THE ASTROLABE

The “Star Taker”
THE ASTROLABE INTRO  [~5 MIN]

• [4:46min] Short video introduction to the ASTROLABE

• http://www.youtube.com/watch?v=SwDU0VFWIQ8
MAKING & USING AN ASTROLABE

The middle ages
Clock, GPS, & Future predictor.
WHAT YOU NEED  [~ 3 MIN ]

- Astrolabe template page 1 : Mother, BACK
- Astrolabe template page 2 : Mother, FRONT
- Astrolabe template page 3 : Rete [photocopied on a transparency]
- Astrolabe template : Rule and Label
- 8.5”x11” thick card stock paper – one sheet
- Pair of scissors
- Glue stick
- Split pin fastener (or brass tack)
- Ribbon or thin string
HOW TO BUILD IT  [~15 MIN]

- Glue the mother front and back templates on to the front and back [OPPOSITE SIDES] of the card stock, so they are positioned back-to-back.
- Glue the Rule and Label on to THE SAME SIDE of the card stock.
- Cut out the Mother, Rete, Rule, & Label.
- Puncture the centre of the Mother, Rete, Rule, & Label.
- Place the Rete on top of the front of the Mother, face up so you can read it.
- Place the Rule on top of the Rete. Face up.
- Place the split pin (or tack) through the hole you just punctured, pushing out into the back of the Mother.
- Turn the Astrolabe around and place the label on the ends of the split pin the is poking out of the back of the Mother, then open the split pin (or bend back the tack) so that all components are held securely together.
LEARNING THE KEY ASPECTS  [~8 MIN ]

• STEREOSCOPIC PROJECTION

• This is concentric circles are the ALTITUDE ANGLES,
• the radial lines are the AZIMUTH ANGLES
• The ZENITH is the point in the centre. It’s the straight ‘up’ spot.

• The grid on the FRONT of the mother is like this
LEARNING THE KEY ASPECTS

• HORIZON LINE
• Only objects above the horizon are visible

• All celestial objects below the horizon can NOT BE SEEN.
LEARNING THE KEY ASPECTS

• The stars move around the north star as the Earth rotates.

• Thus your RETE rotates.
• If the stars fall below the horizon they can NOT be seen at that time.
HOW TO USE THE ASTROLABE [ ~20 MIN ]

- [http://www.joh.cam.ac.uk/library/library_exhibitions/schoolresources/astrolabe/use](http://www.joh.cam.ac.uk/library/library_exhibitions/schoolresources/astrolabe/use)
- Find the date on the back, Using the two innermost concentric rings.
- Use the label to line up to that date.
- Read the sign of the zodiac and the number within that sign. Using the two outermost concentric rings.
- Example: on January 31st the label points to the middle of AQUARIUS. The number within AQUARIUS is around 10.
- Flip the astrolabe over…
- Turn the ruler to point to the position of 10 AQUARIUS on the plastic rete. The numbers go up by twos on our scale.
- Now move the rete & ruler together (keeping their position) until the ruler points at the time of day in question, say 21:00 hrs {BOTH the stars and the ruler will be rotating as you do this.}
HOW TO USE THE ASTROLABE CONTINUED...

• Once you have that you will have a way of finding the location (altitude & azimuth) of any star on the rete, like BETA also called RIGEL in “Orion”
ORION

AS YOU WOULD SEE IT IF YOU LOOKED UP.

NOTE: THE IMAGE IS FLIPPED ON THE RETE DUE TO THE STEREOSCOPIC PROJECTION
HOW TO USE THE ASTROLABE CONTINUED...

• Once you have that you will have a way of finding the location (altitude & azimuth) of any star on the rete, like BETA also called RIGEL in “Orion”

• Using Stellarium we can see that on January 31, 2014 at 21:00hr ….

• RIGEL (Beta) is at an altitude of ~ 31o

• RIGEL (Beta) is at an azimuth of ~ 180o

• Now look at your astrolabe.

• You should see RIGUEL(Beta) on your rete at an altitude of `31o and an azimuth of 180o!

• Note due to the imprecise construction, the stars may not ‘line up’ perfectly on your astrolabe, but …

• … they should be convincingly close ±5o!
LET’S PRACTICE

Let’s pick a new date
Pick a new time
Pick a new star from the RETE…. Say VEGA
Find its ALTITUDE & AZIMUTH
Go to Stellarium and see how close we are
Note: One could do the reverse.

One could use the position of a single star, say RIGEL (Beta) to find the time and date!

We’ll save that exercise for another day.

There is so much more this astrolabe can do.
HOMEWORK ASSIGNMENT

• Take a selfie, or get someone to take a picture of YOU,
• using your ASTROLABE
• outside at NIGHT to find a STAR.
• PRINT OUT PHOTO and place in homework folder/notebook.
ANOTHER EXPLANATION IF TIME PERMITS [~10 MIN]

- Tom Wujec: Learn to use the 13th-century astrolabe [9:23min]
• Source for template: St John’s College University of Cambridge England
• http://www.joh.cam.ac.uk/library/library_exhibitions/schoolresources/astrolabe/build
  NOTE: This particular template is calibrated for a latitude of 52° North, (perfect for
• Winnipeg is at a latitude of 49.8994° N, and a longitude of 97.1392° W
STORY OF ORION
• Orion is the master of the winter skies. He lords over the heavens from late fall to early spring, with his hunting dog Sirius trailing at his feet.

• One story tells of the love between Orion and the goddess, Artemis. One day, Orion was swimming out in the sea. Apollo, who very much disliked Orion, bet his sister sitting up in the heavens, that she couldn't hit the object way down in the sea below with her bow. Artemis didn't realize the object was her lover, Orion. She shot and accidentally killed Orion with her arrow. When she later found out what she had done, she honored the hunter by putting him in the heavens.
STORY OF URSA MAJOR
STORY OF URSA MAJOR

• Story- The two stars on the end of the handle of the big dipper are robins. Sparrow and Crow are their names. The two birds were hungry and didn't save any food for the winter. Then Crow said to Sparrow, "we should go into a bear cave and kill a bear while it is hibernating." So Sparrow and Crow went off to find a bear. They found a bear cave and saw the bear Ursa Major. When they were about to kill it the bear woke up. Ursa Major was scared. Sparrow and Crow chased the bear for one year until they were tired of running. Then Crow threw an arrow and killed the bear. Blood splattered all over the bird's bodies and made their chests red. That is the myth of why robins have red chests.