

Props for Kinesthetic Astronomy

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Creation of “E” &”W” Cards for Kinesthetic Astronomy™ Lessons

The “E” and “W” (east and west) cards are very helpful visual aids for Kinesthetic Astronomy™ lessons. Although hand gestures can be used instead, field testing has proven the strong value to both student and instructor of using explicit letters as depicted below.

MATERIALS: Photocopier, paper cutter, glue stick, and 64 Popsicle sticks.



Instructions: Following these directions will yield 32 double sided “E” cards and 32 double sided “W” cards.

1. Use page **P3** to create a double-sided page with the same E and W pattern on both sides. Make 4 double-sided pages such as this.
2. Use page **P4** to create a double-sided page with the same E and W pattern on both sides. Make 4 double-sided pages such as this.
3. Cut out the letters. Leave at least $\frac{1}{4}$ inch borders along the top and both sides. **Leave maximum space below each letter for attaching the Popsicle stick (see photo above).**
4. The result is 32 double sided E’s and 32 double sided W’s.
5. Glue a Popsicle stick to the base of each letter (see photo above). The signs are ready to use.

E W E

E W E

E W E

W W

W W

E W E

WINTER SOLSTICE



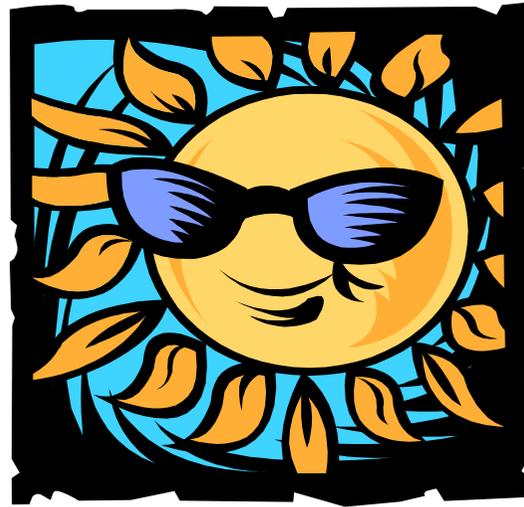
21 December

SPRING EQUINOX



21 March

SUMMER SOLSTICE



21 June

FALL EQUINOX



21 September

INSTRUCTIONS for ASSEMBLY and SET-UP of the ZODIAC SIGNS

The Zodiac signs are not absolutely required for the Kinesthetic Astronomy lessons. You may use other objects in the learning environment to represent the stars. Field testing has shown the value of the signs.

CONSTRUCTION OF SIGNS: Print the 12 Zodiac signs in B&W or color (Props pages **P 11- P 22**). It is best to laminate for repeated use. If desired, use a 3-hole punch to put holes along the top edge of each sign. Weave a loop of string (36 inches in length) through the holes. This will assist you in hanging them up so they are easier to see in the learning environment.

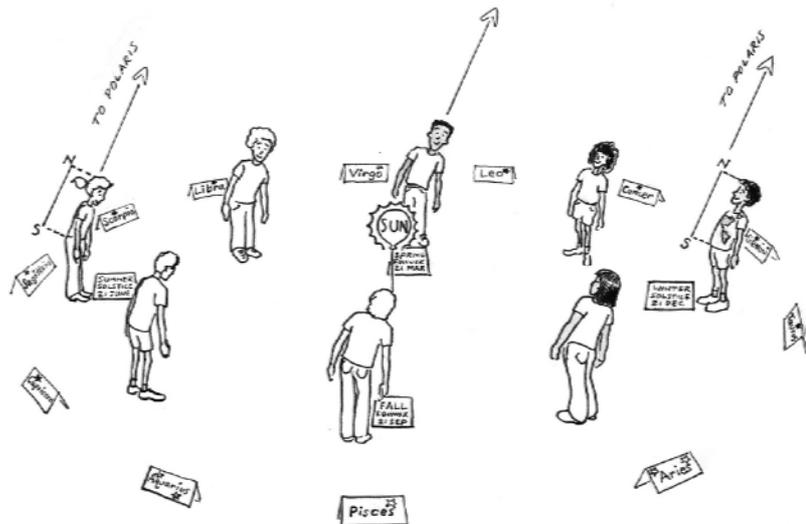
MATERIALS: Object to represent the Sun, 12 laminated cards labeled with the names of the Zodiac constellations, 4 signs labeled with titles and dates of two equinoxes and two solstices on Earth.

BACKGROUND AND INTRODUCTION: The planets orbit the Sun in almost exactly the same plane. The Zodiac¹ is a band of constellations (e.g. Leo, Aries, etc.) made of distant stars that lie in the same plane as the Sun and planets. These stars are far outside the Solar System, but still within the Milky Way Galaxy. Looking out in space, we see these constellations as the backdrop for the apparent motions of the Sun, Moon, and planets. For Kinesthetic Astronomy lessons, we place these constellations outside the circle of students who are representing Earth's position around the Sun at different times of year

PROCEDURE FOR SETTING UP THE ZODIAC for KINESTHETIC ASTRONOMY

1. Determine where you will set up the Kinesthetic Circle with the "Sun" at the center. Choose the direction toward which students will be "tilting toward Polaris" (see diagram below).

2. Find Earth's position on 21 June, the summer solstice. This is the place in the circle where being tilting toward Polaris results in your upper body leaning directly towards the Sun. Place the "Summer Solstice" sign (**P 7**) on the ground as in the Zodiac Diagram (**P 10**).



3. Circle the Sun in a *counterclockwise* direction for $\frac{1}{4}$ of an orbit. Place the "Fall Equinox" (**P 8**) sign.

4. Place the "Winter Solstice" (**P 5**) and "Spring Equinox" (**P 6**) signs accordingly.

5. Return to the Summer Solstice position. Face away from the Sun – midnight on the Summer Solstice. Place Sagittarius (**P 11**) slightly to your left and Scorpio (**P 22**) slightly to your right.

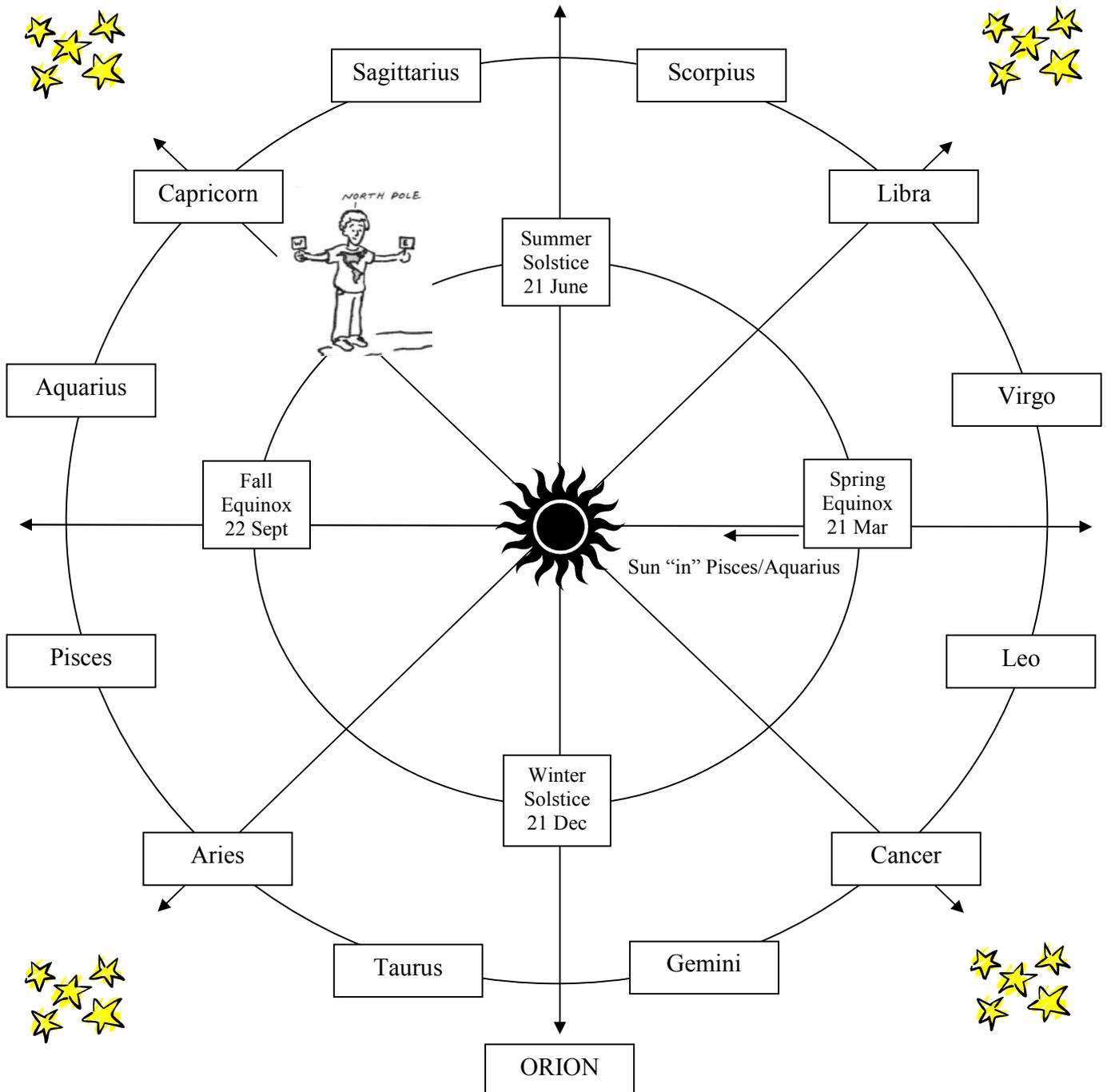
6. Place the remaining Zodiac signs as shown on **P 10**. Hanging the signs from chairs or taping them to the wall at the height of the balloon makes them more readable to students in the Kinesthetic Circle.

7. Remove the Season signs until they are called for in the lesson.

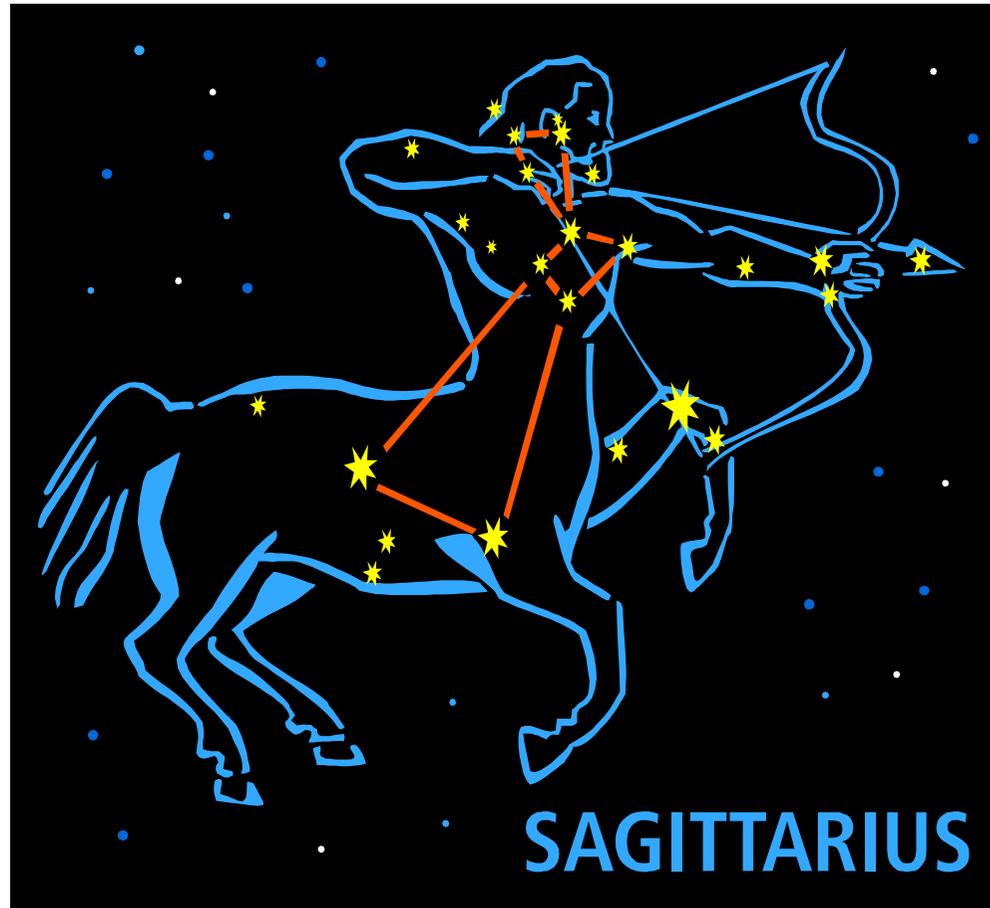
¹ Although astrology is not considered a proper science, it has done a lot to popularize the names of the zodiacal constellations – patterns of stars that mark the path of the Sun as the seasons progress (the ecliptic).

THE ZODIAC DIAGRAM

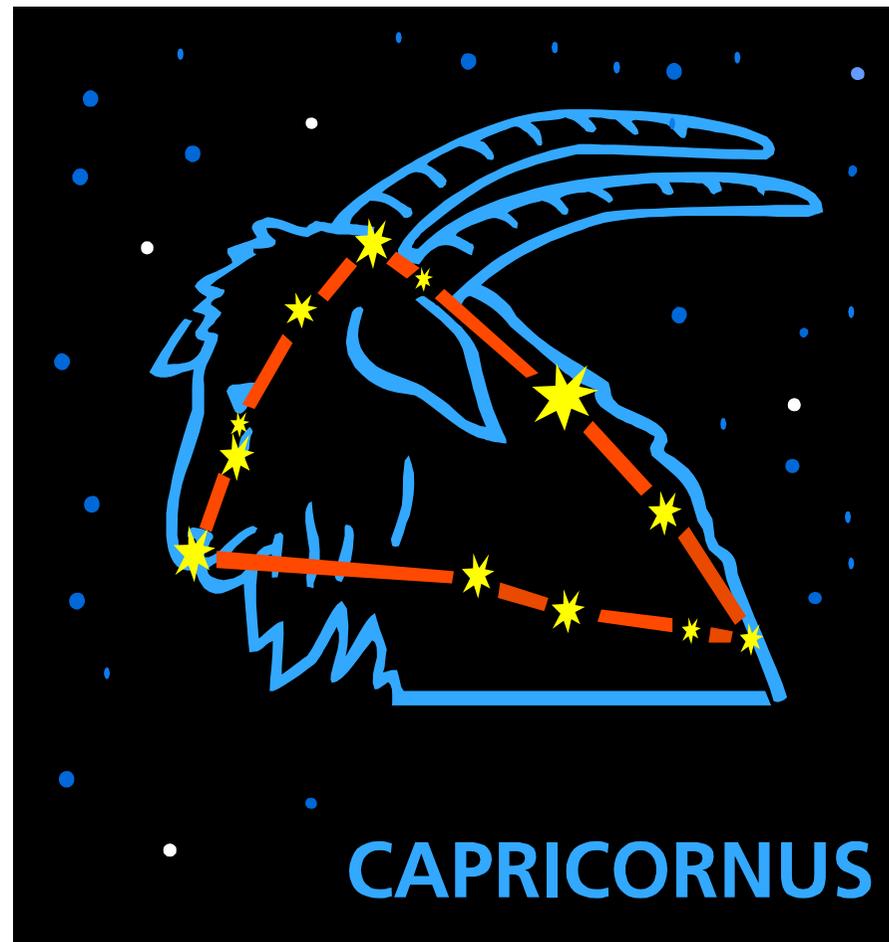
The diagram below depicts the modern order of the Zodiacal constellations relative to the Sun (not to scale). It also indicates Earth's orbital locations at the two solstices and two equinoxes. The boy represents Earth on the Kinesthetic Circle (as defined in the "Sky Time" lesson). If you know how to use a planisphere, you can confirm the positions of the constellations of the Zodiac along the ecliptic. Note also the effects of precession. When western astrological signs were first assigned, the Sun was "in" Aries at the Spring equinox. These days the Sun is between Pisces and Aquarius. Orion (below the ecliptic between Taurus and Gemini) is a familiar constellation for optional use in the "Sky Time" lesson.



SAGITTARIUS



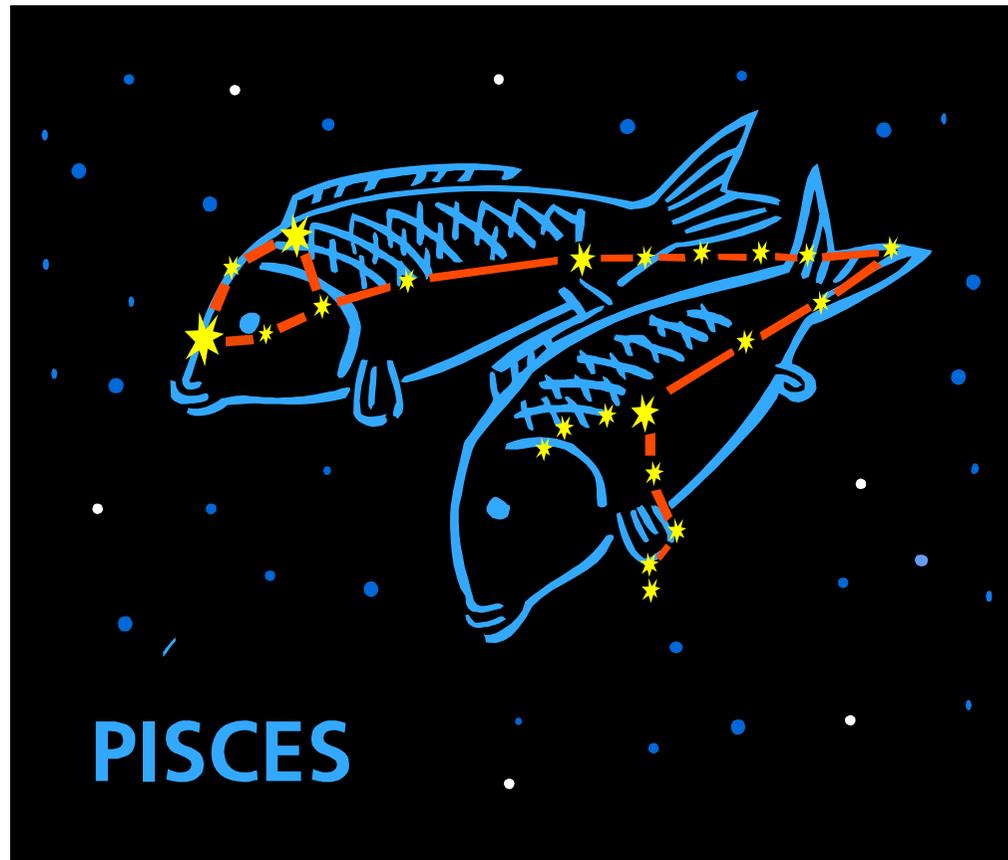
CAPRICORN



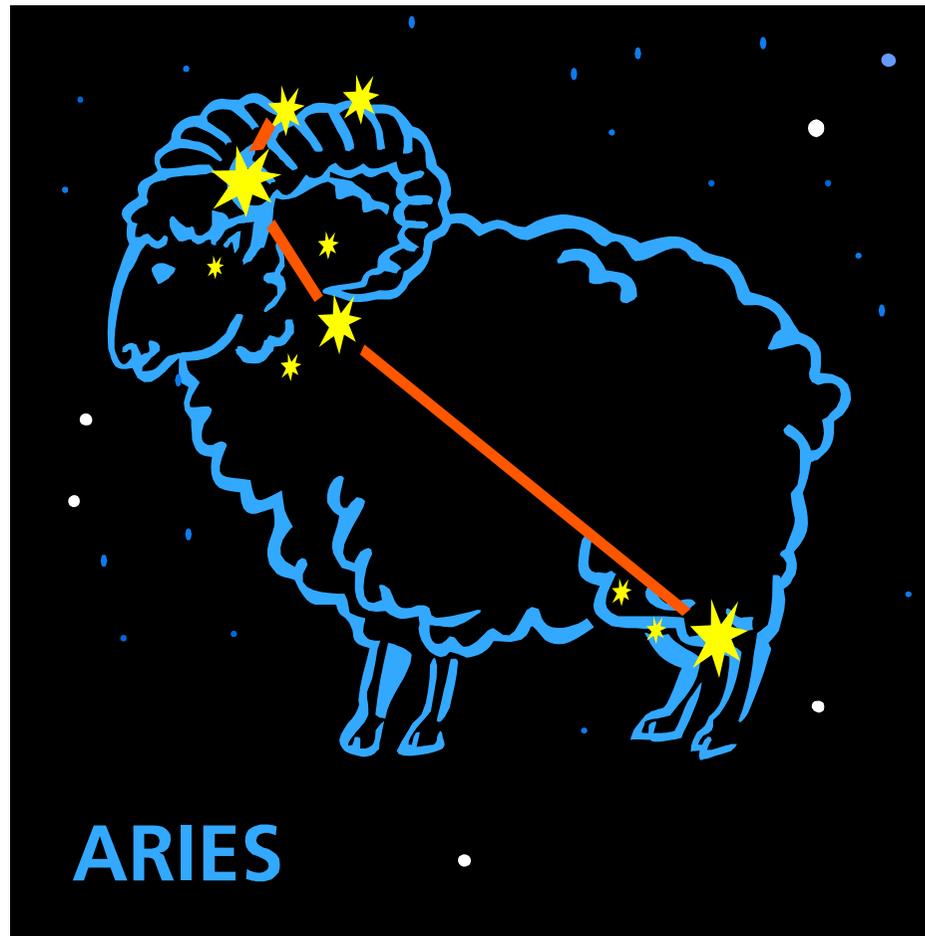
AQUARIUS



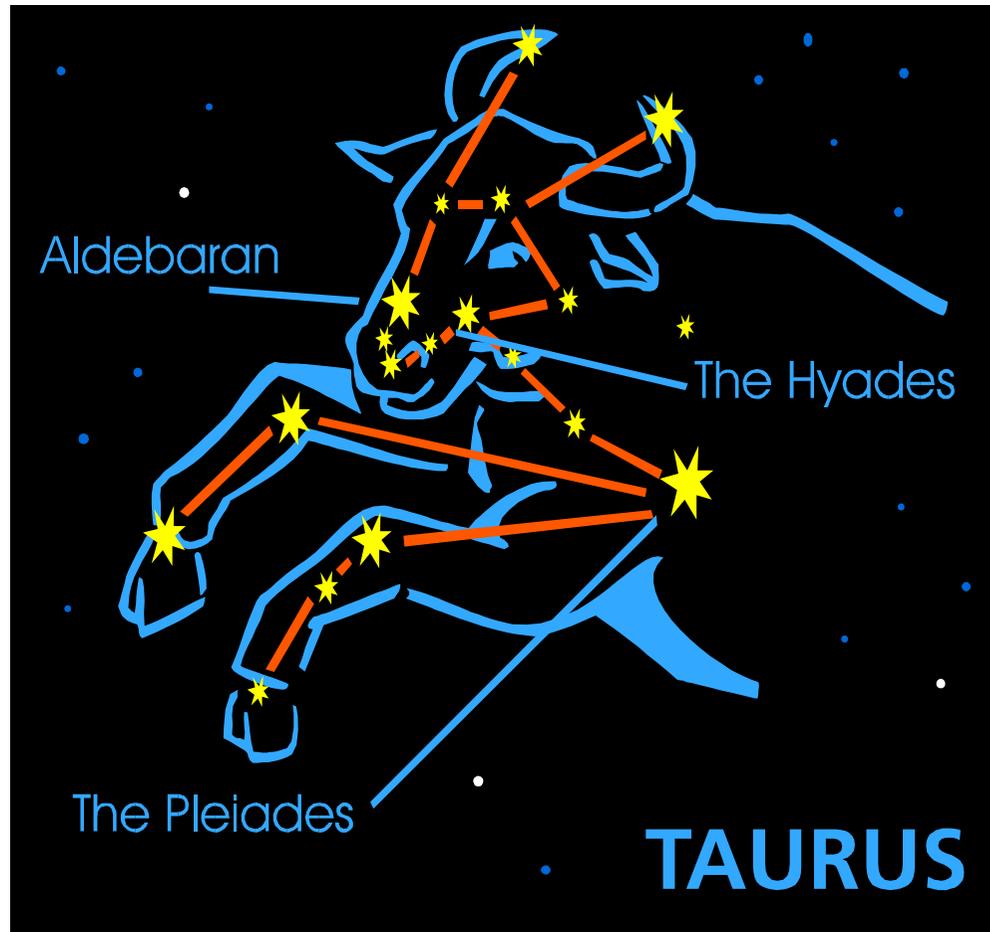
PISCES



ARIES



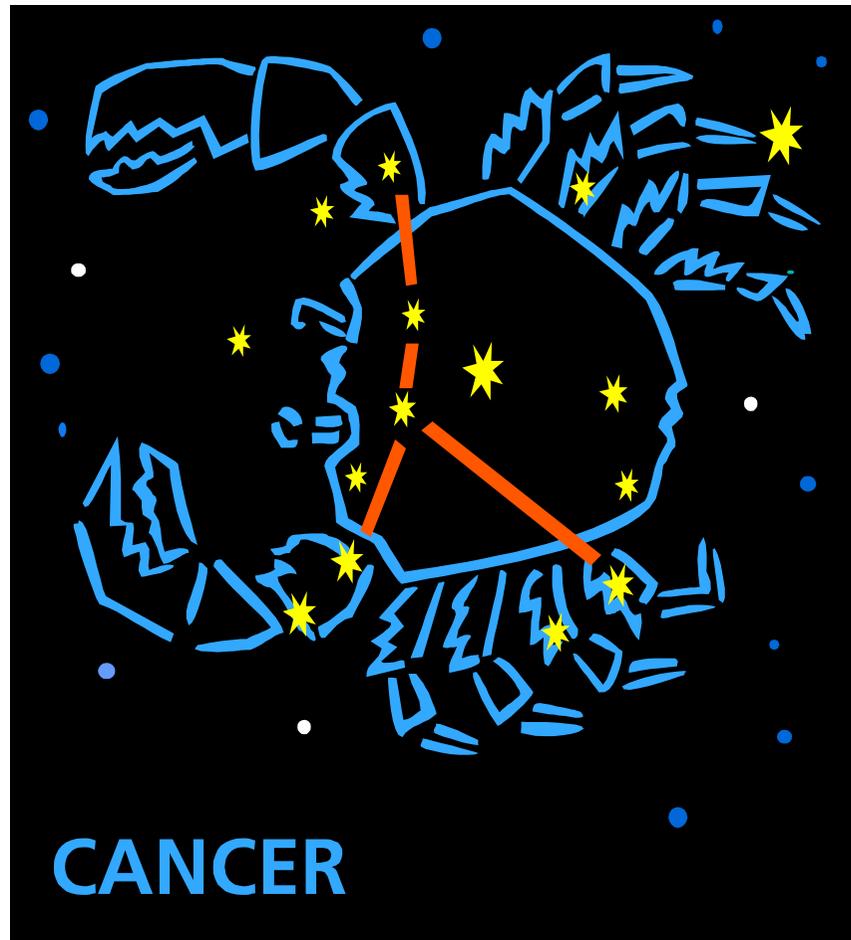
TAURUS



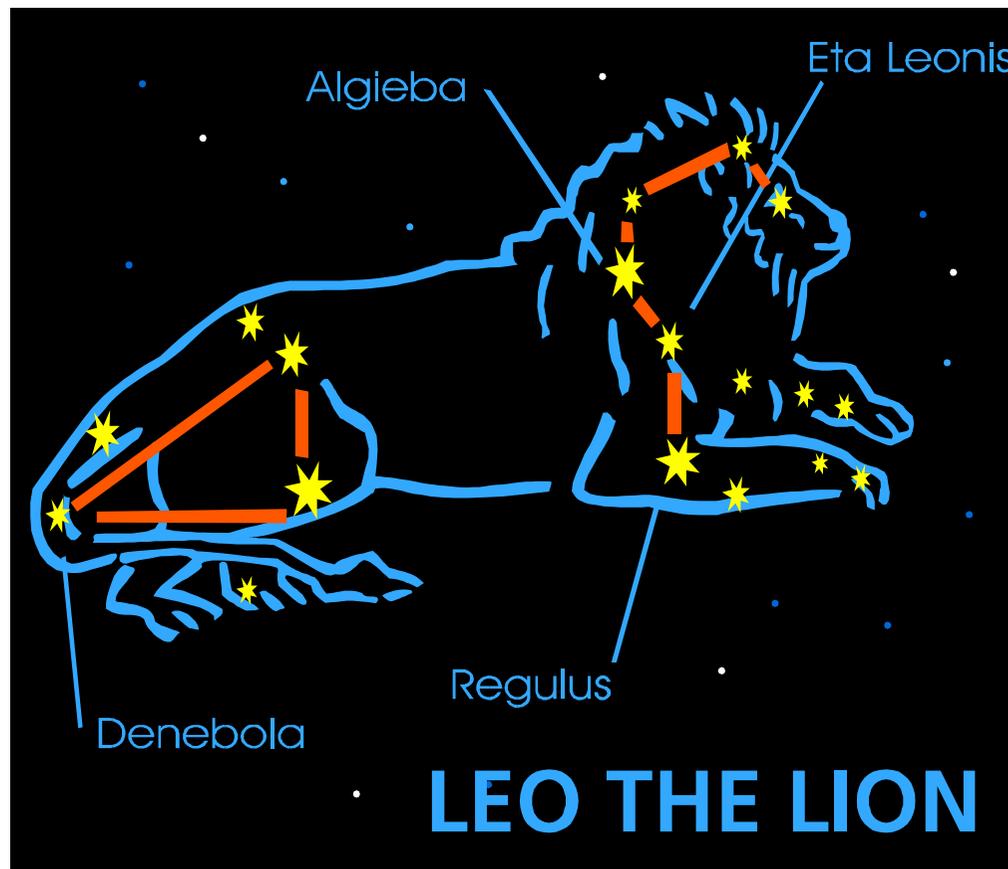
GEMINI



CANCER



LEO



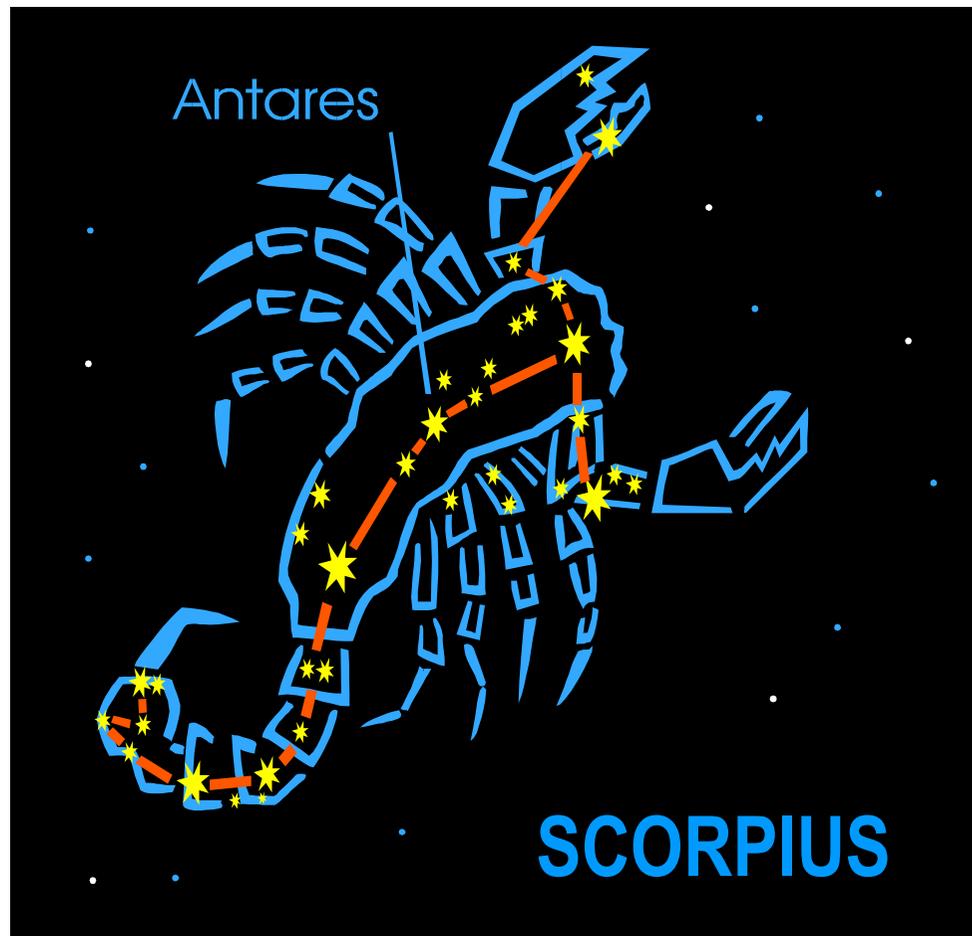
VIRGO



LIBRA



SCORPIUS



ORION

