowed in the Putnam Gallery so please take a few pictures for your Report.

Use the address 1 Oxford Street, Science Center 136 Harvard University. Hint: this building is closer to Harvard Yard and Holden Chapel than Kirkland House. Open daily 11am – 4pm except Saturdays. <https://chsi.harvard.edu/visit-us> **Don't forget to sign the guestbook!**



Figure 6. Collection of Historical Scientific Instruments in the Putnam Gallery at Harvard University.


- ☼ Bonus 5 XPs: Find the first programmable computer “Mark 1” in Harvard’s Science Center, take a Northeastern “selfie” and explain the significance of this historical scientific instrument to modern society in your Scavenger Hunt Report. How has this technology affected society? How has society affected this technology over time?

**MORE SCAVENGER HUNT SUNDIALS** - visit at least one sundial from the following list (your choice):

- ❑ **Massachusetts General Hospital** – intersection of North Anderson and Parkman Streets. 5 minute walk from the Charles/MGH T Station (Red Line).



- ❑ **Somerville** – 175 Elm Street, intersection of Elston & Elm Streets on a private house/business. 10 minute walk from either Porter Square T stop or Davis Square T stop (Red Line).  
*Please respect the homeowner's property and take your Northeastern "selfie" from the sidewalk.*



## Somerville

**Sundial 441**

**State/Province:** Massachusetts    **Country:** USA  
**Dial Type:** Vertical    **Condition:** Good  
**Latitude:** 42° 24' N    **Longitude:** 71° 07' W

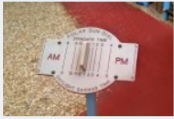
**Location:**

- 175 Elm Street at the intersection of Elston Street, south of Davis Square

**Description:**

- This 5 foot x 7 foot vertical dial is painted onto the true south facing concrete wall of a commercial building. The gnomon and hour lines appear to be weathered copper or bronze. The hour lines are corrected for longitude, but may be in error by about 5 minutes. The dial is in relatively good condition, but the painted numerals are fading. The building itself has been in several hands over the last 10-15 years.

- ❑ **Gibbons Park, Cambridge** – intersection of Columbus Ave and Kimball Street. 10 minute walk from Alewife T station (Red Line). This unique polar dial is at a playground!



## Cambridge

**Sundial 725**


**State/Province:** Massachusetts    **Country:** USA  
**Dial Type:** Polar    **Condition:** Excellent  
**Latitude:** 42° 23.986' N    **Longitude:** 71° 08.269' W

**Location:**


- Gibbons Park  
East side of Alewife Brook Parkway at Whitmore Avenue  
Cambridge

**Description:**

- A small polar dial with Arabic numerals for EST and EDT



- ❑ **Hayes Square, Charlestown** – intersection of Bunker Hill and Moulton Streets. 20 minute walk from Community College T station (Orange Line). 20 minutes T ride from Ruggles T station to Community College direct (inbound Oak Grove Orange Line). 40 minutes total, one way from NU.



## Charlestown

**Sundial 268**

**State/Province:** Massachusetts    **Country:** USA  
**Dial Type:** Horizontal    **Condition:** Good  
**Latitude:** 42° 23' N    **Longitude:** 71° 03' W

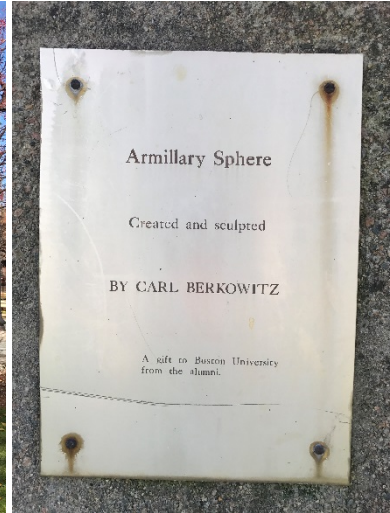
**Location:**

- Hayes Square, Bunker Hill & Moulton Sts.

**Description:**

- A 10 foot diameter bronze and granite horizontal dial with bronze gnomon and Arabic hour numerals on a 2 foot high granite base. Craftspeople of Colonial days are pictured on the face of the sundial. Sculptures depict a grandpa holding a baby while looking at the dial from the east side and a child peeking from behind the 5 foot tall bronze gnomon. Each bronze hour numeral includes a scene sculpture.

- ❑ **Boston University Armillary Sphere** – 640 Commonwealth Ave, intersection of Commonwealth Ave and Hinsdale Mall Streets. 30 minute walk from Northeastern University, past Fenway Park, over the Massachusetts Turnpike highway via Brookline Ave to Commonwealth Ave (head west).



## PUBLIC TRANSPORTATION [WWW.MBTA.COM](http://WWW.MBTA.COM)



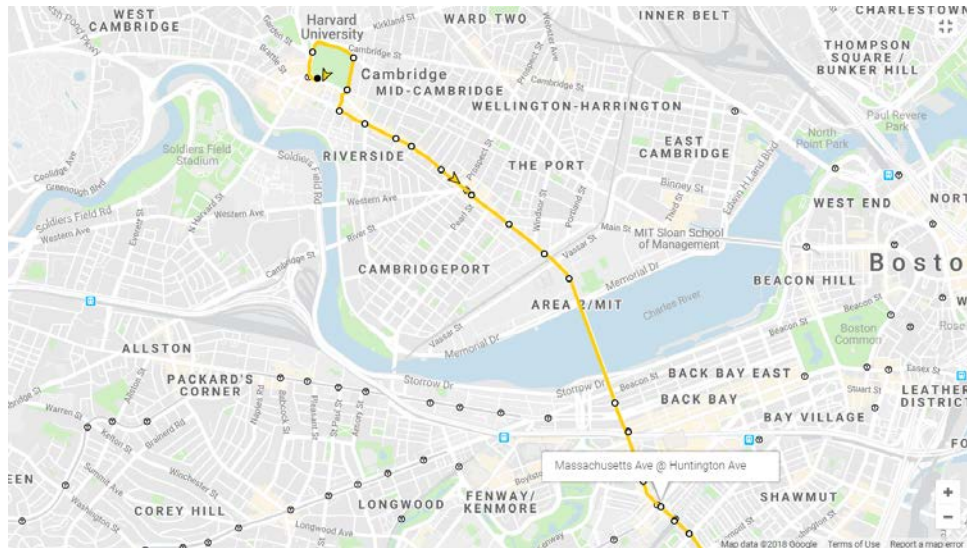
## GETTING TO HARVARD SQUARE

1. MBTA Bus #1 to Harvard Square from Massachusetts Ave/Huntington Ave **30 min bus ride one way**

\$1.70 CharlieCard one way

\$2.00 cash or CharlieTicket one way

<https://www.mbta.com/schedules/1/line>



-OR-

2. MBTA Red Line to Harvard Square

**30 - 45 minutes T one way from NU**

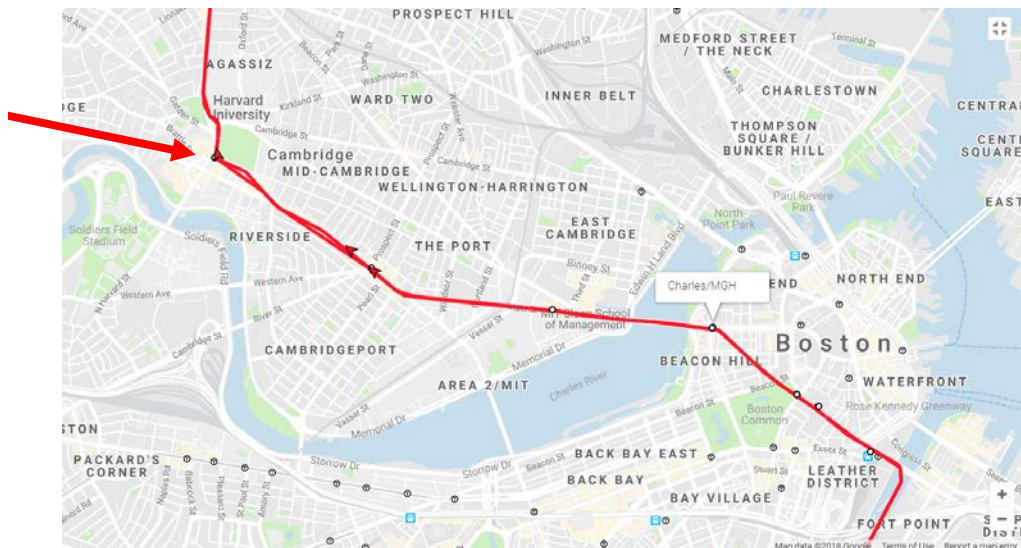
\$2.25 CharlieCard one way

\$2.75 cash or CharlieTicket one way

Take either Northeastern Green Line inbound to Park Street, transfer for free to outbound Alewife Red Line to Harvard Square T stop, or take Ruggles Orange Line inbound to Downtown Crossing, transfer for free to outbound Alewife Red Line to Harvard Square T stop.

<https://www.mbta.com/schedules/Red/line>

Harvard  
Square



## GETTING TO CHARLES/MGH

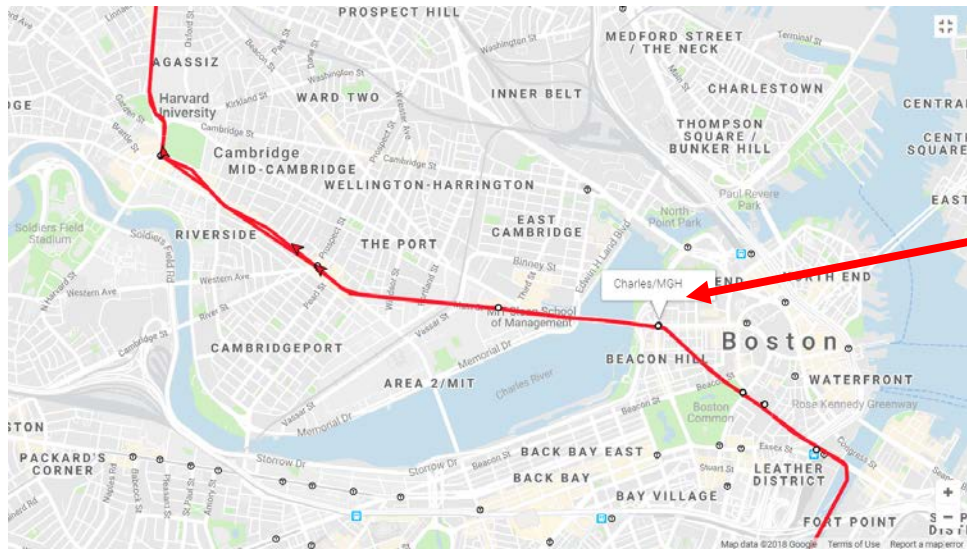
**20 – 30 minutes T one way from NU**

MBTA Red Line \$2.25 CharlieCard one way or \$2.75 cash or CharlieTicket one way

1. Take Northeastern Green Line inbound to Park Street, transfer for free to outbound Alewife Red Line to Charles/MGH stop.

-or-

2. Take Ruggles Orange Line inbound to Downtown Crossing, transfer for free to outbound Alewife Red Line to Charles/MGH T stop.



Charles / MGH

## GETTING TO PORTER SQUARE, DAVIS SQUARE OR ALEWIFE

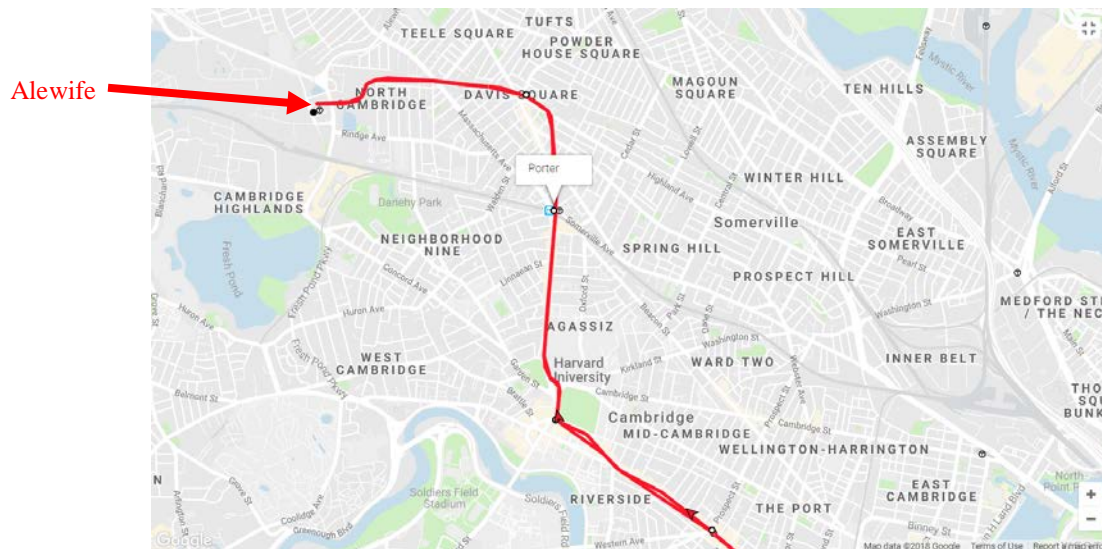
**40 - 50 minutes T one way from NU**

MBTA Red Line \$2.25 CharlieCard one way or \$2.75 cash or CharlieTicket one way

1. Take Northeastern Green Line inbound to Park Street, transfer for free to outbound Alewife Red Line to either Porter Square, Davis Square or Alewife T stop.

-or-

2. Take Ruggles Orange Line inbound to Downtown Crossing, transfer for free to outbound Alewife Red Line to either Porter Square, Davis Square or Alewife T stop.

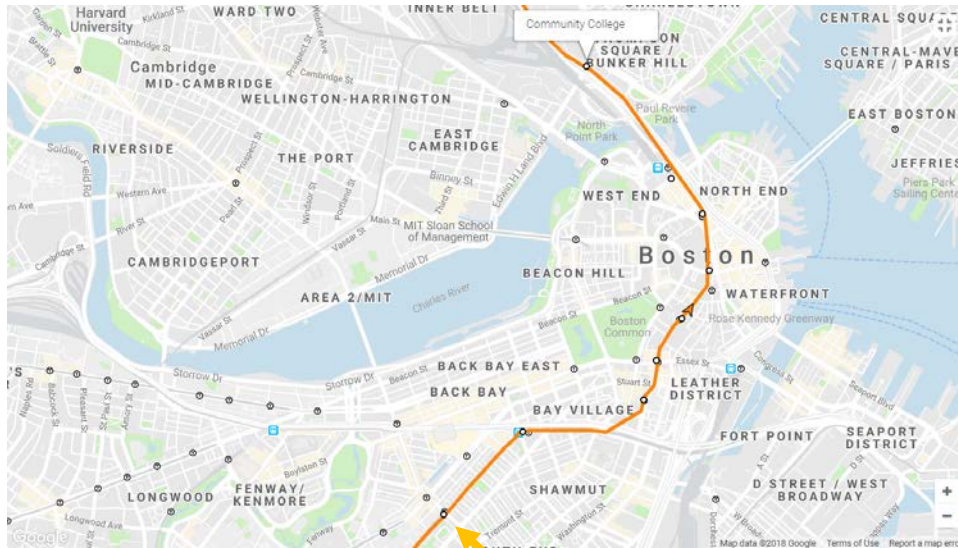


Alewife



**GETTING TO HAYES SQUARE, CHARLESTOWN** **40 minutes total one way from NU**  
 MBTA Orange Line \$2.25 CharlieCard one way or \$2.75 cash or CharlieTicket one way

From Ruggles or Mass Ave Orange Line station, take inbound Oak Grove T directly to Community College T station (20 minutes). Then walk 20 minutes to Hayes Square in Charlestown.

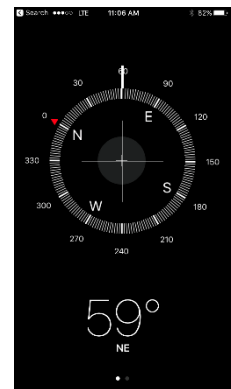


Mass Ave  
Orange Line

**SCAVENGER HUNT REPORT** – please use the following section headings and requirements, in this exact order, **bolded** in your write-up, for the following sundials (if applicable): **[75 XPs]**

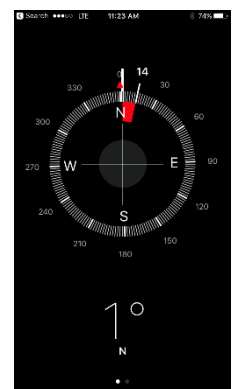
**1. Harvard University – Kirkland House Sundial (required) (15 XPs out of 75 XPs)**

- Include a 3 inch × 5 inch picture of your Northeastern “selfie” photograph (example shown right). **5 XPs out of 15 XPs.**
- Identify this sundial’s type. **3 XPs out of 15 XPs.**
- Describe how it works and what time it indicated (if it was sunny during your visit). **2 XPs out of 15.**
- Estimate the angle and direction of this sundial’s gnomon using your photographs and compass screenshot as 3 inch × 5 inch picture(s) (example shown right). *You may need to get creative since this sundial is so far up and inaccessible to closer inspection. Unless you are Spiderman, please don’t climb the building and use your smartphone zoom feature instead!* **5 XPs out of 15 XPs.**



## 2. Harvard University – Holden Chapel Sundial (required) (20 XPs)

- Include a 3 inch × 5 inch picture of your Northeastern “selfie” photograph (example shown right). 5 XPs out of 20 XPs.
- Identify this sundial’s type and any inscriptions (words, phrases). 5 XPs
- Describe how it works and what time it indicated (if it was sunny during your visit). 5 XPs out of 20 XPs.
- Estimate the angle and direction of this sundial’s gnomon using your photographs and compass screenshot as 3 inch × 5 inch picture(s) (example shown below). 5 XPs out of 20 XPs.



## 3. Harvard University – Collection of Historical Scientific Instruments (required) (20 XPs)

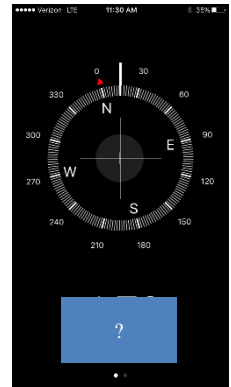
- Include a 3 inch × 5 inch picture of your Northeastern “selfie” photograph (example shown right except add your “selfies”). 5 XPs out of 20 XPs.
- Identify any historical sundial that matches your sundial project’s type. Take a close-up photograph. 5 XPs.
- Look up more information about this particular sundial using the Putnam Gallery’s booklet or online tool: <https://chsi.harvard.edu/waywiser>. Describe when it was built, who built it, how it works, any dial furniture present, and its overall approximate dimensions (height, length, width). 10 XPs out of 20 XPs.



**ONE ADDITIONAL SUNDIAL OF YOUR CHOICE IN YOUR REPORT: (20 XPs)**

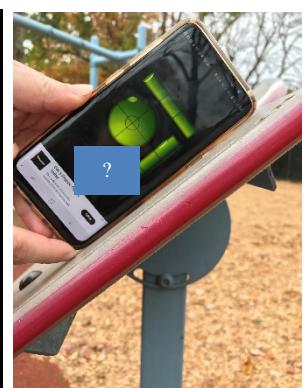
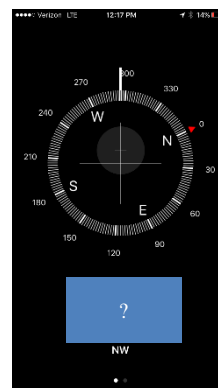
**4. Massachusetts General Hospital Sundial (if applicable)**

- Include a 3 inch  $\times$  5 inch picture of your Northeastern “selfie” photograph (example shown right).
- Identify this sundial’s type and any inscriptions (words or phrases).
- Describe how it works and what time it indicated (if it was sunny during your visit).
- Estimate the angle and direction of this sundial’s gnomon using your photographs and compass screenshot as 3 inch  $\times$  5 inch picture(s) (example shown below).



**5. Gibbons Park Sundial (if applicable)**

- Include a 3 inch  $\times$  5 inch picture of your Northeastern “selfie” photograph (example shown right).
- Identify this sundial’s type and any inscriptions (words or phrases).
- Describe how it works and what time it indicated (if it was sunny during your visit).
- Estimate the angle and direction of this sundial’s gnomon using your photographs and compass screenshot as 3 inch  $\times$  5 inch picture(s) (example shown below).



## 6. Hayes Square (Charlestown) Sundial (if applicable)

- Include a 3 inch  $\times$  5 inch picture of your Northeastern “selfie” photograph.
- Identify this sundial’s type and any inscriptions (words or phrases).
- Describe how it works and what time it indicated (if it was sunny during your visit).
- Estimate the angle and direction of this sundial’s gnomon using your photographs and compass screenshot as 3 inch  $\times$  5 inch picture(s).



## 7. Somerville Sundial (if applicable)

- Include a 3 inch  $\times$  5 inch picture of your Northeastern “selfie” photograph.
- Identify this sundial’s type and any inscriptions (words or phrases).
- Describe how it works and what time it indicated (if it was sunny during your visit).
- Estimate the angle and direction of this sundial’s gnomon using your photographs and compass screenshot as 3 inch  $\times$  5 inch picture(s).



## 8. Boston University Armillary Sphere (if applicable)

- Include a 3 inch  $\times$  5 inch picture of your Northeastern “selfie” photograph.
- Identify this sundial’s type and any inscriptions (words or phrases).
- Describe how it works and what time it indicated (if it was sunny during your visit).
- Estimate the angle and direction of this sundial’s gnomon using your photographs and compass screenshot as 3 inch  $\times$  5 inch picture(s).
- Comment on whether you think this is actually a working sundial. Why or why not?

