

These ideas have been prepared by Hot Springs Greater Learning Foundation, Wyoming. They are free for use by students, educators and homeschool instructors. Email us how you used these ideas – how successful they were with your students or children – or how you feel we might make them better. We welcome suggestions, ideas and examples. We will be creating new activities in the future.

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## **Learning to Think #1 (Early Flight, Aviation, Native American Culture)**

### **Background #1**

#### **Looking with Other Eyes**

The sky has always attracted the wonder of man. Each culture has viewed it through its own special prism, making up stories about what it is, or was or will be. It has been seen as an inverted bowl, a chariot race track, even a dumping ground. It has been a chalkboard for the tales of children, crones, wizards, warlocks, brave hunters and gods. And it has been the province of the birds, whom man has envied from his earliest days. Flight – of birds and man – has figured in songs, folktales, fiction and nonfiction.

#### **Seasons**

Most of the known civilizations have understood the track of the sun and the planets, and the relation of seasons. There are ancient monuments -- Stonehenge, South American pyramids, Egyptian pyramids and Native American caves -- that suggest understanding of the natural calendar. The Big Horn Medicine Wheel in Wyoming may have been built to track the rising of the sun and the positions of important stars. This understanding of seasons was critical to civilizations that grew crops, for they needed to understand light, dark, cold, hot and how these affected their planting and their plants. It was also important to hunter-gatherer tribes – those who followed the migration of animals and who gathered plants that only grew in certain times and places.

#### **Food for Thought**

- What is the solstice? When is it? Why would it have been important to early civilizations?
- How could the stars help in navigating the seas and deserts?
- Why do birds fly at a low altitude?

#### **Exercises**

- On a computer, go to Google Earth (<http://earth.google.com>). Find your school or home. Take a picture of the sky above the site you located.

- Research what instruments were invented to help navigate open spaces. How do these differ from what we have today? Are any of them used on today's space shuttles?

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## **Background #2**

### **Native Americans of the Plains**

There were many Native American tribes that roamed the Great Plains and the Northern Plains. Some tribes are no longer here because they died out or were removed to other locations. Historically (since the 1800s), the tribes of these two regions are:

- Northern Shoshone (Wind River Reservation of central Wyoming)
- Northern Arapaho (Wind River Reservation of central Wyoming)
- Sioux (Siouan-speaking) tribes of the area: Assinboin (Montana), Arikara (North Dakota), Crow (eastern Montana), Mandan (Fort Berthold Reservation), Hidatsa (Fort Berthold Reservation); Dakota, Nakota and Lakota (North and South Dakota).
- Sheep-eater (Yellowstone region)

### **The Pinprick of Stars**

Stories about stars and constellations figure in Native American cultures. "Star maps" often draw a shape that represents the story. For example, the Big Dipper is often shown drawn as a ladle with a long handle. It is also known as Ursa Major (the Big Bear) and may be drawn as a bear with a tale. Many Native American tribes and First Peoples (Canada, Arctic) see a bear or hunter in the great constellation. The Lakota's seven sacred council fires honor the Seven Stars in the sky (the Big Dipper). These Seven Stars dance in a circle around the Star That Does Not Move (North Star).

The Milky Way is sometimes called the Great White Way, but the Dakota called it the Trail of Bubbles, while the Assiniboin called it Backbone of the Sky as did the Shoshone. Other Shoshone saw it as ice crystals scattering when a grizzly bear raced up a snow-covered mountain.

### **Food for Thought**

- Star stories and symbols are important in the Native American Plains culture. Why do you think they are?
- How are star and sky symbols used by Native Americans?
- The Native American cultures did not write their stories down. How are the stories kept alive? How difficult do you think it is to remember details?

### **Exercises**

1. Find a "star map" drawing of the "classical" star constellations. Tell the story of one of the constellations and why you think that story is appropriate.
2. Find a drawing of the Big Horn Medicine Wheel in Wyoming. Research the history and stories of the wheel. Which story do you think is most likely to be true? Why?
3. Find a story from one of the regional Native American tribes. Try to locate the stars or constellations that are included in the story. Draw a "star map" of the story.

4. Choose a constellation or group of stars and write a story about it. (If possible, find out how the stars change location over the seasons and use that in your story.)
5. Create a story of your own about a star or constellation. Memorize it and tell it to a small group of people, seated in a circle.

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### **Background #3**

#### **Leonardo Da Vinci**

When Leonardo Da Vinci (1452-1519) began drawing pictures of flying machines, no one had ever flown. He drew over 100 pictures illustrating his theories of flight. Many of his ideas were based on bird wings and on plant seeds that are propelled by wind. One of his most famous drawings was the ornithopter. Some experts say that the modern day helicopter was inspired by this design.

#### **Exercises**

1. Find drawings by Da Vinci that look like bird wings. Research and compare to Otto Lilienthal's early gliders. How do these differ from hang gliders today?
2. Find an illustration of the ornithopter. Compare it to a helicopter. Compare it to an autogyro (autogyro). How does a helicopter work? How does that differ from an autogyro?
3. Research the Moller SkyCar® ([www.moller.com](http://www.moller.com)) . How does it work? What is the biggest problem that must be overcome before it can be widely used?
4. Design and draw your own air transportation vehicle. Why do you think it will work? What is different or important about it?